

Healthy Eating and School Performance: An Evidence Summary

Comprehensive School Health

Comprehensive School Health (CSH) is a whole-school approach based on the premise that health and education are interconnected¹. Students who are healthy are more likely to be successful in school, and success in school helps children and youth to develop the knowledge, skills, and attitudes required to lead healthy lives. A coordinated approach to school health that incorporates community partnerships, curriculum and improvements to the social and physical environment has been correlated with better school-level progress and performance ratings (such as improvements in meeting school-level academic targets for specific subjects, and lower drop-out rates)^{2,3}. The most effective school health programs promote healthy eating, active living and mental health, partly due to the relationships between these health indicators and school performance⁴.

Good nutrition contributes to healthy growth and development, chronic disease prevention, strong school performance and positive behaviour among children and youth. This evidence brief describes the links between healthy eating and school performance as well as current nutrition-related habits and trends among Albertan and Canadian children and youth.

The Relationship between Nutrition and Academic Achievement

Numerous studies have examined the relationships between a healthy diet, body weight and students' academic achievement, as measured by student-reported grade averages, grades in core subject areas (mathematics and languages), and/or scores on standardized tests.

Choosing Wisely: The Importance of Eating Healthy Foods

Healthier eating habits have been associated with improved performance on standardized tests and overall grade point averages⁵⁻⁷. Similarly, the consumption of less healthy foods has been associated with poorer achievement in core language and math courses⁸. When students do not eat a healthy diet, they may miss out on important nutrients needed to support optimal cognitive functioning. Iron deficiency, particularly when severe enough to cause anemia, has been associated with poorer cognition, shortened attention span, fatigue and significantly lower scores on standardized math tests⁹⁻¹¹. While anemia is not as common in Canada as in some areas of the world, iron deficiency can be a concern among certain groups of children and youth, including those who may be following vegetarian or vegan diets and teenage girls, who have relatively high requirements for iron¹².

What is Healthy Eating?

Research studies in this area all use similar definitions of healthy foods and dietary habits. Healthier eating habits are typically characterized by a variety of foods, adequate amounts of vitamins and minerals, large amounts of vegetables and fruits, and moderate amounts of fat⁵⁻⁷. On the other hand, less healthy foods are typically described as those that are higher in sugar and/or fat and low in vitamins and minerals, such as potato chips, French fries, hamburgers, hotdogs, and sweetened beverages⁸.

Regardless of how it is described in individual research studies, a healthy diet is one that includes a variety of foods from *Eating Well with Canada's Food Guide*¹³ in quantities that are recommended for a person's age, sex, lifecycle stage, and activity level.

Research in Canada and Alberta indicates that many children and youth are not getting enough of the healthy foods they need to support optimal health and learning, such as vegetables and fruit. Children commonly consume sugar-sweetened beverages and fast foods, which are typically of low nutritional value and have been linked to poorer diet quality, increased energy intake, and weight gain over time¹⁴⁻¹⁷. Less healthy foods that don't fit into the four food groups account for over 20% of the total energy consumed by Canadian children and youth¹⁸. This is a trend that schools can help to reverse by offering healthier foods where food is provided and promoting nutrition among their students.

Current Eating Patterns of Canadian Children and Youth

Percent of school-aged children who:	Sex	Age in Years		
		4-8	9-13	14-18
Eat at least 5 daily servings of vegetables and fruit ¹⁸	Boys & Girls	29%	35%	42%
Drink at least one regular pop per day ¹⁹	Boys	19%	33%	53%
	Girls	17%	29%	35%
Eat too much sodium (salt) ²⁰	Boys	93%	97%	97%
	Girls		83%	82%
Eat foods prepared at a fast food outlet daily ¹⁸	Girls & Boys	19%	21%	33%
Eat more energy than they need per day ^{12,21}	Girls & Boys	20%*	30%	

*This estimate includes ages 1-8 years

Too much or too little: The importance of eating the right amount

Eating too much food and less-healthy types of food, coupled with low levels of physical activity can lead to weight gain in children, youth, and adults alike; however, not eating enough food can also have negative effects on a child's development, learning capacity and behaviour. A well-balanced diet that includes a variety of foods throughout the day, in portion sizes that are appropriate for a child's age and sex can help to support academic success.

