KIDS' SAFE & HEALTHFUL FOODS PROJECT

HEALTH IMPACT PROJECT

ADVANCING SMARTER POLICIES FOR HEALTHIER COMMUNITIES

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Appendix 7

Health Impact Assessment

National Nutrition Standards for Snack and a la Carte Foods and Beverages Sold in Schools

Robert Wood Johnson Foundation

PEW HEALTH GROUP

Appendix 7: Summary of Literature of Nutrition Policy and/or Program Impacts

This appendix summarizes literature that evaluates impacts from implementing competitive food nutrition policies or programs. Each research article was scored according to the guidelines in Appendix 2. Briefly, a score of "1" is considered weak, "2" is considered fair, and "3" or higher is considered strong. The results of the literature are provided here based on how they affect a specific outcome such that:

(+) indicates general positive impact on an outcome
(-) indicates general negative impact on an outcome
(0) indicates no impact
(+/0 or -/0) indicates inconsistent findings

Table A8.1: Survey of literature showing impacts on access to healthy and unhealthy items

Citation/Score	Policy	Population	Healthy	Unhealthy
Yvonne M. Terry-McElrath et al., "The School Food Environment and Student Body Mass Index and Food Consumption: 2004 to 2007 National Data," *Journal of Adolescent Health* 45, suppl. 3 (2009): S45–56. (Fair)	District wellness policies between 2004 and 2007	National sample, MS and HS students in the Youth, Education, and Society (YES) and Monitoring the Future (MTF) studies	(0/+) No change in fruit and vegetable offerings	Reduced the availability of regular sugar/fat food items in competitive food outlets
L. A. Lytle et al., "Influencing Healthful Food Choices in School and Home Environments: Results from the TEENS Study," *Preventive Medicine* 43, no. 1 (2006): 8–13. and L. A. Lytle et al., "School-Based Approaches to Affect Adolescents' Diets: Results From the TEENS Study," *Health Education & Behav* 31, no. 2 (2004): 270–87. (Strong)	Multicomponent intervention, including promoting and offering 100% fruit juice, water, low-fat milk, fruit and vegetables, and lower-fat options; limiting higher-fat a la carte options and snacks with more than 5 g of fat, as well as fruit drinks	16 middle schools, Twin Cities MN; 1997–2000; this research is part of the TEEN Study, a randomized, controlled school based intervention over 2-years	(+) Compared to control schools, intervention schools offered (P = 0.04) and sold (P = 0.07) a higher proportion of healthier foods a la carte.	
S. A. French et al., "An	Multicomponent intervention	20 secondary schools, St.	(+) At study end, 42% of	

Citation/Score	Policy	Population	Healthy	Unhealthy
Environmental Intervention to Promote Lower-Fat Food Choices in Secondary Schools: Outcomes of the TACOS Study," *American Journal of Public Health* 94 (2004): 1507–12. (Strong)	increasing availability of lower-fat (snacks 5 g or less per serving) foods served a la carte and school-wide student promotions of these lower-fat foods	Paul, MN; TACOS; 2-year group; randomized control	the a la carte foods were lower fat (an increase of 51%) in intervention schools, compared with 28% of the a la carte foods (a decrease of 5%) in control schools.	
Karen Weber Cullen, Kathy Watson, and Issa Zakeri, "Improvements in Middle School Student Dietary Intake After Implementation of the Texas Public School Nutrition Policy," *American Journal of Public Health* 98, no. 1 (2004): 111–17. (Fair)	Policy in all competitive food outlets; for middle schools, the policy restricts the portion sizes of high-fat and -sugar snacks (limits vary by food group), sweetened beverages (≤12 oz), and the fat content of all foods served (≤28 g fat per serving no more than 2 times per week); it also sets limits on the frequency of serving high-fat vegetables, such as french fries (3 oz per serving no more than 3 times per week)	3 MS in TX; 2001–02, 2002–03, 2005–06; repeated measures; longitudinal; natural experiment	(+/-) Beverage contracts specific 12 oz size; snack machine inventories adhered to policy and machines were off during lunch; 1% milk served, 5 different fruits and vegetables (not counting potatoes) served in a la carte	Snack bar provided more unhealthy items; vending machines provided less in year 3 than in year 1. Children brought more SSBs, desserts, candy, and snack chips from home.
Jill Hartstein et al., "Impact of Portion-size Control for School á La Carte Items: Changes in Kilocalories and Macronutrients Purchased by Middle School Students," *Journal of the American Dietetic Association* 108, no. 1 (2008): 140–44. (Weak/Fair)	A la carte/snack bar goals reduce all regular chips serving size bags to ≤1.5 oz, increase lower-fat chip offerings by 25%; offer bottled water in a 20 oz size; and limit all sweetened beverages to ≤12 oz.	2 schools in pilot in each CA, NC, TX; 2004; cross-sectional part of baseline	(+) Offered fruits and vegetables; all schools changed water and SSB serving sizes; 5 of 6 schools changed low-fat chip goal	
G. Dowaliby et al., *Connecticut's Healthy Snack Pilot Case Studies* (Middletown, CT: Connecticut State Department of Education, Bureau of Health and Nutrition Services and Child/Family/School Partnerships, 2007). and G. Dowailiby et al., *Connecticut's Healthy Snack Pilot Summary Data*	CT standards: Low-fat (1%) milk and dairy alternatives: 32 g total sugar per 8 oz, no artificial sweeteners; ≤35% total calories from fat and ≤10% calories from saturated fat per serving. Fruit or vegetable juice (100%) and water: no added sugar, artificial sweeteners or caffeine. Portion sizes: all drinks ≤12 oz (except water without added juice). Snacks and desserts: ≤35% total calories from fat and 7 g per serving (with the exception of nuts, seeds,	CT; 8 schools (3 ES, 4 MS, 1 HS); 2003–05; 3-year intervention pilot	(+) 5 of 8 schools followed standards in year 2 (only sold water, milk, 100% fruit juice, replaced snacks); students in all schools reported more water consumption; general increases in healthy food consumption across food types; No changes year 1; 2 schools had increased NSLP	(+/-) In 5 schools, fewer students reported consumption of SSBs; in 3 schools, more students reported SSB consumption (no statistics).

Citation/Score	Policy	Population	Healthy	Unhealthy
Report. (Middletown: CT: Connecticut State Department of Education, Bureau of Health and Nutrition Services and Child/Family/School Partnerships, 2007). (Weak/Fair)	peanut and other nut butters, and cheeses). Sat. fat and trans fat: ≤10% of calories from saturated fat and/or trans fat and 2 g per serving. Added sugar: ≤35% by weight and ≤15 g per serving. For low-fat smoothies, yogurt, and pudding: no more than 5 g total sugar per ounce. Snacks may not contain artificial sweeteners. Whole grain foods, FV available.		participation when healthy items offered.	
Michael W. Long, Kathryn E. Henderson, and Marlene B. Schwartz, "Evaluating the Impact of a Connecticut Program to Reduce Availability of Unhealthy Competitive Food in Schools," *Journal of School Health* 80, no. 10 (2010): 478–86. (Fair)	Connecticut Healthy Food Certification Nutrition standards: fat: <35% calories, 7 g package; sat fat: <10% calories, 2 g package; trans fat: 0 g; sugar: <35% and 15 g per package; sodium: <500 mg (<230 mg snacks, <480 mg dairy); soups: <7 g fat per serving, sat. fat <2 g per serving, trans fat 0 g, sugar <15 g per serving, sodium <1000mg	Repeated measures; cross-sectional survey; 151 school districts; CT	(+) On average, all CT districts reduced availability of unhealthy competitive foods. On average, all districts reported a reduction in the number of unhealthy a la carte snack categories offered from the baseline year to year 1, $F(1,71) = 41.127$, $F(1,68) = 61.390$, and $F(1,64) = 89.310$, for elementary, middle, and high schools, respectively, $p < .001$ for all levels. However, HFC participation was related to a significantly greater decline in unhealthy categories offered in elementary and high schools, $F(1,71) = 4.642$, $p = .035$ and $F(1,64) = 7.338$, $p = .009$, respectively. Middle schools showed a trend in this same direction, $F(1,68) = 2.919$, $p = .09$.	
Sarah E. Samuels et al., "The California Endowment's Healthy Eating, Active Communities Program: A Midpoint Review," *American Journal of Public Health* 100 (2010): 2114–23. and Sarah E. Samuels et al., *Healthy Eating, Active Communities Phase 1 Evaluation Findings 2005–2008* (Oakland, CA: Samuels and Associates, 2009). (Weak)	Implementation of SB 12 (foods). Allowed to sell seeds, nuts, butters, low-fat dairy individual items. Snack items <250 kcal total; 35% calories from fat, 10% total calories from sat. fat; 35% total weight from sugar. Dairy and whole grain products meet 35/10/35, and have <175 calories. Entrees must have <35% of calories from fat, 400 kcal max. SB 965 (drinks): 50–100% fruit and vegetable drinks with no added sweeteners, water with no added sweeteners, milk and dairy alternatives ≤2% fat, 28 g total sugars, 8 oz sports drinks with no caffeine, ≤42 g added sweetener per 20 oz in MS/HS	6 MS in CA; 2005 and 2008; multicomponent intervention, including wellness policy changes from state bills, HEAC	A comparison between baseline and midpoint data shows that the HEAC schools' adherence to competitive beverage standards increased from 45% to 78% between 2005 and 2008, and the adherence to competitive food standards increased from 23% to 67%.	

Citation/Score	Policy	Population	Healthy	Unhealthy
Anastasia M. Snelling and Teha Kennard, "The Impact of Nutrition Standards on Competitive Food Offerings and Purchasing Behaviors of High School Students," *Journal of School Health* 79, no. 11 (2009): 541–46. (Weak)	Policy in 2006: Beverages: water, milk (1% or skim), juices containing at least 25% juice (<12 oz); Snacks: <300 calories/item, <30% of total calories from fat, except seeds/nuts; <10% of total calories from sat. fat; sugar <35% by weight, whole grain breads and cereals offered, portion sizes 1.25 oz for snacks and sweets, 2 oz for cookies, 3 oz for bakery items and frozen desserts, 8 oz for yogurt, low sodium	3 public HS, in 1 county; non-experimental longitudinal study; descriptive info from food offerings and purchases; 2005 and 2007; coded foods by Stoplight Diet (green = low calorie, high nutrient; yellow = moderate calorie, moderate nutrient; red = high calorie, low nutrient)	(+/0) Decreased offering of unhealthy red items (57% in 2005 to 30% in 2007); increased moderately healthy yellow foods (meeting standards) (18% to 48%); decreased offering of healthiest green items (fruits, vegetables) 25% to 22% in 2007.	
Gail Woodward-Lopez et al. "Lessons Learned from Evaluations of California's Statewide School Nutrition Standards," *American Journal of Public Health* 100, no. 11 (2010): 2137–45. (Fair/Strong)	Implementation of SB 12 (foods). Allowed to sell seeds, nuts, butters, low-fat dairy individual items. Snack items <250 kcal total; 35% calories from fat, 10% total calories from sat. fat; 35% total weight from sugar. Dairy and whole grain products meet 35/10/35, and are <175 calories. Entrees must have <35% of calories from fat, and be ≤400 kcal. SB 965 Drinks: 50–100% fruit and vegetable drinks, no added sweeteners; water, no added sweeteners; milk and dairy alternatives ≤2% fat, 28 g total sugars, 8 oz sports drinks no caffeine, ≤42 g added sweetener per 20 oz in MS/HS	Data from HEAC, High School Study, and School Wellness Studies, 2005–08, 2007–08, and 2007–09	(0/+) ES/MS: little pre-legislation versus post-legislation change in the number of food and beverage items offered. HS reduced the number of different types of items offered by 25%–35% (beverages) and 10%–15% (food). Unlike foods, nearly all beverage categories were either 100% compliant or 0% compliant.	

