Physical Activity, Smoking, and Obesity Among Canadian School Youth

Comparison Between Urban and Rural Schools

Ronald C. Plotnikoff, PhD¹⁻³

Kim Bercovitz, PhD⁴

Constantinos A. Loucaides, PhD^{1,2}

ABSTRACT

Background: More information is needed to document the prevalence of health risk factors in youth. The purpose of this study is to compare the prevalence of physical inactivity, smoking and overweight/obesity among youth in urban and rural schools.

Methods: Data were obtained from a Student Physical Activity and Smoking Survey of 2,697 high school students in four urban schools in Ontario and four rural schools in Alberta. Prevalence of physical inactivity was assessed by examining compliance with Canada's Physical Activity Guide to Healthy Active Living, and with daily energy expenditure classification values. Prevalence of smoking was assessed by examining current smoking status. Overweight and obesity prevalences were examined by comparing BMI values to the BMI index for age and sex percentiles set by the Centers for Disease Control and Prevention.

Results: Physical activity prevalence was found to be low in our study, with only 57.0% of youth achieving Canada's Physical Activity Guidelines, and with 26.0% classified as sedentary based on the daily energy expenditure classification values. A higher proportion of rural students reported "trying smoking" than urban school students (73.0% versus 64.4%, $p < 0.001$). A significantly higher proportion of rural males were 'overweight' than urban males, and a significantly higher proportion of rural females were 'obese' in comparison to urban females.

Conclusion: Our findings add further support for an urgent need to promote physical activity among Canadian youth. Additionally, our results suggest that it is especially important to target rural students, particularly girls, for smoking prevention programs. Future studies are required to examine such rural and urban differences within provinces.

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

1. Faculty of Physical Education, University of Alberta, Edmonton, AB

2. Alberta Centre for Active Living, University of Alberta

3. Centre for Health Promotion Studies, University of Alberta

4. University of Toronto, Toronto, ON

Correspondence: Dr. Ronald C. Plotnikoff, Centre for Health Promotion Studies, 5-10 University Extension Centre, 8303 – 112 Street, University of Alberta, Edmonton, AB T6G 2T4. Tel: 780-492-4372, Fax: 780-492-9579. E-mail: ron.plotnikoff@ualberta.ca.

Acknowledgements: We thank Tricia Prodaniuk and Kylie Hugo for editorial assistance.

The leading causes of mortality in developed countries include cancer, cardiovascular disease and stroke. Approximately 61.2% of deaths in Canada are attributed to these three chronic diseases.¹ Prevention of the onset of these diseases could therefore significantly decrease mortality and morbidity while reducing the economic burden to public health systems. Key lifestyle behaviours that influence the risk for developing these major diseases are physical activity, diet, and tobacco use.²

Youth comprise an important population of interest with respect to the documentation of these risk behaviours and obesity trends. There has been a progressive increase in the body mass index (BMI) of Canadian youth (aged 7 to 13) from 1981 to 1996, with the prevalence of obesity in this age group more than doubling over this period.³ Recent reviews conclude that the prevalence of overweight/obesity has reached epidemic proportions among children of all ages, and should be addressed from a public health perspective.^{4,5} Furthermore, significant decreases in vigorous physical activity (three bouts of 20 minutes per week) among groups of youth have been documented,⁶ and high smoking prevalence has been reported in Canadian secondary school students.⁷

Further research is clearly needed to monitor the prevalence of health risk factors (i.e., physical inactivity, overweight/obesity, and smoking) and to guide health professionals to design programs to combat effects of these risk factors among young people.^{8,9} Assessing the prevalence of health risk factors may help identify priority subgroups for targeting health promotion and public health efforts. For example, more studies are needed to examine differences in physical activity between urban and rural youth,^{10,11} as the findings of the limited studies are inconsistent.^{12,13} The published research to date has also been silent in the examination of smoking and obesity prevalence between these two geographical locations. The purpose of this study is therefore to compare the prevalence of physical activity, overweight/obesity and smoking between urban and rural youth from two Canadian provinces.

METHODS

This paper presents primary findings from the Student Physical Activity and Smoking

Survey conducted in November 1999 among high school students from four urban schools in Ontario and four rural schools in Alberta. Classifications of geographical location were based on those defined by Statistics Canada.¹⁴ Urban schools were defined as those situated in metropolitan areas that comprise an urban core of more than 100,000 people. Rural schools were defined as those located in areas with a population of less than 10,000 and in which less than 50% of the employed individuals commute to an urban centre.

