

Food Sales Outlets, Food Availability, and the Extent of Nutrition Policy Implementation in Schools in British Columbia

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ABSTRACT

Background: The purpose of this study was to determine the number and types of different food sales outlets, the types of foods offered for sale in all school food outlets, and the extent of nutrition policy implementation in schools in British Columbia. We also directly measured the number and types of snack foods available for sale in each vending machine at each school.

Methods: Based on a thorough literature review and guided by an expert panel of nutritionists, we developed an instrument to measure the quantity and types of foods offered for sale in vending machines, the types of food for sale in all school food outlets, and the extent of nutrition policy development.

Results: The survey response rate was approximately 70%. Approximately 60% of surveyed schools had a permanent food sales outlet. Snack and beverage vending machines were most common in secondary schools, while tuck shops and food-based fundraisers were more common in elementary schools. While few snack vending machines were present in elementary schools, tuck shops stocked items commonly found in snack machines. Approximately 25% of schools had a formal group responsible for nutrition. These schools were more likely to have nutrition policies in place.

Conclusion: “Junk” foods were widely available in elementary, middle, and secondary schools through a variety of outlets. Although snack machines are virtually absent in elementary schools, tuck shops and school fundraisers sell foods usually found in snack machines, largely cancelling the positive effect of the absence of snack machines in these schools. Schools with a group responsible for nutrition appear to have a positive impact on nutrition policy implementation.

MeSH terms: British Columbia; food; nutrition policy; schools; vending machines

La traduction du résumé se trouve à la fin de l'article.

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Several studies indicate that children on average consume one third of their daily food intake at school.¹ Schools are an ideal venue to promote healthy eating to help reverse trends of increasing obesity and type 2 diabetes among youth.²⁻⁴ Nonetheless, many schools sell food of low nutritional value to their students.

To develop public health nutrition policies to improve childhood nutrition, it is essential to know the extent and quality of food available in schools as well as the extent of development of policies which promote healthy eating among students. The purpose of this study was to determine the number and types of different food sales outlets, the types of foods offered for sale in all school food outlets, and the extent of nutrition policy implementation in schools in British Columbia. We also directly measured the number and types of snack foods available for sale in each vending machine at each school.

METHODS

Survey instrument

A literature search was undertaken in order to identify any instruments that assess the type and extent of food sales and nutrition policy implementation in schools. Existing validated questionnaires⁵⁻¹⁰ were used as a framework to develop a survey instrument. The instrument was reviewed by a steering committee consisting of leading BC nutritionists and pilot tested in several schools. It was not further tested for reliability or validity.

The instrument was designed to elicit information about the number and type of outlets where foods and beverages were sold in schools, their accessibility, the types and quality of foods sold, and the exact number and type of food item offered for sale in school vending machines. Respondents indicated whether or not a school committee was in place to promote healthy eating at the school and whether specific types of nutrition policies were in place or being planned at the school. In the spring of 2005, survey instruments were mailed via the Ministry of Education to the superintendents of BC's 60 school districts, who sent the instrument to each school principal in their district for completion.

The permanent food sales outlets assessed by the instrument were snack and

beverage vending machines, tuck shops and cafeterias. Food-based fundraising events were treated separately. We asked respondents to list the food and drink items sold in vending machines, tuck shops, cafeterias, and at special fundraising events. All food items in vending machines were re-coded into 13 categories and further classified as “more” or “less healthy” choices based on the advice of our expert steering committee (Table I). We also ascertained whether or not a committee “concerned with nutrition” had been formed and the extent of nutrition policy development in each school.

In order to take this analysis beyond a mapping of food availability in schools, we extended the methods and analysis in three ways. As vending machines vary in size, we counted the number of slots (i.e., the number of spaces offering food items) in each machine and the total number of machines in each school to develop an accurate cross-sectional measure of the quantity of snack and beverage items available for sale in each school. We also determined the type of snack offered in each slot and classified these as “less” or “more healthy” (Table I). In this way we were able to determine the number and the proportion of “more healthy” and “less healthy” choice slots offered in vending machines in each school. Because BC schools systematically differ in size (e.g., secondary schools tend to be much larger than elementary schools), we standardized the number of vending machine slots in terms of the number of students enrolled in each school. Using these data, we developed an index of the potential for food sales (PFS Index) for each school.*

