Changes in Dietary and Physical Activity Risk Factors for Type 2 Diabetes in Alberta Youth Between 2005 and 2008

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ABSTRACT

OBJECTIVE: Unhealthy dietary and physical inactivity patterns inspired many initiatives promoting healthy youth and healthy schools in Alberta between 2005 and 2008. The purpose of this study was to examine differences in the prevalence of lifestyle risk factors for type 2 diabetes (T2D) between two province-wide samples of Alberta adolescents (2005 and 2008).

METHODS: The dietary and physical activity (PA) patterns of Alberta youth were assessed in two cross-sectional studies of grade 7-10 students, one in 2005 (n=4936) and one in 2008 (n=5091), using a validated web-survey. For each diabetes risk factor, participants were classified as either at risk or not at risk, depending on their survey results relative to cut-off values. Chi-square tests and logistic regression models were used to determine differences in risk factor prevalence between 2005 and 2008.

RESULTS: Compared to 2005, mean BMI, energy intake, fat intake, glycemic index (GI) and glycemic load (GL) were lower in 2008 ($p<0.05$); and carbohydrate, protein, fibre and vegetable and fruit intakes were higher in 2008 ($p<0.05$). In 2008, a lower proportion of students were: overweight, obese, consuming high GI, high GL, high fat, low fibre, low veg/fruit intake ($p<0.05$). No differences existed in magnesium or PA levels between the two time points.

CONCLUSIONS: Improvements were observed between 2005 and 2008 in terms of the proportion of adolescents having specific risk factors for T2D. The cause of these changes could not be determined. Continued monitoring of adolescent lifestyle habits and monitoring of exposure to health promotion programming is recommended.

KEY WORDS: Type 2 Diabetes Mellitus; adolescents; prevalence; risk factors; diet; physical activity

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

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Unhealthy dietary and physical activity patterns are prevalent among Canadian youth^{1,2} and are implicated in increasing rates of early onset type 2 diabetes that have been observed in Canada. Type 2 diabetes, which until the 1970s was considered an adult disease, is increasing in prevalence in youth, with one clinic in Manitoba, Canada reporting a 15-fold increase in the number of children with type 2 diabetes between 1987 and 2005.³ Lifestyle risk factors for type 2 diabetes for adults include overweight and obesity,⁴ high dietary glycemic index (GI), high dietary glycemic load (GL),⁵ low fibre,⁶ low magnesium intake,⁷ low vegetable and fruit consumption,⁸ high fat intake,⁹ and low physical activity levels.¹⁰ These risk factors represent important targets for health promotion and disease prevention.

Schools have been suggested as an ideal location for lifestyle interventions targeting adolescents, as children spend much of their time in school. Growing concerns in the mid-2000s about the health of Alberta youth spawned the creation and implementation of many school health initiatives. In 2005, the Alberta Coalition for Healthy School Communities hosted an inaugural conference bringing together school communities interested in promoting health,¹¹ and in 2007, the Alberta Healthy School Community Wellness Fund was initiated to support healthy school programming.¹² In 2006, the Alberta Government introduced the Daily Physical Activity Initiative, which required grades 1-9 students to

accumulate 30 minutes of physical activity each day.¹³ In 2007, the Edmonton Public School Board created a policy stating the importance of creating healthy food and physical activity promoting environments.¹⁴ Although the efficacy of individual school initiatives has been assessed previously,^{15,16} the province-wide effect of this variety of initiatives has not been investigated. Therefore, the

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Table 1. Summary of Cut-offs Used for Assessing Diabetes Risk Factors

Variable	Cut-off = ↑ risk	Reference
Overweight and obesity	International Obesity Task Force (IOTF) Cut-offs for Overweight and Obesity	(25)(26)(4)
Glycemic index	>58	(5)
Glycemic load	>142	(5)
Fibre	<14.75 g	(6)
Magnesium	<222 mg/day females <280 mg/day males	(7)
Vegetables and fruit	<2 servings/day (>1.99 servings = not at risk)	(8)
Fat intake	>39% of calories	(9)
Physical activity	<3 score from the PAQ-C	(18)(10)

purpose of this study was to examine differences in the prevalence of lifestyle risk factors for type 2 diabetes between two province-wide samples of Alberta adolescents in grades 7 to 10, one surveyed in 2005 and the other in 2008.

