

Desk Potatoes: The Importance of Occupational Physical Activity on Health

Adam W. Probert, MSc
Mark S. Tremblay, PhD
Sarah Connor Gorber, MA

ABSTRACT

Objectives: To determine the relationship between occupational physical activity (OPA) and chronic disease after controlling for leisure-time physical activity (LTPA) and other risk factors.

Methods: Using cycle 2.1 of the Canadian Community Health Survey, OPA energy expenditure was derived. The association of OPA with any self-reported chronic disease, heart disease or diabetes was determined using logistic regression while controlling for confounders. The analyses of OPA controlled for age, sex, ethnicity, BMI, smoking status, time since immigration, income, education and LTPA.

Results: High OPA was associated with reduced odds of having any chronic disease (OR=0.89) independent of LTPA status. Similar significant associations were also observed for heart disease (OR=0.61) and diabetes (OR=0.72).

Conclusion: High OPA is associated with reduced odds of chronic disease independent of LTPA. Accordingly, it is important that physical activity questionnaires carefully assess OPA in addition to LTPA.

Key words: Occupation; exercise; epidemiology; chronic disease; energy expenditure

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

Physical Health Measures Division, Statistics Canada, Ottawa, ON

Correspondence and reprint requests: Dr. Mark Tremblay, Director, Healthy Active Living and Obesity Research (HALO), Children's Hospital of Eastern Ontario Research Institute, 401 Smyth Road, Ottawa, ON K1H 8L1, Tel: 613-737-7600, ext. 4114, Fax: 613-738-4800, E-mail: mtremblay@cheo.on.ca

Acknowledgement: The authors thank Marc Tanguay of the Micro-Economic Analysis Division of Statistics Canada for providing the estimates of employment absences used in the calculation of occupational physical activity.

The health benefits of physical activity (PA) have been well documented.^{1,2} Regular PA has been shown to reduce the risk of premature mortality, as well as the risk of developing cardiovascular disease, diabetes, high blood pressure and obesity among other conditions.^{1,2} Initial research into the health effects of PA focused on occupational PA (OPA). In one of the first studies of OPA, Morris et al. studied mortality among London bus drivers and conductors.³ They found that sudden death and three-year mortality were twice as high for drivers (sedentary) than conductors (active). Similarly, among San Francisco Longshoremen, the mortality rate for high activity workers was 5.6 (per 10,000 work-years), compared to 19.9 for moderately active workers and 15.7 for light workers.⁴ In addition, Menotti and Puddu found that the mortality ratio of sedentary and moderately active Italian railroad workers (combined) vs. very active workers was 1.75.⁵ Despite this research, few current population-based studies have adequately examined the role of OPA when studying the benefits of PA.

There is general agreement that there are four domains of physical activity: leisure-time (LTPA – focusing primarily on sports), commuting or active transportation, chores or personal care, and occupation.^{6,7} Of these four domains, the majority of the adult population likely spends the most time on occupational activities. Yet in Canada, most prevention initiatives have focused on LTPA,⁸ with most research and surveillance activities focusing on the same.

Although self-reported LTPA has increased over the last two decades,^{9,10} and the total daily energy intake has declined slightly¹¹ the proportion of Canadians who are overweight or obese has increased dramatically.¹² This apparent data contradiction suggests that self-reported LTPA alone may not provide an accurate or adequate assessment of overall PA. As public health concerns over physical inactivity escalate, more comprehensive assessments of PA are required to accommodate further research examining the relationships between PA, indicators of health, and their trends, thereby providing essential information for policy guidance. Previous studies have shown that LTPA varies by age and sex,¹³ ethnicity,¹⁴ immigrant status¹³ and other socio-economic factors,^{13,15}

The purpose of this study was to determine the relationship between self-reported OPA and chronic disease controlling for LTPA and other confounding variables, using the population-representative Canadian Community Health Survey (CCHS). Based on these results, the adequacy of current PA surveillance practices can be further assessed. It was hypothesized that OPA, though often poorly assessed, is important in clarifying the relationships among PA and indicators of health.

METHODS

This study analyzed cycle 2.1 of the CCHS. The CCHS is cross-sectional and is representative of 98% of the Canadian population age ≥12 years, with exclusions for those individuals living on Indian Reserves and Crown Lands, institutional residents, full-time members of the Canadian Armed Forces and residents of certain remote areas. Further information regarding the CCHS design, content and collection procedures has been described previously.¹⁵ Cycle 2.1 (conducted in 2003) of the CCHS was chosen over the more recent 3.1 cycle because more detailed labour force information was included in the core questionnaire. Analyses were restricted to those aged 18 to 64 years for whom detailed OPA and LTPA information was available (n = 77,011). Those with a BMI of <14 and >70 kg/m² were excluded from the analysis.