Students, especially girls, who are overweight tend to have poorer academic outcomes and are more likely to experience difficulties in math and reading^{11,22-26}. This relationship may be influenced by socioeconomic status as well as mental health problems, which may both predispose children and youth to obesity and/or poor academic performance^{11,22,24,26}. Between 1978 and 2008, the percentage of Canadian children and youth who were overweight or obese rose from 15% to 26%^{27,28}, making this a common issue in schools today.

Body Weights of Albertan Children and Youth

- 22% of Albertan children and youth are overweight or obese²⁹.
- More Albertan youth aged 12-17 years old are overweight or obese (30%) than Albertan children aged 2-11 years of age (16%)²⁹.
- Rates of overweight and obesity are significantly higher among Albertan children and youth living in rural areas (27%) when compared to those living in urban areas (19%)³⁰. In this study, urban areas included only the Census Metropolitan Areas (CMA) of Calgary and Edmonton.

On the other hand, limited availability of nutritionally adequate and safe foods (which can lead to hunger) has been associated with poorer cognitive functioning and lower academic achievement and test scores as reported by students and parent^{9,31}. Food insecurity, which is defined as a "lack of access to affordable, adequate food through socially acceptable means"³², is common in Alberta. Approximately 12% of children and youth in the province come from food insecure households³³.

Getting a Good Start: The Importance of Breakfast

Eating breakfast positively influences several measures of academic performance, including ^{9,11,34}:

- Short-term cognition;
- Mathematics scores;
- Tests of memory and creativity; and,
- Physical endurance.

Breakfast Consumption

Some Canadian research suggests that more than 24% of children in Grade 4 do not eat breakfast every day and by Grade 8, 47% of girls and 33% of boys do not eat breakfast daily ³⁵.

The greatest positive impact of breakfast seems to be on students who are at nutritional risk. Regardless of nutritional status, eating breakfast is linked with improved overall health and well-being of school-aged children and improvements in overall diet quality, which also contributes to stronger academic performance ^{9,34}.

The Relationship between Nutrition and Student Behaviour

A student's behaviour influences the way in which he or she is treated by school staff and peers, and ultimately contributes to academic success. Attentiveness, absenteeism and tardiness, hyperactivity and aggression, social withdrawal, and social skills of school-aged children can all be influenced by the following nutrition-related factors:

- Students who consume breakfast in the morning have an improved attention span and are less distracted in class ³⁶. School breakfast programs have been shown to improve student attendance and reduce tardiness ^{9,11}.
- Consuming less healthy foods, particularly at a young age, has been linked to increased absenteeism from school as well as lower levels of education completed in adulthood ^{8,37}.
- Students who have a higher than normal body weight tend to have higher rates of absenteeism ^{22,23}.
- Food insecurity due to limited household resources has been associated with hyperactivity and aggression, as well as withdrawn behaviours among school-aged children ³¹. Children who come from families where food availability may be limited are also more likely to have difficulty socializing at school, have a greater chance of being suspended, and have higher needs for counseling and special education services ^{31,38}.

Moving Toward a Healthy School Environment

Eating habits and body weight are determined by an individual's knowledge and behaviours as well as their surrounding environment. Children and youth spend up to 50% of their waking hours in school ³⁹ and consume 30%-50% of their daily food intake during this time ⁴⁰, making it an ideal setting to promote and encourage healthy eating habits through education, peer and adult role modeling, environmental changes and supportive policies that enable students to make healthy choices. The accompanying Alberta Health Services resource, *Strategies for Improving Nutrition among School-Aged Children and Youth*, provides a variety of effective ideas that schools can use to improve the eating habits of their students.