METHODS

Participants and procedure

In 2005 and 2008, students in grades 7-10 (aged 11-16) in Alberta were recruited to participate in the Web Survey of Physical Activity and Nutrition (Web-SPAN). The methods for study have been described previously.^{17,18} This survey was a self-administered, web-based questionnaire that assessed dietary and physical activity patterns and social and environmental determinants of these behaviours. Recruitment protocols differed slightly between the two data collection periods. In 2005, all Alberta School Boards were invited to participate and 7 schools per board were randomly selected for the study. In 2008, schools were randomly selected from a list of all Alberta schools. In both 2005 and 2008, information about the study was mailed to selected school boards and schools. Participation was subsequently requested by telephone. Active parental consent and student assent were obtained. The Web-SPAN was conducted during school time and took approximately 45 minutes to complete. In 2005, the school board, school and student response rates were 75%, 37% and 27%, respectively and in 2008, response rates were 64%, 40% and 44%. The student response rate was significantly higher in 2008 due to the participation of several schools whose administration invested extra effort into recruitment for this study. Ethical approval was obtained from the University of Alberta.

Table 2a. Characteristics of Participants in 2005 and 2008

Variable	2005 n=4887	2008 n=5119
Age (years)	13.6 ± 1.2	13.3 ± 1.5†
Income (\$)	71,739 ± 19,635	74,797 ± 21,737†
BMI (kg/m ²) ‡	20.9 ± 6.3	20.2 ± 4.1†
Total energy intake (kcal)	2077 ± 1101	1971 ± 1054†
Carbohydrate (%kcal)	54.7 ± 11.4	55.2 ± 11.4*
Fat (%kcal)	31.6 ± 9.2	30.5 ± 9.3†
Protein (%kcal)	15.3 ± 5.3	16.0 ± 5.4†
Glycemic index	55.4 ± 7.3	54.7 ± 7.4†
Glycemic load	147 ± 81	140 ± 82†
Fibre (g)	14.5 ± 9.8	15.2 ± 10.0†
Magnesium (mg)	277 ± 158	283 ± 160
Vegetables and fruit (svg/d)	5.1 ± 4.1	5.3 ± 4.4†
PAQ-C Physical Activity Score	2.9 ± 0.7	2.9 ± 0.7

* p<0.05.

† p<0.01 for 2005 vs. 2008.

‡ BMI calculation was based on self-reported height and weight.

Measures

Demographic and Anthropometric Characteristics

Median neighbourhood income of schools was determined by matching 2006 Canadian census data to each school using postal codes.¹⁹ Students entered self-reported height and weight into the Web-SPAN and BMI (kg/m²) was calculated.

Dietary Intake

Dietary intake of participants was measured using a validated web-based 24-hour recall tool: the *Food Behaviour Questionnaire*.²⁰ No changes were made to this tool between 2005 and 2008. Students recorded all food and beverages consumed in the previous day, choosing from a list of over 800 foods. Cues were provided for portion sizes and students were prompted to record foods often missed. Dietary intake data were analyzed using the ESHA Food Processor (version 7.9, ESHA Research, Salem, OR) and the 2001 Canadian Nutrient File²¹ database. Food group intake according to Canada's Food Guide²² was calculated.

To calculate dietary GI and GL, each carbohydrate-containing food in the Web-SPAN database was assigned a GI score based on published values. Daily dietary GI and GL were calculated by a method described previously.²³

Physical Activity

Physical activity was assessed using an online version of the Physical Activity Questionnaire for Older Children (PAQ-C).²⁴

Table 2b. Characteristics of Participants in 2005 and 2008 by Sex

Variable	Males		Females	
	2005 n=2264	2008 n=2313	2005 n=2623	2008 n=2806
Age (years)	13.6 ± 1.2	13.4 ± 1.6†	13.6 ± 1.2	13.3 ± 1.5††
Income (\$)	72,381 ± 20,167	75,307 ± 21,651†	71,250 ± 19,160‡	74,361 ± 21,785†
BMI (kg/m ²)	21.5 ± 7.8	20.4 ± 4.2†	20.5 ± 4.6§	20.1 ± 4.0††
Total energy intake (kcal)	2398 ± 1204	2297 ± 1204†	1801 ± 913§	1705 ± 825§†
Carbohydrate (%kcal)	53.4 ± 11.4	53.8 ± 11.7	55.8 ± 11.2§	56.3 ± 11.0§
Fat (%kcal)	32.2 ± 9.1	31.3 ± 9.4†	31.0 ± 9.2§	29.8 ± 9.2§†
Protein (%kcal)	15.8 ± 5.4	16.4 ± 5.6†	14.9 ± 5.2§	15.7 ± 5.3§†
Glycemic index	56.1 ± 7.4	55.2 ± 7.8†	54.9 ± 7.1§	54.3 ± 7.1§†
Glycemic load	168 ± 90.0	162 ± 97*	128 ± 68§	121 ± 62§†
Fibre (g)	16.0 ± 10.8	16.6 ± 11.3	13.2 ± 8.6§	14.0 ± 8.6§†
Magnesium (mg)	313 ± 172	320 ± 181	247 ± 138§	254 ± 134§
Vegetables and fruit (svg/d)	5.3 ± 4.4	5.6 ± 5.0*	4.8 ± 3.9§	5.0 ± 3.9§*
PAQ-C	3.0 ± 0.7	3.0 ± 0.7	2.8 ± 0.6§	2.8 ± 0.7§