Data analysis

Data were entered into Microsoft Excel spreadsheets, checked for accuracy and completeness, and transferred to SPSS (Version 12) for descriptive analyses. This file was linked to a Ministry of Education

* The PFS Index is a number that describes the density of vending slots (per student) in each school as an indicator of exposure to products sold in vending machines. The PFS index for each school was calculated as follows:

$$\text{PFS index} = (\# \text{ vending machine slots}) / (\# \text{ students enrolled in school}) \times 1000$$

A higher PFS index indicates more vending machines per student in a school and therefore a greater potential for sales to students from vending machines.

TABLE I

Categorization of Vended Beverage and Snack Items into “More” and “Less Healthy” Choices*

Less Healthy Choices

Fried snacks; cheesies; potato/corn/wheat or rice chips or crackers (fried)
Coated granola/ breakfast/ sports bars/energy bars; chocolate bars; candies; fruit roll-ups; Slushy, Popsicles
Pastries; cookies; squares; donuts; fritters, long johns, cakes; rice krispie squares; pizza pretzel; ice cream or frozen yoghurt, frosted malt;
Pop; ice tea; hot chocolate; sports drinks; fruit punch/drink/cocktails
Candy bar-flavoured milk drinks; milkshakes
Coffee or tea

More Healthy Choices

Pretzels; popcorn; potato/corn/wheat or rice chips or crackers (baked)
Uncoated granola/breakfast/ sports bars/energy bars; nut bars
100% fruit or vegetable leathers; dried fruit; nuts/trail mix
Water
100% fruit or vegetable juice
Milk (plain white, chocolate)
Basic flavoured milk drinks (chocolate, strawberry, etc.)

* This classification system was developed prior to the creation of the Guidelines for Food and Beverage Sales in BC by the study steering committee.

TABLE II

Number of Responses and Response Rate by School Type

	Elementary	Middle	Secondary	Total
Number of reporting schools	868 (74.3)	86 (7.4)	215 (18.4)	1169 (100)
Number of schools in BC	1201 (73.2)	109 (6.6)	332 (20.2)	1643 (100)

database with the number of students and the classification for each school.¹¹ Basic descriptive analyses were undertaken. As well, we tested for statistical significance using Chi-square analyses where appropriate.

RESULTS

The survey instrument was completed by 1,169 of BC’s 1,643 schools, for an overall response rate of 71.2%. Response rates were similarly high for each type of school (Table II).

Food sales outlets

Six hundred and seventy-seven schools (57.9%) had at least one permanent food sales outlet on site. Beverage machines constituted the single largest type of permanent food sales outlet (42.3%). Snack machines, tuck shops, and cafeterias each accounted for less than one fifth of all food outlets. Food-sales-based fundraising is mainly an elementary school activity; 82% of elementary schools held a fundraiser during the month prior to the survey, compared with only 51.8% of middle and 38.8% of secondary schools.

In order to better understand the potential for food sales to students from school-based vending machines, it is necessary to describe the quantity of food sold in school

vending machines in relation to the number of students enrolled in the schools. The higher the PFS index for a given school or type of school, the greater potential of exposure to snack foods from vending machines.

The PFS index for *beverage* vending machine slots increases in a regular fashion moving from elementary (40.0) up through to secondary schools (71.6), indicating exposure to beverages in vending machines is approximately 80% greater in secondary and 50% greater in middle compared with elementary schools. While the potential for exposure to beverage snacks is higher in middle and secondary schools, the proportion of more healthy choices available in beverage machines is similar (approximately 30%) across school types (Table III).

The PFS index for *snack* vending machines is highest in elementary schools (141.9). However, as only 16 elementary schools (less than 2%) reported the presence of a snack machine, the PFS index for elementary schools is not particularly representative. (The minimal presence of these machines in elementary schools is a function of voluntary guidelines regarding the sale of junk food and vending machines in elementary schools.^{12,13} In comparing the PFS indices for beverages and snacks, it is clear that the index for snack vending

TABLE III
Average Potential for Food Sales (PFS) Index and the Proportion of Beverage and Snack Vending Machine Slots with “More Healthy” Choices, by School Type

		Elementary	Middle	Secondary
Beverage machines	PFS Index Score	40	61.8	71.6
	Proportion of slots with “more healthy” choices	0.33	0.34	0.26
Snack machines	PFS Index Score	141.9	89.1	96.8
	Proportion of slots with “more healthy” choices	0.30*	0.31	0.19

* Note: Snack machines were present in only 16 elementary schools.

