

# The Food and Beverage Vending Environment in Health Care Facilities Participating in the Healthy Eating, Active Communities Program

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## ABSTRACT

**BACKGROUND.** Little has been done to ensure that the foods sold within health care facilities promote healthy lifestyles. Policies to improve school nutrition environments can serve as models for health care organizations.

**OBJECTIVE.** This study was designed to assess the healthfulness of foods sold in health care facility vending machines as well as how health care organizations are using policies to create healthy food environments.

**METHODS.** Food and beverage assessments were conducted in 19 California health care facilities that serve children in the Healthy Eating, Active Communities sites. Items sold in vending machines were inventoried at each facility and interviews conducted for information on vending policies. Analyses examined the types of products sold and the healthfulness of these products.

**RESULTS.** Ninety-six vending machines were observed in 15 (79%) of the facilities. Hospitals averaged 9.3 vending machines per facility compared with 3 vending machines per health department and 1.4 per clinic. Sodas comprised the greatest percentage of all beverages offered for sale: 30% in hospital vending machines and 38% in clinic vending machines. Water (20%) was the most prevalent in health departments. Candy comprised the greatest percentage of all foods offered in vending machines: 31% in clinics, 24% in hospitals, and 20% in health department facilities.

Across all facilities, 75% of beverages and 81% of foods sold in vending machines did not adhere to the California school nutrition standards (Senate Bill 12). Nine (47%) of the health care facilities had adopted, or were in the process of adopting, policies that set nutrition standards for vending machines.

**CONCLUSIONS.** According to the California school nutrition standards, the majority of items found in the vending machines in participating health care facilities were unhealthy. Consumption of sweetened beverages and high-energy-density foods has been linked to increased prevalence of obesity. Some health care facilities are developing policies that set nutrition standards for vending machines. These policies could be effective in increasing access to healthy foods and beverages in institutional settings. *Pediatrics* 2009;123:S287–S292

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### Key Words

nutrition policy, diet, vending machines, beverages, food, health promotion, obesity/prevention and control, hospitals, public health departments

### Abbreviation

HEAC—Healthy Eating, Active Communities

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OVER THE LAST few decades, obesity rates among children in the United States have increased dramatically.<sup>1,2</sup> Factors in the social and physical environments are increasingly recognized as influential on the precursors of obesity: overweight, poor nutrition, and physical inactivity.<sup>3,4</sup> Hospitals and health care facilities are among the environments that could potentially influence children's health and their adoption of healthy lifestyles. However, many health care institutions or facilities provide environments that may not support the adoption of healthy nutrition habits.

Studies of health care environments to date have shown that many hospitals, including children's hospitals, have fast-food franchises located within their facilities.<sup>5-7</sup> The presence of fast food and other less-healthy foods and beverages may influence patient and employee perceptions of the healthfulness of these items and cause increased purchase and consumption. A study of children's hospitals in the United States revealed that parents of pediatric patients were more likely to purchase fast food when it was present at the hospital than when it was not and that the presence of a fast-food outlet in a hospital was also associated with a more positive view of fast food among parents.<sup>6</sup>

Vending machines are another source of less-healthy foods and beverages in health care environments. As of 2005, 7.1% of all vending machines in the United States were found in hospitals and nursing homes.<sup>8</sup> For many patients, visitors, and staff, vending machines may often be the only source of foods and beverages available in health care facilities when cafeterias are not present or do not operate 24 hours/day. Although research examining

specifically vending machines in health care environments is lacking, studies conducted on vending machines in school and work settings have indicated that the majority of foods and beverages in vending machines are high in calories, fat, and sugar, and their presence in these environments may lead to excess energy intake and weight gain.<sup>9-15</sup>

The purpose of this study was to assess the healthfulness of foods and beverages offered for sale in vending machines in health care and public health department facilities located in 6 California communities that are participating in The California Endowment's Healthy Eating, Active Communities (HEAC) program, an environmentally focused childhood obesity-prevention effort. Several of the HEAC sites are working to improve foods and beverages offered in health care facilities and public health departments by developing and adopting healthy vending policies and setting nutrition standards for foods and beverages sold in these facilities. In this article we report on baseline observations of the food and beverage environment in health care facilities and the extent to which foods and beverages fit within the California state nutrition standards for public schools. Given the timeliness of the topic, these baseline data provide an informational cross-sectional view of the current availability of unhealthy food in health care institutions, which can be used to inform institutions nationally seeking to improve their environments for the health of their patients and staff.