Ethics approval for this study was obtained from university-based ethics committees for each of the provincial subsites. Classroom teachers supervised the completion of the questionnaires with the researchers present to answer any questions. To ensure confidentiality, questionnaires were anonymous. Response rates were 82.1% ($n=1407$) and 80.9% ($n=1290$) for the Ontario and Alberta schools respectively (total $n=2697$). See Table I for demographic characteristics of the sample.

Physical activity was assessed with a modified version of the Godin Leisure-Time Exercise Questionnaire,¹⁵ which has been validated in an adolescent population.¹⁶ Students were asked to provide information on the frequency and duration of physical activity bouts outside of school hours over a one-week period. Based on students' self-reports, an estimate of energy expenditure for both moderate and vigorous activity was calculated. (The calculation of energy expenditure is reported elsewhere.¹⁷) Two different criteria were used to assess physical activity prevalence. First, students were considered active if they reported at least 30 minutes of moderate, or 20 minutes of vigorous physical activity for a minimum of four days/week. This criterion was based on recommendations from Canada's Physical Activity Guide to Healthy Active Living.¹⁸ Physical activity recommendations from Canada's Physical Activity Guide for adults were used instead of employing Canada's Physical Activity Guide for Youth¹⁹ because the youth guide does not provide specific physical activity criteria in terms of duration and frequency. Further, a recent major study conducted in the US has also assessed youth physical activity with US and UK adult National Guidelines.²⁰ The

TABLE I
Demographic Characteristics of the Sample

	Urban n (%)	Rural n (%)	Total n (%)
Gender*			
Boys	674 (48.2)	568 (44.0)	1242 (46.2)
Girls	724 (51.8)	722 (56.0)	1446 (53.8)
Ethnicity			
Canadian	1047 (74.5)	1099 (85.1)	2146 (79.5)
European	143 (10.2)	41 (3.2)	184 (6.8)
Asian	29 (2.1)	8 (0.6)	37 (1.4)
Middle Eastern	3 (0.2)	41 (3.2)	44 (1.6)
Other	184 (13.0)	103 (7.9)	287 (10.7)
Grade			
9	317 (22.5)	273 (21.1)	590 (21.9)
10	307 (21.8)	408 (31.6)	715 (26.5)
11	382 (27.2)	323 (25.0)	705 (26.1)
12/13†	400 (28.4)	287 (22.2)	687 (25.5)
	Mean (SD)	Mean (SD)	Mean (SD)
Age	15.6 (1.3)	15.6 (1.2)	15.6 (1.3)
Height (cm)	171.0 (9.6)	171.0 (10.6)	171.0 (10.1)
Weight (kg)	63.0 (19.0)	68.4 (44.0)	65.6 (33.5)
BMI (kg/m ²)	21.2 (3.6)	21.8 (4.0)	21.5 (3.8)

* 9 of the 2,697 participants did not report their gender

† Grade 13 (OAC) students in Ontario were pooled with grade 12 students, as these two grades did not differ significantly in the prevalence of any of the behaviours

second criterion was based on Schoenborn's²¹ classification of activity patterns. Students who expended ≤ 1.4 kcal/kg/day were classified as sedentary, 1.5-2.9 kcal/kg/day as moderately active, and ≥ 3.0 kcal/kg/day as very active.

Two questions assessed students' smoking behaviour. The first item asked the respondents if they had ever smoked a cigarette and provided a 'yes' and a 'no' response option. The second question assessed smoking status with three response options (i.e., 'I currently smoke', 'I quit smoking', and 'I have never smoked'). To estimate prevalence of overweight and obesity, Body Mass Index (BMI; weight/height²) was calculated and categorized according to the Centers for Disease Control and Prevention (CDC) classification for age percentiles by sex.²² According to CDC classifications, youth above the 85th and 95th percentiles for their age are respectively considered as 'at risk of overweight', and 'overweight'. The respective corresponding terms reported in the Canadian literature are 'overweight' and 'obese'.

The percentages of students meeting physical activity criteria were calculated for urban and rural schools, and for each grade. Prevalence of smoking and overweight/obesity were also assessed by calculating percentages. Grades rather than age were used to categorize prevalence of physical activity and smoking, to be consistent with other studies assessing physical activity^{6,20} and smoking behaviour.²³ Chi-square

tests were performed to test for significant differences on compliance with physical activity guidelines, smoking behaviour, and overweight/obesity prevalence between urban and rural schools.* Additionally, chi-square tests were conducted to test for possible grade differences within urban and rural schools on these health risk factors to further identify 'at-risk' groups within each geographic location. Significance level was set at 0.05 for all analyses.

