Cleveland Metropolitan School District High School Vending Machine Audits, 2019

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Abstract

Healthy Cleveland (HC), an initiative of the Cleveland Department of Public Health, conducted audits of vending machines located in Cleveland Metropolitan School District high schools. The school district recently adopted an updated wellness policy that requires competitive foods sold meet federal Smart Snacks in Schools (SSIS) guidelines. Fifteen schools containing a total of 35 vending machines were audited and nutrition information analyzed. Eighty-two percent of the machines were beverage machines and 57% were accessible only to staff. Six percent of food items and 22% of beverage items accessible to staff met the SSIS requirements and 28% of food items and 71% of beverage items accessible to students met the SSIS requirements. The average caloric difference between SSIS-eligible and SSIS-ineligible items is significant for both food and beverages (147 vs. 206 and 24.2 vs. 176.5; p<0.01). Recommendations were made by HC to include all vending items in the wellness policy and implement a compliance procedure. Additional information collection including price and marketing would be useful for further insight.

Introduction

The Healthy Eating Committee (HEC) is one of seven committees that are a part of HC, advocating for local food policies, creating resources for nutrition promotion, and executing a variety of community outreach strategies. Schools are key environments for nutrition promotion. According to Reedy and Krebs-Smith (2010), empty calories contribute to 40% of daily calories for children and adolescents age 2-18 years, half of which come from soda, fruit drinks, dairy desserts, grain desserts, pizza and whole milk. Touchpoints where food and beverages are accessible outside of school meals include school stores, vending machines, in-school fundraisers, classroom celebrations and beverage fountains. (CDC 2019) These are important because students may consume over 25% of daily calories from snacks, and students who follow healthy eating patterns are more likely to make academic achievements. (USDA 2018) Federally, the USDA Smart Snacks in Schools (SSIS) standards provide guidance for school stores, vending machines, a la carte foods and in-school fundraisers.

In April 2019, the Cleveland Metropolitan School District (CMSD) Board voted to amend the CMSD Comprehensive Wellness Policy with revisions to include SSIS standards for all competitive foods and foods sold as part of school-sponsored fundraising activities that are sold in school buildings. In the Cleveland region, even though the School Breakfast Program is offered in each CMSD high school, up to 24.1% of high schoolers across Cuyahoga County do not eat breakfast at all on any day of the week and 80.9-81.9% of CMSD high schoolers report not eating breakfast one or more days each week. (Frank et al 2018; Prevention 2017) In 2017, 8.6% of CMSD high schoolers did not consume any fruit throughout the day and 12.8% do not consume any vegetables. However, 32.2-34.9% report fast food consumption outside of school three or more times during the week. Therefore, having healthy options available as snacks can help to increase nutrition throughout the day for growth and academic performance.

SSIS standards for snacks require that **food** products:

- Be a grain product that contains 50 percent or more whole grains by weight (have a whole grain as the first ingredient); or
- Have as the first ingredient a fruit, a vegetable, a dairy product, or a protein food; or
- Be a combination food that contains at least ¼ cup of fruit and/or vegetable; and
- The food must meet the nutrient standards for calories, sodium, sugar, and fats:

Nutrient	Snack
Calories	200 calories or less
Sodium	200 mg or less
Total Fat	35% of calories or less
Saturated Fat	Less than 10% of calories
Trans Fat	0g
Sugar	35% by weight or less

SSIS standards for beverages require that **drinks** in high schools be:

- Unlimited water (can be flavored or unflavored)
- Up to 12 oz. milk can be (low fat or fat-free, either flavored or unflavored)
- Up to 12 oz. 100% juice (can be carbonated or without carbonation; may also be diluted with water; no added sweeteners)
- Up to 12 oz. low-calorie beverage (40 cal/8oz; 60 cal/12oz) – with or without caffeine & carbonation
- Up to 20 oz. no-calorie beverage (10 cal/20 oz.) – with or without caffeine & carbonation

Methods

While it was known that not every high school had vending machines on the property, it was uncertain which high schools did and did not. Beginning with a list of 40 high schools, phone calls were made to school staff for inquiry. Ten HEC members were trained to collect and enter data according to a standardized protocol that included outreach methods, resources to provide, data collection procedures, and follow up nutrition research and data entry into HC's Google Drive. Because nutrition facts labels could not be seen on each vending item, research to find the nutrition information using the brand, product, and unit size was done after the visit to determine if the product is SISS compliant.

Data entry for nutrition information also included calculations to determine percentage of sugar by weight of the product and percentage of total calories both from fat and saturated fat. These data points were not readily available from the products' Nutrition Facts but were necessary to determine SSIS eligibility. For example, a package of two granola bars listed 12 grams of sugar on the nutrition facts label, with a serving size of two bars weighing 42 grams total. Dividing 12 into 42 produces 0.286 or 28.6% of the product weight as sugar. This meets the SSIS standard requiring sugar to be less than 30% of the product weight.

