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Evolution of
New Brunswick students'
well-being and its association
with School Wellness Grants

New Brunswick / Nouveau-Brunswick

New Brunswick Health Council | Conseil de la santé du Nouveau-Brunswick

Acknowledgements

Who we are:

New Brunswickers have a right to be aware of the decisions being made, to be part of the decision-making process, and to be aware of the outcomes delivered by the health system and its cost. The New Brunswick Health Council will foster this transparency, engagement, and accountability by engaging citizens in a meaningful dialogue, measuring, monitoring, and evaluating population health and health service quality, informing citizens on health system performance and recommending improvements to the Minister of Health.

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Foreword

Since September 2012, the New Brunswick Health Council (NBHC) has entered into a partnership with the provincial Department of Social Development (Wellness Branch) to conduct and support the New Brunswick Student Wellness Survey and ensure ongoing surveillance related to attitudes and behaviours of New Brunswick students.

The current project aims at evaluating the evolution of New Brunswick students' well-being specifically related to eating behaviours, physical activity levels, tobacco use, and mental fitness. This work falls under

the legislated mandate of the NBHC to measure, monitor and assess population health and health service quality in the Province.

The New Brunswick Student Wellness Survey (NBSWS) has been collecting data since since 2006-2007 school year. With data collection cycles being repeated every three years, this series of surveys offers a rare opportunity to describe the evolution of New Brunswick students' well-being over the last decade.

Key findings

The NBSWS enables the evaluation of students' perceptions, attitudes and behaviours related to their well-being. Data from multiple cycles of the NBSWS were analysed, which allowed the description of the evolution of several New Brunswick students' well-being markers over the past years. In general, the analyses suggest that most wellness indicators for New Brunswick students improved from 2009-10 to 2015-16. Specifically, results suggest that over recent years, New Brunswick students have become more physically active, eat more fruit or vegetables, consume less sugary drinks, eat breakfast more frequently, use less tobacco, have better mental fitness, and engage in more prosocial behaviours and less oppositional behaviours. However, results also suggest that New Brunswick students have become more engaged in screen-based behaviours.

In conclusion, this report highlights that most wellness indicators for students in New Brunswick improved between 2009 and 2015. Although it is not possible to make any causal inferences due to limitations with the survey, measures and analyses, the report also suggests that improvements in wellness indicators are associated with an exposure to School Wellness Grants that originate from the provincial Wellness Strategy.

Introduction

The New Brunswick Student Wellness Survey (NBSWS) has been collecting data since 2006-2007 school year. With data collection cycles being repeated every three years, this series of surveys offers a rare opportunity to describe the evolution of New Brunswick students' well-being over the last decade. Through a series of analyses presented in this report, we explore various markers of students' well-being, including their eating behaviours, physical activity levels, tobacco use, and mental fitness.

Movement
- Physical activity
- Screen time
- School transportation
- Intramural physical activity
- School sports team
- Physical education

Tobacco
- Smoking tobacco
- Other tobacco products

Healthy eating
- Fruit or vegetables
- Sugary drinks
- Breakfast consumption
- Non-nutritious food

Mental well-being
- Mental fitness
- Prosocial behaviours
- Oppositional behaviours
- School connectedness

The analyses allow to contrast levels of the various indicators according to gender, language of institutions and age group. Most importantly however, the analyses provide an overview of how the wellness indicators have changed in light of School Wellness Grants, which provide opportunities for schools to tackle priority areas.

The School Wellness Grants support schools in their efforts to improve one of four wellness themes among all their students: Mental Fitness and Resilience, Healthy Eating, Physical Activity or Tobacco Free Living. These were introduced in 2010. To be eligible for School Wellness Grants, schools had to present initiatives that aligned with the internationally recognised Comprehensive School Health approach. The Comprehensive School Health approach aims at favouring improvements in students' educational outcomes while addressing school health in a planned, integrated and holistic way. To comply with this philosophy, initiatives were considered to adhere to the Comprehensive School Health approach if they included activities that involved the social and physical environment, teaching and learning, healthy school policy, and partnerships and services.

Methodological approach

The NBSWS enables the evaluation of students' perceptions, attitudes and behaviours related to their well-being. Based on an agreement between the New Brunswick Department of Social Development - Wellness Branch - and the NBHC, the data for the NBSWS are collected by the NBHC. This data collection is facilitated through collaboration with the New Brunswick Department of Education and Early Childhood Development. Data from multiple cycles of the NBSWS have already been collected. This report takes advantage of the richness of data accumulated to describe the evolution of several markers of New Brunswick students' well-being over the last decade. Although data has been collected since 2007, only data after 2009 has been included in the analysis due to significant differences in sampling and survey questions being designed and tested in the early period of 2007-2008.

About the source of data and their manipulation

Data for the NBSWS are collected through schools across New Brunswick. Although parents of students from kindergarten to grade 5 fill in questionnaires to report on the behaviours of their children, only data collected from students are used in the current report. Students from grades 4 and 5 fill in questionnaires every three years, as do students from grades 6 to 12. Surveys are administered on different years for students from grades 4 and 5 and those from grades 6 to 12.

All data presented in this report has undergone verifications to ensure that results are not confounded by unrealistic extreme values. Data from the multiple cycles of data collection were aggregated into one long format dataset which was used for the analyses. Some variables have required more than basic management procedures to be ready for analyses. These procedures are described in the following paragraphs.

The measures used to assess amount of screen time and of participation in moderate to vigorous physical activity of students in New Brunswick varied from survey to survey. The variations were important as they included changes in number of items used to assess the behaviours, changes in formulation of questions, changes in examples provided to participants and changes in response options.

Among the most noteworthy changes that occurred for the measurement of sedentary time, is the variation in response options which probed participants to report the number of hours they would typically engage in screen time per day. For this, some survey cycles offered options going up to "over 3 hours" whereas others offered options up to "9 hours". Responses to questions using such different response options may be challenging to compare as previous studies indicated that options and length of response scales can definitely influence response.[1] Nevertheless, there are cases when it is necessary for measures to be modified. For example, in the case of sedentary behaviour, recent advances in media and technology means that users interact differently with screen-based devices today than they did 10-years ago. Consequently, it is necessary to adapt measures to appropriately capture how individuals behave in the presence of new technology. Failure to adapt measures could result in some components of the behaviour not being captured (i.e., time spent on tablets). When such changes occur, it is possible to assess whether it is appropriate to compare estimates derived from different measures using the shifting indicator model,[2] as applied in a similar case of sedentary time measure modification in another study.[3] Using this approach, it was determined that modifications to the measures used

across NBSWS survey cycles were simply too great to justify comparing results from surveys using different sets of items or response options. For this reason, only the responses from surveys in 2009 and in 2012 are contrasted for certain measures during the analysis since they were deemed identical. Similarly, only measures of physical activity captured in 2009 and in 2012 are used in the current analyses as preliminary tests on measures for this construct indicate that they are the only cycles for which variables can be compared.

The concept of mental fitness encompasses three different components, namely the psychological need for competence, the psychological need for autonomy, and the psychological need for relatedness. There can be interest in assessing the three needs separately as well as concurrently (i.e. mental fitness).[4] Through a series of exploratory and confirmatory factorial analysis on the NBSWS data, it was not possible to obtain results supporting the analysis of individual psychological needs. However, both exploratory and confirmatory analyses provided support for the analysis of general mental fitness scores in three different contexts. Specifically, data could be used to represent students' mental fitness at school, at home and with friends. Results are therefore presented for each of these three contexts separately.

Measures of mental fitness were based on a series of questions which presented minor, but noteworthy variations in their formulation or in the formulation of their response options. All mental fitness scores were standardised to a scale ranging from 1 to 4 (higher scores representing better mental fitness). Using the shifting indicator model, it was determined that the variation in protocol was suitably negligible to justify the pursuit of analyses without further modification of the variables for data from the students in Grades 6 to 12. However, such analyses did not support inclusion of data from students in Grades 4 and 5.

Measures of prosocial behavior differed over time. Like the situation above, preliminary verification of invariance in the way variables behaved did not support inclusion of data from students in Grades 4 and 5. Excluding these data enabled appropriate comparison of scores across the remaining survey cycles.

About the statistical approach used

The NBSWS is a case of repeat cross-sectional surveys meaning that elements of a target population are resurveyed multiple times over time. Although the sample surveyed may be the same over time, this type of design does not enable following up the responses of single individuals over time since there is no way to connect responses from an individual in one survey to his or her responses in the following cycle's survey. For this reason, longitudinal-type analyses based on traditional cohort designs are not applicable to the data. However, given survey units (schools) were the same over the multiple survey cycles of the NBSWS, it is possible to compare the evolution of within-unit (within-school) responses. This is of particular use for the current analyses as there was interest in assessing whether the introduction of School Wellness Grants in certain schools had any effect on the wellness indicators they were targeting. Answering this type of question called for the use of multilevel models that allow comparing the average level of a wellness indicator under different levels of exposure to the interventions (School Wellness Grants). Multilevel modeling also enabled accounting for clustering at the school-level due to children being grouped into schools. Given availability of degrees of freedom, all models used the unstructured matrix for the estimation of the covariance matrix. Through these models, we also included potentially confounding

variables of interest, namely participants' gender and school-grade level, the language of institutions and year of survey. From a statistical perspective, the inclusion of these variables (gender, language, and year) in statistical models allowed for the control of their effect on wellness indicators. This said, we improved confidence in our calculations by reducing the chances that the estimated effects of the School Wellness Grants calculated was confounded by other variables.

The wellness indicators assessed were based on either dichotomous or continuous scores. For dichotomous responses, the multilevel models were derived from logistic regressions. In these cases, the results are expressed as a relative likelihood (expressed herein as percentages) that odds of having one outcome varied based on various levels of independent variables. In the analyses, we considered odds ratios as being statistically significant if their associated 95% confidence interval (95% CI) excluded the null value of 1. For continuous responses, the multilevel models were framed around linear regressions. P-values from these regression models are presented in the report. The p-values quantify the probability that the differences observed would be attributable to chance. We considered estimates as being statistically significant if their associated p-value were lower than 0.05.