## METHODS

The evaluation and health care sector liaisons in the 6 HEAC collaboratives selected 19 health care institutions serving their populations for these assessments. To be included in the study each institution (1) had to be a clinic, hospital, or health department, (2) serve school-aged children in the community, and (3) be working with the HEAC grantee community to make changes or implement policies that would improve the nutrition environment. Hospitals were defined as facilities with the ability to care for inpatients, clinics were defined as facilities that provide outpatient care only, and health departments included facilities that administered local health programs. On the basis of these definitions, 8 hospitals, 7 clinics, and 4 public health facilities were assessed. One institution refused to participate because they did not sell food or beverages on the premises.

Baseline data were collected in the fall of 2006. The assessments were completed by trained project staff using a standardized paper assessment tool during onsite visits to each of the facilities. The tool was reviewed by the University of California Berkeley Committee for Protection of Human Subjects, and participants were asked to read and sign an informed-consent form. The tool was used to document the hours of machine accessibility, the location of vending machines, and advertising on vending-machine fronts. It was also used to collect individual food and beverage item information, including brand name, flavor, total size, and price for all foods and beverages available in the vending machines. Information

**TABLE 1 Nutrition Standards for California Middle and High Schools as Specified in Senate Bills 965 and 12**

Allowed Nutritional Content	
Senate Bill 965	
Beverage type	
Juice	≥50% juice, no added sweeteners
Milk	≤2% fat
Water	No added sweeteners
Sport drinks	≤42 g of added sweetener per 20-oz serving
Senate Bill 12 <sup>a</sup>	
Food type	
Snacks	≤35% of calories from fat ≤10% of calories from saturated fat ≤35% sugar by weight ≤250 cal (1046 J)
Entrées	≤36% of calories from fat ≤10% of calories from saturated fat ≤35% sugar by weight ≤400 cal (1674 J)

<sup>a</sup> Excluded from limits: nuts, nut butters, seeds, fruits, vegetables, eggs, and cheese.

regarding vending contracts and onsite vending policies was obtained through discussions with health care administrators, food service directors, and other institution staff. Additional information was collected on foods and beverages offered for sale in cafeterias, gift shops, and coffee/snack carts and the condition and availability of physical activity resources.\*

The environmental assessment forms were completed manually, and data were subsequently entered into and analyzed by using SPSS 14.0 (SPSS Inc, Chicago, IL). Analysis of the nutritional content of foods and beverages inventoried was accomplished with a database developed by Samuels & Associates that combines nutrient data collected from several sources, primarily food and beverage nutrition labels and manufacturers. Standard reference values from US Department of Agriculture nutrient databases were used for foods and beverages for which official package or manufacturer information was unobtainable. The baseline analysis produced descriptive statistics including frequencies and percentages. The analysis included comparisons of the quantity and quality of foods among the 3 types of health care facilities. To compare the foods and beverages across sites we used the California state nutrition standards for schools (Table 1). Although some sites did have their own policy, they varied among facilities; therefore, for comparison purposes we used a single standard to compare all sites. This allowed us to use a common measure for comparing the nutritional value of foods and beverages among facilities. Several of the health care facility policies also had nutrition standards similar to the California state school nutrition standards.

## RESULTS

A total of 96 vending machines were observed in 15 (79%) of the 19 facilities. Overall, facilities contained more beverage machines than food machines. Hospitals had the largest number of vending machines, averaging

\*Data will be reported elsewhere.