Descriptive statistics were used for describing machine locations and percentage of products meeting SSIS. Duplicate items were removed from the databases so that only unique items remained and t-tests performed to compare the means of available nutrition components between eligible and non-eligible items.

Food Product	Unit Size	Servings Per Unit	Have Nutrition Info? (Y/N)	Grain Product? (Y/N)	Whole Grain 1st Ingredient? (Y/N)	First Ingredient Fruit, Veggie, Dairy, Protein?	Calories per Serving	Total Fat (% of total cal)	Saturated Fat (% of total cal)	Trans Fat (g)	Sodium (mg)	Sugar (g)	% Sugar by Product Weight	Meet Smart Snacks Standards? (Y/N)	Reason Product Does not meet standard
Example: Cheetos, oven baked	0.875 oz	1	Y	Y	N	N	120	7	4	0	200	<1	4	N	Not whole grain-rich product
1.															
2.															
3.															
4.															
5.															
6.															
7.															

Results

Schools and Machine Locations

Out of 40 high schools contacted, 26 reported having vending machines on site. Upon further outreach and in-person visits, 15 schools had working machines that could be audited. The number of vending machines, type of machine, and location of each machine was documented on the audit form. Table 1 below shows where machines were located and the machine type: food or beverage.

Table 1

School		Total Vending Machines	# of Food Machines	# of Bev Machines	# in Staff Lounge	# in Hallway	# in Cafeteria	# in Athletic Area
1	Cleveland Early College High School (Stokes)	2	1	1	2	0	0	0
2	Cleveland School of the Arts	2	2	2	1	1	0	0
3	Cleveland School of Architecture & Design	1	1	0	1	0	0	0
4	East Tech	4	0	4	1	0	3	0
5	Ginn Academy	4	0	4	2	2	0	0
6	Glenville High School	6	1	5	3	0	0	3
7	James Ford Rhodes	2	1	1	2	0	0	0
8	Jane Addams Business and Career Center	2	1	1	2	0	0	0
9	John Adams High School	1	0	1	1	0	0	0
10	John Marshall School of Engineering	2	1	1	2	0	0	0
11	Lincoln-West High School	2	0	2	0	0	2	0
12	Lincoln-West Global Studies	2	0	2	0	0	2	0
13	Lincoln-West Science & Health	3	0	3	1	0	2	0
14	Martin Luther King Jr. Campus	1	0	1	1	0	0	0
15	Newcomers Academy: Thomas Jefferson	1	0	1	1	0	0	0
	TOTALS	Total Vending Machines	# of Food Machines	# of Bev Machines	# in Staff Lounge	# in Hallway	# in Cafeteria	# in Athletic Area
		35	8	29	20	3	9	3

Food Results

Overall, 11 food items, or 8% of all food items available in the machines, met the USDA SSIS criteria. Table 2 below shows the percentage of items from food machines in high schools that meet the standards.

Table 2

School		Total Vending Machines	# of Food Machines	Overall % of Compliant Food Items	% of Student-Accessible Compliant Food	% of Staff-Only Accessible Compliant Food
1	Cleveland Early College High School (Stokes)	2	1	4	n/a	4
2	Cleveland School of the Arts	2	2	17	28	6
3	Cleveland School of Architecture & Design	1	1	17	n/a	17
4	East Tech	4	0	n/a	n/a	n/a
5	Ginn Academy	4	0	n/a	n/a	n/a
6	Glenville High School	6	1	n/a	n/a	n/a
7	James Ford Rhodes	2	1	5	n/a	5
8	Jane Addams Business and Career Center	2	1	3	n/a	3
9	John Adams High School	1	0	n/a	n/a	n/a
10	John Marshall School of Engineering	2	1	0	n/a	0
11	Lincoln-West High School	2	0	n/a	n/a	n/a
12	Lincoln-West Global Studies	2	0	n/a	n/a	n/a
13	Lincoln-West Science & Health	3	0	n/a	n/a	n/a
14	Martin Luther King Jr. Campus	1	0	n/a	n/a	n/a
15	Newcomers Academy: Thomas Jefferson	1	0	n/a	n/a	n/a
	TOTALS	Total Vending Machines	# of Food Machines	Overall % of Compliant Food Items	% of Student-Accessible Compliant Food	% of Staff-Only Accessible Compliant Food
		35	8	8	28	6
				11 items		

Beverage Results

Only one out of the 15 schools did not have a beverage vending machine. Overall, 38 drink options, or 37% of the total options, met the USDA SSIS criteria. Table 3 below shows the percentage of items from beverage machines in high schools that met the standards.