RESULTS

There was no significant difference between the proportion of students in urban and rural schools achieving at least 30 minutes of moderate or 20 minutes of vigorous activity for a minimum of four days per week (see Table II for percentages). Overall, 57.0% of the students in the sample met this criterion. The differences in the proportions of students across the grades who met physical activity guidelines was significant for urban [$\chi^2(3) = 21.35$, $p < 0.001$] but not for rural school students.

Percentages of students who met the guidelines ranged from 65.2% to 51.1% for urban and from 61.4% to 51.6% for rural schools. Percentages of students classified as sedentary, moderately active, and very active were remarkably similar in urban and rural schools (see Table III).

* Missing data were <1% for the physical activity variables, <3% for the smoking variables, and <7% for BMI.

TABLE II

Descriptives (Number and Percentage) of Youth Achieving a Minimum of 30 Minutes of Moderate or 20 Minutes of Vigorous Activity for At Least Four Days Per Week Across School Location and Grade

	Urban (n=1388) n (%)	Rural (n=1283) n (%)
Grade 9	198 (63.0)*	167 (61.4)
Grade 10	199 (65.2)	248 (60.8)
Grade 11	202 (52.9)	168 (52.3)
Grade 12/13	203 (51.1)	158 (51.6)
Total	802 (57.8)	741 (57.0)

* p<0.001 – grade differences in urban schools

TABLE III

Descriptives (Number and Percentage) of Youth Meeting Schoenborn's (1986) Classification of Activity Patterns Across School Location and Grade

	Urban (n=1338)			Rural (n=1248)		
	Sedentary n (%)	Moderately Active n (%)	Very Active n (%)	Sedentary n (%)	Moderately Active n (%)	Very Active n (%)
Grade 9	70 (22.5)*	61 (19.6)	174 (55.9)	57 (21.1)†	62 (23.0)	138 (51.1)
Grade 10	53 (17.6)	65 (21.6)	175 (58.1)	80 (19.7)	110 (27.1)	209 (51.5)
Grade 11	110 (28.9)	89 (23.4)	168 (44.2)	102 (31.9)	68 (21.25)	143 (44.7)
Grade 12/13	121 (30.6)	100 (25.3)	152 (38.4)	83 (29.0)	66 (23.1)	130 (45.5)
Total	354 (26.5)	315 (23.5)	669 (50.0)	322 (25.8)	306 (24.5)	620 (49.7)

* p<0.001 – grade differences in urban schools

† p<0.001 – grade differences in rural schools

TABLE IV

Descriptives (Number and Percentage) of Youth Who Reported Trying Smoking Across School Location and Grade

	Urban (n=1397)		Rural (n=1284)	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Grade 9	152 (48.1)*	164 (51.9)	198 (73.0)	73 (27.0)
Grade 10	172 (56.8)	131 (43.2)	278 (69.0)	125 (31.0)
Grade 11	273 (71.8)	107 (28.2)	245 (76.0)	77 (24.0)
Grade 12/13	303 (76.1)	95 (23.9)	216 (75.3)	71 (24.7)
Total	900 (64.4)†	497 (35.6)	937 (73.0)	346 (27.0)

* p<0.001 – grade differences in urban schools

† p<0.001 – urban and rural differences

TABLE V

Descriptives (Number and Percentage) of Youth Smoking Status Across School Location and Grade

	Urban (n=1366)			Rural (n=1255)		
	Currently Smoker n (%)	Quit Smoking n (%)	Never Smoked n (%)	Currently Smoker n (%)	Quit Smoking n (%)	Never Smoked n (%)
Grade 9	43 (13.7)*	69 (22.1)	201 (64.2)	65 (24.2)†	90 (33.8)	111 (41.7)
Grade 10	57 (19.5)	66 (22.6)	169 (57.9)	87 (22.1)	96 (24.4)	210 (53.4)
Grade 11	98 (26.3)	93 (24.9)	182 (48.8)	106 (33.5)	65 (20.6)	145 (45.9)
Grade 12/13	140 (36.0)	86 (22.1)	162 (41.6)	95 (33.9)	62 (22.1)	123 (43.9)
Total	338 (24.7)	314 (23.0)	714 (52.3)‡	353 (28.1)	313 (24.9)	589 (46.9)‡

* p<0.001 – grade differences in urban schools

† p<0.001 – grade differences in rural schools

‡ p<0.01 – urban and rural differences

Approximately 26.0% of pupils were classified as sedentary, 24.0% as moderately active, and 50.0% as very active. The differences between proportions of students in different grades who were sedentary were significant in both urban [$\chi^2(3) = 19.04$, $p<0.001$] and rural schools [$\chi^2(3) =$

18.61, $p<0.001$]. The highest proportion of sedentary students was in grades 12/13 for urban schools (30.6%) and in grade 11 for rural schools (31.9%).