To quantify OPA, a question on usual activities at work was used. This question asks “which best describes your usual daily activities or work habits” (usually sit; stand or walk; lift light; or lift heavy loads). In order to derive energy expenditure, metabolic equivalent (MET) values for each activity were assigned (sit = 1.5 METs; stand/walk = 2.5 METs; light lifting = 5 METs; and heavy lifting = 7 METs) according to the Compendium of Physical Activities.¹⁶ A MET is a measure of energy output with one MET equivalent to resting metabolic rate. These values have been used in other studies of OPA and LTPA.¹⁷

To derive the total occupational energy expenditure (OEE), the length of time spent working was required. The CCHS collects information on the respondent’s hours worked per week and weeks worked per year, allowing a calculation of hours

Proportion (%)

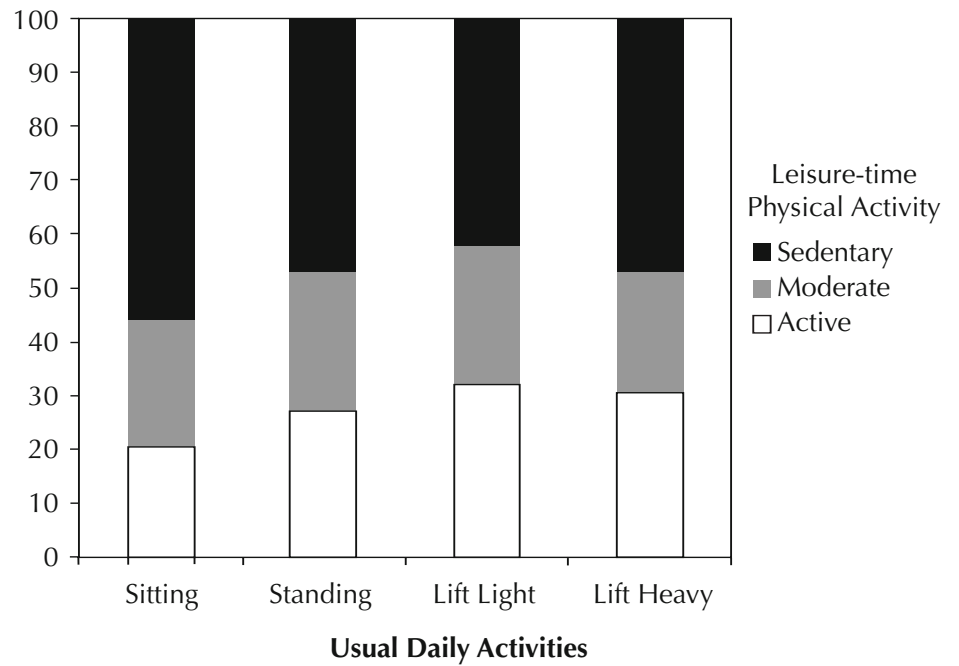


Figure 1. Distribution of leisure-time physical activity by usual work activities
Note: sample size across usual work activity categories varies significantly.

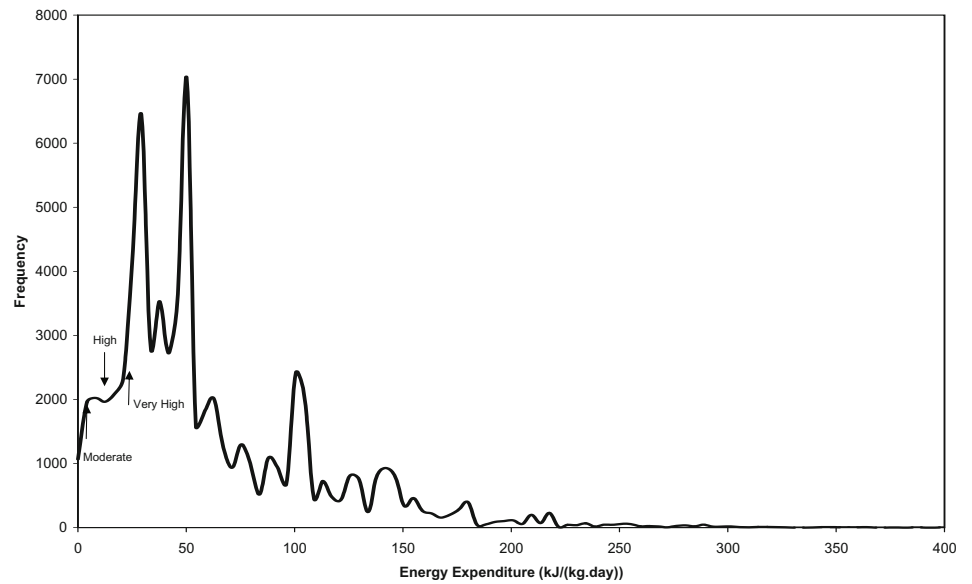


Figure 2. Frequency distribution of mean estimated occupational energy expenditure, both sexes
* Arrows reflect cut-offs for moderate (1.5 kcal/kg/day (kcd)), high (3.0 kcd) and very high (6.0 kcd) leisure-time physical activity.