**TABLE 2** Number of Vending Machines According to Type of Facility and Location (N = 15)

Venue	Hospital	Clinic	Health Department	Total
Cafeteria	28	0	2	30
Waiting area	21	2	0	23
Staff lounge	4	8	5	17
Hallway	12	0	4	16
Other	9	0	1	10
Total	74	10	12	96

9.3 vending machines per facility compared with 3 in health departments and 1.4 in clinics. Hospitals were also the most likely to have vending machines: 100% of hospitals had vending machines compared with 71% and 50% in clinics and health departments, respectively. Vending machines were found in a variety of locations in each type of health care facility but were observed most frequently in cafeterias. Table 2 presents the number of vending machines according to type of facility and location.

### Beverage-Vending Machines

Table 3 presents the types of beverages that were found in each type of facility. For hospitals and clinics, sodas comprised the greatest percentage of all beverages offered for sale: 30% in hospital vending machines and 38% in clinic vending machines. Diet sodas and sweetened coffee, tea, and hot chocolate were the next highest percentages for these institutions. For public health departments, water (20%) and sweetened coffee, tea, and

**TABLE 3** Number of Vending Machine Slots<sup>a</sup> According to Beverage and Facility Type (N = 15)

Beverage Category	Type of Facility, % (n)			% of Sum in Beverage Categories, Total
	Hospital	Health Department	Clinic	
100% juice	6 (62)	8 (13)	3 (2)	6 (77)
Diet soda	11 (117)	10 (16)	30 (24)	12 (157)
Energy drink	7 (68)	6 (9)	5 (4)	6 (81)
Milk, >2% fat, sweetness unknown	3 (34)	3 (4)	0 (0)	3 (38)
Soda	30 (311)	9 (15)	38 (30)	28 (356)
Sports drink	5 (54)	6 (10)	5 (4)	5 (68)
Sweetened coffee/tea drink/hot chocolate	10 (99)	14 (22)	10 (8)	10 (129)
Sweetened juice drink	8 (79)	12 (19)	4 (3)	8 (101)
Unsweetened coffee or tea	4 (39)	0 (0)	0 (0)	3 (39)
Water	8 (87)	20 (32)	6 (5)	10 (124)
Other <sup>b</sup>	7 (80)	13 (20)	0 (0)	7 (100)
Total	100 (1030)	100 (160)	100 (80)	100 (1270)

<sup>a</sup> The number of times a beverage was present accounted for the number of slots.

<sup>b</sup> "Other" represents beverages that each accounted for  $\leq 2\%$  of total slots, including: artificially sweetened drinks, carbonated water with natural flavors, sweetened water drink, sweetened milk ( $\leq 2\%$  fat), unsweetened milk ( $\leq 2\%$  fat), unsweetened milk ( $> 2\%$  fat), sweetened milk (percentage of fat unknown), milk ( $\leq 2\%$  fat, sweetness unknown), and undeterminable items.

hot chocolate (14%) made up the highest percentage of beverages that were offered for sale.

Among all facilities, 25% of the beverages adhered to the California state nutrition standards for schools (Senate Bill 965), whereas 75% did not. Health departments had the highest percentage of beverages that met the beverage standards, with  $\sim 40\%$  of the beverages offered for sale meeting these standards compared with 14% in clinics and 23% in hospitals (Table 4).

### Food-Vending Machines

Table 5 presents the distribution of foods most commonly found in vending machines in the health care facilities that were assessed. In hospitals, candy, chips, and hot entrées were the most frequently observed items in the vending machines. In health departments and clinics, candy was the most frequently recorded item in vending machines. Healthier items such as cereal and oatmeal, entrée salads, fruits and vegetables, and yogurt were observed in much smaller proportion than other items. Except within health departments, where cereal and oatmeal comprised 5% of the vending-machine slots, all the mentioned healthier items combined constituted 3% of all vended items.

The nutritional values of foods offered for sale across health care sites were compared with the California state nutrition standards for schools. Table 6 shows the percentage of foods that adhered to the standards according to health care setting. Overall, 81% of the foods that were offered for sale across the health care sites did not adhere to the standard, whereas 19% did adhere.

### Advertising on Vending Machines

In addition, we also assessed the advertising that we found on vending machines. Sixty-nine percent of the beverage machines had large illuminated advertisements on the vending fronts. For all facilities the majority of advertising was for soda, which accounted for 75% of the advertising on the beverage-vending machines. One of the 30 food machines had an advertisement for a soy-based snack product.