In some cases, the estimated effect associated with progressing to higher school grades was non-linear. To assess linearity of associations, we introduced a variable representing school grade in all models. We assessed other curve functions by additionally introducing a quadratic variant of the school grade variable. When a relationship follows a significant quadratic function, it is described in the text as being a U-shaped or bell-shaped relationship, depending on if the central value represents a low-point or a peak, respectively.

Despite using statistical methods that provide adjusted estimates of levels of association between exposure to School Wellness Grants and the various wellness indicators, the results should not be interpreted as assessments of causal relationships. Determining whether the School Wellness Grants caused changes in wellness indicators would have required a different way of allocating the grants and of following up students over time (for example, through an experimental study design such as a randomized controlled trial). However, using a different approach of grant allocation and data collection would not have been practical and for the benefit of the cause, it is reasonable to consider that the data available and analytical approach used provide us with sound estimates of how incorporating School Wellness Grants relates with wellness indicators.

About the presentation of results

The years of data collection for students from grades 4 and 5 are 2010-2011 and 2013-2014. For ease of interpretation, we refer to those as the 2010 and 2013 editions of the survey, respectively. The years of data collection for students from grades 6 to 12 are 2009-2010, 2012-2013 and 2015-2016 and we represent those as the 2009, 2012 and 2015 editions of the survey throughout this report.

Results from the analyses are described in the next section. In that section, we generally summarize the results of analyses in one paragraph per wellness indicator. The first sentence of these result summaries presents an overview of how the given indicators changed on average (for all participating students from all participating schools in New Brunswick) over the various survey cycles. Other sentences present associations between the wellness indicators and gender and language; whereas the last sentence presents how the indicators were associated with exposure to School Wellness Grants.

To accompany the description of results, figures are included to help present the general trends observed. However, figures typically only include up to three levels of information (i.e., the dependent variable of interest, school grade, and year of survey) and are therefore only a crude representation of the more complex statistical models used. As such, figures should be used as an aid to visualize findings, but not as a replacement to the more detailed description of results presented in the text.

Most figures included are bar charts and curves. Bar charts are used to present the proportion of participants reporting a defined outcome whereas curves are used to present the arithmetic mean of continuous variables. In these figures, every survey cycle is represented by a different bar or curve colour. Further, different colour schemes are used to distinguish survey cycles that were specific to the lower (shades or orange) and higher (shades of blue and gray) school grades.

Movement

In 2016, Canada moved from having separate guidelines for physical activity, sedentary time, sleep duration, and screen time for Children and Youth (5-17 years) to an integrated set of Movement Guidelines. The Canadian 24-Hour Movement Guidelines for Children and Youth: An Integration of Physical Activity, Sedentary Behaviour and Sleep are the first evidence-based guidelines to address the whole day.

These new guidelines specify that for optimal health benefits, children and youth should accumulate at least 60 minutes of moderate to vigorous physical activity per day; avoid sitting for extended periods and spend no more than 2 hours of recreational screen time per day; children from 9-13 should get 9 to 11 uninterrupted hours of sleep per night and 14-17 years-old should get 8 to 10 hours per night. [5]

Key findings

Participation in moderate to vigorous physical activity was higher in 2012 than in 2009 for grades 6 to 8 students. Over the years, students in general had higher odds of participating in intramural physical activities. However, there was an increase in the amount of time students spent using screens between 2009 and 2012 and the odds that they participated in competitive sports teams declined over the years, as did the number of physical education classes that students in grade 8 and lower attended.

Students from schools that had School Wellness Grants focused on physical activity had greater odds of engaging in active school transportation than students from other schools. There were no differences, however, between students of schools with or without such grants in terms of the levels of moderate to vigorous physical activity, the amount of screen time, participation in intramural physical activities or school sports team, nor number of physical education classes.

Physical activity

Being physically active represents one of the most important determinants of positive health outcomes. Physical activity among youth is positively associated with better social, mental and physical health. [6] [7]

Promoting physical activity among children and adolescents is also important since youth who are physically active are more likely to become active adults, [8] which lowers the risk of developing non-communicable diseases, including coronary heart disease, Type-2 diabetes, and certain cancers. [9] Data from the NBSWS suggest that levels of participation in moderate to vigorous physical activity were higher in 2012 than in 2009. The difference was significant among students from grade 6 to 8, inclusively (p < 0.001). There were no significant differences in levels of physical activity reported by students from grades 9 to 12 in those two years of data collection. Levels of physical activity

Figure 1. *Moderate to vigorous physical activity*
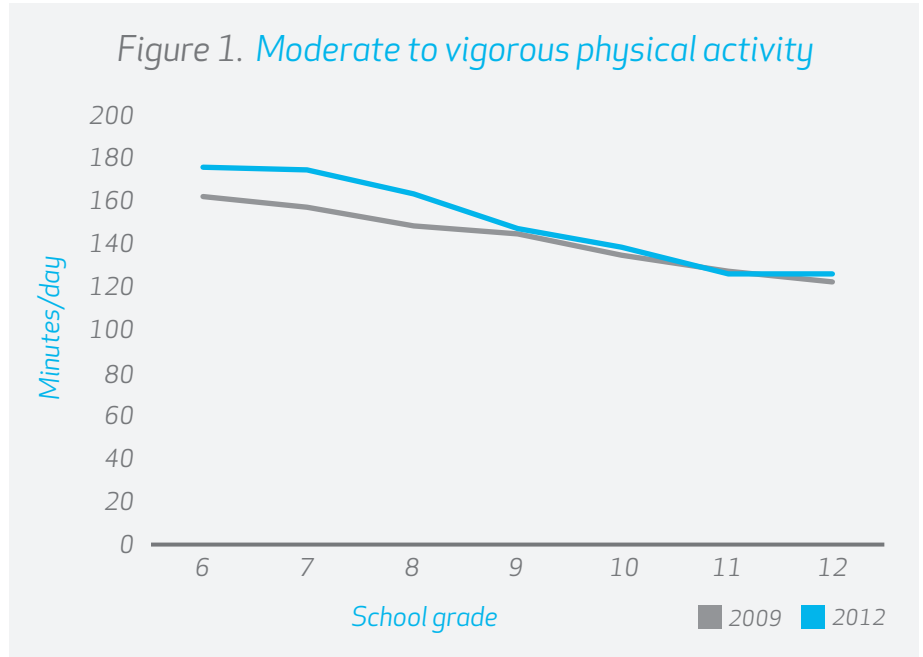
reported were higher among boys than girls (p < 0.001) as well as among students from Francophone than Anglophone schools (p < 0.001). There were no differences between students from schools that had a School Wellness Grant focused on physical activity and students from other schools in terms of the levels of moderate to vigorous physical activity they reported (p = 0.15).

Screen time

Studies now suggest that, independent of physical activity, sedentary time is a risk factor for the development of obesity and chronic diseases. [10]

Sedentary time should therefore be considered as being distinct from physical activity since it is possible for students to attain recommended physical activity levels and still accumulate a considerable amount of sedentary time. [11] Sedentary time encompasses multiple behaviours, including reading, doing homework, watching TV, playing with electronics, etc. Among the most targeted sedentary behaviours, interventions generally seek to reduce involvement in screen-based activities (i.e., watching TV, using a smart phone or tablet, playing video games, or playing on a computer) as these are often considered to be less productive than others. Looking at data from recent years in New Brunswick, there was a significant increase in the amount of time students

spent using screens between 2009 and 2012 ($p < 0.001$). The relationship between age and screen time followed a bell-shaped pattern indicating that although screen time increased as students aged after grade 6, this behaviour then declined from grade 9 to 12. Still, youth generally reported greater use of screens in grade 12 than in grade 6. Data also indicate that more screen time is reported among male students ($p < 0.001$) and students from Anglophone schools ($p < 0.001$). There was no difference in reports of amount of screen time between students from schools that had School Wellness Grants focused on physical activity and students from other schools ($p = 0.2$).

Figure 2. Screen time per day

Hours/day

School grade ■ 2009 ■ 2012
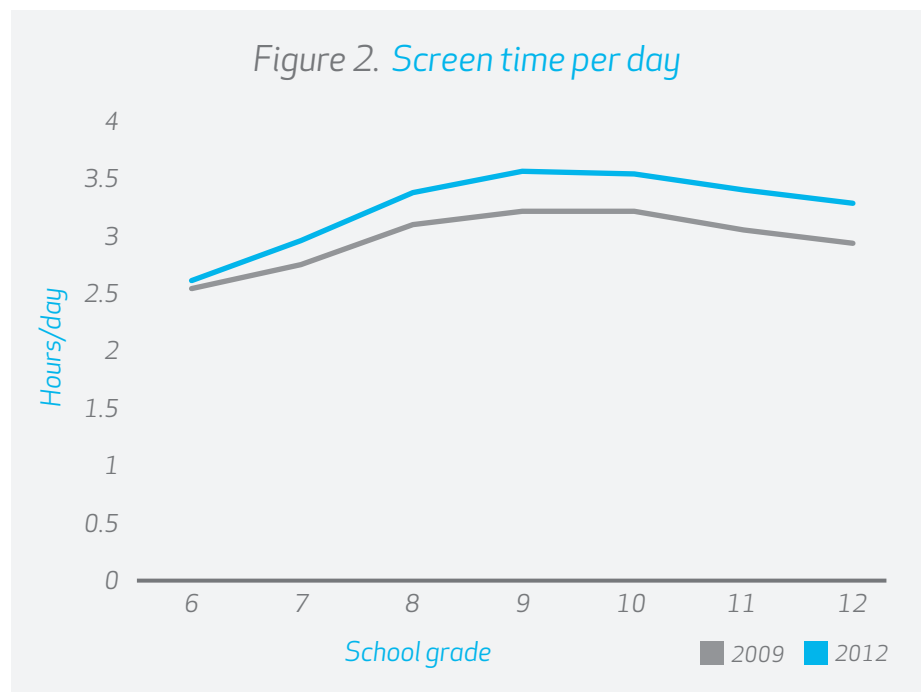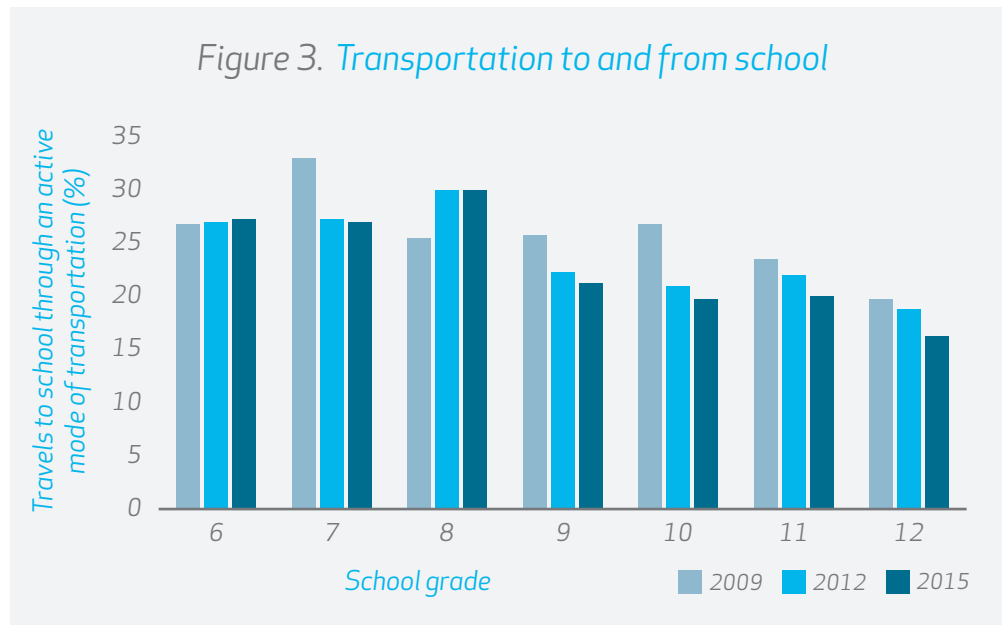
Active school transportation