Citation/Score	Policy	Population	Healthy	Unhealthy
M. Boles et al., "Changes in Local School Policies and Practices in Washington State After an Unfunded Physical Activity and Nutrition Mandate," *Preventing Chronic Disease* 8 no. 6 (2011): 1–13. (Fair)	2005 WA physical activity and nutrition mandate (PAN) impact on MS and HS practices	Public health surveillance data secondary data analysis compared WA (with mandate) to OR schools (no mandate), same time period	(+/-) MS and HS had a significant (18.8–20.0 percentage point) increase in the number of schools with restricted access to competitive foods (what foods and time of day). MS increased type of foods sold (10.4 percentage points). Unexpectedly, healthy food options (low-fat snacks, fruits, veggies) for MS/HS declined significantly, by 5.9 and 2.0 percentage points, respectively.	*Implementation of a complete ban—no change in offerings.* These schools may have been eliminating these venues for food purchases rather than reducing the availability of healthier food types in vending machines or school stores. Another explanation for the decline may be changing perceptions of school principals about what constitutes a "healthy" option.
J. E. Blum et al., "Impact of Maine's Statewide Nutrition Policy on High School Food Environments," *Preventing Chronic Disease* 8 no. 1 (2011): 1–10. (Fair)	Chapter 51 legislation in Maine 2004	89 HS, ME; cross-sectional survey	(+/0) Availability of soda in student vending significantly decreased pre–Chapter 51 versus post–Chapter 51 (P = .04). No significant changes were found for other SSBs and junk foods.	
Elaine S. Belansky et al., "Early Effects of the Federally Mandated Local Wellness Policy on School Nutrition Environments Appear Modest in Colorado's Rural, Low-Income Elementary Schools," *Journal of the American Dietetic Association* 110 no. 11 (2010): 1712–17. (Fair)	District wellness policies following 2004 federal mandate	40 school districts in CO; repeated random sample; cross-sectional surveys; 2005–07	(+/0) Lunchroom: (+) fresh fruits (0.8 choices in 2005 to 1.15 choices in 2007, $p<0.04$). Parties: 21.4% healthy to 48.7% $p<0.04$. No changes in veggies in other locations. (+) There were not significant healthy foods in vending machines.	
D. R. Taber et al., "Banning All	State policies governing the sale of	Bridging the Gap,	(+) Fewer students	

Citation/Score	Policy	Population	Healthy	Unhealthy
Sugar-sweetened Beverages in Middle Schools: Reduction of In-school Access and Purchasing but Not Overall Consumption," *Archives of Pediatrics & Adolescent Medicine* 166, no.3 (2012): 256-62. (Fair) .	soda and other SSBs in middle schools in 2006–07. States were classified as having (1) policy limiting the availability of soda and other SSBs (e.g., "Only milk, water, and 100% juice will be available in school"); (2) policy prohibiting soda but no policy limiting the availability of other SSBs (e.g., "Allowed beverages include milk, water, energy drinks, and electrolyte replacement beverages"); or (3) no policy limiting any type of SSB	BRFSS, Early Childhood Longitudinal Study Kindergarten Cohort; 1998–2007; national sample; correlation variance	reported in-school access in states that banned all SSBs (prevalence difference, −14.9; 95% CI, −23.6 to −6.1, p = 0.0001); no access differences between states banning only soda and those allowing all SSBs	
Janet M. Wojcicki and Melvin B. Heyman, "Healthier Choices and Increased Participation in a Middle School Lunch Program: Effects of Nutrition Policy Changes in San Francisco," *American Journal of Public Health* 96, no. 9 (2006): 1542–47. (Fair/Strong)	Water: no added sweeteners; juice and juice blends: 12 oz max, no added sweeteners, no caffeine or herbal supplements; milk or dairy substitute: 1% or fat-free, 1.4 oz (40 g) sugar per 12 oz, ≤12 oz; food: ≤30% cal fat, ≤10% cal sat. fat plus trans-fat, ≤35% sugar by weight; snacks must include no less than 5% of 8 nutrients; portion size limits 1.25 oz chips, crackers, popcorn, cereal, jerky; 2.5 oz trail mix, nuts, seeds, dried fruit; 2 oz cookies/cereal bars; 3 oz bakery items; 3 fl oz frozen desserts; 8 fl oz non-frozen yogurt; 12 oz limit for all beverages except water; fruits and veggies sold at all sites; warning labels on peanut foods	San Francisco Unified School District (SFUSD); surveys; 1 class per grade level in schools <500; 2 classes per grade level in schools 500–1,200; 3 classes per grade level in schools >1,200	(+)Beginning in August 2003, all SFUSD schools altered their snack bar menus to meet the revised district-wide nutrition standards., phased out soda, Twinkies, Slim Jims, and giant pizzas, and replaced them with healthier items such as sushi, fresh soup, deli sandwiches, 100% fruit juice, baked chicken with rice, etc.	
Nicole Larson and Mary Story, "Are 'Competitive Foods' Sold at School Making Our Children Fat?" *Health Affairs (Project Hope)* 29, no. 3 (2010): 430–35. (Strong)	Review	U.S. school-based studies through 2009	With few exceptions, cross-sectional (and longitudinal studies have found that students have better diets relative to the recommendations of the 2005 Dietary Guidelines for Americans when unhealthy competitive foods are not sold at school.	
P. C. Jaime and K. Lock, "Do School Based Food and Nutrition Policies Improve Diet and Reduce	Review	School-based nutrition policy studies, earliest record to 2007	4 studies on the impact of guidelines on **food availability**, focused primarily on fruit and vegetables offered at **school lunch (could be a la carte)**. All	

Citation/Score	Policy	Population	Healthy	Unhealthy
Obesity?" *Preventive Medicine* 48, no. 1 (2008): 45–53. (Strong)			studies showed that guidelines led to increased **fruit and vegetable availability, [ranging from + 0.28 servings/day to + 0.48 servings/day].**	

Table A8.2 Survey of literature on student purchases and/or general food intake

Citation/Score	Policy or Intervention	Population, Design	Impact—Healthy Items	Impact—Unhealthy or Overall
Gary D. Foster et al., "A Policy-based School Intervention to Prevent Overweight and Obesity," *Pediatrics* 121, no. 4 (2008): e794–802. (Fair)	Beverages: 100% juice (6 oz serving size), water (no portion limits), and low-fat milk (8 oz serving size); Snacks: allowed ≤7 g total fat, 2 g sat. fat, 360 mg sodium, and 15 g sugar per serving	4–6 grade; 10 schools; 1,349 students; mid-Atlantic region; 2-year matched randomized control; repeated measures	(0) Fruit and vegetable intake the same between intervention and control	Overall calorie intake the same between intervention and control
James F. Sallis et al., "Environmental Interventions for Eating and Physical Activity: a Randomized Controlled Trial in Middle Schools," *American Journal of Preventive Medicine* 24, no. 3 (2003): 209–17.(Strong)	Multicomponent intervention to provide and market low-fat foods at all school food sources included taste tests and new foods in menus.	24 MS; randomized controlled trial; San Diego CA	(0) Introduction of new items was limited; no significant changes in purchase or consumption	
L. A. Lytle et al., "Influencing Healthful Food Choices in School and Home Environments: Results from the TEENS Study," *Preventive Medicine* 43, no. 1 (2006): 8–13. (Strong)	Multicomponent intervention, including promoting and offering 100% fruit juice, water, low-fat milk, fruit and vegetables, and lower-fat options; limiting higher fat a la carte options and snacks with more than 5 g fat and fruit drinks	16 MS, Twin Cities, MN; 1997–2000; Teens Eating for Energy and Nutrition Schools (TEENS)	(0) No effects were seen for fruit and vegetables sales as part of the regular meal pattern lunch.	
Dianne Neumark-Sztainer et al., "School Lunch and Snacking Patterns Among High School Students: Associations with School Food Environment and Policies," *International Journal of Behavioral Nutrition and Physical Activity* 2, no. 1 (2005): 14. (Fair)	Nutrition intervention, looked at exposure to vending machines	20 HS, Minneapolis, St. Paul; TACOS study; 2-year group; randomized intervention by school; cross-sectional surveys and observations	(+) Student snack food purchases from vending machines were significantly more frequent among students from schools with a greater number of snack food vending machines (1–2 machines, 0.8 snack food purchases). Student soft drink purchases from vending machines were not significantly associated with the number of soft drink vending machines, but were significantly lower in schools in which machines were turned off during lunchtime. In schools with policies about the types of foods sold in vending machines, students reported making	

Citation/Score	Policy or Intervention	Population, Design	Impact—Healthy Items	Impact—Unhealthy or Overall
			snack food purchases an average of 0.5 days/week as compared to an average of 0.9 days/week in schools without policies. Similar non-significant trends were found for soft drink purchases.	
Y. Terry-McElrath et al., "The School Food Environment and Student Body Mass Index and Food Consumption: 2004 to 2007 National Data," *Journal of Adolescent Health* 3, suppl. 1 (2009): 45–56. (Fair)	District wellness policies between 2004 and 2007	National sample; MS and HS students in YES and MTF studies	(+MS/0 HS) MS—odds of daily or almost daily fruit intake were significantly associated with how often schools reported offering fruits and vegetables; students ate more green vegetables if offered at lunch or if offered low-fat food items; no relationships in HS	Students ate fruit less frequently when schools had regular sugar/fat food items in competitive food outlets; no HS relationships
Karen Weber Cullen, Kathy Watson, and Issa Zakeri, "Improvements in Middle School Student Dietary Intake After Implementation of the Texas Public School Nutrition Policy," *American Journal of Public Health* 98, no. 1 (2008): 111–17. (Fair)	TX policy in all competitive food outlets; for MS, the policy restricts the portion sizes of high-fat and -sugar snacks (limits vary by food group), sweetened beverages (≤12 oz), and the fat content of all foods served (≤28 g fat per serving no more than 2 times per week). It also sets limits on the frequency of serving high-fat vegetables such as french fries (3 oz per serving no more than 3 times per week).	3 MS; TX; 2001–02, 2002–03, 2005–06; repeated measures; longitudinal; natural experiment	(+) More milk and vegetables and fewer sweetened beverages, soft drinks, and snack chips were consumed in year 3 than during years 1 and 2. After we controlled for energy intake, dessert food servings were significantly lower in year 3 compared with year 1.	
Karen W. Cullen and Kathleen B. Watson, "The Impact of the Texas Public School Nutrition Policy on Student Food Selection and Sales in Texas," *American Journal of Public Health* 99, no. 4 (2009): 706–12. (Fair)	TX policy (implemented 2004) restricts the portion sizes of high-fat and -sugar snacks to ≤200 kcal per serving package and sweetened beverages to ≤12 oz, limits the fat content of milk offered to ≤1%, provides guidelines for the fat content of foods served, and sets limits on the	2004–05 evaluation to assess policy adherence, daily production records for 23 schools in 5 districts sent adequate data for food availability before and after implementation.,	(+/0) Regardless of district and school size, cafeterias served significantly fewer high-fat vegetable items per student post policy (P<.001). Post-policy snack bar sales of large bags of chips were significantly reduced (P = .006), and baked chips sales significantly increased (P = .048). Also, primary school served more portions of fruit per student both school years than secondary schools (by	