References

1. Joint Consortium for School Health. What is comprehensive school health? [Online]. 2008 [cited 2010 Nov 30]; Available from URL: <http://eng.icsh-cces.ca/upload/JCSH%20CSH%20Framework%20FINAL%20Nov%2008.pdf>
2. Vinciullo FM, Bradley BJ. A correlational study of the relationship between a coordinated school health program and school achievement: a case for school health. *J Sch Nurs* 2009;25(6):453-465.
3. Rosas S, Case J, Tholstrup L. A retrospective examination of the relationship between implementation quality of the coordinated school health program model and school-level academic indicators over time. *J Sch Health* 2009;79(3):108-115.
4. Stewart-Brown S. What is the evidence on school health promotion in improving health or preventing disease and, specifically, what is the effectiveness of the health promoting schools approach? World Health Organization Europe Health Evidence Network Report. [Online]. 2006 [cited 2010 Nov 30]; Available from URL: http://www.euro.who.int/_data/assets/pdf_file/0007/74653/E88185.pdf
5. Florence MD, Asbridge M, Veugelers PJ. Diet quality and academic performance. *J Sch Health* 2008 Mar;78(4):209-215.
6. MacLellan D, Taylor J, Wood K. Food intake and academic performance among adolescents. *Can J Diet Pract Res* 2008;69(3):141-144.
7. Wang F, Veugelers PJ. Self-esteem and cognitive development in the era of the childhood obesity epidemic. *Obes Rev* 2008;9(6):615-623.
8. Kristjansson AL, Sigfusdottir ID, Allegrante JP. Health behavior and academic achievement among adolescents: The relative contribution of dietary habits, physical activity, body mass index, and self-esteem. *Health Educ Behav* 2010;37(1):51-64.
9. Taras H. Nutrition and student performance at school. *J Sch Health* 2005;75(6):199.
10. Halterman JS, Kaczorowski JM, Aligne CA, Auinger P, Szilagyi PG. Iron deficiency and cognitive achievement among school-aged children and adolescents in the United States. *Pediatrics* 2001;107(6):1381.
11. Story M, Kaphingst KM, French S. The role of schools in obesity prevention. *Future Child* 2006;16(1):109-142.
12. Health Canada Office of Nutrition Policy and Promotion. Do Canadian adolescents meet their nutrient requirements from food intake alone? [Online]. 2010 [cited 2010 Nov 30]; Available from URL: <http://www.hc-sc.gc.ca/fn-an/surveill/nutrition/commun/art-nutr-adol-eng.php>
13. Health Canada. Eating well with Canada's food guide. [Online] 2007 [cited 2010 Nov 30] Available from URL: http://www.hc-sc.gc.ca/fn-an/alt_formats/hpfb-dgpsa/pdf/food-guide-aliment/view_eatwell_vue_bienmang-eng.pdf
14. Malik VS, Schulze MB, Hu FB. Intake of sugar-sweetened beverages and weight gain: a systematic review. *Am J Clin Nutr* 2006;84(2):274.
15. Veugelers PJ, Fitzgerald AL. Prevalence of and risk factors for childhood overweight and obesity. *Can Med Assoc J* 2005;173(6):607.
16. Bowman SA, Gortmaker SL, Ebbeling CB, Pereira MA, Ludwig DS. Effects of fast-food consumption on energy intake and diet quality among children in a national household survey. *Pediatrics* 2004;113(1):112.
17. Larson NI, Neumark-Sztainer DR, Story MT, Wall MM, Hamack LJ, Eisenberg ME. Fast food intake: longitudinal trends during the transition to young adulthood and correlates of intake. *J Adolesc Health* 2008;43(1):79-86.
18. Garriguet D. Canadians' eating habits. *Health Rep* 2007;18(2).
19. Garriguet D. Beverage consumption of children and teens. *Health Rep* 2008;19(4):17-22.
20. Garriguet D. Sodium consumption at all ages. *Health Rep* 2006;18(2):47.
21. Health Canada Office of Nutrition Policy and Promotion. Do Canadian children meet their nutrient requirements from food intake alone? [Online]. 2010 [cited 2010 Nov 30]; Available from URL: http://www.hc-sc.gc.ca/fn-an/alt_formats/pdf/surveill/nutrition/commun/art-nutr-child-enf-eng.pdf