worked per year. Data from Statistics Canada’s Labour Force Survey were used to adjust these estimates for holidays, sick time and other absences. These adjustments were specific to each province, full-time or part-time status and for public and private sector employees. The adjusted hours worked per year was multiplied by the occupational MET value to arrive at an estimated OEE for each respondent, and

subsequently converted into a daily OEE. LTPA was calculated in a similar manner, with a MET value assigned to each self-reported leisure activity (e.g., bowling 2 METs, gardening 3 METs, ice hockey 6 METs) multiplied by the frequency and duration of the activity. These values were summed to provide the LTPA for each respondent. OPA level was categorized into tertiles: inactive (0 to 9.9 kcal/kg/day

TABLE I

Proportion of Sample with Chronic Conditions, Heart Disease or Diabetes According to Activity Levels and Covariates

	Any Chronic Disease			Heart Disease			Diabetes		
	%	Lower CI	Upper CI	%	Lower CI	Upper CI	%	Lower CI	Upper CI
Occupational Physical Activity									
Sedentary	30.7%	30.0%	31.4%	30.1%	26.7%	33.4%	30.0%	27.1%	33.0%
Moderate	36.7%	36.0%	37.4%	39.1%	35.1%	43.1%	39.4%	36.1%	42.7%
Active	32.5%	31.8%	33.1%	30.7%	27.2%	34.2%	30.4%	27.3%	33.6%
Leisure-time Physical Activity									
Sedentary	49.1%	48.3%	49.8%	54.1%	49.9%	58.2%	55.0%	51.6%	58.4%
Moderate	26.1%	25.4%	26.7%	24.5%	21.1%	27.8%	25.2%	22.1%	28.4%
Active	24.7%	24.1%	25.4%	21.3%	18.0%	24.5%	19.6%	16.8%	22.4%
Sex									
Male	49.0%	48.5%	49.5%	65.6%	61.8%	69.5%	59.2%	55.9%	62.4%
Female	50.9%	50.4%	51.4%	34.3%	30.4%	38.1%	40.7%	37.5%	44.0%
Age Group (years)									
18-34	33.8%	33.2%	34.3%	9.1%	6.7%	11.5%	9.8%	8.0%	11.6%
35-49	40.0%	39.4%	40.7%	31.7%	27.9%	35.5%	35.0%	31.8%	38.3%
50-64	26.1%	25.6%	26.5%	59.1%	55.1%	63.2%	55.0%	51.8%	58.2%
Body Mass Index									
Underweight	2.0%	-1.9%	2.3%	1.7%	-0.8%	2.6%	1.1%	-0.3%	1.9%
Normal	45.5%	44.8%	46.2%	35.3%	31.3%	39.3%	22.5%	19.4%	25.7%
Overweight	33.1%	32.4%	33.8%	36.6%	32.8%	40.4%	35.1%	31.9%	38.4%
Obese	16.2%	15.7%	16.7%	24.9%	21.6%	28.1%	38.4%	35.0%	41.8%
Ethnicity									
White	86.1%	85.5%	86.7%	88.9%	85.7%	92.2%	78.5%	75.1%	81.9%
East or Southeast Asian	4.6%	4.3%	5.1%	3.7%	1.4%	5.9%	5.8%	3.7%	7.8%
Aboriginal	0.9%	0.8%	1.0%	0.8%	0.3%	1.4%	1.7%	1.2%	2.3%
South Asian	2.3%	2.0%	2.5%	1.8%	0.6%	3.1%	6.0%	4.1%	8.0%
Other	5.7%	5.3%	6.2%	4.2%	2.2%	6.3%	7.7%	5.4%	10.0%
Income									
<\$15,000	3.3%	3.0%	3.5%	3.3%	2.2%	4.4%	2.5%	1.9%	3.2%
\$15,000-\$29,999	8.4%	8.0%	8.7%	11.7%	9.4%	14.0%	12.3%	10.0%	14.7%
\$30,000-\$49,999	17.9%	17.3%	18.5%	17.6%	14.9%	20.3%	21.0%	18.3%	23.6%
\$50,000-\$79,999	27.5%	26.8%	28.1%	27.6%	23.7%	31.5%	28.6%	25.2%	31.9%
≥\$80,000	33.8%	33.0%	34.5%	32.7%	28.8%	36.6%	26.2%	23.3%	29.2%
Education									
Less than Secondary School	11.6%	11.0%	12.0%	17.0%	14.5%	19.5%	19.3%	16.6%	22.1%
Secondary School Grad.	19.4%	18.9%	20.0%	19.2%	15.9%	22.4%	17.5%	15.2%	19.9%
Some Post-Secondary	8.9%	8.5%	9.3%	6.1%	4.3%	7.9%	8.1%	6.3%	9.8%
Post-Secondary Grad.	58.0%	57.3%	58.8%	55.2%	51.0%	59.0%	52.0%	48.7%	55.4%
Time Since Immigration									
Non-immigrants	81.8%	81.2%	82.4%	81.0%	77.2%	84.8%	72.6%	69.0%	76.2%
≤10 years	4.2%	3.9%	4.6%	1.9%	0.8%	3.1%	4.5%	2.7%	6.3%
>10 years	13.7%	13.2%	14.3%	16.9%	19.9%	20.5%	22.6%	19.2%	25.9%
Type of Smoker									
Never	30.4%	29.8%	31.1%	22.7%	19.1%	26.2%	28.5%	24.9%	32.1%
Former	42.1%	41.4%	42.8%	50.5%	46.6%	54.5%	50.0%	46.4%	53.7%
Occasional	6.0%	5.7%	6.4%	3.1%	1.8%	4.4%	3.8%	2.6%	5.0%
Daily	21.2%	20.6%	21.8%	23.5%	19.9%	27.0%	17.5%	15.1%	19.9%

