



The impact of a population-level school food and nutrition policy on dietary intake and body weights of Canadian children[☆]

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ABSTRACT

Objective. The objective of this study is to assess population-level trends in children's dietary intake and weight status before and after the implementation of a provincial school nutrition policy in the province of Nova Scotia, Canada.

Method. Self-reported dietary behavior and nutrient intake and measured body mass index were collected as part of a population-level study with grade 5 students in 2003 ($n = 5215$) and 2011 (5508), prior to and following implementation of the policy. We applied random effects regression methods to assess the effect of the policy on dietary and health outcomes.

Results. In 2011, students reported consuming more milk products, while there was no difference in mean consumption of vegetables and fruits in adjusted models. Adjusted regression analysis revealed a statistically significant decrease in sugar-sweetened beverage consumption. Despite significant temporal decreases in dietary energy intake and increases in diet quality, prevalence rates of overweight and obesity continued to increase.

Conclusion. This population-level intervention research suggests a positive influence of school nutrition policies on diet quality, energy intake and healthy beverage consumption, and that more action beyond schools is needed to curb the increases in the prevalence of childhood obesity.

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Introduction

Public policy is a critical component of population health interventions (Hawe and Potvin, 2009) and offers an important opportunity to address the rising public health concerns of child and adolescent obesity (Story et al., 2009b). Rates of overweight and obesity have increased over the last two decades (Shields, 2006a; Tremblay and Willms, 2000; Willms et al., 2003) and have significant health (Whitaker et al., 1997; Must et al., 1999; Rocchini, 2002; Biddle et al., 2004) and economic implications (Kirk et al., 2011; Kuhle et al., 2011; Tran et al., 2013). Current evidence suggests the need for comprehensive, sustainable initiatives to stimulate the changes necessary to produce a population-level change in childhood weight status (Hobbs, 2008); however, there is a relative paucity of population-level intervention research to help inform this

important public health issue (Sanson-Fisher et al., 2008). Schools are an important partner in population-level obesity prevention, particularly through supporting early development of healthy behaviors, including promoting healthy eating and physical activity (Stone et al., 1998; Story et al., 2009a; Wechsler et al., 2000). Over the past ten years, many school jurisdictions have developed and implemented nutrition policies and guidelines as part of a broader strategy to address childhood obesity (Boehmer et al., 2007; Foster et al., 2008).

In Canada, there is no national/federal school nutrition policy or school feeding program; rather provincial/territorial jurisdictions are responsible for developing policies to regulate and manage school food. Research and policy activity in the Canadian province of Nova Scotia (NS) provide a timely opportunity to explore the relative impact of a nutrition policy on children's health behaviors and weight status over time (McIsaac et al., 2012). Provincial results from the 2003 Children's Lifestyle and School Performance Study I (CLASS I) (Veugelaers and Fitzgerald, 2005b; Veugelaers et al., 2005) helped to inform new policies and investments related to school health over the past decade in NS. The *Food and Nutrition Policy for Nova Scotia Public Schools* was introduced in 2006, with full implementation expected in all public (state) schools by 2009. This policy included all three categories defined in an earlier systematic review, including nutritional guidelines, regulation of food and beverages available and price interventions (Jaime and

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Table 1
Nova Scotia Nutrition Policy 2006: Summary of directives.