* p<0.05.

† p<0.01 for 2005 vs. 2008.

‡ p<0.05, § p<0.01 for boys vs. girls.

Table 3a. Proportion of Participants With Diabetes Risk Factors Between 2005 and 2008

Risk Factor	2005 % (n)	2008 % (n)
Overweight	21.1 (870)	18.3 (706)†
Obese	6.1 (252)	4.4 (170)†
High GI	35.8 (1760)	31.7 (1620)†
High GL	44.8 (2205)	40.1 (2062)†
Low fibre	59.1 (2903)	56.4 (2882)†
Low magnesium	48.8 (2373)	47.0 (2389)
Low vegetable and fruit	23.0 (1129)	21.2 (1084)*
High fat	19.5 (959)	17.4 (889)†
Low physical activity	56.8 (2497)	55.9 (2278)

* p<0.05.

† p<0.01 for 2005 vs. 2008.

Physical activity levels were determined based on self-reported activities performed in the last 7 days. The PAQ-C scores range from 1 to 5 with 1 being least active and 5 being most active.²⁴

Defining Risk Factors

Major dietary and physical activity risk factors for diabetes and cut-offs for identifying those at risk were determined using literature searches. Evidence was drawn from large epidemiological studies of diabetes risk.^{4-10,18,25,26} Wherever possible, studies of children and youth were evaluated,^{18,25,26} but these were limited in number. Dichotomous variables (at risk or not at risk) for each risk factor were constructed based on levels of dietary intake that were significantly related to risk of developing diabetes. Studies referenced and cut-offs used are found in Table 1. Risk factors identified included overweight, obesity, high GI, high GL, low fibre, low magnesium, low vegetable and fruit intake, high fat intake and low physical activity levels.

Statistical analysis

Predetermined criteria from the 2005 survey were used to identify and remove outliers from the database. Those removed from analysis included students who signed onto but did not complete any part of the survey (2005: n=9, 2008: n=26), and extreme outliers of total energy intake (2005: n=24, 2008: n=33), physical activity (2005: n=14, 2008: n=19) and BMI (2005: n=34, 2008: n=33). The total number of outliers removed was 36 in 2005 and 111 in 2008, resulting in final sample sizes of 4,936 in 2005 and 5,119 in 2008.

Characteristics of participants were assessed using descriptive statistics and differences between boys and girls were determined using independent sample t-tests. The frequency of each diabetes risk factor was assessed using descriptive statistics. Differences in

the proportion of participants reporting risk factors between 2005 and 2008 were determined using chi-square tests. As a follow-up, specific risk factors were tested as dependent variables in a series of logistic regression models to determine whether differences in risk factor presence between 2005 and 2008 remained after accounting for age and median income quintiles.

The total number of risk factors was calculated for each participant. For the risk factors of overweight and obesity, overweight individuals were considered to have one risk factor and obese individuals were considered to have two risk factors due to their weight status (i.e., they were considered both overweight and obese). Intraclass correlations (ICC) were calculated using Restricted Maximum Likelihood Estimation (REML) for the total number of risk factors to examine whether school clustering was present. ICCs of 0.040 for the entire sample, 0.029 for 2005 and 0.032 for 2008 were calculated, indicating that a very small level of clustering was present. Therefore, linear mixed-modelling (LMM) was used to account for clustering. The intercepts-only model showed that school clustering had a modest effect on the number of risk factors (p<0.001), therefore clustering was included in the final model. To reduce collinearity, the continuous variables of age and income were centred about the grand mean. This was not done for sex and year. Median neighbourhood income was considered a level two factor compared to year, sex, and age which were level one factors. All statistical analyses were performed using SPSS statistical software (Version 19.0.0.1; SPSS Inc, Chicago).