TABLE IV
Potential for Food Sales (PFS) Index for Beverage and Snack Slots and Proportion (%) of Beverage and Snack Slots Offering “More Healthy” Choices, by Presence or Absence of a Formal Nutrition Group in the School

Formal Nutrition Group	Beverage Slots		Snack Slots	
	PFS Index	Proportion with “More Healthy” Choices	PFS Index	Proportion with “More Healthy” Choices
Absent	71.1	0.30	102.8	0.20
Present	57.3	0.32	91.8	0.29

TABLE V
Proportion (%) of Schools with Nutrition Policies in Place and Their Stage of Development

School Food Policies or Guidelines	In Place	Under Development	None in Place or Under Development
Types of food sold in school vending machines, cafeterias or school stores.	20.3	14.6	65.1
Types of food sold at school special events and field trips.	10.6	16.8	72.6
Fundraising by selling food outside the school.	7.2	8.5	84.2
Competitive pricing to promote healthy food choices.	17.3	12.6	70.1
Discouraging the use of food as a reward.	12.7	15.0	72.3
Limiting access to less nutritious foods during school hours.	28.7	13.8	55.5
Providing adequate time and pleasant spaces to eat.	45.6	8.5	43.8

TABLE VI
Number and Proportion (%) of Schools with Any Nutrition Policy in Place, by Presence of a Formal Group Concerned with Nutrition

Implementing Any Nutrition Policy/Guideline	Formal Nutrition Group		Total
	Absent	Present	
No	367 (48.8)	66 (26.0)	433 (43.0)
Yes	385 (51.2)	188 (74.0)	573 (57.0)
Total	752 (100)	254* (100)	1006 (100)

* 256 schools had a group concerned with nutrition in place. However, 2 of these schools had information missing about implementation of nutrition policies. This is why only 254 schools are reported with a formal nutrition group. This difference is statistically significant (Chi square=40.3; p=0.000).

machines in middle and secondary schools is much higher than it is for beverage vending machines, indicating that the potential for student exposure to snacks in vending machines in these types of school is higher than for beverage machines. As well, as in the case of beverage vending machines, the proportion of snack machine vending slots offering “more healthy” choices ranged from 20-30% (Table III).

The number of tuck shops is similar in elementary schools and secondary schools (108 and 93, respectively). After standardizing for the number of students enrolled in each school, the potential for sales from tuck shops is approximately fourfold higher in elementary compared with secondary schools (i.e., the number of students per tuck shop in elementary schools was 260 compared with 978.5 in secondary schools). However, this trend could be

partly offset because of the increased hours of opening per week moving from elementary to secondary schools. While elementary schools have virtually no snack machines, the much greater presence of tuck shops may act as a substitute.

Nutrition policy

A total of 256 schools (25.2%) had a formal group concerned about nutrition in place. Middle schools had the highest proportion of these groups with 32.1% reporting a formal nutrition group in the school.

The presence of a formal nutrition group appears to have an effect on the PFS index for the school. The PFS index for beverage machine slots is approximately 20% lower in schools with a formal group concerned with nutrition in place. The PFS index for snack machines is approximately 10% lower in schools with a formal group concerned with nutrition (91.8 versus 102.8) (Table IV).

Six hundred fifty-four (55.9%) schools had at least one of seven specific nutrition policies in place and a further 110 schools were developing at least one of them (Table V). The full range of policies was under development in approximately 10 to 15% of schools. However, except for policies relating to time and space to eat and limiting access to less nutritious foods, approximately two thirds of schools had no policies in place or under development.

The impact of having a formal group concerned with nutrition present in the school was assessed in terms of its influence on nutrition policy development. Of the schools with such a group in place, 74% had also implemented at least one of the seven nutrition policies described above (Chi square=40.3; p=0.000) (Table VI).