Studies indicate that children and youth who travel to and from school through active modes of transportation, including walking, cycling and skateboarding, are more physically active than those using motorized travel modes of transportation to get to and from school. [12]

Active school transportation is also associated with greater cardiovascular fitness and reduced cardiovascular disease risk factors. [13][14] The NBSWS allowed students to report whether they typically travelled to school actively, inactively (i.e., by bus or car) or through a mix of active and inactive modes of transportation. For the analyses presented herein, we combined the categories actively and mixed to represent the proportion of all students who used active modes of transportation at least part of the time. Although not presented, we obtained the same results in analyses where we only considered students who reported usually using active modes of transportation as engaging in active school transportation. The results indicate that, on average, there was no significant variation in the proportion of students who reported using active modes of transportation for going and coming back from school between 2009 and 2015 ($p = 0.8$). With increases in school grade, there was a general reduction in odds of reporting using an active mode of transportation for traveling to and from school. Specifically, the odds of engaging in active school transportation were 11% lower for every additional school grade year (95% CI = 9-11%). On average, when adjusted for other variables, the odds of reporting active school transportation were

35% higher among boys than girls (95% CI = 30-40%) and 39% lower among students from Francophone schools than students in Anglophone schools (95% CI = 36-42%). Additionally, we noted that the odds of engaging in active school transportation were 15% higher among students from schools that had School Wellness Grants focused on physical activity in comparison with students from other schools (95% CI = 10-20%).

Figure 3. *Transportation to and from school*

Travels to school through an active mode of transportation (%)

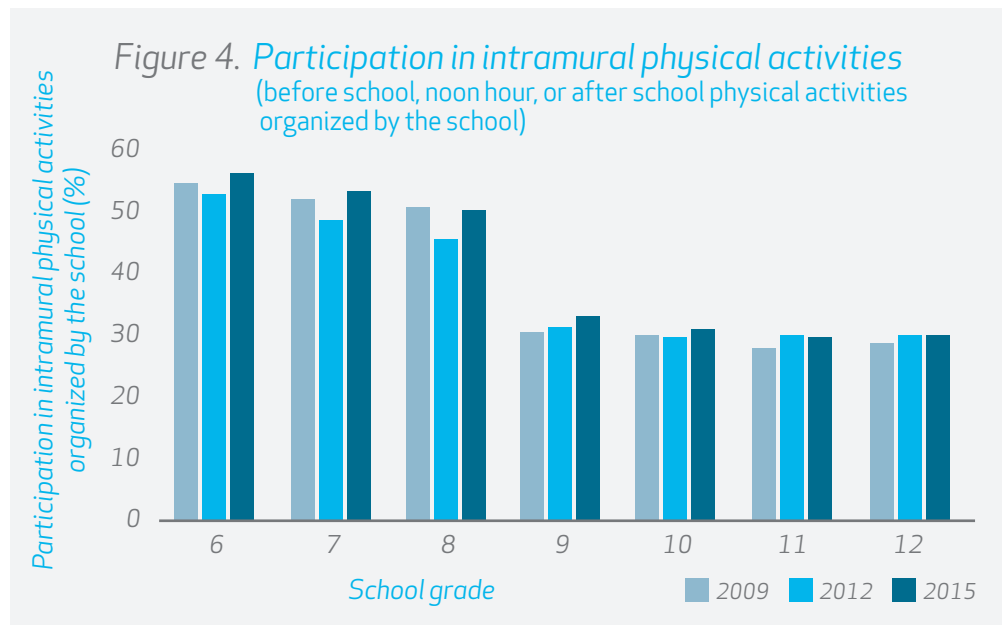*School grade*

2009 · 2012 · 2015

⚽ Intramural physical activity

For the NBSWS, participation in intramural physical activities included any physical activities organized by the school before school, during the noon hour, or after school.

This type of physical activity was reported more frequently in more recent editions of the NBSWS. Specifically, we noted a 5% increase in odds of reporting participation in intramural physical activities with every additional year between 2009 and 2015 (95% CI = 4-6%). With every additional school grade however, we noted a 17% lower odds of reporting participation in this type of physical activity (95% CI = 16-18%).

Boys were 11% more likely to report participation in intramural physical activities (95% CI = 8-14%) and there were no differences in participation in

type of physical activity in relation to language of the school (p = 0.2) or exposure to School Wellness Grants focused on physical activity (p = 0.3).

Figure 4. *Participation in intramural physical activities*
(before school, noon hour, or after school physical activities organized by the school)

Participation in intramural physical activities organized by the school (%)

School grade

2009 · 2012 · 2015

🏀 School sports teams

Between 2009 and 2015, the odds of participation in competitive school sports teams decreased by approximately 3% per year among New Brunswick students (95% CI = 2-4%).

The odds of being a member of school sports team deceased by 3% for every additional school grade (95% CI = 2-4%) and were 5% lower among girls than boys (95% CI = 2-7%). Students in Francophone schools were 27% less likely than students in Anglophone schools to report membership in a school sports team (95% CI = 24-29%). Whether the school had had School Wellness Grants focused on physical activity was not associated with reports of belonging to a school sports team (p = 0.5).

Figure 5. *Membership in competitive school sports teams*
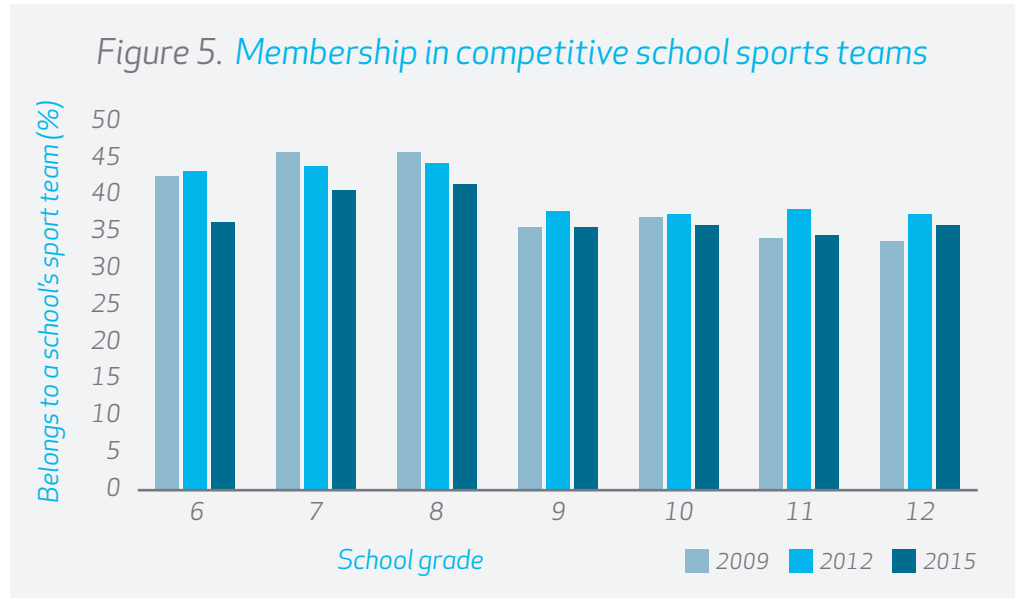
## 🎾 Physical education classes

Because of considerable differences in the number of physical education classes typically offered to students from grade 8 and under and those from grade 9 and over, separate analytical models were computed for those two categories.

Whereas the analyses among students from grade 8 and under hinted that there was a statistically significant decline in number of physical education classes per week between 2009 and 2015 (p < 0.001), there appeared to be no notable change in the offer of physical education classes among students from grade 9 and over (p = 0.1). Among both the younger and the older groups of students, there was a significant decline in number of physical education classes reported per week with increasing school grade (p < 0.01). Students from Francophone schools at the high school level reported a higher number of physical education classes per week than students from Anglophone schools (p = 0.001), but no language-related differences were observed among students from grade 8 and under. Finally, differences in the number of physical education classes per week between students from schools with School Wellness Grants focused on

physical activity and students from other schools did not reach statistical significance in either of the two series of analyses.