Regarding smoking prevalence, a significantly higher percentage [$\chi^2(1) = 22.29$, $p<0.001$] of rural youth reported trying

smoking than their urban counterparts (73.0% versus 64.4%) (see Table IV). No differences were evident in the proportion of students across grades from rural schools who reported trying smoking. However, significant differences across grades were observed in the percentages of students from urban schools who reported trying smoking [$\chi^2(3) = 77.41$, $p<0.001$]. Percentages of students from rural and urban schools who reported smoking ranged from 69.0% to 75.3%, and 48.1% to 76.1% respectively.

No differences were found in the proportion of students from urban and rural schools who reported being current smokers (see Table V). However, differences in the proportions of students across grades who were current smokers were significant in both urban [$\chi^2(3) = 51.90$, $p<0.001$] and rural schools [$\chi^2(3) = 18.02$, $p<0.001$]. Grade nine students were less likely to be current smokers in both urban and rural schools (13.7% and 24.2% respectively) in comparison to students in grades 12/13 (36.0% and 33.9% respectively). When asked about quitting smoking, similar proportions of urban and rural youth reported having quit smoking (24.0%). Nonetheless, the differences in the proportion of youth who never smoked was significant [$\chi^2(1) = 7.21$, $p<0.01$]; urban youth were more likely to report that they never smoked (52.3%) in comparison to rural youth (46.9%). To further explore these differences, we stratified urban and rural location by gender. Interestingly, a higher percentage [$\chi^2(1) = 22.74$, $p<0.001$] of rural school girls reported trying smoking in comparison to urban school girls (74.4% and 62.8% respectively). In addition, a significantly higher percentage [$\chi^2(1) = 8.00$, $p<0.01$] of rural girls reported being a current smoker (29.8% versus 23.1%) and a significantly higher percentage [$\chi^2(1) = 12.97$, $p<0.001$] of urban girls reported that they never smoked (54.0% versus 44.4%). None of these differences were evident for boys.

Table VI shows the percentages of pupils classified as 'overweight' and 'obese'.²² 'Obese' prevalence among boys was similar for urban and rural school youth (8.3% versus 9.3%). Likewise, proportions of girls identified as 'overweight' were similar for urban and rural school samples (7.7% versus 10.3%). However, differences in the

TABLE VI

Number and Percentage of Youth Classified as Being Overweight and Obese Based on the CDC (2000) Body Mass Index-for-age Percentiles

Age	Urban (n=1239)				Rural (n=1238)			
	Boys (n=591)		Girls (n=648)		Boys (n=546)		Girls (n=692)	
	Overweight n (%)	Obese n (%)	Overweight n (%)	Obese n (%)	Overweight n (%)	Obese n (%)	Overweight n (%)	Obese n (%)
13	2 (9.5)	3 (14.3)	2 (11.1)	1 (5.6)	1 (14.2)	0 (0.0)	4 (33.3)	1 (8.3)
14	12 (8.3)	12 (8.3)	10 (8.4)	4 (3.4)	9 (11.1)	10 (12.3)	10 (6.8)	8 (5.5)
15	14 (11.1)	11 (8.7)	13 (8.5)	4 (2.6)	22 (13.9)	13 (8.2)	25 (12.5)	7 (3.5)
16	25 (17.0)	11 (7.5)	16 (8.4)	1 (0.5)	33 (22.0)	12 (8.0)	19 (10.6)	9 (5.0)
17	13 (12.7)	7 (6.9)	6 (5.1)	3 (2.5)	20 (18.7)	13 (12.1)	11 (8.5)	3 (2.3)
18/19	7 (14.3)	5 (10.2)	3 (6.0)	2 (4.0)	11 (25.6)	3 (7.0)	2 (7.7)	5 (19.2)
Total	73 (12.4)*	49 (8.3)	50 (7.7)	15 (2.3)†	96 (17.6)*	51 (9.3)	71 (10.3)	33 (4.8)†