DISCUSSION

The instrument used for this study did not provide information regarding *actual* food purchases or volume of sales. Rather, we measured the extent of student exposure to different types of foods using the PFS Index. Although assessing the number of selections available in vending machines does not inform us as to which items students are actually purchasing, it does provide an easily measured indicator for food availability. Aside from increasing students’ opportunity to consume particular foods,

the availability of different types of foods in the school environment can also set an example for appropriate eating habits and influence students' food choices in general.

There is evidence to support a link between food availability and diet among school children. Children spend much of their day in school and several studies indicate that children on average consume one third of their daily food intake at school.¹ Schools have thus been identified as an ideal venue to promote healthy eating for reasons of improved health, psychosocial well-being, and academic performance, all of which are related to poor nutrition.²⁻⁴ Canadian children are consuming upwards of 25% of calories from foods of low nutritional value such as pop and sweet or salty snacks,^{14,15} the types of foods often sold in schools. Moreover, a study of middle school students in Texas showed that diets were affected when students were offered access to vending machines and canteens in addition to school lunch programs. Students with access to foods from these sources had lower intakes of fruits, vegetables, and milk, and consumed more sweetened drinks and fried foods.¹⁶ Time can also be a factor in food choices; insufficient time for meals can encourage students to purchase food from vending machines rather than line up at the cafeteria.¹⁷ Price can have an impact as well, as healthier options often cost more than "junk" foods. When faced with price reductions on healthy foods such as fresh fruit or baby carrots, students tend to choose these options over traditional high-fat snack foods.¹⁸ Thus there is a strong argument for providing access to high-quality, competitively-priced, healthy foods that will be attractive to students.

Virtually all schools in this study had either a permanent food sales outlet or regularly held food-based fundraising events and "less healthy" food choices were widely available. Focussing on sale of foods in vending machines alone is likely insufficient to improve the quality of foods offered for sale at school, as vending machine guidelines are essentially circumvented through sales in tuck shops and fundraisers. This issue is of particular concern in elementary schools where, although snack machines are rare, tuck shops and fundraisers selling snack-like items are ubiquitous.

Although studies are limited, the evidence suggests that in order for school food policies to have the greatest impact on student health, a comprehensive, whole school approach needs to be taken.^{19,20} The 2003 Nova Scotia Children's Lifestyle and School Performance Study (CLASS) found that children from schools participating in a coordinated program promoting healthy eating at school had healthier weights and better diets than non-participants. Moreover, children from schools with more piecemeal nutrition policies did not fare better than children from schools with no nutrition programs.¹⁹ These results add strong support for the formation of a school committee with a focus on offering healthier choices to students and coordinating comprehensive nutrition policies.

Recommendations

The formation of groups focussed on nutrition in the schools should be encouraged because of their positive impact on school food policy, particularly in elementary schools where policies are lacking. Guidelines regarding the sale of food in vending machines and tuck shops should be mandatory. Schools should also work with the food industry to improve the types of snacks and beverages available in school vending machines.

RÉSUMÉ

Contexte : Cette étude visait à déterminer le nombre et la catégorie des points de vente de denrées alimentaires dans les écoles de la Colombie-Britannique, le type d'aliments vendus en milieu scolaire et la mesure dans laquelle les écoles mettent en oeuvre une politique nutritionnelle. Nous avons aussi directement mesuré le nombre et le genre de collations proposées dans les distributeurs automatiques des écoles.

Méthode : D'après les résultats d'une enquête bibliographique approfondie et les conseils d'un groupe de nutritionnistes, nous avons élaboré un instrument pour mesurer 1) le nombre et le genre d'aliments vendus dans les distributeurs automatiques, 2) le genre d'aliments vendus dans l'ensemble des points de vente de denrées alimentaires en milieu scolaire et 3) la prévalence des politiques nutritionnelles dans les écoles.

Résultats : Nous avons obtenu un taux de réponse d'environ 70 % à notre enquête. Quelque 60 % des écoles sondées avaient un point de vente de denrées alimentaires permanent. Les distributeurs automatiques de collations et de boissons étaient surtout présents dans les écoles secondaires, tandis que les comptoirs à provisions et les campagnes de financement par la vente d'aliments étaient plus courants dans les écoles primaires. Nous avons compté très peu de distributeurs automatiques de collations dans les écoles primaires, mais les comptoirs à provisions y vendaient les articles que l'on trouve communément dans ces machines. Environ le quart des écoles avaient officiellement mandaté un groupe pour s'occuper de nutrition. Ces écoles étaient plus susceptibles d'avoir instauré une politique nutritionnelle.