22. Taras H, Potts-Datema W. Obesity and student performance at school. *J Sch Health* 2005;75(8):291.
23. Datar A, Sturm R. Childhood overweight and elementary school outcomes. *Int J Obes* 2006;30(9):1449-1460.
24. Datar A, Sturm R, Magnabosco JL. Childhood overweight and academic performance: National study of kindergartners and first-graders. *Obes Res* 2004;12(1):58-68.
25. Kristjansson AL, Sigfusdottir ID, Allegrante JP, Helgason AR. Adolescent health behavior, contentment in school, and academic achievement. *Am J Health Behav* 2009;33(1):69-79.
26. Judge S, Jahns L. Association of overweight with academic performance and social and behavioral problems: An update from the early childhood longitudinal study. *J Sch Health* 2007;77(10):672-678.
27. Shields M. Overweight and obesity among children and youth. *Health Rep* 2006;17(3):27-42.
28. Statistics Canada. Canadian Health Measures Survey Cycle 1 Data Tables, 2007-2009. [Online]. 2010 [cited 2010 Nov 30]; Available from URL: <http://www.statcan.gc.ca/pub/82-623-x/82-623-x2010002-eng.pdf>
29. Statistics Canada. Measured child body mass index (BMI), by age group and sex, household population aged 2 to 17 excluding pregnant females, Canadian Community Health Survey cycle 2.2, Canada and Provinces, occasional. [Online]. 2007. Available from Statistics Canada CANSIM Table 105-2002. [cited 2010 Nov 30].
30. Shields M, Tjepkema M. Regional differences in obesity. *Health Rep* 2006;17(3):61-67.
31. Brandeis University Center on Hunger and Poverty. The consequences of hunger and food insecurity for children: Evidence from recent scientific studies. [Online]. 2002 [cited 2010 Nov 30]; Available from URL: <http://www.hungernwnc.org/about-hunger/Consequences%20of%20hunger-children.pdf>
32. Food and Agriculture Organization. Rome Declaration on World Food Security and World Food Summit Plan of Action. [Online]. 1996 [cited 2010 Nov 30]; Available from URL: <http://www.fao.org/docrep/003/w3613e/w3613e00.HTM>
33. Health Canada Office of Nutrition Policy and Promotion. Income-related household food insecurity in Canada. [Online]. 2007 [cited 2010 Nov 30]; Available from URL: http://www.hc-sc.gc.ca/fn-an/alt_formats/hpfb-dgpsa/pdf/surveill/income_food_sec-sec_alim-eng.pdf
34. Rampersaud GC, Pereira MA, Girard BL, Adams J, Metz J. Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. *J Am Diet Assoc* 2005;105(5):743-760.
35. Evers S, Taylor J, Manske S, Midgett C. Eating and smoking behaviours of school children in southwestern Ontario and Charlottetown, PEI. *Can J Public Health* 2001;92(6):433-436.
36. Benton D, Jarvis M. The role of breakfast and a mid-morning snack on the ability of children to concentrate at school. *Physiol Behav* 2007;90(2-3):382-385.
37. Feinstein L, Sabates R, Sorhaindo A, Rogers I, Herrick D, Northstone K, et al. Dietary patterns related to attainment in school: The importance of early eating patterns. *J Epidemiol Community Health* 2008;62(8):734-739.
38. Alaimo K, Olson CM, Frongillo EA, Jr. Food insufficiency and American school-aged children's cognitive, academic, and psychosocial development. *Pediatrics* 2001;108(1):44-53.
39. Naylor PJ, McKay HA. Prevention in the first place: schools a setting for action on physical inactivity. *Br J Sports Med* 2009;43(1):10.
40. Briggs M, Safaii S, Beall DL, American Dietetic Association, Society for Nutrition Education, American School Food Service Association. Position of the American Dietetic Association, Society for Nutrition Education, and American School Food Service Association - Nutrition services: an essential component of comprehensive school health programs. *J Am Diet Assoc* 2003;103(4):505-514.