* $p < 0.05$ – urban and rural differences in percentage overweight† $p < 0.05$ – urban and rural differences in percentage obese

percentages of 'overweight' boys and 'obese' girls were revealed. A significantly higher percentage [$\chi^2(1) = 5.73$, $p < 0.05$] of boys in rural schools were classified as being 'overweight' in comparison to boys in urban schools (17.6% versus 12.4%). Rural girls were significantly more likely [$\chi^2(1) = 5.15$, $p < 0.05$] to be 'obese' in comparison to urban girls (4.8% versus 2.3%). Analyses to test for differences in the prevalence of obesity within urban and rural schools were not performed because of the small number of cases in each category.²⁴

Bivariate correlations were also computed between geographic location (urban = 1; rural = 2) and all three health-related variables. Weak relationships were obtained for smoking status ($r = -.06$, $p < 0.01$), ever tried smoking ($r = -.09$, $p < 0.001$), and BMI ($r = .06$, $p < 0.01$). Additionally, within the rural school analyses, a significant relationship was found between physical activity and smoking status ($r = .11$, $p < 0.001$).

DISCUSSION

Prevalence of physical activity was similar between urban and rural school youth in our study. Our findings are congruent with recent research conducted in the United States with 1,668 eighth-grade girls,¹² where no differences were found in physical activity levels between urban and rural locations. Nevertheless, about one quarter of our sample was classified in the sedentary physical activity category based on Schoenborn's²¹ classification of activity patterns, and approximately 43.0% failed to engage in the minimum criteria of 30 minutes of moderate or 20 minutes of vigorous activity for a minimum of four days/week. Results of our study are compa-

table to findings obtained in a study of adolescents in Ontario assessing prevalence of vigorous physical activity, where 63.1% of adolescents engaged in vigorous physical activity for at least 20 minutes during three or more days in the past week.⁶ Prevalence of physical inactivity reported in these two studies suggests an urgent need for physical activity promotion among youth. Furthermore, the present study indicated that the proportion of sedentary students increased by approximately 10.0% from grades 9 and 10 to grades 11 and 12/13 (see Table III). This finding is congruent with previous research investigating this target population, indicating that physical activity, especially vigorous activity, significantly decreases as youth get older.⁹

Regarding smoking, the overall prevalence in the present study was 25.0% and 28.0% for urban and rural school youth respectively. Whereas results are comparable to the 29.0% prevalence rates of smoking among Canadian youth as reported by O'Loughlin and Tarasuk,⁹ caution should be exercised when interpreting our findings with national or provincial surveys of youth because of potential differences in the measures used to estimate smoking prevalence. Interestingly, the proportion of youth who reported quitting smoking was similar between the two locations (23.0% for urban and 24.9% for rural schools). However, students from rural schools in Alberta were more likely to try smoking than students in urban schools in Ontario. Of concern is the high percentage of grade 9 rural school youth who reported trying smoking (73.0%) in comparison to their urban counterparts (48.1%). Age initiation may be a reason for this difference in smoking prevalence between the two locations. This is supported by our finding that no significant differences in the propor-

tions of youth smoking across grades were evident in the rural schools, in contrast to the urban schools where significant differences were detected. In another study examining a sample of post-secondary students in Canada, Cairney and Lawrance²⁵ found that 72.8% of those who reported being current daily smokers began smoking by the age of 17. A secondary analysis of our data also revealed that these differences were attributed to girls rather than to boys. Intervention efforts should therefore focus on preventing the initiation of smoking at these early ages, especially among rural school girls.

Our study suggests that prevalence of 'overweight' is higher among rural than urban boys (17.6% versus 12.4%), and prevalence of 'obesity' is higher among rural than urban girls (4.8% versus 2.3%). Overall, about 9.0% of urban and rural boys were classified as 'obese', and 9.0% of urban and rural girls were classified as 'overweight'. The overall prevalence of 'obesity' and 'overweight' in our study was lower than in a Canadian sample of children (7-13 years of age) reported by Tremblay and Willms,³ wherein 11.8% of girls were classified as obese and 23.6% as overweight, with the respective percentages for boys being 13.5% and 28.8%. Although the prevalence difference between the two studies is interesting (as physical activity levels tend to decline from childhood to adolescence),⁹ Willms and colleagues do report relatively lower obesity/overweight prevalence rates of the older groups in comparison to the younger groups in their sample of Canadian children aged 7-13 years.²⁶

We also compared the prevalence of youth at risk (i.e., either overweight or obese) between the two geographical locations. In total, 20.7% of boys and 10.0%

of girls in urban schools were at risk, with the respective percentages being 26.9% and 15.1% for rural schools (see Table VI). Whereas these analyses indicate clearer differences between boys and girls, they also provide evidence that youth in rural schools may be more at risk of overweight or obesity in comparison to children from urban schools.