### Vending Policies

Of the 15 health care facilities that had vending machines, 9 (60%) had adopted, or were in the process of

**TABLE 4** Adherence to California State Nutrition Standards (Senate Bill 965) According to Facility Type (N = 15)

Type of Facility	Does the Beverage Adhere to Senate Bill 965 (MS&HS Standards)? % (n)		% (n) of Sum in Senate Bill 965 Adherence, Total
	Yes	No	
Hospital	23 (238)	77 (781)	100 (1019)
Health department	40 (59)	60 (87)	100 (146)
Clinic	14 (11)	86 (69)	100 (80)
Total	25 (308)	75 (937)	100 (1245)

Excludes 25 slots for which adherence to Senate Bill 965 could not be determined. MS&HS indicates middle school and high school.

**TABLE 5** Distribution of Slots<sup>a</sup> According to Facility Type and Food Category (N = 15)<sup>b</sup>

Food Category	Type of Facility, % (n)			% (n) of Sum in Food Categories, Total
	Hospital	Health Department	Clinic	
Cake and pastry products	5 (67)	7 (14)	3 (3)	5 (84)
Candy	24 (315)	20 (42)	31 (27)	24 (384)
Chips	14 (187)	11 (23)	22 (19)	14 (229)
Cold sandwiches	8 (109)	8 (17)	0 (0)	8 (126)
Cookies	10 (130)	13 (27)	16 (14)	11 (171)
Crackers, pretzels, and popcorn	5 (63)	8 (18)	14 (12)	6 (93)
Hot entrées	14 (189)	13 (28)	0 (0)	13 (217)
Snack bars	4 (47)	3 (7)	5 (4)	4 (58)
Other foods <sup>c</sup>	16 (216)	17 (36)	8 (7)	16 (259)
Total	100 (1323)	100 (212)	100 (86)	100 (1621)

<sup>a</sup> The number of times a food is present accounts for the number of slots.

<sup>b</sup> Excludes 288 empty slots and 7 slots for which the product information was not available.

<sup>c</sup> "Other" represents foods that each accounted for ≤2% of total slots, including: bagels and breads, baked chips, breakfast entrées, cereal and oatmeal, cheese and eggs, entrées, salads, frozen desserts (not ice cream), ice cream, meat snacks, pizza products, seeds and nuts, side salads, sugar-free candy, trail mix, fruits and vegetables, and yogurt.

adopting, policies that set nutrition standards for vending machines. Some of the facilities fell under the same countywide or institution-wide policies, and as a result, there were a total of 5 separate policies found. Three of the 5 policies had been adopted and were in the process of being implemented. Two of the policies had yet to be adopted. The majority of policies did not specify plans for monitoring implementation. However, each of the policies outlined nutrition standards for beverages and foods sold in vending machines.

For beverages, all of the policies included the provision that 50% of the beverages in vending machines must adhere to the beverage standards. In addition, 1 policy required 100% of the beverages in facilities that primarily serve youth to comply with the nutrition standards. The beverage nutrition standards in all of the policies were based on categories of beverages that were allowed or not allowed, with some exceptions given on the basis of nutrient and calorie content. Soda was not

**TABLE 6** Adherence to California State Nutrition Standards (Senate Bill 12) According to Facility Type (N = 15)

Type of Facility	Does the Beverage Adhere to Senate Bill 12 (MS&HS Standards)?		% (n) of Sum in Senate Bill 12 Adherence, Total
	% (n)		
	Yes	No	
Hospital	19 (226)	81 (966)	100 (1192)
Health department	19 (41)	81 (170)	100 (211)
Clinic	14 (12)	86 (74)	100 (86)
Total	19 (279)	81 (1210)	100 (1489)

Excludes 288 empty slots, 132 slots for which Senate Bill 12 adherence was indeterminable and 7 slots for which the product information was not available. MS&HS indicates middle school and high school.