Citation/Score	Policy or Intervention	Population, Design	Impact—Healthy Items	Impact—Unhealthy or Overall
	frequency of serving high-fat vegetables such as french fries	pre/post cross-sectional study	about .32 servings). There was no impact on non-fried FV, milk, no changes in drinks or water in snack bars.	
G. Dowaliby et al., *Connecticut's Healthy Snack Pilot Case Studies* (Middletown, CT: Connecticut State Department of Education, Bureau of Health and Nutrition Services and Child/Family/School Partnerships, 2007). (Weak/Fair)	Low-fat (1%) milk and dairy alternatives: 32 g total sugar per 8 oz, no artificial sweeteners, ≤35% total calories from fat and ≤10% calories from saturated fat per serving. Fruit or vegetable juice (100%) and water: no added sugar, artificial sweeteners, or caffeine. Portion sizes: all drinks ≤12 oz (except water without added juice). Snacks and desserts: ≤35% total calories from fat and 7 g per serving (with the exception of nuts, seeds, peanut and other nut butters, and cheeses). Saturated fat and trans fat: ≤10% of calories from saturated fat and/or trans fat and 2 g per serving. Added sugar: ≤35% by weight and ≤15 g per serving. For low-fat smoothies, yogurt, and pudding, no more than 5 g total sugar per ounce. Snacks may not contain artificial sweeteners. Whole grain foods, FV available.	CT; 8 schools (3 ES, 4 MS, 1 HS); 2003–2005; 3-year intervention pilot	(+ 5 schools/0 3 schools) 5 schools showed a reduction in child consumption of regular soft drinks and sweetened tea. Students purchased more school meals when only healthy snacks were available.	
Simone A. French et al., "An Environmental Intervention to Promote Lower-fat Food Choices in Secondary Schools: Outcomes of the TACOS Study," *American Journal of Public Health* 94, no 9 (2004): 1507–12. (Strong)	Multicomponent intervention increasing availability of lower fat (Snacks ≤5 g per serving) foods in a la carte and school-wide student promotions of these lower-fat foods	20 secondary schools, St. Paul MN; TACOS; 2 year Group randomized control	(+ sales/0 consume) The intervention schools showed a significantly higher mean percentage of sales of lower-fat foods in year 1 (27.5% vs. 19.6%, P = .096) and a significantly higher mean percentage of sales of lower-fat foods in year 2 (33.6% vs. 22.1%, P = .042)	No differences in student reported food consumption choices between control and intervention
Anastasia M. Snelling and Teha Kennard, "The Impact of Nutrition	Policy in 2006 Beverages: water, milk (1% or skim), juices containing at least	3 public HS, outside single metro county; non-	(+) Increased purchase of green foods (11% in 2005	Decreased purchase of red foods from

Citation/Score	Policy or Intervention	Population, Design	Impact—Healthy Items	Impact—Unhealthy or Overall
Standards on Competitive Food Offerings and Purchasing Behaviors of High School Students," *Journal of School Health* 79, no. 11 (2009): 541–6. (Weak)	25% juice (<12 oz); Snacks: <300 calories/item; <30% of total calories from fat, except seeds/nuts; <10% of total calories from sat. fat; sugar <35% by weight; whole grain breads and cereals offered; portion sizes 1.25 oz for snacks and sweets, 2 oz for cookies, 3 oz for bakery items and frozen desserts, 8 oz for yogurt; low sodium.	experimental longitudinal study; descriptive info from food sales; 2005–07; coded foods by Stoplight Diet (green = low calorie, high nutrient; yellow = moderate calorie, moderate nutrient such as those meeting standards; red = high calorie, low nutrient)	to 20% in 2007) and yellow foods (6% in 2005 to 34% in 2007). Students purchased the more nutritious yellow and green foods when there were fewer red food offerings.	83% in 2005 to 46% in 2007. However, even with lower proportion of red food offerings (30% in 2007), these foods made up almost half of all competitive food purchases (47%).
R. R. Briefel et al., "School Food Environments and Practices Affect Dietary Behaviors of US Public School Children," *Journal of American Dietetic Association* 109, no. 2 (2009): S91–S107. (Fair)	Impact of exposure to restrictions on low-nutrient, energy-dense foods (LNED), vending venues, pouring contracts	Cross-sectional, SNDA III 2004–05, K–12	(+) Offer daily fresh FV through government program, reduce 36 kcal from LNED ($p<.05$) in ES. (+) Attending a school without stores or snack bars was estimated to reduce sugar-sweetened beverage consumption by 22 kcal per school day in MS children ($P<0.01$) and by 28 kcal in HS children ($P<0.01$). (+) The lack of a pouring rights contract in a school reduced SSB consumption by 16 kcal ($P<0.05$), and no a la carte offerings in a school reduced consumption by 52 kcal ($P<0.001$) in MS children. (+) The most effective practices for reducing energy from LNED foods were characteristics of the school meal program; not offering french fries reduced LNED foods consumption by 43 kcal in ES children ($P<0.01$) and SSB consumption by 41 kcal in HS children ($P<0.001$).	
Karen Weber Cullen and Debbe I. Thompson, "Texas School Food Policy Changes Related to Middle School a la Carte/Snack Bar Foods: Potential Savings in Kilocalories." *Journal of the American Dietetic Assocation* 105 (2005): 1952–54. (Fair)	Texas state policy in 2004 impacting the school competitive venues, including limiting sweetened beverages to 12 oz containers and high-fat, salty, and sweet foods to small, single-serving packages	23 MS in TX; cross-sectional; used sales records to estimate the energy savings to children from policy changes	(+) By reducing portion sizes to smaller, single-serving packages, 47 kcal per student was saved on a daily basis. Over a 180-day school year, an energy deficit equivalent to about 2 lb could occur if students replaced the large portion-sized snacks and beverages with the smaller sizes on a 1-to-1 basis, did not buy multiple small bags or small drinks, did not consume additional other foods or beverages, and did not change physical activity levels.	

Citation/Score	Policy or Intervention	Population, Design	Impact—Healthy Items	Impact—Unhealthy or Overall
Marlene B. Schwartz, Sarah A. Novak, and Susan S. Fiore, "The Impact of Removing Snacks of Low Nutritional Value From Middle Schools," *Health Education & Behavior* 36, no. 6 (2009): 999–1011. (Fair)	Policy: Snacks limited to total fat ≤35% of calories, saturated fat <10% of calories, added sugar ≤35% by weight, and limiting serving sizes. Beverages: water, milk, and 100% juice	2-year nonrandom intervention; 6 intervention schools, 6 control; CT; repeated surveys	(+) Intervention schools increased consumption of healthy drinks from year 1 to year 2, comparison schools had no increase (B = .33, p<.05); MNS intervention schools consumed more baked chips, pretzels, popcorn, and crackers; comparison schools stayed the same (B = .29, p<.05)	EBNS salty snacks intervention decreased chips, comparison increased slightly (B = -.30, p<.05); comparison schools increased consumption of SSBs from year 1 to year 2, intervention schools decreased (B = -.23, p<.05)
Jill Hartstein et al., "Impact of Portion-size Control for School á La Carte Items: Changes in Kilocalories and Macronutrients Purchased by Middle School Students," *Journal of the American Dietetic Association* 108, no. 1 (2008): 140–44. (Weak/Fair)	Intervention: a la carte/snack bar goals reduce all regular chips serving size bags to ≤1.5 oz, increase lower-fat chip offerings by 25%; offer bottled water in a 20 oz size, and limit all sweetened beverages to ≤12 oz	6 schools total: 2 schools in pilot in each CA, NC, TX; 2004; cross-sectional part of baseline	(+/0) Significant changes in percent of kilocalories from protein (P<0.05) and ounces of water (P<0.01), sweetened beverages (P<0.01), and regular chips (P<0.05) were found across the 6 schools. **No increases in FV purchases**	There was a significant reduction in kcal density per item sold P<0.01 for 2 of the schools.
J.A. Mendoza et al., "Change in Dietary Energy Density After Implementation of the Texas Public School Nutrition Policy," *Journal of the American Dietetic Association* 110 (2010): 434–440. (Fair)	Texas Public School Nutrition Policy restricted portion sizes of snacks and high-fat foods, reduced the fat content of all food, and restricted sales of sweetened beverages (30 g sugar/8 oz portions, in HS 12 oz portion size for regular soda, no more than 15% of beverages can be sugared, carbonated soft drinks, milk 2% or less).	Pre- and post-policy in TX, 2001–02 to 2005–06 after implementation of state policy, 3 public MS, cross sectional food records	(+) The following food groups increased: the NSLP mixed entrée, vegetables, fruit, and the NSLP dessert. The following food groups decreased: snack chips, fat/oil, and candy.	Following implementation of the Texas policy, students' energy density without beverages significantly decreased from 2.80+/-1.08 kcal/g to 2.17+/- 0.78 kcal/g (P<0.0001). Similarly, energy density including beverages significantly decreased from 1.38+/-0.76 kcal/g to 1.29+/- 0.53 kcal/g

Citation/Score	Policy or Intervention	Population, Design	Impact—Healthy Items	Impact—Unhealthy or Overall
				(P<0.0001)
Sarah E. Samuels et al., "The California Endowment's Healthy Eating, Active Communities Program: A Midpoint Review," *American Journal of Public Health* 100 (2010): 2114–2123. And S.E. Samuels et al., *Healthy Eating, Active Communities Phase 1 Evaluation Findings 2005–2008* (Oakland, CA: Samuels and Associates, 2009). (Weak)	Implementation of SB 12 and SB 965. Allowed to sell seeds, nuts, butters, low-fat dairy individual items. Snack items max of <250 calories, total 35% calories from fat, 10% total calories from saturated fat, 35% total weight from sugar. Dairy and whole grain products must meet 35/10/35, and be <175 calories. Entrees must have <35% of calories from fat, 400 cal max.	6 MS in CA, 2005 and 2008, multicomponent intervention including wellness policy changes from state bills, HEAC, no statistics, no controls	(+) The percentage of students reported consuming candy, chips, soda, and sports drinks at school decreased in 2008, decrease of students reporting they consumed these items at all the day prior to completing the survey (School vending 27% to 21%, school snack bar/store 36% to 27%, school fundraiser, 16% to 10%)	
Gail Woodward-Lopez et al., "Lessons Learned from Evaluations of California's Statewide School Nutrition Standards," *American Journal of Public Health* 100 (11) (November 2010): 2137–2145. (Fair/Strong)	Implementation of SB 12 (foods). Allowed to sell seeds, nuts, butters, low-fat dairy individual items. Snack items must be <250 kcal total, max 35% calories from fat, 10% total calories from sat. fat, 35% total weight from sugar. Dairy and whole grain products must meet 35/10/35, and be <175 calories. Entrees must have <35% of calories from fat, 400 cal max. SB 965 (drinks): 50–100% fruit and vegetable drinks with no added sweeteners, water with no added sweeteners, milk and dairy alternatives ≤2% fat, 28 g total sugars, 8 oz, sports drinks with no caffeine, 42 g added sweetener max per 20 oz in MS/HS	Data from CA: HEAC, High School Study, and School Wellness Studies, 2005–08, 2007–08, and 2007–09, cross sectional	(+/0) After legislation (+) water consumption 9%, p<.01; (-) soda at school (7%) p<.01; (-) veggies at school 3% p<.01. Gen non-significant trends: (-) consumption of sports drinks, candy, and chips at school, (+) consumption of milk and fruit. At home only significant change in consumption was water (+)—not compensating at home for changed intake at school.	
Donna B. Johnson et al., "Impact of School District Sugar-Sweetened Beverage Policies on Student Beverage Exposure and Consumption in Middle Schools," *Journal of Adolescent Health* 45 (3,	Limits sugar content of beverages, limits regular (sugar-sweetened) soda, and limits beverages other than soda containing added caloric.	65 schools, 29 school districts, WA, 2007–08 cross sectional		(+)The proportion of students who consumed SSB at each school was positively associated with SSB exposure at