There are a number of explanations for the differences found between urban and rural youth with regards to overweight/obesity and smoking in the present study. In terms of overweight/obesity, recent evidence among Canadian youth suggests that socio-economic status is inversely related to the prevalence of overweight.²⁶ Rural students are more likely to come from families with lower socio-economic status, and parents of rural school youth are more likely to have lower levels of education and lower paid jobs.¹⁴ The lower income available to rural students may be linked to less healthy food choices which may lead to increased overweight prevalence. Additionally, recreational facilities may be limited in rural communities.¹³ In terms of smoking prevalence, tobacco control policies,²⁷ as well as smoking behaviour of friends, siblings, and teachers,²⁸⁻³⁰ may have contributed to the difference between locations found in our study.

When discussing the findings of the present study, limitations must also be considered. First, urban and rural youth were selected from only four schools in Ontario and four schools in Alberta respectively, and therefore our results are not necessarily representative of the urban and rural population of each province. Second, our results may in part be attributed to differences between provinces rather than to urban versus rural setting. Third, the reliance on self-report for the assessment of health behaviours may have increased measurement error. Nevertheless, the present study has provided concurring evidence on prevalence of physical inactivity based on two criteria, and suggests prevalence of smoking and overweight is somewhat higher in rural school children. The significant (albeit small) bivariate correlations of smoking and BMI with geographic location, provide further support of the higher prevalence of these behaviours in rural youth. More studies with nationally repre-

sentative samples of youth in Canada need to be conducted to further explore possible differences in health behaviours between urban and rural school youth. Future studies should include prospective and multi-level designs that incorporate potential mediating and moderating measures, and employ diverse methods of data analyses (e.g., regression techniques, multilevel modeling) to further advance the findings of the present study.

Youth comprise an important population with respect to monitoring health risk factors, given the potential of reducing chronic disease in later life through health promotion efforts. The identification of youth population subgroups, such as urban and rural school students, will assist in tailoring health promotion/public health programs for specific high-risk target populations.

REFERENCES

1. Statistics Canada. Selected leading causes of death by sex. Available online at: <http://www.statcan.ca/english/Pgdb/health36.htm>. Last updated November 20, 2003.
2. Steptoe A, Wardle J, Cui W, Bellisle F, Zotti A, Baranay R, et al. Trends in smoking, diet, physical exercise, and attitudes toward health in European University students from 13 countries, 1990 – 2000. *Prev Med* 2002;35(2):97-104.
3. Tremblay MS, Willms JD. Secular trends in the body mass index of Canadian children. *CMAJ* 2000;163(11):1429-33.
4. Centre for Reviews and Dissemination. The prevention and treatment of childhood obesity. *Effective Health Care* 2000;7:1-11.
5. Troiano RP, Flegal KM. Overweight children and adolescents: Description, epidemiology, and demographics. *Pediatrics* 1998;101(3):497-504.
6. Irving HM, Adlaf EM, Allison KR, Paglia A, Dwyer JJ, Goodman J. Trends in vigorous physical activity participation among Ontario adolescents, 1997-2001. *Can J Public Health* 2003;94(4):272-74.
7. Cohen B, Evers S, Manske S, Bercovitz K, Edward HG. Smoking, physical activity and breakfast consumption among secondary school students in a southwestern Ontario community. *Can J Public Health* 2003;94(1):41-44.
8. National Center for Chronic Disease Prevention and Health Promotion. Measuring behaviors that endanger health. Available online at: http://www.cdc.gov/nccdphp/bb_brfss_yrbs/index.htm. Last updated March 3, 2003.
9. O'Loughlin JL, Tarasuk J. Smoking, physical activity and diet in North American youth: Where are we at? *Can J Public Health* 2003;94(1):27-30.
10. Sallis JF, Prochaska J, Taylor W. A review of correlates of physical activity of children and adolescents. *Med Sci Sports Exerc* 2000;32(5):963-75.
11. Pratt M, Macera C, Blanton C. Levels of physical activity and inactivity in children and adults in the United States: Current evidence and research issues. *Med Sci Sports Exerc* 1999;31(11 Suppl):S526-S533.
12. Felton GM, Dowda M, Ward DS, Dishman RK, Trost SG, Saunders R, et al. Differences in physical activity between black and white girls living in rural and urban areas. *J Sch Health* 2002;72(6):250-55.
13. Loucaides CA, Chedzoy SM, Bennett N. Differences in physical activity levels between urban and rural school children in Cyprus. *Health Educ Res Theory Pract* 2004;19(2):138-47.
14. Statistics Canada. Education, Skills and Learning Research Papers. Understanding the rural-urban reading gap. Available online at: <http://www.statcan.ca/english/IPS/Data/81-595-MIE2002001.htm>. Last updated May 6, 2004.
15. Godin G, Shephard RJ. Psychosocial factors influencing intentions to exercise of young students from grades 7 to 9. *Res Q Exercise Sport* 1985;57:41-52.