Conclusion : Au primaire comme au secondaire, la « malbouffe » est très présente dans les divers points de vente de denrées alimentaires dans les écoles. Bien que les distributeurs automatiques soient pratiquement absents des écoles primaires, les comptoirs à provisions et les campagnes de financement par la vente d'aliments proposent tous les produits que l'on trouve en général dans les distributeurs de collations, ce qui annule en grande partie l'effet positif de l'absence de ces machines au primaire. Par ailleurs, les groupes responsables de la nutrition dans les écoles semblent exercer un effet positif sur la mise en oeuvre de politiques nutritionnelles.

Clearly, many questions remain about how best to approach nutrition in schools. It appears, however, that schools are an ideal setting for health promotion. Habits learned in childhood often carry over into adulthood, suggesting that healthy school children are the key to a healthy population in the future. With a variety of efforts currently underway and an emerging interest from governments at all levels, schools today are in an ideal position to take a lead on school nutrition by implementing more comprehensive school health promotion initiatives.

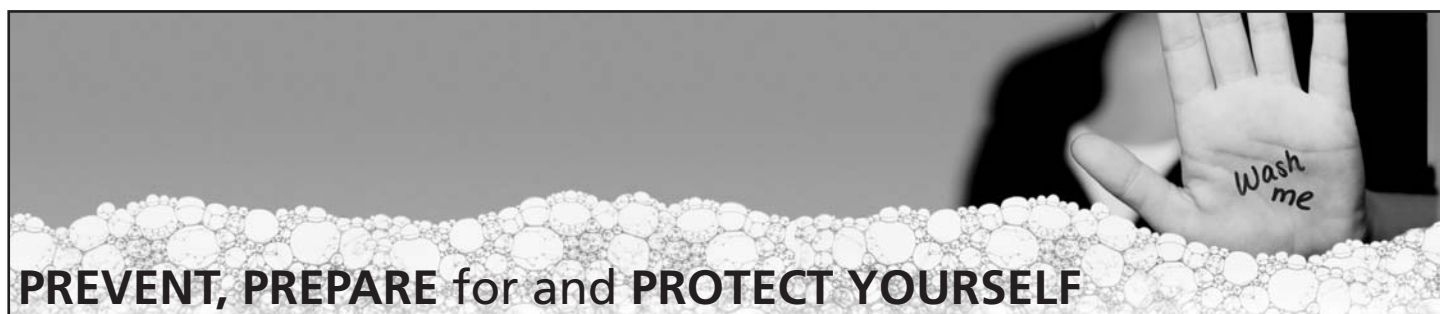
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PREVENT, PREPARE for and PROTECT YOURSELF from the next FLU PANDEMIC

The Canadian Public Health Association (CPHA) and the Pandemic Health Alert Network are informing Canadians about the basic public health steps we can all take to help prevent the spread of infection, prepare to cope in an emergency, and protect our health during a flu pandemic.

Around the world, governments are gearing up for the next flu pandemic. Websites, fact sheets and checklists abound. However, the language they use and level of information they provide can be overwhelming and technical. To address this, CPHA and the Pandemic Health Alert Network have created a toolkit of practical, evidence-based information that is communicated in plain language.

This simple and practical toolkit provides Canadians with the information they need to protect themselves in a flu pandemic. The tools are easy to use, with common sense measures Canadians can put into practice in their daily lives.

These simple public health steps fall into three action areas:

1. **PREVENT** – basic public health habits that reduce the chance of catching and spreading the flu, such as proper hand washing;
2. **PREPARE** – easy-to-follow instructions on how to be prepared for a flu pandemic, or other emergency situation; and
3. **PROTECT** – crucial information on self-care during a flu pandemic.

The toolkit is designed to stimulate Canadians' interest to learn more and put that knowledge into action with simple measures that could stem the force of the next flu pandemic. The hope is that these steps will strengthen public resilience. That way we'll all be better prepared to cope in a flu pandemic, or other public health emergency.

The toolkit is available in English and French, online at www.pandemic.cpha.ca.