Figure 6. *Number of physical education classes per week*
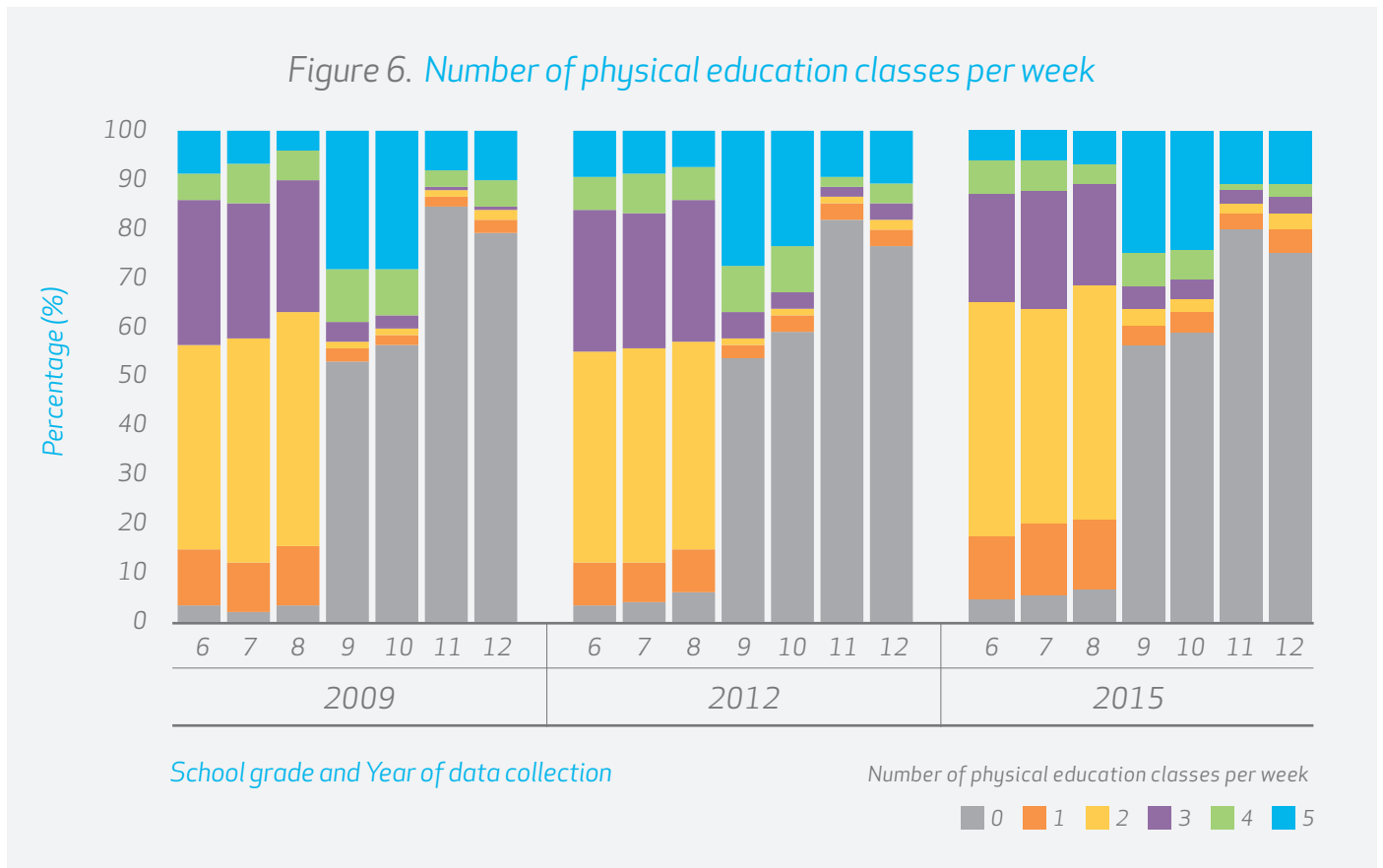
Healthy eating

Healthy eating is essential for optimal growth and development. Since many children acquire meals through school cafeterias, this setting represents a key location where one could implement population-level interventions to promote healthy food options to a significant proportion of children.

As such, in 2005, New Brunswick and Prince Edward Island were the first Canadian provinces to implement province-wide policies requiring that foods promoted and sold at school must be of moderate and maximum nutritional value only, thereby restricting the sale of junk food. A recent study compared body mass indexes of children exposed to such provincial policies (now present in 6 provinces) to children in provinces with no provincial policy related to quality of food sold in schools. [15] This study found that provincial junk-food restricting policies were associated with lower body mass index. Whether policies were implemented as intended was not accounted for in this analysis. This may be a relevant next step since an analysis of school cafeteria menus led by the New Brunswick Medical Society revealed that the majority of New Brunswick schools do not meet the provincial nutritional guidelines presented in New Brunswick's Policy 711 for Healthier Foods and Nutrition in Public Schools. [16] [17] Questions still remain regarding the evolution of healthy eating related measures and their relationship with healthy eating promotion interventions in New Brunswick.

Key findings

There has been an increase over the years in the proportion of students consuming at least 5 portions of fruit or vegetables per day and eating breakfast daily. There has also been a decline in the consumption of non-nutritious drinks among New Brunswick students over the past decade but no notable time-trends regarding the proportion of students consuming non-nutritious foods.

Students from schools that had School Wellness Grants focused on healthy eating had lower odds of eating non-nutritious foods and were more likely to notice improvements in the offering of healthy foods in their school than students in schools without such grants. There were no differences, however, in the proportion of students consuming at least 5 portions of fruit or vegetables, consuming non-nutritious drinks and eating breakfast daily between schools with or without such grants.

Fruit or vegetables

One of the most common measure used to represent healthy eating is the number of fruit or vegetables eaten. Consumption of fruit or vegetables promotes exposure to essential vitamins, especially vitamins C and A; dietary fiber; minerals, especially electrolytes; and phytochemicals, including antioxidants. [18]

Since 2009, we have noted a significant increase in the proportion of students reporting consuming at least 5 portions of fruit or vegetables per day. Specifically, the odds of reporting consuming at least 5 portions of fruit or vegetables per day increased by 3% per year since 2009 (95% CI = 2.5-3.6%). However, the consumption of fruit or vegetables declines with increasing age of students. Specifically, we noted a 6% (95% CI = 5.2-6.2%) lower odds of reporting fruit or vegetable consumption for every additional school grade. We also noted that

Figure 7. *Consumption of fruit or vegetables*
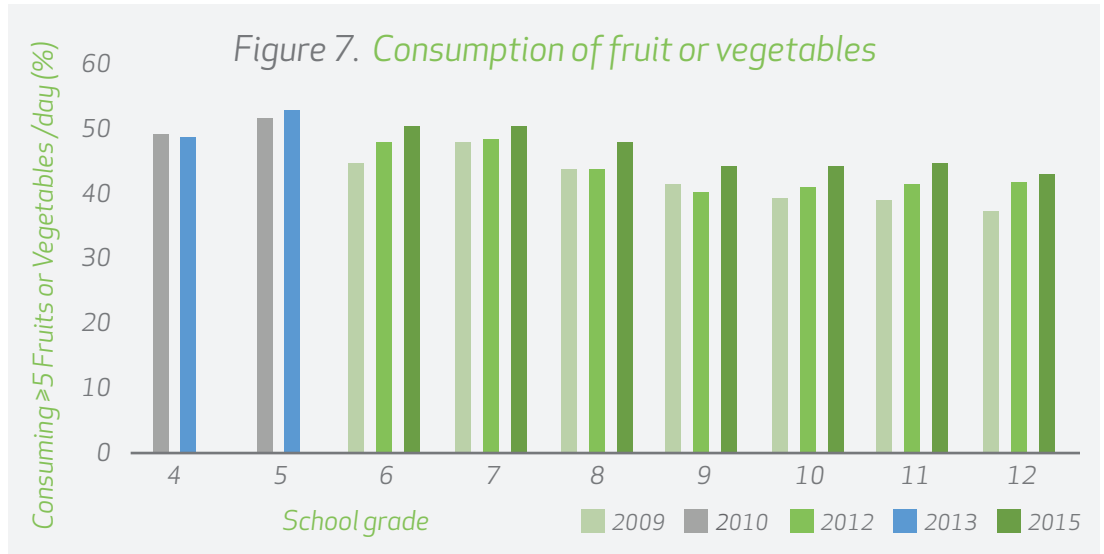
boys were 11% (95% CI = 9-13%) less likely than girls to report consuming at least 5 portions of fruit or vegetables. On average, the odds of reporting consuming at least 5 portions of fruit or vegetables per day were 30% higher (95% CI = 27-35%) among students from Francophone

schools. We observed no statistically significant relationship between exposure to a School Wellness Grant on healthy eating and the odds of reporting fruit or vegetable consumption.
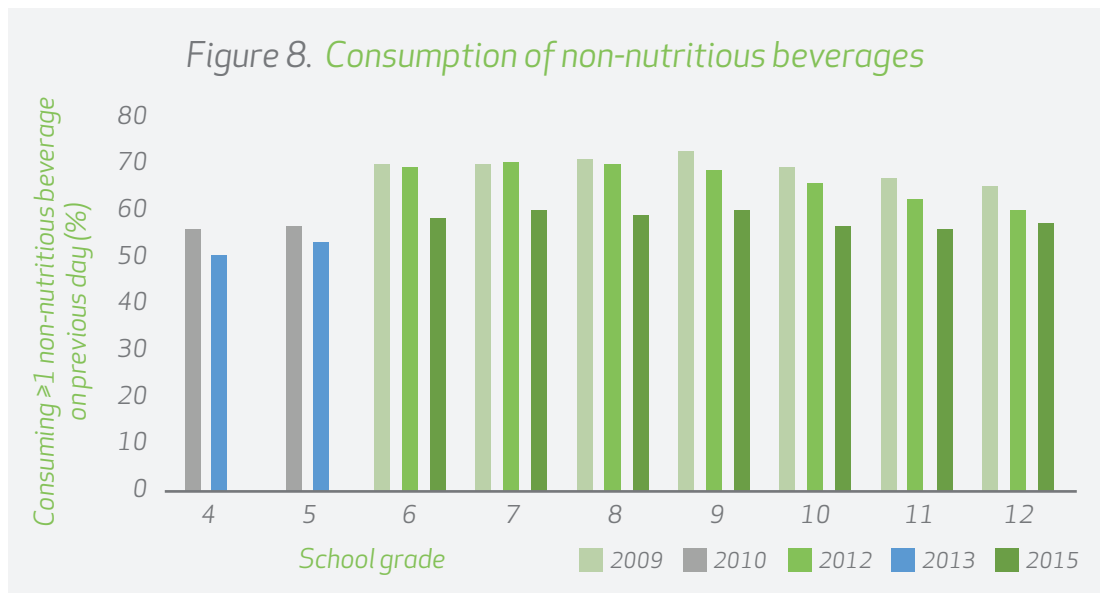
Sugary drinks