or kkd), moderately active (10 to 16.9 kkd) or active (17 or more kkd). LTPA was categorized as inactive (0 to 1.49 kkd), moderately active (1.5 to 2.99 kkd) or active (3.0 or more kkd), consistent with recent practice.^{13,14}

Health outcomes of interest in this study were self-reported chronic disease (any of 31 conditions from the CCHS, e.g., asthma, arthritis, cancer, heart disease, diabetes); heart disease; and diabetes. Respondents were asked to respond positively if the condition of interest was diagnosed by a health professional and had lasted six months or more. To assess the specific effect of OPA on chronic disease, logistic regression analyses were adjusted for age, sex, income, education, body mass index (BMI), smoking, time since immigration, ethnicity and LTPA. Variables in the analyses were categorized as detailed in Table I.

Models were constructed with and without LTPA included (including OPA and LTPA interactions). Records with missing values for the independent variables were dropped. To account for survey design effects, confidence intervals and p-values were estimated using the bootstrap technique. The significance level was set at $p < 0.05$ and all analyses were conducted using SAS version 9.1.¹⁸

RESULTS

A higher proportion of those who stated that their usual work habits involved mostly sitting tended also to be more sedentary in their leisure time (Figure 1), while more of those who tended to lift (light and heavy loads) reported being active.

The distribution of the derived OPA energy expenditure is shown in Figure 2. Arrows identify the cut-offs for moderate

(1.5 kkd), high (3 kkd) and very high (6 kkd) LTPA to illustrate the relative difference between LTPA and OPA. The median OEE is approximately 10 times the cut-off for moderate LTPA. Using the LTPA cut-offs, 93% of those working met the standard for moderate activity, 87% met the standard for high activity and about 76% met the standard for very high activity.

Table I provides the proportional distribution of the sample with chronic diseases according to activity level and covariate category. The odds of having any chronic disease, heart disease alone or diabetes alone by OPA category after controlling for various socio-economic factors and LTPA can be found in Table II (a,b,c). OPA was found to be associated with reduced odds of any of the three disease outcomes, in a dose-response fashion, independent of LTPA status. As expected,

TABLE IIa

Odds Ratios for Self-reported Chronic Disease by Physical Activity Status, Adjusted for All Factors Shown

	OR	Model 1 - OPA		OR	Model 2 - LTPA		OR	Model 3 - OPA and LTPA	
		Lower CI	Upper CI		Lower CI	Upper CI		Lower CI	Upper CI
Occupational Physical Activity									
<i>Sedentary</i>	1.00						1.00		
Moderate	0.93	0.87	1.00				0.93	0.87	1.00
Active	0.89	0.83	0.96				0.89	0.83	0.96
Leisure-time Physical Activity									
<i>Sedentary</i>				1.00			1.00		
Moderate				0.97	0.90	1.04	0.97	0.90	1.04
Active				0.95	0.88	1.02	0.95	0.88	1.02
Sex									
Male	0.59	0.56	0.63	0.58	0.55	0.62	0.60	0.56	0.63
Female	1.00			1.00			1.00		
Age Group (years)									
<i>18-34</i>	1.00			1.00			1.00		
35-49	1.30	1.22	1.38	1.28	1.21	1.37	1.29	1.22	1.38
50-64	2.14	1.98	2.32	2.13	1.97	2.30	2.13	1.97	2.31
Body Mass Index									
Underweight	0.89	0.73	1.08	0.88	0.72	1.08	0.88	0.72	1.07
<i>Normal</i>	1.00			1.00			1.00		
Overweight	1.24	1.16	1.33	1.23	1.15	1.32	1.24	1.16	1.32
Obese	1.65	1.52	1.80	1.64	1.50	1.79	1.65	1.51	1.80
Ethnicity									
<i>White</i>	1.00			1.00			1.00		
East or Southeast Asian	0.87	0.74	1.03	0.87	0.74	1.03	0.87	0.73	1.03
Aboriginal	1.11	0.87	1.40	1.11	0.87	1.40	1.11	0.87	1.41
South Asian	0.86	0.70	1.06	0.86	0.70	1.06	0.86	0.69	1.06
Other	0.93	0.80	1.09	0.93	0.80	1.09	0.93	0.80	1.08
Income									
<\$15,000	1.28	1.09	1.50	1.31	1.12	1.52	1.28	1.09	1.49
\$15,000-\$29,999	1.18	1.07	1.31	1.18	1.07	1.31	1.17	1.06	1.30
\$30,000-\$49,999	1.05	0.98	1.14	1.05	0.97	1.13	1.05	0.97	1.13
\$50,000-\$79,999	1.02	0.95	1.09	1.01	0.95	1.09	1.02	0.95	1.09
≥\$80,000	1.00			1.00			1.00		
Education									
Less than Secondary School	1.02	0.93	1.12	1.01	0.92	1.11	1.02	0.93	1.12
Secondary School Grad.	0.90	0.84	0.97	0.90	0.83	0.97	0.90	0.84	0.97
Some Post-Secondary	1.05	0.95	1.17	1.06	0.96	1.18	1.06	0.95	1.17
<i>Post-Secondary Grad.</i>	1.00			1.00			1.00		
Time Since Immigration									
<i>Non-immigrants</i>	1.00			1.00			1.00		
≤10 years	0.55	0.46	0.65	0.55	0.46	0.65	0.55	0.46	0.65
>10 years	0.86	0.77	0.96	0.86	0.77	0.96	0.86	0.77	0.96
Type of Smoker									
<i>Never</i>	1.00			1.00			1.00		
Former	1.13	1.06	1.21	1.13	1.06	1.21	1.13	1.06	1.21
Occasional	1.08	0.95	1.24	1.08	0.95	1.24	1.08	0.95	1.24
Daily	1.17	1.08	1.27	1.16	1.06	1.26	1.17	1.07	1.27