...continues next page

RÉSUMÉ

Contexte : On manque d'information documentant la prévalence des facteurs de risque pour la santé chez les jeunes. Notre étude visait à comparer la prévalence de la sédentarité, du tabagisme et de l'embonpoint ou de l'obésité chez les jeunes dans les écoles de milieux urbains et ruraux.

Méthode : Nos données provenaient d'une enquête sur l'activité physique et le tabagisme menée auprès de 2 697 élèves de niveau secondaire dans quatre écoles urbaines de l'Ontario et quatre écoles rurales de l'Alberta. Nous avons évalué la prévalence de la sédentarité selon les critères du Guide canadien d'activité physique pour une vie active saine et selon des valeurs de classification de la force dépensée quotidiennement. La prévalence du tabagisme a été obtenue d'après l'usage actuel du tabac. La prévalence de l'embonpoint et celle de l'obésité ont été obtenues en comparant les valeurs de l'indice de masse corporelle à l'IMC par centiles d'âge et de sexe mis au point par les CDC américains.

Résultats : La prévalence de l'activité physique était faible dans notre étude; seulement 57 % des jeunes répondaient aux critères canadiens pour l'activité physique, et 26 % se classaient dans la catégorie des personnes sédentaires selon les valeurs de classification de la force dépensée quotidiennement. La proportion des élèves ayant dit avoir « essayé la cigarette » était supérieure en milieu rural (73 %, contre 64,4 % en milieu urbain, $p < 0,001$). La proportion des garçons faisant de « l'embonpoint » dans les écoles en milieu rural était sensiblement plus élevée que chez les garçons en milieu urbain, et la proportion des filles « obèses » en milieu rural était sensiblement plus élevée que chez les filles en milieu urbain.

Conclusion : Nos constatations soulignent l'urgence de promouvoir l'activité physique chez les jeunes au Canada. De plus, nos résultats donnent à penser qu'il est très important de cibler les élèves en milieu rural, et encore plus les filles, dans les programmes de prévention de l'usage du tabac. Il faudrait mener d'autres études pour examiner les écarts entre les milieux urbain et rural à l'échelle des provinces.

16. Sallis JF, Buono MJ, Roby JJ, Micale FG, Nelson JA. Seven-day recall and other physical activity self-reports in children and adolescents. *Med Sci Sports Exerc* 1993;25:99-108.
17. Fein AJ, Plotnikoff RC, Wild C, Spence JC. Perceived environment and physical activity in youth. *Int J Behav Med* 2004;11:135-42.
18. Canada's Physical Activity Guide to Active Living. Ottawa: Health Canada, 1998.
19. Canada's Physical Activity Guide for Youth. Ottawa: Health Canada, 2002.
20. Pate RR, Freedson PS, Sallis JF, Taylor WC, Sirard J, Trost SG, et al. Compliance with physical activity guidelines: Prevalence in a population of children and youth. *Ann Epidemiol* 2002;12:303-8.
21. Schoenborn C. Health habits of US adults, 1985: The 'Almeida 7' revisited. *Public Health Rep* 1986;101:571-80.
22. National Center for Chronic Disease Prevention and Health Promotion. CDC Growth Charts. United States: CDC, 2000.
23. Waller BJ, Cohen JE, Ferrence R, Bull S, Adlaf EM. The early 1990s cigarette price decrease and trends in youth smoking in Ontario. *Can J Public Health* 2003;94(1):31-35.
24. Huck SW. *Reading Statistics and Research*. New York, NY: Addison Wesley Longman, 2000.
25. Cairney J, Lawrance K. Smoking on campus: An examination of smoking behaviours among post-secondary students in Canada. *Can J Public Health* 2002;93(4):313-16.
26. Willms JD, Tremblay MS, Katzmarzyk PT. Geographic and demographic variation in the prevalence of overweight Canadian children. *Obes Res* 2003;11(5):668-73.
27. Adlaf EM, Gliksman L, Demers A, Newton-Taylor B. Cigarette use among Canadian undergraduates. *Can J Public Health* 2003;94(1):22-24.
28. De Vries H, Engels R, Kremers S, Wetzels J, Mudde A. Parents' and friends' smoking status as predictors of smoking onset: Findings from six European countries. *Health Educ Res Theory Pract* 2003;18(5):627-36.
29. Boyle MH, Sanford M, Szatmari P, Merikangas K, Offord DR. Familial influences on substance use by adolescents and young adults. *Can J Public Health* 2001;92(3):206-9.
30. Poulsen LH, Osler M, Roberts C, Due P, Damsgaard MT, Holstein BE. Exposure to teachers smoking and adolescent smoking behaviour: Analysis of cross sectional data from Denmark. *Tobacco Control* 2002;11(3):246-51.