Across all age-groups, studies have found that the most important source of added sugar in diets comes from the consumption of sugary drinks. [19] [20]

Although the prevalence of non-nutritious beverage consumption is still elevated, data from the NBSWS indicate that there was a decline in the consumption of non-nutritious

drinks among New Brunswick students over the past decade. The odds of reporting having drank one or more non-nutritious drink the day prior to the survey decreased by 7% (95% CI = 6.5-7.5%) per

year from 2009 to 2015. Across years, the consumption of such beverages was generally more common among older children (2.3% per school-grade, 95% CI = 1.8-2.9%), but as can

be noted in figure 8, there was no clear grade-related gradient. Drinking sugary drinks was also more common among boys than girls (95% CI = 84-93%). In comparison with students from Anglophone schools, the odds of reporting having drank one or more non-nutritious drink the day prior to the survey were 38% (95% CI = 36-40%) lower among students from Francophone schools.

Figure 8. Consumption of non-nutritious beverages

Y-axis: Consuming ≥1 non-nutritious beverage on previous day (%)
X-axis: School grade
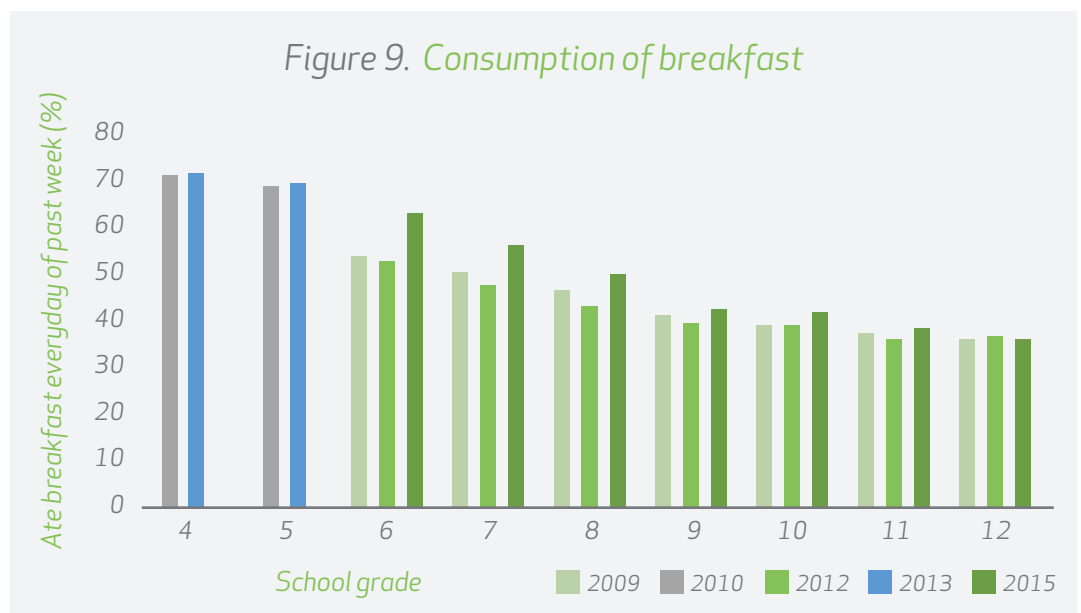
Legend: 2009, 2010, 2012, 2013, 2015

We observed no statistically significant relationship between exposure to a School Wellness

Grant on healthy eating and the odds of reporting sugary drink consumption.

Breakfast consumption

Links between breakfast consumption, eating frequency, and body mass index have frequently been documented in the scientific literature. [21] [22] [23] It is generally thought that skipping breakfast promotes excess weight gain via overconsumption later in the day. [24]

As observed in the literature, skipping breakfast increased with increasing age among participants in the NBSWS (odds changed by 17% per school-grade, 95% CI = 16-17%). [25] However, NBSWS data indicate that the odds of eating breakfast on a daily basis increased by 2% per year since 2009

Figure 9. Consumption of breakfast

Y-axis: Ate breakfast everyday of past week (%)
X-axis: School grade

Legend: 2009, 2010, 2012, 2013, 2015

(95% CI = 1.3-2.5%) among students in New Brunswick. With a 61% (95%CI = 56-67%) difference in odds, eating breakfast daily was considerably more common among Francophone than Anglophone students. Eating breakfast was also more common among boys than girls (95% CI = 34-42%).

We observed no statistically significant relationship between exposure to a School Wellness Grant on healthy eating and the odds of reporting regularly eating breakfast.

Non-nutritious food

Non-nutritious (junk) foods are typically recognised as contributing few micronutrients to the diet, containing high amounts of fat and/or sugar and being high in energy. [26] As can be attested in figure 10, the consumption of such food is highly prevalent among New Brunswick students.

Although there were no notable time-trends regarding the proportion of students consuming non-nutritious foods (p=0.5), the less health-promoting behaviour was more prevalent among the higher-grade students than the younger ones (p for trend for grade < 0.001). The consumption of non-nutritious was 25% (95% CI = 21-28%) more prevalent among Anglophone than Francophone students. There was no difference in consumption of non-nutritious food between boys and girls (p = 0.3). Students in schools with a School Wellness Grant on healthy eating had 6.5% (95% CI = 1.8-10.9%) lower odds of reporting having eaten at least one serving of non-nutritious food the day before the survey.

Consistent with the finding above, it is also notable that students in schools with a School Wellness Grant on healthy eating were 7% (95% CI = 1-14%) more likely to report having observed improvements in the offering of healthy foods in their school. Examples of such changes include noticing price drops for healthy food options in the school cafeteria, more healthy food options in vending machines, and serving of healthy foods at special events.

Figure 10. *Consumption of unhealthy food*
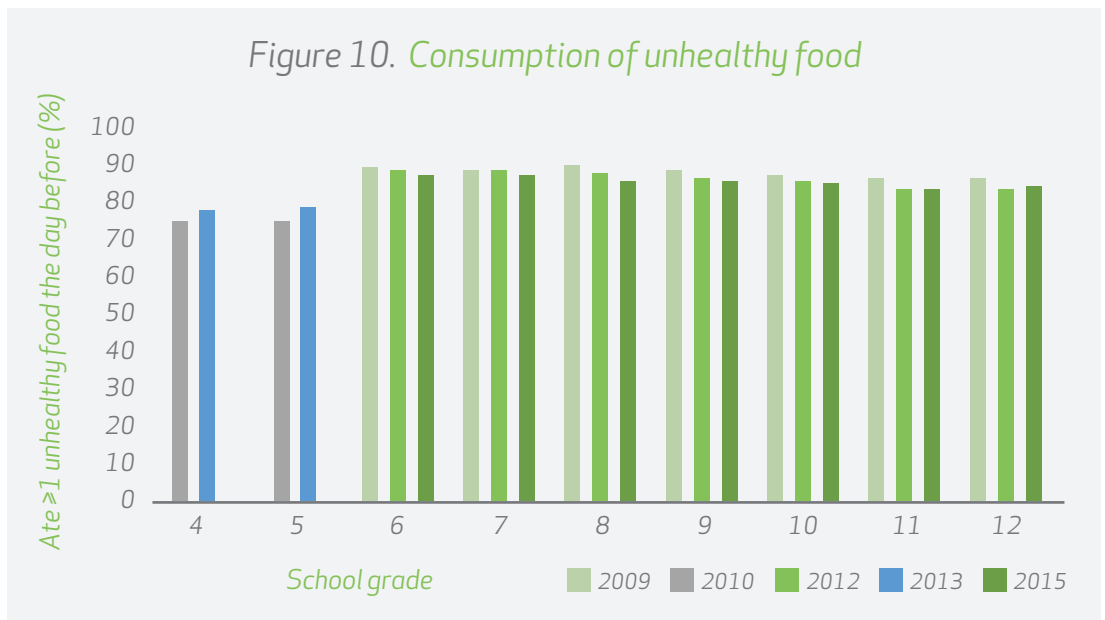
Tobacco

In Canada, the prevalence of tobacco smoking among youth has been declining steadily over the past two decades.[27][28] Tobacco use nevertheless remains a serious health challenge as it continues to be the primary cause of several types of cancers and of premature mortality in the country. Another cause for concern is that the age at which tobacco smokers take up the habit remains low and may even be declining. [29] Data suggest that the younger a person starts smoking, the more likely it is they will continue using tobacco later in life. [30]

Key findings

In 2015, a lower proportion of students reported having ever tried tobacco cigarettes and the prevalence of students currently smoking was also lower than in previous editions of the NBSWS. There was no difference in odds of reporting smoking on a daily basis across years when the NBSWS was administered.