Referent group in italics
 Values in bold indicate a significant difference from the referent group (p<0.05)

older and obese people have increased odds of reporting chronic disease. To determine if there was a combined effect of LTPA and OPA, the same models were run with nine combinations of activity (Table III). While not significant in all categories apart from the highest levels of activity, there was a noticeable gradient of decreasing odds as activity increases. Overall, those with the highest level of OPA and the highest level of LTPA showed a protective association for any chronic disease (OR=0.85, 95% CI 0.76-0.97). The most protective effect was found for heart disease (OR=0.44, 95% CI 0.30-0.65).

DISCUSSION

The results demonstrate a significant relationship between OPA and chronic disease

after controlling for LTPA and other socio-economic factors. Similar to LTPA, the highest levels of OPA are associated with the greatest health benefits. The dose-response gradient between the combined OPA and LTPA also demonstrates added health benefits from the activity generated at work.

While these are original analyses of Canadian data, similar studies elsewhere have reported independent effects of OPA on health outcomes. Hu et al., in a prospective study of cardiovascular disease outcomes in a cohort of diabetics, found that moderate or vigorous OPA was independently and significantly associated with a lower risk of all-cause and cardiovascular mortality.¹⁹ This study also showed a protective effect when OPA and LTPA were combined. A similar prospective study in

Norfolk, England used two questions (one for usual activity at work and one for hours of exercise in summer and winter) to determine the effect of both on mortality from cardiovascular disease.²⁰ Moderate activity from the combined OPA and LTPA scale showed a significant reduction in risk of cardiovascular disease mortality for both sexes. The authors also found that this combined scale reduced the misclassification of PA as there were a substantial number of participants who scored low on LTPA yet were active on the combined scale.

Recent studies have shown that both LTPA and OPA can vary by race/ethnicity and social status,²¹ so relying solely on LTPA can suggest misleading relationships between PA and health in some race/ethnic groups. Our analyses also showed signifi-

TABLE IIB

Odds Ratios for Self-Reported Heart Disease by Physical Activity Status, Adjusted for All Factors Shown