RESULTS

In total, 4,936 students from 136 schools within 44 school boards participated in this study in 2005 and 5,119 students from 109 schools in 37 school boards participated in 2008 (Table 2a). The mean age was 13.6 years in 2005 and lower at 13.3 years in 2008 (p<0.01). In 2005 and 2008, 54% and 55% of participants were girls, respectively, representing a slight over-sampling of female students. Median school neighbourhood income was higher in 2008 compared to 2005 at \$74,797 and \$71,739, respectively (p<0.010) (Table 2a). Median school neighbourhood income in 2005 was comparable to median income of Alberta families in 2005 (\$71,000).²⁷ Rates of overweight were similar to those reported by the CCHS in 2004; obese youth were under-represented.²⁸

Differences in mean values for each of the risk factor variables between 2005 and 2008 were assessed using independent sample t-tests. Mean BMI, total energy intake, % energy from fat, GI and GL were significantly lower in 2008 compared to 2005 and % energy

Table 3b. Proportion of Participants With Diabetes Risk Factors Between 2005 and 2008 by Sex

Risk Factor	Males		Females	
	2005 % (n)	2008 % (n)	2005 % (n)	2008 % (n)
Overweight	26.6 (530)	21.1 (390)†	15.9 (340)‡	15.8 (316)‡
Obese	7.8 (155)	4.8 (89)†	4.5 (97)‡	4.1 (81)
High GI	39.0 (878)	35.2 (808)†	33.0 (863)‡	28.7 (801)†‡
High GL	56.3 (1269)	52.5 (1212)*	35.1 (918)‡	30.0 (840)†‡
Low fibre	52.8 (1190)	50.4 (1155)	64.2 (1679)‡	61.2 (1711)*‡
Low magnesium	47.9 (1079)	47.6 (1091)	49.5 (1294)	46.5 (1298)*
Low vegetable and fruit	22.8 (514)	21.3 (487)	23.0 (602)	21.1 (589)
High fat	21.8 (491)	19.8 (454)	17.6 (459)‡	15.4 (430)*‡
Low physical activity	49.7 (991)	49.4 (881)	62.9 (1485)‡	61.1 (1386)‡

* p<0.05.

† p<0.01 for 2005 vs. 2008.

‡ p<0.01 for boys vs. girls.

Table 4. Influence of Differences in Age, WebSPAN Survey Year, Sex, School Income and School Clustering on the Total Number of Risk Factors

Effect	Estimate	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Fixed effects				
Intercept	3.19†	0.04	3.12	3.28
Age	0.07†	0.02	0.04	0.10
WebSPAN year	-0.27†	0.05	-0.39	-0.18
Sex	-0.18†	0.04	-0.25	-0.11
School income‡	-0.0000026*	0.0000012	-0.0000050	-0.0000022
Random effects				
Between-school variance	0.05†	0.01	0.03	0.09
Within-school variance	2.13†	0.04	2.05	2.20

* $p < 0.05$.† $p < 0.01$.

‡ Effect of school income was determined using income quintiles. Quintile ranges were: Q1: 46,288-56,287; Q2: 56,288-66,074; Q3: 66,075-76,809; Q4: 76,810-88,882; Q5 88,883-138,258.

from carbohydrate, % energy from protein, fibre and vegetable and fruit intakes were higher in 2008 (Table 2a).

When demographic variables were separated by sex, several significant differences between the genders were observed (Table 2b). At both time points, boys had greater BMIs, total energy, % fat, % protein, GI, GL, fibre, magnesium and vegetable and fruit intakes and had higher physical activity scores compared to girls. Girls had a greater % of energy coming from carbohydrate.

When risk factor cut-offs were applied (Table 3a), there was a lower proportion of youth with the risk factors of overweight, obesity, high GI diets, high GL diets, high fat diets, low fibre diets and low vegetable and fruit intake in 2008 compared to 2005. No differences existed in the proportion of youth consuming low magnesium diets or having low levels of physical activity. When the results were separated by sex (Table 3b), a lower proportion of boys had the risk factors of overweight, obesity, high GI and high GL in 2008 compared to 2005. A lower proportion of girls had the risk factors of high GI, high GL, low fibre, low magnesium and high fat in 2008 compared to 2005. When the risk factors were tested to determine whether these differences between 2005 and 2008 remained after accounting for age and median income quintiles, results showed that all differences persisted with the exception of magnesium (Table 4), which was no longer different between 2005 and 2008 after accounting for age and income. Contrary to the results of chi square tests, year and sex were significantly related to physical activity score in the logistic regression model, with girls, and those surveyed in 2005 being more likely to have low physical activity levels. Further, compared to the highest income category, participants in the bottom 3 income quintiles were at higher risk of inactivity.