Citation/Score	Policy or Intervention	Population, Design	Impact—Healthy Items	Impact—Unhealthy or Overall
Supplement) (September 2009): S30–S37. (Fair)				school (Pearson's correlation coefficient .40, p = .001). SSB exposure was a significant predictor of SSB behavior (b = .16, p =.001) in the expected direction: that is, more availability of SSB at a school leads to a higher percentage of students drinking SSB.
W. Gonzalez et al., "Restricting Snacks in U.S. Elementary Schools Is Associated with Higher Frequency of Fruit and Vegetable Consumption," *Journal of Nutrition* 139 (2009): 142–4. (Fair)	School policies restricting snack availability (no snack items available) or unrestricted (at least 1 snack item available)	National sample, 5th graders, cross sectional survey 2008–09	(+)Children in schools with policies restricting snack availability reported more occasionally eating fruits (p = .025) or frequently eating fruits (p = .05) and vegetables (p = .001)	
M. Fernandes, "The Effect of Soft Drink Availability in Elementary Schools on Consumption," *Journal of the American Dietetic Association* 108 (2008): 1445–52. (Fair/Strong)	Consumption based on access via policy	1998–99 began national cross sectional surveys, 5th graders, Early Childhood Longitudinal Study, Kindergarten cohort	(+) Controlling for covariates, limiting availability of soft drinks at school is associated with a 4% decrease (odds ratio 1.38) in the rate of any consumption overall. Black non-Hispanic and low-income children were significantly more likely to consume soft drinks at school, conditional on availability ($p<0.01$). Children attending schools located in the South were more likely to consume soft drinks at school ($p<0.001$).	
Jason M. Fletcher et al., "Taxing Soft Drinks And Restricting Access To Vending Machines To Curb Child Obesity," *Health Affairs* 29 (5) (May 1, 2010): 1059–1066. (Fair)	Examined impact of taxation of SSBs and vending machine bans	Early Childhood Longitudinal Study Kindergarten Cohort, 5th grade (2004) and 8th grade (2007) survey waves, national sample, descriptive statistics	(+/0) Less soda consumption based on purchases made at school for those students with limited access (8% versus 26% of fifth graders and 20% versus 28% of 8th graders reported any consumption from school-based sources; p = 0.001 level). However, no difference in overall consumption of soft drinks between those with access at school and those without. The results strongly suggest that limiting	

Citation/Score	Policy or Intervention	Population, Design	Impact—Healthy Items	Impact—Unhealthy or Overall
			access to soft drinks at school might not reduce children's soft drink consumption because of the many alternative outlets where they can obtain soft drinks, including homes, convenience stores, and other school outlets such as after-school events.	
D.R. Taber et al., "Banning All Sugar-sweetened Beverages in Middle Schools Reduction of In-school Access and Purchasing but Not Overall Consumption," *Archives of Pediatrics & Adolescent Medicine* (2011): E1–7. (Fair)	State policies governing the sale of soda and other SSBs in middle schools in 2006–2007. States were classified as having (1) policy banning soda and other SSBs (e.g., "Only milk, water, and 100% juice will be available in school"), (2) policy prohibiting soda but allows other SSBs (e.g., "Allowed beverages include milk, water, energy drinks, and electrolyte replacement beverages"), or (3) no policy limiting any type of SSB.	6900 students, 2 of 7 observations; Bridging the Gap, Early Childhood Longitudinal Study Kindergarten Cohort, 1998–2007, General linear models	The proportions of 8th-grade students who reported in-school SSB access and purchasing were similar in states that banned only soda (66.6% and 28.9%, respectively) compared with states with no beverage policy (66.6% and 26.0%, respectively). In states that banned all SSBs, fewer students reported in-school SSB access (prevalence difference, −14.9; 95% CI, −23.6 to −6.1) or purchasing (−7.3; −11.0 to −3.5), adjusted for race/ethnicity, poverty status, locale, state obesity prevalence, and state clustering. Overall SSB consumption was not associated with state policy; in each policy category, approximately 85% of students reported consuming SSBs at least once in the past 7 days.	
Sonya J. Jones et al., "Policies That Restrict Sweetened Beverage Availability May Reduce Consumption in Elementary-school Children," *Public Health Nutrition* 13 (4) (April 2010): 589–595. (Fair)	Examined exposure to SSB policy restriction and provision of alternate beverages or not	Early Childhood Longitudinal Study Kindergarten Cohort, multilevel logistic regression 107,191 children; administrator and student reports	Children in schools with a policy that allowed SSBs were 5 times more likely (OR = 5.16, 95% CI 4.18, 6.49) to purchase at least 1 SSB at school in the past week when the presence of alternative beverages was not considered. The population-attributable risk (from RR for association and prevalence of availability) was 35.7%, meaning that if all schools changed to a policy of no availability of SSBs, more than one-third of the children currently purchasing SSBs in elementary schools would be prevented from doing so. If the administrator did not have a policy that made an alternative beverage present, the policy regarding availability of SSBs (not available v. available) was associated with the percentage of purchase of SSBs, about 3–4% when not available vs. 16–27% when available.	
J.A.L. Spangler, "Beverage Vending Purchasing Patterns and Attitudes	Replaced sweetened beverages in vending machines with 100% juice and bottled water	1 HS, cross sectional, convenience sample WV, 2004	Changes in purchases (reduction of overall frequency) not significant	(+/0) $\chi 2$ analysis revealed students were significantly more likely to choose

Citation/Score	Policy or Intervention	Population, Design	Impact—Healthy Items	Impact—Unhealthy or Overall
in Southwest Virginia High School Students," Master of Science, Blacksburg, VA: Virginia Polytechnic Institute and State University (2006). (Weak)				healthier beverage vending options after 1 year compared to baseline (P<0.01). The number of students who agreed to choose healthy options increased from 39.4% at baseline to 59.3% at follow-up.
A.L. Cradock et al., "Effect of School District Policy Change on Consumption of Sugar-sweetened Beverages Among High School Students, Boston, Massachusetts, 2004–2006," *Preventing Chronic Disease* 8 (4) (2011): A74. (Fair)	Boston Public Schools Snack and Beverage Policy restricting sugar-sweetened beverages in Boston schools. Precludes sale of soft drinks, fruit drinks (i.e., non–100% vegetable or fruit juice beverages), and sports drinks anywhere in school buildings or on school campuses and had specifications that limited other beverage serving sizes.	quasi experimental study 2004: N= 1,079, 17 HS 2006: N=1,233, 18 HS	(+) After the policy implementation restricting sale of SSB in school: (+) HS: Significant decreased consumption of 1.71 (CI 95% 1.61–1.81) servings of SSB (2004) vs. 1.38 (CI 95% 1.30–1.47) servings (2006) Significant declines in consumption of soda (−0.16 servings; CI:−0.23 to −0.08), other SSB (−0.14 servings; CI: −0.23 to −0.06), and total SSB (−0.30 servings; CI: −0.43 to −0.17) between 2004 and 2006 (P<.001 for all). NHANES indicated no significant nationwide change in adolescents' consumption of sugar-sweetened beverages between 2003–2004 and 2005–2006.	

Table A8.3: Impact of competitive foods policy or intervention on caloric intake, BMI and weight status

Citation/Source	Policy or Intervention	Population, Design	BMI or calories	Weight Status (Age differences)
Vasanti S. Malik et al., "Intake of Sugar-sweetened Beverages and Weight Gain: a Systematic Review," *The American Journal of Clinical Nutrition* 84 (2) (August 2006): 274–288. (Strong)	Review of relationship between SSB and weight gain	5 cohort, 3 trials, 10 prospective, and 5 experimental, 2 prospective and cross-sectional	Both epidemiologic and experimental evidence indicates that greater consumption of SSBs is associated with weight gain and obesity. Although more research is needed, sufficient evidence exists for public health strategies to discourage consumption of sugary drinks as part of a healthy lifestyle.	
Susan Harrington, "The Role of Sugar-sweetened Beverage Consumption in Adolescent Obesity: a Review of the Literature," *The Journal of School Nursing: The Official Publication of the National Association of School Nurses* 24 (1) (February 2008): 3–12. (Strong)	Review of SSB and adolescent obesity	2 randomized controlled trials and 8 longitudinal studies	Modest, significant increases in BMI in relation to SSB consumption	
L.R. Vartanian et al., "Effects of Soft Drink Consumption on Nutrition and Health: A Systematic Review and Meta-analysis." *American Journal of Public Health* 97 (2007): 667–75.(Strong)	Meta analysis of relationship between soft drink consumption and nutrition and health outcomes including BMI	88 studies examined: 12 cross-sectional, 5 longitudinal studies, 4 long term experimental, 12 short term experimental; 55 other	The overall effect size for studies examining the link between soft drink consumption and body weight was 0.08 ($P < .001$; $Q_{47} = 337.73$, $P < .001$, fail-safe N = 3173). Larger effect sizes were observed in experimental studies than in cross-sectional or longitudinal studies. Also, further testing of moderators revealed that effect sizes were larger among (1) women, (2) adults, (3) studies focusing on sugar-sweetened soft drinks, and (4) studies not funded by the food industry.	
A. Datar and Nancy Nicosia, *Junk Food Availability and Childhood Obesity* (RAND, 2008). (Fair)	Estimate the causal effect of competitive food availability on children's body mass index (BMI) and other food- and school-related outcomes. Looked at BMI, total consumption of selected foods, junk food purchase in school.	Nationally representative. Sample from Early Childhood Longitudinal Study–Kindergarten Cohort (ECLS-K). N = Approximately 10,000 children, in 5th grade in 2003–04 school year, public/private schools.	Schools' grade structure had no effect on weight. No relationship between children's fifth-grade weight status and the presence or sale of competitive foods in their schools was found.	