	Model 1-OPA			Model 2-LTPA			Model 3-OPA and LTPA		
	OR	Lower CI	Upper CI	OR	Lower CI	Upper CI	OR	Lower CI	Upper CI
Occupational Physical Activity									
<i>Sedentary</i>	1.00						1.00		
Moderate	0.82	0.66	1.02				0.81	0.65	1.02
Active	0.61	0.49	0.78				0.61	0.48	0.77
Leisure Time Physical Activity									
<i>Sedentary</i>				1.00			1.00		
Moderate				0.90	0.73	1.11	0.89	0.72	1.10
Active				0.82	0.65	1.03	0.81	0.64	1.01
Sex									
Male	1.06	0.86	1.30	0.98	0.80	1.19	1.07	0.87	1.32
Female	1.00			1.00			1.00		
Age Group									
<i>18-34</i>	1.00			1.00			1.00		
35-49	3.73	2.66	5.24	3.59	2.56	5.03	3.69	2.62	5.19
50-64	16.58	11.73	23.45	16.11	11.39	22.79	16.30	11.49	23.13
Body Mass Index									
Underweight	1.66	0.79	3.49	1.66	0.80	3.46	1.64	0.79	3.44
<i>Normal</i>	1.00			1.00			1.00		
Overweight	1.39	1.11	1.74	1.38	1.10	1.73	1.38	1.10	1.73
Obese	2.73	2.14	3.48	2.69	2.12	3.43	2.69	2.11	3.42
Ethnicity									
<i>White</i>	1.00			1.00			1.00		
East or Southeast Asian	0.96	0.42	2.16	0.96	0.43	2.12	0.93	0.41	2.09
Aboriginal	1.15	0.52	2.51	1.18	0.54	2.60	1.15	0.52	2.52
South Asian	1.18	0.51	2.72	1.12	0.49	2.56	1.14	0.50	2.63
Other	0.95	0.53	1.72	0.95	0.52	1.72	0.95	0.52	1.71
Income									
<\$15,000	1.82	1.17	2.83	1.92	1.24	2.98	1.81	1.16	2.81
\$15,000-\$29,000	1.98	1.46	2.69	2.03	1.49	2.76	1.94	1.43	2.63
\$30,000-\$49,000	1.18	0.91	1.53	1.15	0.89	1.49	1.16	0.90	1.50
\$50,000-\$79,000	1.13	0.89	1.44	1.12	0.88	1.42	1.12	0.88	1.41
≥\$80,000	1.00			1.00			1.00		
Education									
Less than Secondary School	1.09	0.84	1.41	1.03	0.79	1.34	1.07	0.82	1.39
Secondary School Grad.	0.94	0.74	1.20	0.91	0.72	1.16	0.94	0.74	1.19
Some Post-Secondary	0.89	0.62	1.28	0.89	0.62	1.28	0.89	0.62	1.28
<i>Post-Secondary Grad.</i>	1.00			1.00			1.00		
Time Since Immigration									
<i>Non-Immigrants</i>	1.00			1.00			1.00		
≤10 years	0.23	0.10	0.53	0.24	0.10	0.55	0.23	0.10	0.52
>10 years	0.92	0.70	1.23	0.92	0.69	1.22	0.92	0.70	1.23
Type of Smoker									
<i>Never</i>	1.00			1.00			1.00		
Former	1.26	1.01	1.59	1.28	1.02	1.62	1.27	1.01	1.60
Occasional	0.89	0.54	1.48	0.87	0.53	1.44	0.88	0.54	1.46
Daily	1.28	0.94	1.75	1.24	0.91	1.67	1.26	0.93	1.70

Referent Group in Italics

Values in bold indicate a significant difference from the referent group ($p < 0.05$)

cant differences in mean OEE by income, education, immigrant status and ethnicity.

This study found that many of those who are considered active in leisure time also tend to be in active occupations. Results from the United States' Behavioural Risk Factor Surveillance System also showed that for both sexes, those who were active at work (mostly walking or mostly heavy labour) were found to be more active outside of work than those who mostly sat or stood at work.²² Using information from the National Health Interview Survey, it was noted that half of the adults who reported no LTPA, reported at least 1 hour a day of "hard" OPA,²³ further illustrating that LTPA alone is a limited measure of PA.

Despite using a large nationally representative sample, there were some limita-

tions with this study. Potential data limitations include the possibility of reporting bias due to selective recall or social desirabilities (e.g., respondents may overreport OPA or LTPA levels). Also, the derivation of OPA in this study was not an exact measure. The hours worked, although adjusted, may not have been an accurate measure of the "dose" of the time spent at work. While the measure of OPA in this study was based on a single question of usual work activity, other studies have demonstrated that a single question yields similar results to an eight-question panel²⁴ and can be used to provide a broad overview for surveillance purposes.²⁵

The CCHS is a cross-sectional study with the inherent concern of reverse causality which cannot be controlled for in this study (duration of occupational expo-

sure and timing of diagnoses were not available). Nevertheless, the purpose of this study – to show that occupation and chronic disease were associated – was demonstrated.

This study, while seeking to capture a greater proportion of total PA, did not include two important domains: transportation and domestic activity or chores. To accurately account for an individual's PA, information on all four domains should be collected. Cycle 2.1 of the CCHS asked 22 questions on LTPA (including frequency, intensity and duration), 2 questions on active commuting (biking and walking), 4 on sedentary behaviours and 1 on usual work activities (used in this study). There are several validated options available that provide a more comprehensive assessment of total daily PA

TABLE IIc

Odds Ratios for Self-Reported Diabetes by Physical Activity Status, Adjusted for All Factors Shown