The mean total number of risk factors (Figure 1) was significantly higher in 2005 compared to 2008 (3.1 vs. 2.9, $p < 0.001$). Girls reported having significantly fewer risk factors than boys in both 2005 and 2008 (2005: boys 3.2, girls 3.0; 2008: boys 3.0, girls 2.8; $p < 0.001$ for both years). When a REML LMM was applied to determine whether the differences observed persisted after accounting for differences in age, sex and income, this pattern was unchanged ($p < 0.001$). However, each year of age was associated with an increase in the mean number of risk factors. School area income was also related to the total number of risk factors, with a higher number of risk factors being associated with a lower mean income.

DISCUSSION

This study examined the presence of diabetes risk factors in large samples of Alberta adolescents in 2005 and 2008 and found that

the prevalence of many of these risk factors was high. However, independent of demographic differences between the samples, the prevalence of several diabetes risk factors decreased from 2005 to 2008. Food and nutrient intakes observed were similar to intakes observed in other North American studies of youth.^{29,30} We found that dietary risk factors for type 2 diabetes are highly prevalent in Alberta adolescents. The most commonly reported dietary risk factors were high GI and GL diets, low fibre intakes and low magnesium intakes – all of which indicate that the diets of youth are low in vegetables, fruit and whole grains. These results are concerning as low GI, high fibre foods help to prevent obesity,³¹ and contain many beneficial vitamins, minerals and antioxidants;³² all of which may help to decrease diabetes risk.

Over 50% of youth in the current study were considered inactive which is consistent with the findings of other studies of Canadian youth using the PAQ-C.³³ Low levels of physical activity are concerning as physical activity decreases diabetes risk both by helping to regulate body weight and body composition and by increasing insulin sensitivity,³⁴ and is critical to the prevention of many other chronic diseases.

Students in low SES-area schools were more likely to be physically inactive and have a greater number of risk factors. Studies of the effects of SES on Canadian youth consistently show strong effects of SES on health behaviours.³⁵ In the current study, SES was measured using postal codes; an imprecise method which does not capture individual variation in SES. However, the link between SES and health behaviours was identified even when using an imprecise measure, suggesting that SES may be of greater importance than demonstrated in this study. Previous studies show that school community SES affects the health behaviours of youth independently of individual SES, likely due to obesogenic environments of low SES neighbourhoods.³⁵

Independent of differences in demographic characteristics, boys were less likely to have the risk factors of overweight, obesity, high GI and high GL, and girls were less likely to have the risk factors of high GI, high GL, low fibre and high fat in 2008 compared to 2005. In addition, the total number of risk factors decreased for both boys and girls between 2005 and 2008. This suggests that the diets of youth in Alberta have shown modest improvement. Physical activity levels of youth did not change during this time period. This lack of change in physical activity levels may confirm previous reports that school physical activity programs were poorly implemented,¹³ or that the PAQ-C was unable to detect the changes. Although the cause(s) of these dietary changes over time cannot be established

Figure 1. Distribution of the total number of risk factors in 2005 and 2008

Total number of risk factors was 3.1 in 2005 and 2.9 in 2008, $p < 0.001$. In 2005, boys had an average of 3.2 risk factors and girls had 3.0. In 2008, boys had an average of 3.0 risk factors and the mean for girls was 2.8.

from this study due to the lack of a control group, several changes happened between 2005 and 2008 in Alberta that may have contributed to this trend. During this time, many school boards adopted school food policies, schools became engaged in programs that took a Comprehensive School Health approach,¹¹⁻¹⁴ and the problem of obesity in childhood and adolescence was widely publicized; all of which may have contributed to the changes observed.