Received: December 9, 2003

Accepted: June 25, 2004

ERRATUM

In the September/October 2004 issue of the Canadian Journal of Public Health (Vol.95, No.5, pg. 382), the incorrect abstract and abstract translation were published for the article by Wilson et al., entitled: "Long-term-care residents: Concerns identified by population and care trends."

We publish the correct abstract and translation here in their entirety.

ABSTRACT

Objective: Despite rising concern over population aging, few descriptions exist of long-term-care (LTC) residents, the people who are normally the oldest and the most dependent persons. This study sought to describe a LTC resident population and trends in this population.

Methods: A descriptive-comparative quantitative analysis of all data (1988-1999) from a provincial (Alberta) LTC resident database was undertaken.

Findings: Over the 10-year period, there was a significant increase in care needs. In 1988, the mean Care Requirement Score was a "C" (indicating low to medium level care was required); by 1999, the mean score was "E" (medium to high level care). There were both a substantial reduction in residents with low care needs and an increase in residents with high care needs. Although the mean age of LTC residents increased from 80.5 to 82.5, residents under age 65 had higher care needs. General linear modelling also revealed younger age was a significant influence in regard to higher care needs, along with larger (versus smaller) LTC facilities, and urban (versus rural) LTC facility location. The average length of stay from LTC admission to death also declined significantly from 6.9 to 3.4 years. Although this study may only confirm what is suspected about LTC residents, it should raise discussion over the impact of limited LTC beds on families, community-based health services, and acute care hospitals; and the implications of more dependent residents on LTC facility and personnel planning.

RÉSUMÉ

Objectif : Malgré les préoccupations croissantes engendrées par le vieillissement de la population, rares sont les descriptions des résidents en soins de longue durée, bien que ces personnes soient d'habitude les plus âgées et les plus dépendantes. Nous avons donc voulu décrire une population de résidents de soins de longue durée et les tendances qui s'y rattachent.

Méthode : Nous avons mené une analyse quantitative descriptive-comparative de toutes les données (1988-1999) d'une base provinciale (Alberta) de résidents de soins de longue durée.

Constatactions : Sur une période de 10 ans, nous avons observé une hausse significative des besoins en matière de soins. En 1988, la note moyenne de ces besoins était de C (besoin d'un niveau de soins faible à moyen), mais en 1999, elle était de E (niveau moyen à élevé). Il y a eu à la fois une baisse considérable du nombre de résidents ayant de faibles besoins en matière de soins et une augmentation des résidents ayant des besoins importants. Bien que l'âge moyen des résidents en soins de longue durée ait augmenté, passant de 80,5 à 82,5 ans, les résidents de moins de 65 ans avaient des besoins plus importants en matière de soins. Un modèle linéaire général a également indiqué la présence de liens significatifs entre un âge moins avancé et les besoins supérieurs en matière de soins, le fait de résider dans un établissement de soins de longue durée de grande taille (plutôt que de taille réduite), et le fait que l'établissement soit situé en milieu urbain (plutôt que rural). La durée moyenne du séjour en établissement de soins de longue durée, de la date d'entrée jusqu'au décès, a elle aussi diminué de manière significative, passant de 6,9 à 3,4 ans. Cette étude ne fait sans doute que confirmer ce que l'on soupçonnait déjà au sujet des résidents en soins de longue durée, mais elle devrait susciter un débat sur les incidences du manque de lits dans les établissements de soins de longue durée, tant pour les familles que pour les services de santé communautaires et les hôpitaux de soins actifs, et sur les conséquences de la dépendance accrue des résidents pour la planification des établissements et du personnel des soins de longue durée.