	Model 1 - OPA			Model 2 - LTPA			Model 3 - OPA and LTPA		
	OR	Lower CI	Upper CI	OR	Lower CI	Upper CI	OR	Lower CI	Upper CI
Occupational Physical Activity									
<i>Sedentary</i>	1.00						1.00		
Moderate	0.86	0.70	1.06				0.86	0.70	1.06
Active	0.73	0.58	0.90				0.72	0.58	0.90
Leisure Time Physical Activity									
<i>Sedentary</i>				1.00			1.00		
Moderate				1.02	0.82	1.26	1.01	0.82	1.26
Active				0.92	0.74	1.15	0.92	0.73	1.15
Sex									
Male	0.71	0.60	0.85	0.67	0.57	0.80	0.72	0.60	0.86
Female	1.00			1.00			1.00		
Age Group									
18-34	1.00			1.00			1.00		
35-49	3.96	3.02	5.20	3.86	2.95	5.05	3.94	3.00	5.18
50-64	15.44	11.94	19.96	15.15	11.72	19.60	15.32	11.82	19.86
Body Mass Index									
Underweight	1.44	0.53	3.93	1.46	0.53	3.99	1.43	0.52	3.91
Normal	1.00			1.00			1.00		
Overweight	2.36	1.86	2.98	2.33	1.84	2.96	2.35	1.86	2.98
Obese	7.87	6.18	10.03	7.82	6.13	9.99	7.83	6.13	10.00
Ethnicity									
White	1.00			1.00			1.00		
East or Southeast Asian	1.98	1.20	3.28	2.00	1.21	3.32	1.98	1.19	3.28
Aboriginal	2.73	1.56	4.78	2.77	1.58	4.86	2.74	1.56	4.82
South Asian	3.43	1.93	6.08	3.37	1.90	5.98	3.41	1.91	6.06
Other	2.00	1.30	3.08	1.99	1.29	3.08	2.00	1.29	3.08
Income									
<\$15,000	1.34	0.97	1.86	1.40	1.01	1.93	1.34	0.97	1.86
\$15,000-\$29,000	2.38	1.75	3.24	2.41	1.77	3.28	2.37	1.74	3.22
\$30,000-\$49,000	1.60	1.28	2.00	1.59	1.27	2.00	1.59	1.27	2.00
\$50,000-\$79,000	1.33	1.07	1.66	1.32	1.07	1.65	1.33	1.07	1.65
≥\$80,000	1.00			1.00			1.00		
Education									
Less than Secondary School	1.27	0.98	1.64	1.24	0.95	1.60	1.26	0.97	1.63
Secondary School Grad.	0.89	0.73	1.09	0.88	0.72	1.07	0.89	0.73	1.09
Some Post-Secondary	1.19	0.89	1.59	1.20	0.90	1.60	1.19	0.89	1.59
Post-Secondary Grad.	1.00			1.00			1.00		
Time Since Immigration									
<i>Non-Immigrants</i>	1.00			1.00			1.00		
≤10 years	0.43	0.24	0.76	0.43	0.24	0.77	0.42	0.24	0.76
>10 years	1.00	0.77	1.30	1.00	0.77	1.30	1.00	0.77	1.30
Type of Smoker									
Never				1.00			1.00		
Former	1.14	0.92	1.41	1.15	0.93	1.42	1.14	0.92	1.41
Occasional	0.96	0.63	1.47	0.96	0.62	1.47	0.96	0.63	1.47
Daily	0.90	0.69	1.17	0.89	0.68	1.16	0.90	0.69	1.17

Referent Group in Italics
 Values in bold indicate a significant difference from the referent group (p<0.05)

with proportionally less emphasis on LTPA. The World Health Organization has developed and validated the Global Physical Activity Questionnaire (GPAQ) for PA surveillance.²⁶ The GPAC asks 6 questions on OPA, 3 on active transport, 6 on sports and recreation and 1 on sedentary activities. A similarly valid instrument called the International Physical Activity Questionnaire (IPAQ) collects information on all four domains, plus sedentary behaviour.²⁷ The long version contains 7 questions on occupation, 6 on active transport, 6 on chores, 6 on sports and 2 on sedentary activities. Subsequent PA surveillance activities in Canada should consider adapting their questionnaires to achieve greater balance among the four PA domains.

In the spring of 2007, Statistics Canada began data collection for the Canadian

Health Measures Survey (CHMS).²⁸ One component of the CHMS involves all 5,000 respondents wearing an activity monitor (accelerometer) during their waking hours over the course of a week. When this information becomes available, it will allow researchers to determine each respondent's PA intensity and duration, free from self-reporting biases. The objective data from the CHMS will help to assess the accuracy of self-reported PA from the CCHS and other self-report surveys in Canada. Recent data from the United States suggest the proportion of adults classified as being sufficiently active is remarkably reduced when direct PA monitoring procedures are employed.²⁹

This study has demonstrated, within the limits of the information available in Canada, that OPA, independent of LTPA,

is related to certain chronic conditions. As information on other forms of PA are refined, improved knowledge on PA, including the benefits of sustained light or moderate activity (such as in an occupational setting), will begin to emerge.³⁰ In order to properly monitor the relationships between PA and chronic disease in Canada, PA epidemiology should endeavour to capture all domains of activity.^{30,31} This may lead to more informed public health strategies and PA guidelines.