Exposure to a School Wellness Grant to support tobacco-free initiatives was associated with lower odds that students reported being a daily smoker and lower odds that students reported having smoked a cigarette in the past month. School Wellness Grants were not associated with a lower proportion of students having ever tried tobacco cigarettes.
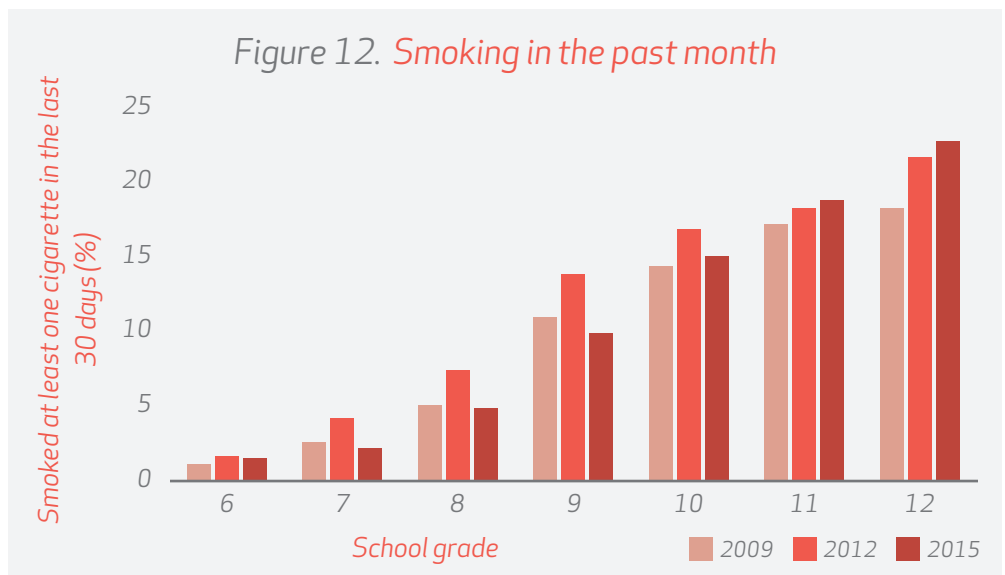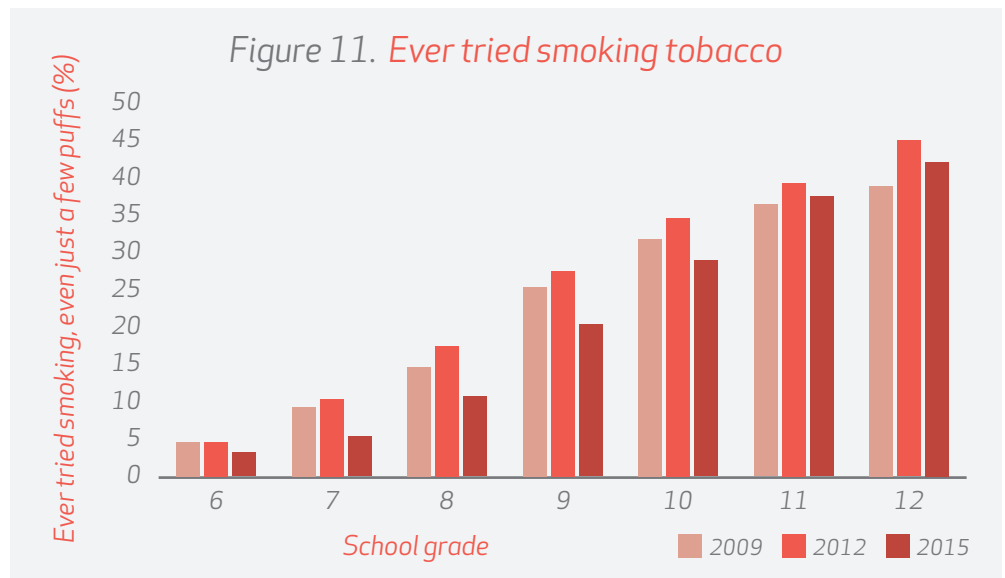
Smoking tobacco

There are various ways to define tobacco smoking. Among youth, it has been recommended to consider assessing whether one has ever tried cigarette smoking since even minimal exposure to tobacco has been linked to considerable increases in risk of developing nicotine dependency. [31] [32] [33]

Among New Brunswick students, a slightly lower proportion of students reported having ever smoked tobacco cigarettes in 2015 than in previous editions of the NBSWS (p<0.0001). As could be expected, the odds of reporting having ever tried smoking increased with increasing school-grade (odds increase by 57% per grade, 95% CI = 55-59%). The odds of reporting having ever tried smoking were also 32% lower (95% CI = 29-35%) among Francophone than Anglophone students and 31% higher among boys than girls (95% CI = 26-36%). We observed no association between exposure to a School Wellness Grant to support tobacco-free initiatives and the odds of reporting having ever tried smoking.

On average, the prevalence of current smoking, which includes any form of daily or occasional smoking of tobacco cigarettes over the past 30 days, was also lower in 2015 than in previous editions of the NBSWS (p<0.0001). The odds of reporting smoking in the past 30 days increased with increasing school-grade (odds increase by 52% per grade, 95% CI = 50-55%). The odds

of reporting having smoked in the past 30 days were also 62% higher among boys than girls (95% CI = 55-71%) and 32% lower (95% CI = 27-36%) among Francophone than Anglophone students. Exposure to a School

Wellness Grant to support tobacco-free initiatives was associated with 10% lower odds that students reported having smoked a cigarette in the past month (95% CI = 0-19%).

Figure 11. Ever tried smoking tobacco

Figure 12. Smoking in the past month

There was no difference in odds of reporting smoking daily across years when the NBSWS was administered (p = 0.5). As with other indicators of tobacco use, there was an increase in odds of reporting daily smoking with increasing age of students (95% CI = 60-68% increase per school-grade). Boys were about twice as likely to report daily smoking as girls (95% CI = 195-229%) and students from Francophone schools had 45% lower odds of reporting this behaviour than students from Anglophone schools (95% CI = 39-51%).
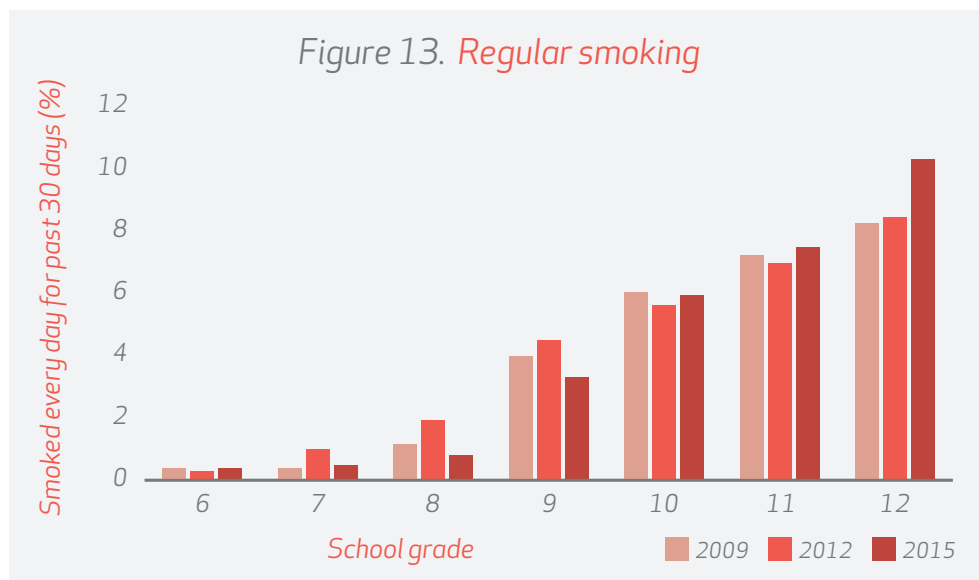
Figure 13. *Regular smoking*

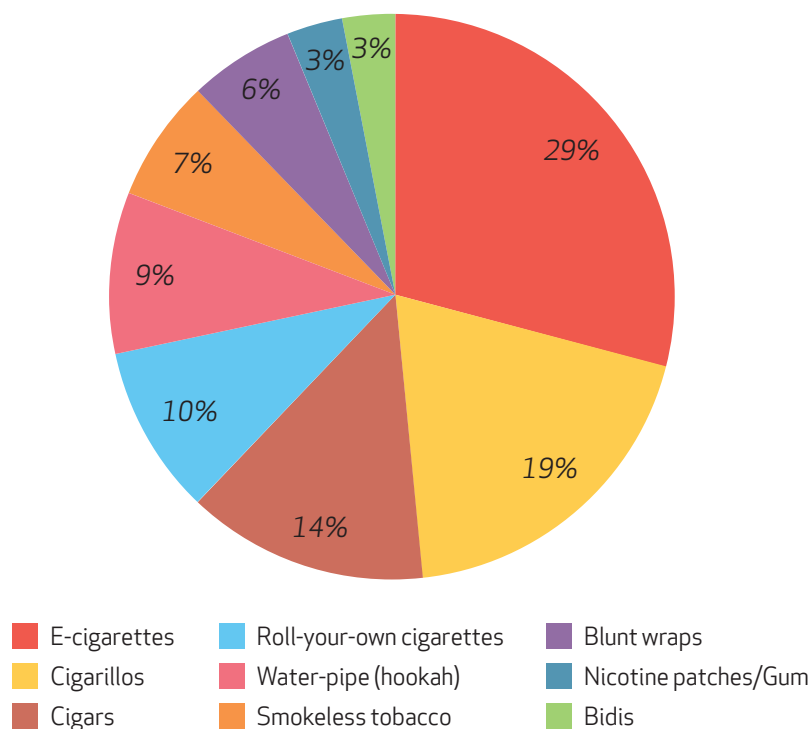Exposure to a School Wellness Grant to support tobacco-free initiatives was associated with an 18% reduction in odds that students reported being a daily smoker (95% CI = 4-30%).

Other tobacco products

Besides smoking tobacco cigarettes, tobacco can be consumed various other ways. For example, in the 2015 edition of the New Brunswick Student Wellness Survey, 22% of participants from grades 6 to 12 reported having tried smoking e-cigarettes.

In total, 28% of participants from this survey cycle reported having tried at least one form of alternative tobacco product. These numbers are similar to those observed among students in Ontario. [34] Among New Brunswick students who reported having tried an alternative tobacco product, e-cigarettes were clearly the most common method of exposure. Cigarillos and cigars were also common forms of alternative tobacco exposure.

Figure 14. *Other tobacco products*

E-cigarettes — Roll-your-own cigarettes — Blunt wraps
Cigarillos — Water-pipe (hookah) — Nicotine patches/Gum
Cigars — Smokeless tobacco — Bidis

Mental well-being

Mental well-being signifies the condition of an individual's mind, but defining this is difficult as it can be assessed from various angles including maturity, emotions, socio-emotional intelligence, subjective well-being, resilience, etc. [35] Further, the behaviours, thoughts, feelings, and attitudes of individuals can represent attributes that will inform on their mental health, which is also influenced by the social environment, be it at school, within a family, with friends or elsewhere. [36] For this section, four constructs closely tied to mental well-being are presented.