Mary Kay Fox et al., "Association Between School Food Environment and Practices and Body Mass Index of US Public School Children," *Journal of the American Dietetic Association* 109 (2 Suppl) (February 2009): S108–117. (Fair)	To examine the association between school food environments and practices and children's body mass index	Analytical study using data from SNDA III school year 2004–2005; nationally representative; N = 2,228 students from 287 public Schools, grades 1–12; 54% non-Hispanic white, 17% non-Hispanic black, 22% Hispanic, and 7% other. 42% certified to receive a free or reduced-price school lunch.	**(+)Vending Machines, MS:** VM in or near the food service area that sold low-nutrient, energy dense foods were associated with a higher BMI z score (Beta= 0.21; p<0.05). **(-)** A la carte **, MS:** the availability of low-nutrient, energy dense foods for a la carte purchase was associated with decreased BMI z score (Beta= -0.32; p<0.01), the opposite of the hypothesized association. **(0) HS:** No stat. significant associations between school food environments and practices and BMI z scores or the likelihood of obesity. Researchers hypothesized: This could reflect the increased autonomy of these older children in obtaining low-nutrient, energy-dense foods from other locations.
Terry-McElrath et al., "The School Food Environment and Student Body Mass Index and Food Consumption: 2004 to 2007 National Data." *The Journal of Adolescent Health* 45 (3 Suppl) (September 2009): S45–56. (Fair)	District wellness policies between 2004 and 2007	National sample, MS and HS students in YES and MTF studies	**(+)Vending Machines:** + assoc. between regular sugar/fat food items in VM/other CF outlets and student obesity (OR 1.14; p<.05). **(0) Non significant:** HS: All associations between the school food environment and student overweight and obesity were not significant when% of students eligible for F/R lunch was included. **(-)** A la carte **sugar/fat food HS:** Contrary to expectations, negative associations were also observed between regular sugar/fat food items for lunch/a la carte and both overweight (OR: 0.92, p<.05) and obesity (OR: 0.86, p<.01).
Ludwig et al., "Relation Between Consumption of Sugar-sweetened Drinks and Childhood Obesity: a Prospective, Observational Analysis," *Lancet* 357 (9255) (February 17, 2001): 505–508. (Fair)	Each school received teacher training workshops, classroom lessons, PE materials, wellness sessions, and fitness funds. Compared to control schools without intervention.	n=548 ethnically diverse children; mean age 11.7,48% female, 64% white, 15% Hispanic, 14% African-American, 8% Asian, 8% American-Indian; from public schools in 4 Massachusetts communities. Randomized control. Data collected prospectively during the Planet Health Intervention: For 19 months (Oct 1995–May 1997).	**(+)** For each additional serving of sugar-sweetened drink consumed: increases in BMI (mean .24 kg/m^2; 95% CI 0.10–0.39; p=0.03) and frequency of obesity (OR 1.6; 95% CI 1.14–2.24; p=0.02) were observed. The OR of becoming obese among children increased 1.6 times for each additional can or glass of SSB drink that they consumed every day. By contrast, diet-soda consumption was negatively associated with obesity incidence.
P. M. Anderson and K.F. Butcher, "Reading, Writing, and Refreshments: Are School	Examine whether	National sample using data from the National	**(+)** 10-point increase in the % of schools in a county that allow students access to junk food leads to a 1% increase in

Finances Contributing to Children's Obesity?" *The Journal of Human Resources* 41 (3) (2006): 467–494. (Fair)	schools under financial pressure tend to adopt potentially unhealthful food policies and whether students' Body Mass Index (BMI) is higher where they are more likely to be exposed to these food policies	Longitudinal Survey of Youth 1997 (NSLY97), School Health Policies and Programs Study (SHPPS) from 1994 and 2000, and U.S. Censuses 1990 and 2000. N = 3482 students; mean age: 16.2; 451 public MS & HS. Females: .471; white .686	students' BMI (p<.00001). As average weight for sampled adolescents is about 148 pounds. This translates into about 1.5 extra pounds per 10 percentage point increase in availability. No CI available.
Martha Y. Kubik et al., "Schoolwide Food Practices Are Associated with Body Mass Index in Middle School Students," *Archives of Pediatrics & Adolescent Medicine* 159 (12) (December 2005): 1111–1114. (Weak/Fair)	School-based dietary intervention to evaluate the association between student BMI and school-wide food practices.	16 middle schools, n=3088 8th graders from the Twin Cities MN; data collected as part of TEEN Study; Randomized to intervention school. 2 year.	**(+)** Student BMI increased 10% for every additional food practice (i.e., food as incentives, classroom fundraising) permitted in their school (95% CI 0.010–0.186; p<.03.)
Emma V. Sanchez-Vaznaugh et al., "'Competitive' Food And Beverage Policies: Are They Influencing Childhood Overweight Trends?" *Health Affairs* 29 (3) (March 1, 2010): 436–446. (Fair)	Examined whether new policies restricting sales of competitive foods and beverages influenced increasing rates of overweight children in the Los Angeles Unified School District and the rest of CA. California schools: 2001–04 (pre-policy) compared to 2004–08 (post-policy), LAUSD	LAUSD and CA Schools, 5th and 7th grade students. Combined analytic sample includes more than 5 million observations. N = 5,389,819; 763,181 of those observations were from LAUSD.	After the policies took effect: **(+)**Found a significantly lower rate of increase in overweight among 5th graders in Los Angeles (p<.005). 5th-grade girls in LAUSD experienced the largest change in overweight trends. **(+)**In the rest of CA, the lower rate of increase in overweight was significant (p<.001) among 5th grade boys and 7th graders. **(+)**5th and 7th graders: Average rates of increase in overweight prevalence occurring in the period before competitive food and beverage policies took effect were **significantly reduced afterward**, even after differences in individual-, school-, and district-level characteristics were controlled for. (+) In the post-policy period, overweight prevalence was no longer significantly increasing. (0) No change in overweight trends in 7th graders in LAUSD and 5th-grade girls in the rest of CA. In the period after the

	Healthy Bev Res 2004, CA SB 677, SB12, Portion Standards 2007 State & LAUSD Policies: Regulate fruit juice, requiring 50%+ fruit juice with no added sweeteners; no added sweeteners in water and sports beverages; ≤10% of calories from sat fat (state standard applies only to snacks and MS entrées); limit the fat in milk to 2% (LAUSD: only skim/low-fat milk allowed). LAUSD Policy: foods < 35% cal from fat (excluding nuts and seeds); <10% total calories from sat fat w/trans fat; 35% added sugar by weight max; and ≤600 mg of sodium per serving; no artificial flavorings, colors, caffeine CA2007 (SB 12) state rules apply to		policies took effect, the change in overweight trends was more pronounced, and the trend changes among 5th-grade girls in CA became significant after 2005.

	snacks and entrees in MS, but only to snacks in elementary schools.			
Gary D. Foster et al., "A Policy-based School Intervention to Prevent Overweight and Obesity," *Pediatrics* 121 (4) (April 2008): e794–802. (Strong)	The purpose of this work was to examine the effects of a multicomponent, School Nutrition Policy Initiative on the prevention of overweight (85.0th to 94.9th percentile) and obesity (>95.0th percentile) among children in grades 4 through 6 over a 2-year period. Beverages: 100% juice (6-oz serving size), water (no portion limits), and low-fat milk (8-oz serving size). Snacks: allowed ≤7 g of total fat, 2 g of saturated fat, 360 mg of sodium, and 15 g of sugar per serving	4th–6th grade; 10 schools; 1,349 students; mid-Atlantic region; 2-year matched random control, repeat surveys.	**(0)** Overall calorie intake the same between intervention and control, each reporting similar intake in self-reported consumption of energy (-104 kcal/d), fat (-3.78 g/d), and fruits and vegetable (-.04/day) over 2 year. Author's Note: It is unlikely that differences in energy intake had no role in mediating the intervention effects, but there were no group differences in self-reported energy intake. Children reported decreases of 2520 to 3780 kJ per day (600–900 kcal per day) raising questions about the validity of the self-reported intake data.	**(+)** Significantly fewer children in the intervention schools (7.5%) than in the control schools (14.9%) became overweight after 2 years ($p<.05$.) **(+)** OR overweight 33% lower for the intervention group (OR: 0.67; 95% CI: 0.47–0.96; $p<.05$). **(0)** No difference (control v. intervention) for obesity incidence. **(+)** OR incidence of overweight or obesity: 15% lower for intervention group (OR: 0.85; CI: 0.74 to 0.99; $p<.05$)
D.R. Taber et al., "Banning All Sugar-sweetened Beverages in Middle Schools Reduction of In-school Access and Purchasing but Not Overall Consumption," *Archives of Pediatrics & Adolescent Medicine* (2011): E1–7. (Fair)	State policies governing the sale of soda and other SSBs in middle schools in 2006–2007. States were classified as having	Public Schools in 40 states. 5th and 8th grade students. Policy data from Bridging the Gap; state obesity prevalence data from the 2003BRFSS; student data from the Early	**(+/0)** Laws that ban only soda: **(0)** no impact on access, purchasing or consumption. Laws restricting all SSBs: **(+)** Fewer students reported weekly purchase of SSBs at	If laws could eliminate SSBs in school, overall impact could be negligible because of outside school intake.

	(1) policy banning soda and other SSBs (e.g., "Only milk, water, and 100% juice will be available in school"), (2) policy prohibiting soda but allows other SSBs (e.g., "Allowed beverages include milk, water, energy drinks, and electrolyte replacement beverages"), or (3) no policy limiting any type of SSB.	Childhood Longitudinal Study Kindergarten Cohort, 1998–2007.	school (−7.3; Range −11.0 to −3.5, p<0.001). **(0)** Overall weekly SSB consumption was not associated with state policy. **(0)** No difference across policy types in **daily** purchases. **(+)** Losing access to SSBs within school associated w/ slightly lower probability of weekly SSB consumption, slightly higher probability of daily SSB consumption.	
Richard A. Forshee et al., "A Risk Analysis Model of the Relationship Between Beverage Consumption from School Vending Machines and Risk of Adolescent Overweight," *Risk Analysis: An Official Publication of the Society for Risk Analysis* 25 (5) (October 2005): 1121–1135. (Fair)	Data for Regular Carbonated Soft Drink (RCSD) consumption in schools: Continuing Survey of Food Intake by Individuals 1994–1996, 1998 (CSFII), the National Health and Nutrition Examination Survey 1999–2000 (NHANES), and the National Family Opinion (NFO) World Group Share of Intake Panel (SIP) study	Age: 13–18, 2,748 NHANES: M: 839, F 824; CSFII: M:536, F:549.	**(0)** Found no relationship between RCSD consumption from all sources and BMI in either the CSFII or the NHANES data. The risk assessment showed no impact on BMI by removing RCSD in school. These findings suggest that focusing adolescent overweight prevention programs on RCSD in schools will not have a significant impact on BMI.	
Richard A. Forshee et al., "Sugar-sweetened	Meta-analysis of	8 longitudinal studies and 2	**(0)** Overall estimate of association was 0.004 (95% CI : -	

Beverages and Body Mass Index in Children and Adolescents: a Meta-analysis," *The American Journal of Clinical Nutrition* 87 (6) (June (2008): 1662–1671. (Fair)	SSBs and weight gain (no policy intervention)	randomized control trial studies	0.006, 0.014) change in BMI during time period for each serving per day in SB consumption with fixed-effects model; 0.017 (95% CI: -0.009, 0.044) with the random effects model. Near zero relationship between SSB and BMI
J. Van Hook and C.E. Altman, "Competitive Food Sales in Schools and Childhood Obesity a Longitudinal Study," *Sociology of Education* 85 (1) (2012): 23–29. (Weak)	Compared BMI of children attending MS with access to competitive foods (CF) vs. no access	Longitudinal. Observational; Non-Randomized Representative. N: 21,410 children. Sample from Early Childhood Longitudinal Study–Kindergarten Cohort (ECLS-K), 1998–1999. Children were followed from the fall of kindergarten through the fall of 8th grade (1998–99 through 2006–07 school years).	**(0)** Children who moved into MS offering CF were no more likely to gain or lose weight than children who attended schools that did not offer CF. Weight gain between 5th and 8th grades was not associated with the introduction or the duration of exposure to CF sales in MS. In addition, children who moved out of schools that sold CF were no more likely to gain or lose weight than children who remained at schools that sold competitive foods. *Note: did not control for type of competitive foods, most commonly sold items were considered "healthy." Also, the relationship between competitive foods and weight gain did not vary significantly by gender, race/ethnicity, or family socioeconomic status.
S. Templeton et al., "Competitive Foods Increase the Intake of Energy and Decrease the Intake of Certain Nutrients by Adolescents Consuming School Lunch," *Journal of the American Dietetic Association* 105 (2005): 215–20. (Weak/Fair)	Longitudinal study of plate waste—shows relationship between consuming competitive foods and throwing out school meal items	6th grade, Franklin County, Kentucky, n=493 no competitive foods, n=250 for competitive food consumers; data were collected over 24 days in 2 school years	Students who ate CF: Macronutrient content of lunch was 19–20% lower than no CF. • Significantly higher waste: (23–32%) of school lunch nutrients, which further reduced nutrient consumption ($p<.05$). • CF purchasers reduced their school lunch servings, portion weight and/or item selection and increased school lunch item plate waste, resulting in lower intakes of energy (400 kcal vs. 530 kcal for no competitive foods), calcium (300 mg vs. 362 mg for no competitive foods), and vitamin A (77 retinol equivalents vs. 113 retinol equivalents for no competitive foods) from the school lunch; and competitive foods supplied more than 1/3 of total energy for the meal. • Students who ate CF ate less micronutrients due to higher waste: vitamin A (68% more waste), vitamin C (57% more waste), 2–3 times more waste of thiamin and riboflavin, niacin (59% more waste), folate (34% more waste), calcium (89% more waste), and iron (64% more waste), ($P<0.05$) compared to students who did not eat CF.