allowed in any policy. Diet sodas were allowed in 4 of the policies. Only low-fat or nonfat milk was allowed in all policies. Flavored milks were not allowed in 3 of the policies, and there were limits on sugar content for flavored milk in the remaining 2 policies. Sports drinks were not allowed in 2 of the policies, and there were calorie restrictions on sports drinks in the remaining policies. Three of the policies allowed only 100% juices without added sweeteners, and the remaining policies allowed juice drinks that contain at least 50% juice. Water was allowed in all policies, and most policies specified that no additives or sweeteners could be added to the water. Three policies allowed soy or other plant-derived milks. Sweetened coffee and tea drinks were allowed to varying degrees across the policies. In addition, all of the policies had calorie and size restrictions on some of the beverages that were allowed.

Similar to beverages, all of the policies included the provision that 50% of the foods sold in vending machines must adhere to the food nutrition standards. One policy required 100% compliant foods to be sold in vending machines in facilities that primarily serve youth. In all of the policies, the nutrition standards for foods were based on nutrient limits. Four of the policies stated that all foods must contain no more than 35% of calories from fat, whereas 1 policy set the limit at 30% of calories from fat. All of the policies stated that foods must contain no more than 10% of calories from saturated fat. Trans fats were not allowed under any of the policies. All of the policies allowed no more than 35% of weight by sugar. Sodium standards were addressed in all policies, but limits varied among the policies. Two policies required foods to have at least 2 g of fiber, whereas the remaining policies did not address fiber. Two policies set calorie limits on the foods sold in vending machines, and 3 policies did not specify calorie limits. In addition to setting nutrient standards, 1 policy outlined specific categories of foods that were allowed and not allowed. Another policy required fruits and vegetables to be available.

## CONCLUSIONS

Although many factors influence food-purchasing decisions, the convenience and availability of vending machines may lead to increased purchasing of vending-machine products in health care facilities. This may be especially true if vending machines are the only source of foods or beverages available in a facility or cafeterias and coffee shops are not open 24 hours/day. Convenience and availability have been reported in past studies as important factors that influence food-purchasing choices in worksite environments.<sup>10,16</sup> In this study, the number of vending machines varied according to institution, but hospitals, on average, tended to have more vending machines located on their grounds. In many of the facilities the vending machines were the only source of foods and beverages available for all or part of the day. These vending machines were located primarily in cafeterias and waiting rooms, where they were highly visible to patients, staff, and visitors. The majority of bev-

erage-vending machines had prominent advertisements for sodas on their fronts, which may also increase their visibility. Although we did not track purchasing and consumption patterns in our study, a study in middle schools indicated that larger numbers of vending machines located in a school is associated with a higher overall intake of soft drinks and sweetened beverages among youth.<sup>15</sup> We hypothesize that this may also be true in health care environments, but further studies must be conducted.

To determine the healthfulness of items that we observed in vending machines, we used the California state nutrition standards for schools. Although these standards have limitations, as mentioned previously, the standards provided a common measure for comparison across facilities, and there was significant overlap between the school nutrition standards and the nutrition standards in the health care vending policies that facilities were working on adopting and implementing. Using the school nutrition standards, we found that the majority of vended foods and beverages did not adhere to the standards, with fewer food items than beverage items adhering. The most prevalent items in vending machines were soda, candy, and chips. These items were consistent with items found in previous vending studies in schools and workplaces.<sup>9–15</sup> Presence of these items and other unhealthy items in vending machines may have an impact on consumption, energy intake, and weight gain. Consumption of soft drinks and sweetened beverages has been linked to increased BMI,<sup>17</sup> and the availability and consumption of fast foods and other high-energy-density foods has also been linked to increased prevalence of obesity.<sup>18,19</sup>