Table 3

School		Total Vending Machines	# of Bev Machines	Overall % of Compliant Beverages	% of Student Accessible Compliant Beverages	% of Staff-Only Accessible Compliant Beverages
1	Cleveland Early College High School (Stokes)	2	1	10	n/a	10
2	Cleveland School of the Arts	2	2	59	63	54
3	Cleveland School of Architecture & Design	1	0	n/a	n/a	n/a
4	East Tech	4	4	10	3	30
5	Ginn Academy	4	4	32	53	11
6	Glenville High School	6	5	80	77	20
7	James Ford Rhodes	2	1	29	n/a	29
8	Jane Addams Business and Career Center	2	1	30	n/a	30
9	John Adams High School	1	1	14	n/a	14
10	John Marshall School of Engineering	2	1	14	n/a	14
11	Lincoln-West High School	2	2	100	100	n/a
12	Lincoln-West Global Studies	2	2	100	100	n/a
13	Lincoln-West Science & Health	3	3	12	100	25
14	Martin Luther King Jr. Campus	1	1	0	n/a	0
15	Newcomers Academy: Thomas Jefferson	1	1	25	n/a	25
	TOTALS	Total Vending Machines	# of Bev Machines	Overall % of Compliant Beverages	% of Student Accessible Compliant Beverages	% of Staff-Only Accessible Compliant Beverages
		35	29	37	71	22
				38 items		

Nutrition

Total calories, percent of saturated fat, sodium, and sugar content were all significantly different between eligible and ineligible food items. There was no difference between percent of total fat, trans fat content, or percent of sugar by product weight. However, limitation between the sample sizes is important to note.

Table 4

	Compliant (n=11)	Compliant, Excluding Nuts (n=9)	Non-Compliant (n=107)	Difference^	p-value^
Avg Calories	147	142	206	59	**<0.01**
Avg Total Fat (%)	35.7	26.7	38	2.3	0.72
Avg Saturated Fat (%)	5.7	4.6	11.9	6.2	**<0.01**
Avg Trans Fat (g)	0	0	0	0	-
Avg Sodium (mg)	122.3	127.8	213.6	91.3	**<0.01**
Avg Sugar (g)	6.8	8	12.9	6.1	**<0.01**
Avg % Sugar by Weight	18.4	21.3	25.1	6.7	0.11

^Significance was assigned at p < 0.01

The difference between average total calories for the 38 eligible beverages and 77 ineligible beverages was 152.3 calories, which is statistically significant.

Table 5

	Compliant (n=38)	Non-Compliant (n=77)	Difference	p-value^
Avg Calories	24.2	176.5	152.3	**<0.01**

^Significance was assigned at p < 0.01

Discussion

Over half of the vending machines on high school property are located in the teachers' lounges, and only 6% of food items and 22% of drinks found in these machines meet the SSIS standards. Machines that were not student-accessible were not currently required to meet SSIS standards. However, of healthy eating behaviors by staff, administrators, and teachers reinforces the social norm and importance of these habits for students. (CDC 2011) Per federal regulations, vending machines on school property must be turned off during the school day. However, there are no current procedures in place to enforce this rule for vending machines at CMSD.

Despite analytical limitations, the difference in nutrition over time remains astounding. If an individual were to consume one snack per day from a vending machine throughout 180 standard school days, non-eligible snack items would result, on average, in an extra 10,620 calories and 1,098 grams of sugar compared to SSIS eligible items. This is 3 pounds of body weight per school year. For beverages, it is an extra 27,414 calories from non-eligible drinks, or 7.8 pounds per school year.

There are additional opportunities for observation and policy recommendations that were not including in these audits. The audit forms utilized only documented the minimum information needed to determine location and SSIS eligibility. Additional information not documented, although anecdotally noticed, included pricing and marketing. Vending machines can be wrapped in logos for specific brands or products, display unofficial nutrition claims near the selectin buttons, and allow for differing cost per volume of options available. Recommendations exist for food and beverage marketing of healthier option such as fruits, vegetables and water near point-of-purchase locations. (CDC 2019) School policy standards for vending machines could include conditions for healthy product marketing and price promotion of water.

Recommendations

A summary of HEC recommendations are below. These recommendations were developed by the HEC in conjunction with CMSD SNS staff.

1. Include staff lounges and all district administration buildings in the Wellness Policy guidelines to promote role modeling best practices.
2. Require items in vending machines to meet the USDA Smart Snacks guidelines regardless of when they are on or off.
3. Create a compliance and enforcement process/protocol to make sure machines are off during the school day, which is already federal law.
4. Provide guidance from SNS for principals with a pre-approved list of items and/or contractors for principals to choose from for machines.

Additionally, future assessments that include marketing and promotion collection would be useful to learn about strategies in place by vending contractors at the schools and to develop guidelines for product marketing in these settings.

References

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