			• No CI available	
M. Fernandes, "The Effect of Soft Drink Availability in Elementary Schools on Consumption," *Journal of the American Dietetic Association* 108 (2008): 1445–52. (Fair/Strong)	Energy-dense SSB consumption based on access to SSBs in elementary school children	1998–99 began national cross sectional surveys, 5th graders, Early Childhood Longitudinal Study, Kindergarten cohort	(+) Controlling for covariates, limiting availability of soft drinks at school is associated with a 4% decrease (OR 1.38; 95% CI: 1.11–1.70; p<.01) in the rate of any consumption overall. (+) Black, non-Hispanic and low-income children were significantly more likely to consume soft drinks at school when available (p<0.01). (+) Children attending schools located in the South were more likely to consume soft drinks at school (p<0.001).	
Sonya J. Jones et al., "Policies That Restrict Sweetened Beverage Availability May Reduce Consumption in Elementary-school Children," *Public Health Nutrition* 13 (4) (April 2010): 589–595. (Fair)	Examined exposure to SSB policy restriction and provision of alternate beverages or not	Early Childhood Longitudinal Study Kindergarten Cohort, multilevel logistic regression; n = 107,191 children; administrator and student surveys	Children in schools with a policy that allowed SSBs were 5 times more likely (OR = 5.16, 95% CI 4.18, 6.49) to purchase at least 1 SSB at school in the past week when the presence of alternative beverages was not considered. The population-attributable risk (from RR for assoc and prevalence of availability) was 35.7%, if all schools changed to a policy of no availability of SSBs more than one-third of the children currently purchasing SSBs in elementary schools would be prevented from doing so. If the administrator did not have a policy that made an alternative beverage present, the policy regarding availability of SSBs (not available vs. available) was associated with the percentage of purchase of SSBs, about 3–4% when not available vs. 16–27% when available.	
Jason A. Mendoza et al., "Change in Dietary Energy Density After Implementation of the Texas Public School Nutrition Policy," *Journal of the American Dietetic Association* 110 (3) (March 2010): 434–440. (Fair)	Texas Public School Nutrition Policy restricted portion sizes of snacks and high-fat foods, reduced the fat content of all food, restricted sales of sweetened beverages (30 g sugar/8 oz portions, in HS 12 oz portion size for regular soda, no more than 15% of beverages can be sugared, carbonated soft	Pre- and post- TX policy, 2001–02 to 2005–05 after implementation of state policy, 3 public MS, cross sectional food records	(+) Implementation of the policy was associated with greater lunchtime consumption of vegetables, milk, and several nutrients and lower consumption of sweetened beverages, snack chips, and % energy from fat	• (+) After implementation of policy, students' energy density from drinks significantly decreased from 2.80±1.08 kcal/g to 2.17± 0.78 kcal/g (p<0.0001). • (+) Similarly, overall food and drink energy density significantly decreased from 1.38±0.76 kcal/g to 1.29± 0.53 kcal/g (p<0.0001).

	drinks), milk 2% or less		
Karen Weber Cullen et al., "Improvements in Middle School Student Dietary Intake After Implementation of the Texas Public School Nutrition Policy," *Am J Public Health* 98 (1) (January 1, 2008): 111–117. (Fair/Strong)	TX policy in all comp. food outlets; for middle schools, the policy restricts the portion sizes of high-fat and sugar snacks (limits vary by food group), sweetened beverages (≤12 oz), and the fat content of all foods served (≤28 grams of fat per serving no more than 2 times per week). It also sets limits on the frequency of serving high-fat vegetables such as french fries (3 oz per serving no more than 3 times per week)	3 MS; TX, 2001–02, 2002–03, 2005–06; repeated measures, longitudinal, natural experiment	Fewer sweetened beverages, candy, chips, and dessert foods were purchased and consumed, but more of these items were brought from home and purchased from the snack bar. Y3 after implementation: Significantly (-) overall snack chip, soda, sweetened beverage, and dessert food consumption, and reduced the percentages of these items plus candy that were consumed from vending machines. Y1–Y3: (+) F/V consumption from .61 to 1.34 servings; (+) milk intake from 2.4 to 6.5 oz; (-) Sweetened beverage intake from 5.4 to 1.5 oz; (-) Snack chip intake 0.21 to 0.04 servings.
Nicole Larson and Mary Story, "Are 'Competitive Foods' Sold at School Making Our Children Fat?" *Health Affairs (Project Hope)* 29 (3) (March 2010): 430–435. (Strong)	Review of competitive foods available in the schools and their nutritional implications for young people.	Literature Review of 23 studies examining the relationship between competitive foods, dietary intake, and students' weight.	**With few exceptions, 9 cross-sectional and 1 longitudinal studies** have found that students have better diets, relative to the recommendations of the 2005 DGA when unhealthy competitive foods are not sold at school. **Policy interventions to modify the types of competitive foods available to students:** 4 studies found no improvement in students' dietary intake (Sallis et al 2003, Lytle et al 2004, French et al, 2004; Foster et al. 2008). 3 of these (Sallis, Lytle and French) were focused on increasing access to healthy foods, not restricting unhealthy foods. **Impact on pre and post school diet:** (Schwartz 2009) When schools removed snacks and beverages (e.g., SSBs, regular chips) not meeting the nutrition guidelines, students decreased their consumption of those foods at school and

			did not compensate by increasing consumption at home. (Samuels 2008)
Anastasia M. Snelling and Teha Kennard, "The Impact of Nutrition Standards on Competitive Food Offerings and Purchasing Behaviors of High School Students," *Journal of School Health* 79 (11) (November 1, 2009): 541–546. (Weak)	**Nutrition Standards for Competitive Foods** Policy in 2006 Bevs: water, milk (1% or skim), juices containing at least 25% juice (<12 oz); Snacks <300 calories/item, fat <30% of total calories from fat, except seeds/nuts; <10% of total calories from sat. fat; sugar <35% by weight, whole grains breads and cereals offered, portion sizes 1.25 oz for snacks and sweets, 2 oz for cookies, 3 oz for bakery items and frozen desserts, 8 oz yogurt, low sodium (no #).	3 public HS, outside single metro county, nonexperimental longitudinal study, descriptive info from food offerings and purchases 2005 and 2007, coded foods by Stoplight Diet (green: low calorie, high nutrient; yellow: moderate calorie, moderate nutrient such as those meeting standards; red: high calorie, low nutrient)	(+) healthy/still buying lots unhealthy. Increased purchase of green foods (11% in 2005 to 20% in 2007), yellow foods (6% in 2005 to 34% in 2007). Students purchased the more nutritious yellow and green foods when there were fewer red food offerings. (+) Decreased offering of unhealthy red items (57% in 2005 to 30% in 2007), increased moderately healthy yellow foods (meeting standards) (18% to 48%), decreased offering of healthiest green items (fruits, vegetables) 25% to 22% in 2007.
R.R. Briefel et al., "School Food Environments and Practices Affect Dietary Behaviors of US Public School Children." *Journal of the American Dietetic Association* 109 (2 Suppl) (February 2009): S91–107. (Fair)	Impact of exposure to restrictions on low nutrient, energy dense foods (LNED), vending venues, pouring contracts	Cross sectional, SNDA III 2004–05, K-12	**Caloric Contributions from SSB** SSB from school contributed: MS a daily mean of 29 kcal; 46 kcal **(+) School without stores/snack bar:** Reduced daily SSB consumption in MS by 22 kcal ($p<.01$); HS by 28 kcal ($p<.01$). **(+) No pouring rights contract:** Reduced SSB consumption in MS by 16 kcal/school day ($p<0.05$) **(+) No a la carte offerings:** Reduced SSB consumption in MS by 52 kcal/school day ($p<0.001$).

			(+) A la carte **but no LNED:** Reduced SSB consumption in MS by 26 kcal/school day (p<0.001) **(+)No vending machine:** HS: 40 kcal fewer per day of sweetened beverages, (p=0.07). **(+) HS Consumption of LNED:** Reduced if female (46 kcal fewer, P<0.01). More than NHW if Hispanic (47kcal more), or NHAA (70 kcal) (p<0.05).
D. Johnson et al., "Impact of School District Sugar-sweetened Beverage Policies on Student Beverage Exposure and Consumption in Middle Schools," *Journal of Adolescent Health* 3 (Suppl 1) (2009): 30–7. (Fair)	Limits sugar content of beverages, limits regular (sugar-sweetened) soda, and limits beverages other than soda containing added calories.	64 schools, 28 school districts, WA, 2007–08 cross sectional	**SSB access leads to consumption** (+)The proportion of students who consumed SSB at each school was positively associated with SSB exposure at school (Pearson's correlation coefficient .40, p = .001). SSB exposure was a significant predictor of SSB behavior (beta = .16, p =.001) in the expected direction: that is, more availability of SSB at a school leads to a higher percentage of students drinking SSB.
Gail Woodward-Lopez et al., "Lessons Learned from Evaluations of California's Statewide School Nutrition Standards," *American Journal of Public Health* 100 (11) (November 2010): 2137–2145. (Fair/Strong)	Implementation of SB 12 (foods). Allowed to sell seeds, nuts, butters, low-fat dairy individual items. Snack items max of <250 calories, total 35% calories from fat, 10% total calories from sat. fat,; 35% total weight from sugar. Dairy and whole grain products must meet 35/10/35, and max of <175 calories. Entrees must have <35% of calories from fat, 400 cal max. SB 965 (Drinks): 50–100% fruit and	Data from HEAC and School Wellness Studies, 7th & 9th grade, 2005–08 and 2007–09	(+/0) After legislation Gen non significant trends: (-) consumption of sports drinks, candy, and chips at school, (+) consumption of milk and fruit. At home only significant change in consumption was water (+)—not compensating at home.