There are a number of potential reasons for the high availability of unhealthy products in the vending machines that we observed in health care facilities. One potential reason for filling vending machines with unhealthy food is the shelf life of the item. Packaged snack items such as candy and chips often have a long shelf life and may not require refrigeration. However, with growing attention toward meeting new nutrition standards in schools and other facilities, many vending companies are developing strategies to market healthier vending-machine products that do not need to be refrigerated and also offer vending machines that contain only healthy product lines.<sup>20</sup> Food manufacturers are also beginning to offer more items that meet certain nutrition standards.<sup>8</sup> Additional research is needed to assess whether the items described as “healthier” by vending companies and food manufacturers are indeed meeting nutrition standards, but there may be healthier alternatives with the necessary shelf life that could replace unhealthy foods. Refrigerated vending machines may also provide a solution to concerns about the shelf life of vending-machine products. Many of the food-vending machines that we observed in health care environments were refrigerated and could possibly contain healthier foods that may be perishable. However, in the refrigerated vending machines, we most commonly observed hot entrées and other entrée items, including sandwiches, breakfast entrées, and pizza products that did not adhere

to the nutrition standards. These unhealthy items could be replaced with healthier items such as fruits, vegetables, and entrée salads.

In addition to concerns about shelf life, another potential reason for the high availability of unhealthy products in vending machines could be financial. Soda, candy, and chips, the most prevalent items that we observed, were the top-selling items in vending machines across the United States in 2005.<sup>8</sup> Among health care facility staff with whom we spoke during the study, there was a concern that removing these items and other unhealthy items could lead to less revenue from vending machines. Although we are not aware of any studies that assessed the financial impact of removing unhealthy items from health care facility vending machines, some studies of financial impact have been performed in school environments and have shown limited or no revenue change when switching to healthier options.<sup>21</sup> To avoid the risk of losses in revenue that may result from changes in vending content, pricing strategies could be used along with the changes. Price reductions for healthier items in vending machines in schools and worksites have been shown to be an effective strategy for increasing purchases of healthier foods.<sup>10</sup> Marketing of new healthier items with the involvement of health care facility staff may also be an effective way to promote sales and reduce any potential revenue loss.

The presence of unhealthy foods and beverages in health care facility vending machines could also be supported by the argument that facility staff members, patients, and visitors should be able to make their own decisions about the type of products they consume. However, because the majority of foods and beverages that we observed in vending machines did not meet the nutrition standards for healthier items, people who wish to make healthier choices at vending machines would be limited in their options. In addition to serving staff, vending machines in health care facilities serve patients and visitors, not all of whom are adults. In fact, many of the facilities that we assessed served children. Having unhealthy items in health care facilities and seeing adult staff consume unhealthy products from vending machines contradicts the nutrition and health messages children often receive from health care providers.

Despite many possible reasons for stocking vending machines with unhealthy items, health care institutions and several local government agencies, counties, and cities in California have begun to develop and implement policies that set nutrition standards for foods and beverages in vending machines. Many of the standards are based on the California state school nutrition standards, but some have gone beyond these standards to include additional limits on sweetened beverages, sodium, trans fat, calories, and the total size of items. However, unlike the school nutrition standards that require 100% compliance, most health care facility and county policies only require that 50% of the items in vending machines adhere to the nutrition standards. Future assessments will be conducted to evaluate implementation of nutrition standards in the health care facilities involved in this study, but additional research is

needed to determine if the presence of healthier items in vending machines makes a difference in consumption behaviors when up to 50% of vending-machine items remain unhealthy.

To our knowledge, this study is one of the first to closely examine the availability and content of vending machines in health care facilities and report on emerging health care facility vending policies. The health care facilities in this study were limited to HEAC across the state of California; however, the results may be applicable to other health care facilities throughout the state. Our survey instrument was created for this study and was based on an instrument that was developed and used for assessing vending machines in school environments. The instrument could potentially be used by other researchers in future studies to assess vending machines in a variety of settings. Once nutrition standards for vending machines are implemented, the instrument also could be used to monitor adherence to standards.

Work on improving food and beverage environments in health care facilities is an evolving area, and there are great opportunities for health care facilities to become model environments that support obesity- and chronic-disease-prevention strategies. Although not all health care facility environments are aimed primarily at children, community obesity-prevention programs are partnering with health care facilities to create seamless environments that support healthy eating and physical activity for children and their families. Future research is needed to assess how best to change the health care food environment and how these changes affect staff, visitor, and patient health.

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Sally Lawrence, Maria Boyle, Lisa Craypo and Sarah Samuels

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