Key findings

Over the years covered by the NBSWS, improvements are noticed in all areas related to mental well-being, namely students' mental fitness scores, their levels of prosocial and oppositional behaviours, as well as their level of school connectedness.

Exposure to a School Wellness Grant focused on positive mental health was associated with more prosocial behaviour and higher mental fitness scores at home and with friends but not at school.
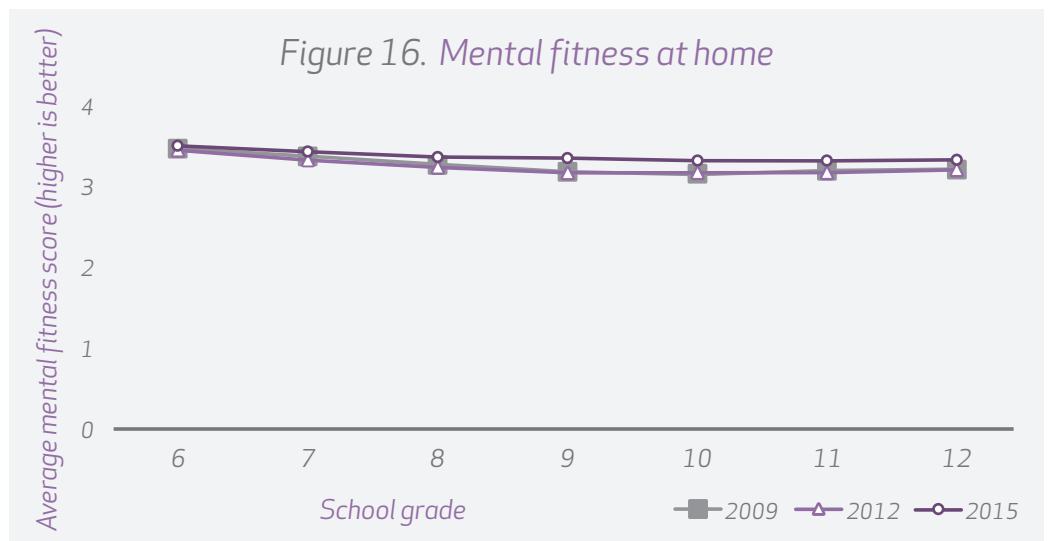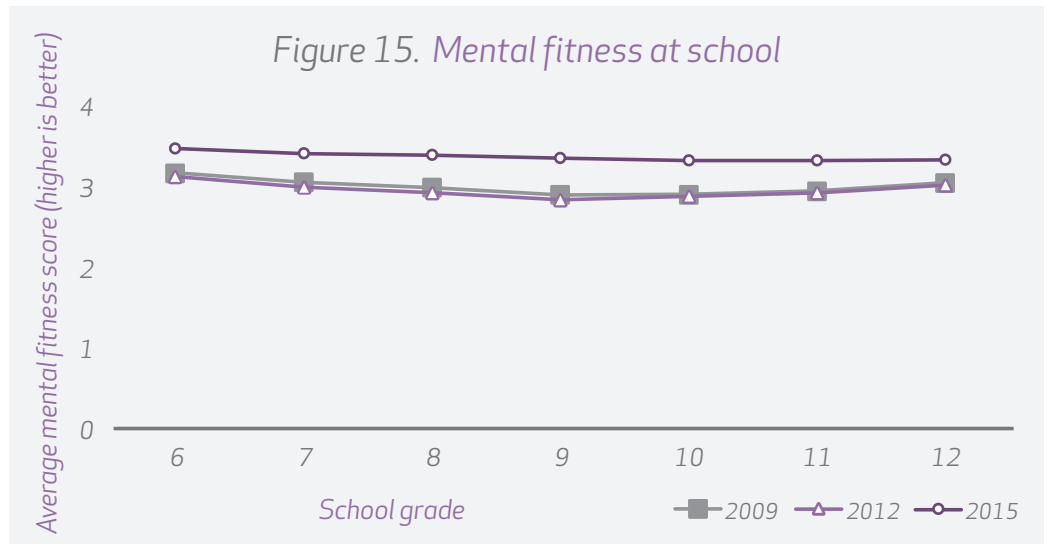
Mental fitness

Basic psychological needs theory (BPNT; Deci & Ryan, 2000) can be used to explain behaviour. [37] Developers of the BPNT contend that humans are born with key psychological needs for competence (i.e., individual's perception of successfully completing optimally challenging tasks), autonomy (i.e., person's perception of agency and volition), and relatedness (i.e., person's perception of belongingness).

Still according to the theory, satisfying these three psychological needs leads to sustained adaptive behaviours such as participation in physical activity, healthy eating, and less involvement in maladaptive behaviours such as smoking. [38] Overall satisfaction of the three basic psychological needs is necessary for positive mental health, also described as mental fitness. The concept of mental fitness can present different properties depending on the context or environment for which it is measured. [39] As such, the NBSWS captures data on mental fitness at school, at home and with friends.

Among New Brunswick students, there were small but statistically significant improvements in mental fitness scores at school, at home and with friends over the past years (all p < 0.001). It was also noted that, as they

get older, students typically report lower levels of mental fitness in all three settings assessed (all p < 0.001). Although the difference was relatively small in scale, girls reported statistically significantly higher mental fitness scores than boys (all p < 0.001).

On average, students in Francophone schools reported mental fitness scores that were 5 to 10% higher than scores reported by students in Anglophone schools (p < 0.001). It is also noteworthy that schools which exposed their students to

Figure 15. Mental fitness at school

Figure 16. Mental fitness at home

School Wellness Grants focused on positive mental health had students with higher mental fitness scores at home and with friends than students from other schools (all p < 0.05). However, there were no differences in scores of mental fitness at school between students from those two types of schools (p = 0.46).

Figure 17. Mental fitness with friends
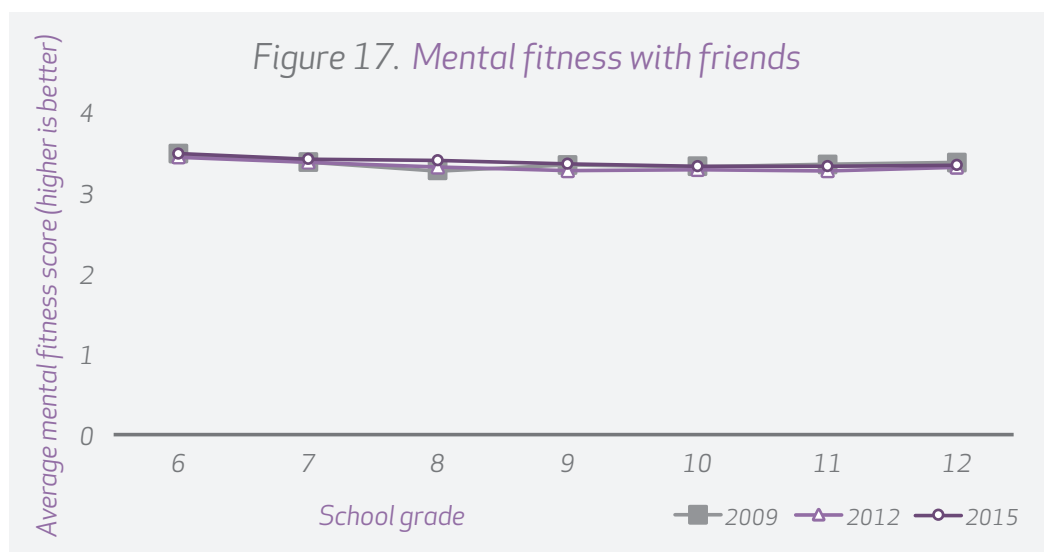
Prosocial behaviours

Prosocial behaviour is represented by taking actions intended to help others. This can be represented several ways. [40] For example, in the NBSWS, prosocial behaviour is captured with items such as helping, sharing, complimenting, lending things, and doing favours for people without being asked.

Looking at data from recent years in New Brunswick, there was a significant improvement in prosocial behaviour scores of students from grades 6 to 12 (p < 0.001). The relationship between age and prosocial behaviours followed a U-shaped pattern indicating that although prosocial behaviours declined as students aged after grade 6, these types of behaviours then increased from grade 9 to 12. On average, youth report higher levels of prosocial behaviours in grade 12 than in grade 6. Data also indicate that more prosocial behaviour
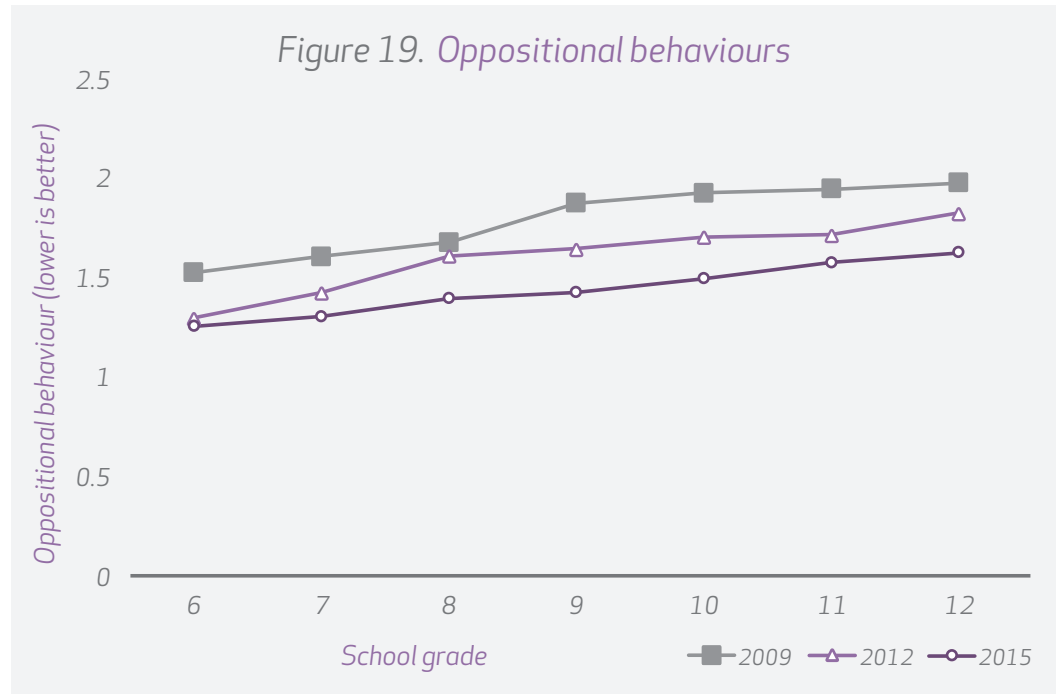
is reported among female students (p < 0.001), students from Francophone schools (p < 0.001), and students from schools that had School Wellness Grants focused on positive mental health (p < 0.001).