	vegetable drinks no added sweeteners, water no added sweeteners, milk and dairy alternatives ≤2% fat, 28 g total sugars, 8 oz, sports drinks no caffeine, 42 g added sweetener max per 20 oz in MS/HS		
Martha Y. Kubik et al., "The Association of the School Food Environment with Dietary Behaviors of Young Adolescents." *American Journal of Public Health* 93 (7) (July 2003): 1168–1173. (Weak/Fair)	Multicomponent intervention including promotion and offering 100% fruit juice, water, low-fat milk, fruit and vegetables, lower fat options. Limiting higher fat a la carte options and snacks with more than 5 g of fat and fruit drinks	16 middle schools, n=598, Twin Cities MN; 1998–2000; TEENS; randomized to intervention school. 2 Year.	(+) Students from schools w/o a la carte consumed More than ½ a serving more of fruits per day than did students in schools w/ a la carte (1.95 vs. 1.30 servings; diff 0.65 (CI 0.24,1.07) P= .005). (-) Students w/o a la carte consumed, on average, nearly an entire serving more of fruits and vegetables than did students from schools with such programs (4.23 vs. 3.39 servings; diff 0.84 (CI 0.13,1.54); P=.02.) Schools w/o a la carte : consumed a mean % of daily calories from total fat that met the USDA dietary recommendations, whereas those from schools with these programs exceeded the recommendations (28.49% vs. 31.08%; diff–2.59 (CI–4.71,–0.47); P=.02). Students w/o a la carte : Exceeded USDA dietary recommendations (% daily calories from saturated fat) by less than 0.5%, whereas students exposed to a la carte reported mean intakes 1.5% higher than recommended levels (Difference–1.06 (CI–2.02,–0.09); P=.03).
Karen Weber Cullen and Debbe I. Thompson, "Texas School Food Policy Changes Related to Middle School a la carte/snack Bar Foods: Potential Savings in Kilocalories," *Journal of the American Dietetic Association* 105 (12) (December 2005): 1952–54. (Fair)	Texas state policy in 2004 impacting the school CF venues including limiting sweetened beverages to 12-oz containers and high-fat, salty, and sweet foods to small, single-serving packages	23 MS in TX, cross sectional; used sales records to estimate the energy savings to children from policy changes	(+) By reducing portion sizes to smaller, single-serving packages, mean kilocalories were reduced to 64 kcal/day/student (range: 21–121), mean 47 kcal per student was saved on a daily basis (range: 13–75). Over a 180-day school year, an energy deficit equivalent to about 2 lb could occur if students replaced the large portion-sized snacks and beverages with the smaller sizes on a 1-to-1 basis, did not buy multiple small bags or small drinks, did not consume additional other foods or beverages, and did not change physical activity levels.

Jill Hartstein et al., "Impact of Portion-size Control for School á La Carte Items: Changes in Kilocalories and Macronutrients Purchased by Middle School Students," Journal of the American Dietetic Association 108 (1) (January 2008): 140–144. (Weak/Fair)	Intervention: a la carte /snack bar Goals: reduce all regular chips serving size bags to ≤1.5 oz, increase lower-fat chip offerings by 25%; offer bottled water in a 20-oz size, and limit all sweetened beverages to ≤12 oz	6 schools total: 2 schools in pilot in each CA, NC, TX 2004, cross sectional part of baseline, MS	(+) Across 6 schools: Significant increase in percent of kilocalories from protein (P=0.03) and ounces of water (P=0.01), significant decrease sweetened beverages (P=0.01), regular chips (P=0.03).There was a significant reduction in kcal density per item sold P<0.01 for 2 of the schools.
A.L. Cradock et al., "Effect of School District Policy Change on Consumption of Sugar-sweetened Beverages Among High School Students, Boston, Massachusetts, 2004–2006," *Preventing Chronic Disease* 8 (4) (2011): A74. (Fair)	Boston Public Schools Snack and Beverage Policy restricting sugar-sweetened beverages in Boston schools. Precludes sale of soft drinks, fruit drinks (i.e., non–100% vegetable or fruit juice beverages), and sports drinks anywhere in school buildings or on school campuses and had specifications that limited other beverage serving sizes.	Quasi experimental study 2004: N= 1,079, 17 HS 2006: N=1,233, 18 HS	(+) After the policy implementation restricting sale of SSB in school: (+) HS: Significant decreased consumption of 1.71 (CI 95% 1.61–1.81) servings of SSB (2004) vs. 1.38 (CI 95% 1.30–1.47) servings (2006). Significant declines in consumption of soda (−0.16 servings; CI:−0.23 to −0.08), other SSB (−0.14 servings; CI: −0.23 to −0.06), and total SSB (−0.30 servings; CI: −0.43 to −0.17) between 2004 and 2006 (P<.001 for all). NHANES indicated no significant nationwide change in adolescents' consumption of sugar-sweetened beverages between 2003–2004 and 2005–2006.

Table A8.4 Impact of policy on school service revenues

Study/Score	Policy	Population/Design	School Service Impacts
Arizona Department of Education, *Arizona Healthy School Environment Model Policy Implementation Pilot Study* (Arizona Department of Education, 2005). (Fair)	No foods of minimal nutritional value sold during school day; nutrient requirements for all vending and a la carte options. Policy includes 1) food service operation; 2) nutrition education; 3) food choices at school and 4) physical education and healthy school environment. Items 1 and 3 were required and 2 and 4 were suggested. AZ Dept of Education supplied each of the 8 pilot schools with nutrition and physical education curricula to facilitate items 2 and 4	8 schools (ES/MS/HS); preliminary evaluation of a pilot study	(0) Each school that offered additional foods via vending, al a Carte or school stores showed no negative financial impacts after making healthy changes to their food selections.
D. B. Bellis, "School Meal Programs: Competitive Foods Are Widely Available and Generate Substantial Revenues for Schools. Report to Congressional Requesters. GAO-05-563" (US Government Accountability Office, 2005). (Fair)	Reports information from 2 nationally representative surveys about the prevalence of competitive foods in schools, competitive foods restrictions and groups involved in their sale, and the amounts and uses of revenue generated from the sale of competitive foods.	CA, CT, MI, MO, SC	(-/+) The effects of changes on revenues were often unclear because of limited data. From the limited data available, it appears that changes had varied effects on revenues across districts.

Study/Score	Policy	Population/Design	School Service Impacts
Brown et al., "Managing Sales of Beverages in Schools to Preserve Profits and Improve Children's Nutrition Intake in 15 Mississippi Schools," *J Am Diet Assoc.* 109 (12) (December 2009): 2036–42. (Fair/Strong)	3 changes to beverage vending were implemented over the course of the 2005–06 school year. Schools agreed to work with beverage vendors to change the faces of vending machines or display cases in school stores to reflect physical activity, school logos, or any of the more healthful beverage choices. Schools also agreed to change the drinks offered to increase the number of more healthful choices offered and reduce the number of sweetened non-nutritive beverages. Each school could determine the specific mix of beverages offered to meet local needs as long as no more than 50% of the choices included sugar-sweetened beverages. Schools were asked to price more healthful drinks lower than sweetened non-nutritive beverages by 25% when possible (actual pricing ranged from 10% to 25% discounts).	Prospective, quasiexperimental study; examining 2 K–12 schools, 8 MS, 5 HS	(-/+) Relative to profits, 3 schools reported lower profits in the 2005–06 school year as compared to the 2004–05 school year. Total annual profits in 2005–06 were lower than those reported in 2004–05. There appeared to be no specific impact of enrollment or the percentage of children receiving free meals on profits or units sold. The largest, most affluent schools were not the most profitable schools relative to beverage sales. Similarly, schools with 75% to 95% free meals were in the middle profitability range ($6,000 to $14,000). Schools with 100% free meals reported between $300 and $5,000 in profits. The range of profits in both years demonstrates the variability in profit by individual schools.

Study/Score	Policy	Population/Design	School Service Impacts
Center for Weight and Health, University of California, Berkeley, *Pilot Implementation of SB 19 in California Middle and High Schools: Report on Accomplishments, Impact, and Lessons Learned.* (Berkeley, CA: Center for Weight and Health, University of California, Berkeley, 2005). (Fair/Strong)	California Senate Bills 19 and 56, (the Pupil Nutrition, Health and Achievement Act of 2001) Specifically, the 16 pilot schools were required to develop and implement policies to address the following: • SB 19/56 nutrition standards for competitive foods and beverages • Increased availability, access to, and consumption of California-grown fruits and vegetables (through the Buy California Initiative of 2002) • Nutrition education supporting the link between food choices, health, and physical activity • Healthy fundraisers • Ensuring that students do not go hungry • Sufficient levels of vigorous physical activity Each school was awarded approximately $200,000 for a total ranging from $197,000 to $740,000 per district to cover a 21 month implementation period from January 2003 through September 2004.	16 middle and high schools in 9 California school districts; policy evaluation	(-/+) Thirteen out of the 16 sites (81%) achieved increases in food service per capita gross revenues (reimbursable meals plus a la carte) from year 1 to year 2. (-) 14 out of the 16 sites (88%) experienced decreased food service a la carte revenues from year 1 to year 2. Decreases in a la carte revenues of 43% to 89% in 8 of the 14 sites resulted from the complete elimination of student a la carte food offerings. (+) Increases in reimbursable meal sales compensated for losses in a la carte sales in 11 of the 14 schools that experienced such losses (79%).

Study/Score	Policy	Population/Design	School Service Impacts
Connecticut State Department of Education, *Summary Data Report on Connecticut's Healthy Snack Pilot.* (Hartford, CT: Connecticut State Department of Education, 2006). (Weak/Fair)	The Healthy Snack Standards focus on decreasing fats and sugars, increasing nutrient density and moderating portion sizes. During the pilot year, the 5 schools that followed the Healthy Snack Standards eliminated all snack foods and beverages that did not meet the standards. The only beverages sold were milk, water (without sugar or artificial sweeteners) and 100 percent juice. The choice of snack foods was locally determined at each school, based on such factors as current snack offerings, student preferences, cost and availability. Schools could choose any snack foods from CSDE's list of approved snacks.	Sep 2003 to June 2005—evaluation of Healthy Snack Pilot: 8 schools	(-/+) Free-meal eligible students increased in 5 schools, with the increase ranging from 3 to 27 students (7.3 percent to 325 percent). Free-meal eligible students decreased in 3 schools, ranging from 1 to 47 students (0.3 percent to 17.8 percent). Reduced-price meal eligible students increased in 3 schools, with the increase ranging from 2 to 6 students (6.1 percent to 60 percent). From year 1 to year 2, the student food cost percentage increased in 7 of the 8 schools. Food costs did not change appreciably when healthy snacks were provided.
Karen W. Cullen and Kathleen B. Watson, "The Impact of the Texas Public School Nutrition Policy on Student Food Selection and Sales in Texas," *American Journal of Public Health* 99 (4) (April (2009): 706–712. (Weak/Fair)	Lunch food production records from 47 schools in 11 Texas school districts for the school years before (2003–04) and after (2004–05) policy implementation. Cafeteria servings of fruit, vegetables (regular and fried), and milk served each day were calculated. 23 schools from 5 districts provided records of a la carte sales of candy, chips, desserts, drinks, ice cream, and water. We examined aggregated school-level differences in total items served or sold per day per student between study years.	Repeated measures, ANOVA, between-group factors (school level: primary and secondary; district size: small and large). We examined main effects for year, school level, and district size, with interactions for year by school level and year by district size included.	Revenue and Sales data not reported, though sales of unhealthy foods decline: Regardless of district and school size, cafeterias served significantly fewer high-fat vegetable items per student post policy (P<.001). Post policy snack bar sales of large bags of chips were significantly reduced (P=.006), and baked chips sales significantly increased (P=.048).