Directives	Description
1. Food and Beverages Served and Sold in School	<p>1.1 During the school day when students are present, food and beverages served and sold in school will be consistent with the Food and Beverage Standards for Nova Scotia Public Schools. This includes cafeterias, canteens, vending machines, and lunch, breakfast, and snack programs.</p> <p>1.2 The policy and food and beverage standards are also in effect during evening programs for students provided by the school. (Refer to Directives 5 and 6 for considerations for Fundraising and Special Functions.)</p> <p>1.3 Schools will ensure that the majority of choices available are from food and beverages of Maximum Nutrition, recognizing that they are more nutritious than those of Moderate Nutrition.</p> <p>1.4 Schools will serve or sell only milk (white, chocolate, flavored, and nutritional alternatives to milk, e.g., soy), 100% juice, and water as beverages as per the Food and Beverage Standards for Nova Scotia Public Schools.</p> <p>1.5 Schools will not use deep fat fryers to prepare food.</p>
2. Clean Drinking Water	<p>2.1 Schools will ensure that students and staff have access to clean drinking water during the school day.</p> <p>2.2 Teachers and administrators will encourage students to drink water, especially during periods of hot weather or increased physical activity. This may be facilitated by allowing water bottles into the classroom.</p>
3. Programming	<p>3.1 It is expected that all schools will participate in the Nova Scotia Department of Agriculture's School Milk Program.</p>
4. Pricing	<p>4.1 To ensure that healthy food and beverage choices are accessible to the majority of students, schools will make affordability the primary consideration when setting prices or profit margins. Meal programs, in particular, will be priced with this in mind.</p>
5. Fundraising	<p>5.1 Fundraising with food and beverages organized by and through schools will center only on items of Maximum or Moderate Nutrition.</p>
6. Special Functions	<p>6.1 Food and beverages of Maximum and Moderate Nutrition will be offered during Special Functions. However, Special Functions may include items from the Minimum Nutrition list. Special Functions are events that may occur once or twice a month and include special occasions and in-school celebrations (e.g., parent–teacher night, Remembrance Day, school bazaar, Spring Fling, Halloween, Christmas bake sales).</p>
7. Promotion and Advertising	<p>Schools will work to develop a culture that promotes health by</p> <p>7.1 promoting healthy food and beverage choices that emphasize and are consistent with the Maximum Nutrition and Moderate Nutrition lists.</p> <p>7.2 giving priority space to healthy food and beverages as defined by the Maximum Nutrition list (e.g., counter-top refrigerators, placement of fruits and vegetables at student eye level).</p>
8. Food as a Reinforcer	<p>8.1 School staff and volunteers will not offer food as a reinforcer or withhold food from students as a consequence, except in cases where a program planning team is using applied behavioral analysis to implement an individual program plan for a student.</p>
9. Students Who May Be Vulnerable	<p>9.1 Schools will ensure that students and parents are aware of breakfast, lunch, and snack programs that are offered in or through the school at minimal or no cost and are accessible to all students.</p> <p>9.2 Schools must ensure that any food programs are made available to students in a non-stigmatizing manner.</p> <p>9.3 Schools will work with parents to ensure that staff/volunteers are aware of food allergies and guidelines for supporting children with food-related chronic diseases (e.g., diabetes, celiac disease).</p> <p>9.4 Schools will ensure that any food and beverages served and sold from those listed in the Food and Beverage Standards for Nova Scotia Public Schools are in alignment with school board anaphylaxis policy, Canadian School Boards Association Anaphylaxis Guidelines, or Peanut Aware policies and guidelines.</p>

Table 1 (continued)

Directives	Description
10. Portion Sizes	<p>10.1 Schools will serve and sell appropriate portions of food and beverages. Super-sized portions are not appropriate to serve or sell in schools. Refer to Canada's Food Guide to Healthy Eating for information related to portion sizes.</p>
11. Food Safety	<p>11.1 Schools are required to prepare and serve foods in accordance with food safety standards and training guidelines as outlined by the Health Protection Act of the Nova Scotia Department of Agriculture. This may require the need for a Food Establishment Permit, food safety training, and Workplace Hazardous Materials Information System (WHMIS) training.</p> <p>11.2 Schools will emphasize and promote cleanliness. Placemats or disinfectant wipes are encouraged if students are to eat at their desks.</p> <p>11.3 Schools will ensure that students are aware of the importance of hand washing and will provide students with the opportunity to wash their hands before consuming meals.</p>
12. Nutrition Education	<p>12.1 The Department of Education will work with partners to ensure continued development and currency of high-quality, evidence-based health education curriculum that includes food and nutrition outcomes.</p> <p>12.2 The Department of Education will work with partners to ensure continued development and currency of high-quality, evidence-based family studies curriculum that includes food and nutrition studies.</p> <p>12.3 When possible, schools should integrate nutrition education into other subject areas and activities beyond the classroom.</p> <p>12.4 The Department of Education will work with partners to enhance pre-service and in-service teacher education regarding nutrition.</p> <p>12.5 The Department of Education will work with partners to ensure that opportunities for ongoing professional development are made available to teachers to support food and nutrition education.</p> <p>12.6 The Department of Education will work with partners to ensure that teachers and students have access to the resources they need to address food and nutrition curriculum outcomes.</p>

Lock, 2009). Briefly, the Nova Scotia Nutrition Policy (NSNP) is intended to increase access to and enjoyment of health-promoting, safe, and affordable food and beverages served and sold in public schools, with the objective of helping to make the healthy food and beverage choice the easy choice in the school setting. The policy mandates standards for foods and beverages served and sold in schools and provides directives for various school eating practices (including pricing, programming and advertising) and guidelines that encourage schools to foster community partnerships and support local food products (Government of Nova Scotia, 2008). A summary of the policy directives and guidelines is provided in Table 1. Following policy implementation, a subsequent data collection cycle in 2011 (CLASS II) provided an opportunity to explore how changes in school food practices as a result of the NSNP may have affected changes in student behavior, if at all. The objective of this study is therefore to assess population-level trends in children's nutritional intake and weight status from 2003 to 2011 as they relate to the potential impact of the NSNP.

Methods

Study design

CLASS is a large, cross-sectional, provincial study that has investigated the relationship between nutrition, physical activity, mental health and school performance of grade 5 students in Nova Scotia across two time points (2003 and 2011). The vast majority of the grade 5 student population in Nova Scotia attends

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