Figure 18. Prosocial behaviours
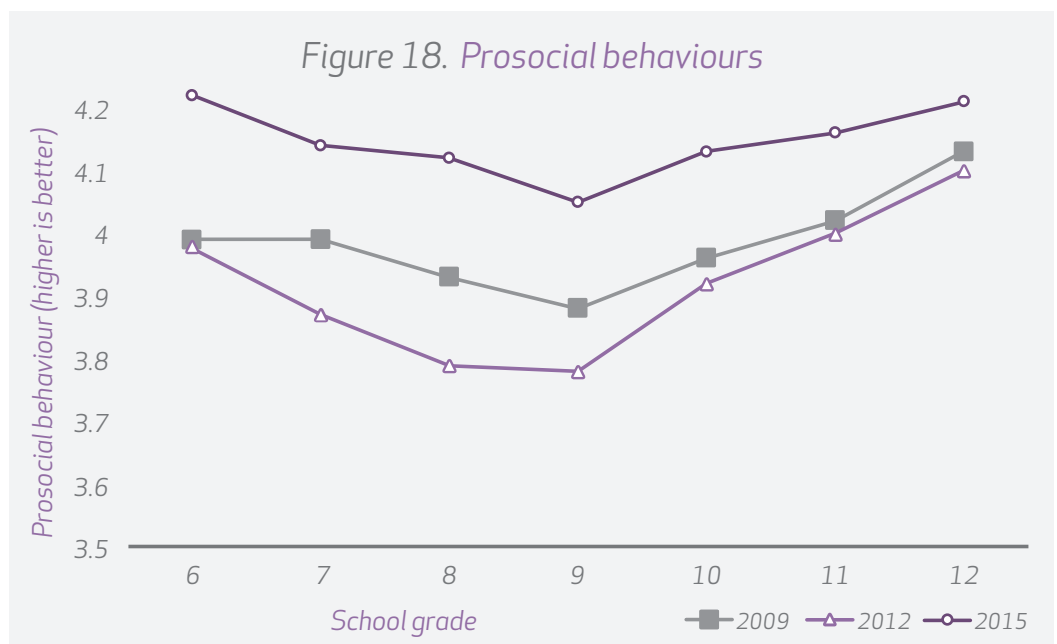
😠 Oppositional behaviours

In contrast to prosocial behaviours, oppositional behaviours are disruptive actions that can unsettle or that can be a nuisance to the individual, others, groups, or even the environment. [41]

Within the NBSWS, examples of captured opposition behaviours are skipping school, disobeying parents, talking back to teachers, getting into fights, saying mean things, and taking things that are not your own. Over the past few years, oppositional behaviours have been declining among students in New Brunswick (p<0.001). On average, we noted that females (p<0.001) and students from Francophone schools (p < 0.01) reported less oppositional behaviours. However, there was no significant association between exposure to a School Wellness Grant focused on positive mental health and reports of oppositional behaviours.

Figure 19. Oppositional behaviours

🎓 School connectedness

School connectedness has been defined as "the extent to which students feel personally accepted, respected, included, and supported by others in the school social environment". [42]

As students transition from childhood to adolescence, the construct of school connectedness is believed to be particularly important given students become less dependent of their family as part of the individuation process and come to rely more on relationships with people they find in settings such as schools, where a large proportion of their time is spent. [43] Although not a measure of mental health or fitness, school connectedness has been shown to be positively associated with mental health functioning (good self-efficacy and self-esteem). [44] More recent research also suggests that school connectedness is a predictor of general functioning, lower anxiety and fewer depressive symptoms. [45]

Figure 20. School connectedness
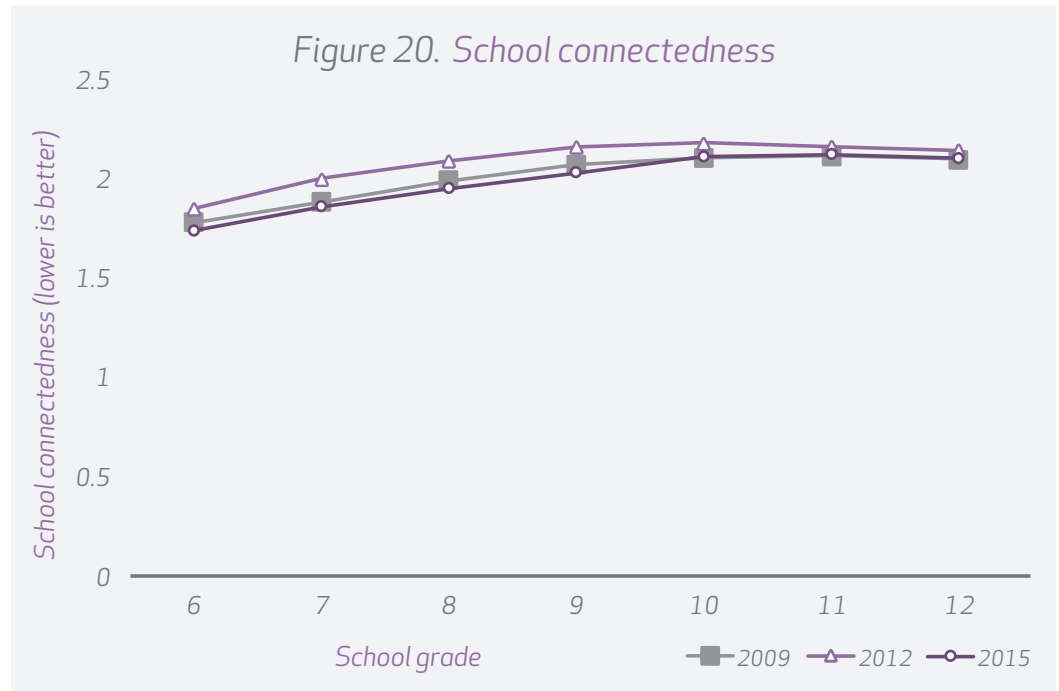
The level of school connectedness among young New Brunswickers has improved in a statistically significant manner over the past few years (p < 0.001). School connectedness was at a higher level among students from Francophone schools than students from Anglophone schools (p < 0.001) as well as among younger students (p<0.001) and among boys in comparison with girls (p<0.001). There was no significant association between exposure to a School Wellness Grant focused on positive mental health and levels of school connectedness reported.

Interpretation

The NBSWS enables the evaluation of students' perceptions, attitudes and behaviours related to their well-being. Data from multiple cycles of the NBSWS were analysed, which allowed the description of the evolution of several New Brunswick students' well-being markers over the past years. In general, the analyses suggest that most wellness indicators for New Brunswick students improved from 2009-10 to 2015-16.

Specifically, results suggest that over recent years, New Brunswick students have become more physically active, eat more fruit or vegetables, consume less sugary drinks, eat breakfast more frequently, use less tobacco, have better mental fitness, and engage in more prosocial behaviours and less oppositional behaviours. However, results also suggest that New Brunswick students have become more engaged in screen-based behaviours.

Among the various explanations possible for general improvements in New Brunswick students' well-being, it is possible that the School Wellness Grants provided in support of the provincial Wellness Strategy were effective. School Wellness Grants provide schools with opportunities to tackle priority areas. Schools could apply and obtain such grants to address issues related to either physical activity, healthy eating, tobacco-free living, or mental fitness.

Through the analyses, statistically significant relationships suggested that the odds of using a physical active mode of transportation to travel to and from school were higher when students were from a school with a physical-activity focused School Wellness Grant. The analyses also indicated that students who had been exposed to a healthy eating-focused School Wellness Grant had lower odds of reporting consuming non-nutritious food and higher odds of noting that improvements in the offering of healthy food options had taken place in their school.

The results also suggested that students in schools that obtained School Wellness Grants to tackle tobacco use ended with lower odds that students would report smoking cigarettes regularly. Students from schools which targeted the promotion of mental fitness with their School Wellness Grants had higher levels of prosocial behaviours and greater mental fitness scores.

When interpreting results from these analyses, one should also consider other potential explanations for the results obtained. For example, it is possible that as years pass, students become more aware of what is socially desirable and report accordingly. Social desirability bias can occur without respondents even realizing that they are providing inaccurate responses.

Another potential explanation is that wellness indicators improved as a result of factors other than the School Wellness Grants. As authorities from around the world realize the importance of preventing chronic diseases, initiatives are taking place around the globe which could have an influence on the attitudes and behaviours of New Brunswick students.

Further, it is possible that the attribution of School Wellness Grants is simply a marker of schools being engaged in a given priority and that the actual grant contributed little to the changes. Despite potential alternative explanations, it needs to be acknowledged that there was considerable coherence among the findings.

In all cases, results pointed to either more favourable outcomes among students exposed to School Wellness Grants or no significant association. We found no cases of School Wellness Grants being associated to the various wellness indicators in a detrimental way.

In conclusion, this report highlights that most wellness indicators for students in New Brunswick improved between 2009 and 2015. Although it is not possible to make any causal inferences due to limitations with the survey, measures and analyses, the report also suggests that improvements in wellness indicators are associated with an exposure to School Wellness Grants that support the implementation of New Brunswick's Wellness Strategy.

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