Study/Score	Policy	Population/Design	School Service Impacts
Karen Weber Cullen et al., "Improvements in Middle School Student Dietary Intake After Implementation of the Texas Public School Nutrition Policy," *Am J Public Health* 98 (1) (January 1, 2008): 111–117. (Strong)	TX policy in all comp. food outlets; for middle schools, the policy restricts the portion sizes of high-fat and sugar snacks (limits vary by food group), sweetened beverages (≤12 oz), and the fat content of all foods served (≤28 grams of fat per serving no more than 2 times per week). It also sets limits on the frequency of serving high-fat vegetables such as french fries (3 oz per serving no more than 3 times per week).	3 MS; TX, 2001–02, 2002–03, 2005–06; repeated measures, longitudinal, natural experiment, We report the results of a naturalistic study that assessed the effect of the Texas Public School Nutrition Policy on lunch consumption of middle school students in southeast Texas.	(+) Increase in free (77%), reduced-price (127%), and full price (143%) NSLP meals served in year 3 compared with year 1. Each school recorded an increase of about 200 students during this period and an increase in the number of children eligible for free or reduced-price meals.
S.A. French et al., "Pricing and promotion effects on low-fat vending snack purchases: the CHIPS Study," *Am J Public Health* 91 (1) 2001: 117. (Fair)	Low-fat snacks introduced into vending machines at reduced cost; promotions of low-fat options	Convenience sample of 12 schools in Minneapolis–St. Paul, Minn. Sites selected for demographic and geographic diversity.	(0) Price reductions of 10%, 25%, and 50% on low-fat snacks were associated with significant increases in low-fat snack sales; percentages of low-fat snack sales increased by 9%, 39%, and 93%, respectively. Promotional signage was independently but weakly associated with increases in low-fat snack sales. Average profits per machine were not affected by the vending interventions.
Simone A. French et al., "An Environmental Intervention to Promote Lower-fat Food Choices in Secondary Schools: Outcomes of the TACOS Study," *American Journal of Public Health* 94 (9) (September 2004): 1507–1512. (Strong)	Decrease in price for low-fat a la carte options; student-run promotions of low-fat foods	20 secondary schools, St. Paul MN; TACOS; 2 year group randomized control	(0) No significant differences over time were observed for any of the food service revenue variables examined.
S.A. French et al., "Pricing strategy to promote fruit and vegetable purchase in high school cafeterias," *Journal of American Dietetic Association,* 97(9) (1997): 1008–1010. (Fair)	Price of fruit, carrots, salad reduced by approx. 50%; use of promotions for reduced-price foods	2 high schools; intervention; 3 observations	(0) Price reduction led to increased sales of fruit and carrots (no change for salad); no significant change in total dollar sales for a la carte purchases during intervention period

Study/Score	Policy	Population/Design	School Service Impacts
GAO-03-569: *School Meal Programs. Revenue and Expense information from Selected States* (2003). (Fair)	In school year 1996–97, the Department of Agriculture instituted more stringent requirements for the nutritional content of school meals. GAO was asked to study the school food service revenues and expenses and how they have changed since the requirements went into effect.	6 states; secondary data analysis	(-) The 6 states had a small though increasing shortfall in total revenue compared to expenses over the 5-year period. Their total expenses increased by about 22 percent, while their total revenues increased by about 20 percent. The portion of total school food service expenses covered by federal reimbursements declined from 54 to 51 percent, and the portion of expenses paid by state funds was small and declined slightly. Labor and food purchases were the principal expenses for the 6 states, sharing nearly equal proportions and changing only slightly. Labor expenses, which included salaries and benefits for food service employees, grew slightly while food expenses decreased slightly. Other expenses, such as contract services, made up a smaller portion of expenses, and this portion remained constant.
R. E. Litchfield and B. Wenz, "Influence of School Environment on Student Lunch Participation and Competitive Food Sales," *Journal of Child Nutrition & Management* 35(1). (Fair/strong)	Examined NSLP participation and CF purchasing among students before and after local wellness policy implementation and assessed factors in the school environment influencing NSLP participation and CF purchasing. Data was collected as part of the USDA-funded Team Nutrition Local Wellness Demonstration Project, a 3-state collaborative project.	Selected school districts (N = 16) included 8 large and 8 small districts, each comprising 4 high and 4 low policy scores. Data were collected for large districts in 1 elementary school (ES), 1 MS and 1 HS, while small district data collection included all buildings (K–12). ES were excluded from data analysis because no CF was available to students in any of the districts. Data were analyzed as 8 MS, 8 HS, and 8 small school (SS) (N = 24).	(0) NSLP meals per student per week and CF sales per student per year did not change significantly over the 3 years.

Study/Score	Policy	Population/Design	School Service Impacts
Michael W Long et al., "Evaluating the Impact of a Connecticut Program to Reduce Availability of Unhealthy Competitive Food in Schools," *The Journal of School Health* 80 (10) (October 2010): 478–486. doi:10.1111/j.1746-1561.2010.00531.x. (Fair)	Evaluating the impact of Connecticut's Healthy Food Certification (HFC), a program which provides monetary incentives to school districts that choose to implement state nutrition standards for all foods sold to students outside reimbursable school meals. HFC certification required districts to eliminate the sale of unhealthy snacks in both vending and a la carte.	Food service directors from all school districts participating in the National School Lunch Program (NSLP) (N = 151) in Connecticut were surveyed about the availability of competitive foods before and after the 2006–07 implementation of HFC. Food categories were coded as healthy or unhealthy based on whether they met the Connecticut Nutrition Standards. Data on NSLP participation were provided by the State Department of Education. Changes in NSLP participation and availability of unhealthy competitive foods in elementary, middle, and high schools were compared pre- and post-HFC across districts participating (n = 74) versus not participating (n = 77) in HFC.	(-/+) Average NSLP participation increased across the state. Participating in HFC was associated with significantly greater NSLP participation for paid meals in middle school; however, implementing HFC did not increase overall NSLP participation beyond the statewide upward trend.
C. Peterson, "Competitive foods sales are associated with a negative effect on school finances," *Journal of the American Dietetic Association* 111(6): 851–7. (Strong)	Examine revenue from competitive foods vs. school lunch	Observational study used a multivariate time series analysis of annual foodservice financial data from repeated observations of 344 Minnesota public school districts between 2001 and 2008 (N =2,695). First, revenue from competitive foods was assessed in terms of whether or not such revenue displaced or complemented revenue from	(-) significant negative relationship between competitive foods revenue and reimbursable meals revenue, even while controlling for districts' foodservice and demographic characteristics.

Study/Score	Policy	Population/Design	School Service Impacts
		reimbursable meals. Second, profit from competitive foods was assessed in terms of whether or not such profit displaced or increased total school foodservice profit.	
C. Probart et al. "Factors Associated with the Offering and Sale of Competitive Foods and School Lunch Participation," Journal of the American Dietetic Association 106(2) (2006): 242–247. (Strong)	NA	Random sample of 271 high schools in Pennsylvania that were selected to be representative of the entire population of high schools in Pennsylvania based on chosen demographic characteristics. Statistical analyses: Descriptive and multiple regression analyses.	(-) % of students eligible for free or reduced price lunch were significant predictors of a la carte sales; enrollment negatively associated with number of vending machines; enrollment inversely related to average daily participation in school lunch
Sarah E. Samuels et al., *Healthy Eating, Active Communities Phase 1 Evaluation Findings 2005–2008*. (Oakland, CA: Samuels and Associates, 2009). (Weak/Fair)	Implementation of SB 12 and SB 965. Allowed to sell seeds, nuts, butters, low-fat dairy individual items. Snack items must have a max of<250 kcal, max total 35% calories from fat, 10% total calories from saturated fat, 35% total weight from sugar. Dairy and whole grain products must meet 35/10/35, and be <175 calories. Entrees must have <35% of calories from fat, 400 cal max	6 MS in CA, 2005 and 2008, multicomponent intervention including wellness policy changes from state bills, HEAC	(0) Meal sales appear to be the most important indicator of food service financial health; a la carte sales and vending sales did not contribute substantially to the bottom line in these schools.
West Virginia University, Robert C. Byrd Health Sciences Center, Health Research Center. *West Virginia Healthy Lifestyles Act: Year One Evaluation Report*	Implementation of the Act's school-based components, which provide policy direction for physical education, health education, fitness assessments, body mass index (BMI)	Natural experiment of policy impact in traditional public schools in West Virgina (n=696)	(-/+) Findings based on qualitative data only; results were mixed with 80% of principals reporting stable or increased revenue and superintendents reporting that vending income is a significant part of their revenue stream.

Study/Score	Policy	Population/Design	School Service Impacts
(Morgantown, WV: West Virginia University, 2009). (Weak)	assessments and the availability of vended beverages on campus, began in August 2006.		
Janet M. Wojcicki and Melvin B. Heyman, "Healthier Choices and Increased Participation in a Middle School Lunch Program: Effects of Nutrition Policy Changes in San Francisco," *American Journal of Public Health* 96 (9) (2006): 1542–1547. (Fair/Strong)	SFUSD Nutrition Standards	SFUSD, surveys, 1 class per grade level in schools <500; 2 classes per grade level schools 500–1,200; 3 classes per grade levels schools >1200	(-/+) At worst, revenues did not change and profits at some schools increased. The increase in revenue can be explained by the increase in overall participation in the federally subsidized school lunch program. Participation in the federally subsidized reduced-price lunch program, in contrast to the free lunch program, decreased in the 2003–04 school year. 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 price) because of the larger number of free student lunches provided to students in the 2003–04 school year than in the 2002–03 school year. Participation in the paid lunch line (which offered food also provided as part of the free and reduced-price lunch program) decreased from the 2002–03 school year to the 2003–04 school year.
Gail Woodward-Lopez et al., "Lessons Learned from Evaluations of California's Statewide School Nutrition Standards," *American Journal of Public Health* 100 (11) (November 2010): 2137–2145. (Fair/Strong)	Evaluation of CA statewide nutrition standards—California, Senate Bill 12 (SB 12)	Data from HEAC and School Wellness Studies, 18+ HS in CA, 2005–08 and 2007–09	(-/+) at the 5 schools that provided data for non-food service sales of competitive foods and beverages, 4 venues experienced a decrease in revenue of more than 5%, and 1 venue experienced an increase of 1 cent per student per day; food service a la carte sales decreased at 60% of the schools. However, meal sales increased at all schools, and these increases were large enough to compensate for the reduction in a la carte sales, such that all schools experienced an increase in total revenues.

Study/Score	Policy	Population/Design	School Service Impacts
J. Johanson et al., *Raw Deal: School Beverage Contracts Less Lucrative Than They Seem.* (Washington, DC: Center for Science in the Public Interest; 2006). (Strong)	Analysis of 120 school beverage contracts from 16 states.	Secondary analysis of school beverage contracts across ES/MS/HS	(-) School beverage contracts generate an average of $18 per student per year for schools and/or school districts and schools/districts have negotiated very different deals with the same companies. Revenue to schools/districts ranged from about $0.60 to $93 per student per year. The majority of schools/districts had total annual revenues of less than $20 per student. Only 1 small high school had total annual revenue of more than $50 per student. The majority (67%, on average) of revenue generated from school beverage sales goes to beverage companies rather than to the schools. Children (and their parents) have to spend 1 dollar in order for their school to raise 33 cents.