Canadian studies that examined the effects of school policies and comprehensive school health initiatives have shown significant effects on the health behaviours of youth. One study assessed the effect of school food policy changes in Prince Edward Island on the dietary choices of youth in grades 5-6 by measuring dietary intake before (2001/2002) and one year after policy implementation (2007). This study showed that youth consumed approximately one fewer serving of low-nutrient dense food per day post intervention.¹⁶ An Alberta study evaluated the effects of the APPLE Schools program (a comprehensive school health intervention). Students in APPLE schools ate more vegetables, fewer calories, were more physically active and were less likely to be obese in 2010 compared to 2008.¹⁵ The magnitudes of the changes observed in the current study are comparable to changes seen in the policy study. It is plausible that changes in the current study were the result of changes in health policies and programs, but as participation in these programs was not measured in this study, definitive conclusions cannot be made. Other explanations for this difference could include the effect of the growing awareness of obesity in Alberta

adolescents on their health behaviours. It is also possible that these differences were caused by increasing interest in adolescent health which led to increased response bias in 2008. The higher student response rate and higher SES seen in 2008 may be evidence of this. Further study is needed to determine whether positive lifestyle changes occurred in Canadian youth. Studies that track possible causes of these changes would allow Canadian school administrators and public policy makers to pinpoint effective interventions for more extensive implementation across Canada.

Strengths of this study include the large samples and use of validated tools to assess dietary intake and physical activity. Few Canadian studies of this size have evaluated the lifestyles of youth or followed changes over time. Although sampling techniques differed slightly between 2005 and 2008, both appeared to be fairly representative of Alberta youth. The convenience sampling method used is subject to volunteer bias, which may have affected study results. Schools and students interested in health may have been more likely to participate and improvements in dietary patterns may have been more likely to happen in this population. The survey did not assess ethnicity or family history of diabetes, which are important diabetes risk factors. However this study aimed to examine modifiable lifestyle risk factors to determine opportunities for prevention. Finally, cut-offs for diabetes risk were based on values from adult literature and it is not known how appropriate these cut-offs are for youth.

In conclusion, this study showed that current dietary intake and physical activity patterns among Alberta youth could increase risk

of future type 2 diabetes, however, dietary behaviours showed improvement between 2005 and 2008. Physical activity levels were low at both time points and showed no improvements. Although the cause of these changes could not be determined from this study, it is possible that increased awareness and the implementation of school health programs and policies contributed to this change. Continued monitoring of adolescent dietary patterns is warranted. Monitoring of exposure to programs and policies is needed to pinpoint the causes of these changes.

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RÉSUMÉ

OBJECTIF : Les habitudes alimentaires malsaines et l'inactivité physique ont inspiré de nombreuses initiatives de promotion de la santé des jeunes et des écoles en Alberta entre 2005 et 2008. Nous avons cherché à examiner les différences dans la prévalence des facteurs de risque liés aux habitudes de vie pour le diabète de type 2 (DT2) entre deux échantillons provinciaux d'adolescents albertains (2005 et 2008).

MÉTHODE : Les habitudes d'alimentation et d'activité physique des jeunes de l'Alberta ont été évaluées à la faveur de deux études transversales auprès d'élèves de la 7^e à la 10^e année, l'une en 2005 (n=4 936) et l'autre en 2008 (n=5 091), à l'aide d'un sondage en ligne validé. Pour chaque facteur de risque du diabète, les participants ont été classés comme étant à risque ou non à risque selon leurs réponses au sondage par rapport aux valeurs limites. Des tests du khi-carré et des modèles de régression logistique ont servi à déterminer les différences dans la prévalence des facteurs de risque entre 2005 et 2008.

RÉSULTATS : Comparativement à 2005, l'IMC moyen, l'apport énergétique, l'apport en matières grasses, l'indice glycémique (IG) et la charge glycémique (CG) étaient plus faibles en 2008 (p<0,05); et les apports en glucides, en protéines, en fibres et en fruits et légumes étaient plus élevés en 2008 (p<0,05). En 2008, une moindre proportion d'élèves était en surpoids ou obèse et consommait une diète avec IG élevé, CG élevée, riche en gras, faible en fibres et faible en fruits et légumes (p<0,05). Aucune différence n'a été relevée dans les niveaux de magnésium ou d'activité physique entre les deux dates.

CONCLUSIONS : Des améliorations ont été observées entre 2005 et 2008 dans la proportion d'adolescents présentant les facteurs de risque propres au DT2. Nous n'avons pas pu déterminer la cause de ces changements. Il est recommandé de continuer à surveiller les habitudes de vie des adolescents et leur exposition aux programmes de promotion de la santé.

MOTS CLÉS : diabète de type 2; adolescent; prévalence; facteurs de risque; régime alimentaire; exercice physique