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TABLE III

Odds Ratios for Self-reported Chronic Disease by Combined Physical Activity Status, Adjusted for All Factors Shown

	Any Chronic Disease			OR	Heart Disease		OR	Diabetes	
	OR	Lower CI	Upper CI		Lower CI	Upper CI		Lower CI	Upper CI
Combination Physical Activity									
<i>Low OPA, Sedentary LTPA</i>	1.00	—	—	1.00	—	—	1.00	—	—
Low OPA, Moderate LTPA	0.94	0.82	1.07	0.96	0.66	1.41	1.04	0.72	1.49
Low OPA, Active LTPA	0.93	0.81	1.06	0.85	0.55	1.31	0.86	0.56	1.33
Medium OPA, Sedentary LTPA	0.92	0.83	1.02	0.86	0.63	1.18	0.87	0.67	1.14
Medium OPA, Moderate LTPA	0.90	0.79	1.02	0.66	0.45	0.97	0.75	0.51	1.10
Medium OPA, Active LTPA	0.85	0.75	0.97	0.74	0.52	1.05	0.89	0.64	1.24
High OPA, Sedentary LTPA	0.87	0.78	0.96	0.63	0.46	0.88	0.70	0.52	0.94
High OPA, Moderate LTPA	0.85	0.76	0.96	0.62	0.43	0.90	0.84	0.59	1.20
High OPA, Active LTPA	0.85	0.76	0.97	0.44	0.30	0.65	0.59	0.40	0.88
Sex									
Male	0.60	0.56	0.63	1.06	0.86	1.31	0.71	0.60	0.86
Female	1.00	—	—	1.00	—	—	1.00	—	—
Age Group (years)									
18-34	1.00	—	—	1.00	—	—	1.00	—	—
35-49	1.29	1.22	1.38	3.70	2.63	5.20	3.95	3.01	5.20
50-64	2.13	1.97	2.31	16.29	11.48	23.11	15.35	11.84	19.91
Body Mass Index									
Underweight	0.88	0.72	1.07	1.65	0.79	3.47	1.44	0.52	3.96
Normal	1.00	—	—	1.00	—	—	1.00	—	—
Overweight	1.24	1.16	1.32	1.39	1.11	1.74	2.35	1.86	2.98
Obese	1.65	1.51	1.80	2.69	2.11	3.43	7.83	6.12	10.02
Race									
White	1.00	—	—	1.00	—	—	1.00	—	—
East or Southeast Asian	0.87	0.74	1.03	0.93	0.42	2.10	1.98	1.19	3.27
Aboriginal	1.11	0.87	1.41	1.15	0.52	2.53	2.75	1.55	4.86
South Asian	0.86	0.70	1.06	1.13	0.49	2.60	3.37	1.88	6.03
Other or Mixed	0.93	0.80	1.08	0.95	0.52	1.72	2.00	1.30	3.08
Income Adequacy Quintile									
<\$15,000	1.28	1.09	1.49	1.82	1.17	2.83	1.35	0.97	1.86
\$15,000-\$29,999	1.17	1.06	1.30	1.95	1.44	2.65	2.38	1.75	3.24
\$30,000-\$49,999	1.05	0.97	1.13	1.16	0.90	1.50	1.60	1.28	2.01
\$50,000-\$79,999	1.01	0.95	1.09	1.13	0.89	1.44	1.34	1.08	1.66
≥\$80,000	1.00	—	—	1.00	—	—	1.00	—	—
Highest Level of Education									
Less than Secondary School	1.02	0.93	1.12	1.06	0.82	1.39	1.26	0.97	1.63
Secondary School Grad.	0.90	0.84	0.97	0.94	0.74	1.19	0.89	0.73	1.09
Some Post-Secondary	1.06	0.95	1.17	0.89	0.62	1.28	1.19	0.89	1.59
Post-Secondary Grad.	1.00	—	—	1.00	—	—	1.00	—	—
Time Since Immigration									
<i>Non-immigrants</i>	1.00	—	—	1.00	—	—	1.00	—	—
≤10 years	0.55	0.46	0.65	0.23	0.10	0.52	0.42	0.24	0.75
>10 years	0.86	0.77	0.96	0.92	0.70	1.23	1.00	0.77	1.30
Type of Smoker									
Never	1.00	—	—	1.00	—	—	1.00	—	—
Former	1.13	1.06	1.21	1.26	1.00	1.59	1.14	0.92	1.41
Occasional	1.09	0.95	1.24	0.88	0.53	1.45	0.96	0.63	1.47
Daily	1.17	1.07	1.27	1.25	0.92	1.70	0.90	0.69	1.17

Referent group in italics

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Received: March 12, 2007

Accepted: February 19, 2008

RÉSUMÉ

Objectifs : Déterminer le lien entre l'activité physique au travail (APT) et les maladies chroniques en tenant compte de l'activité physique pendant les loisirs (APPL) et d'autres facteurs de risque.

Méthode : Nous avons calculé la force dépensée lors de l'APT à l'aide des données du cycle 2.1 de l'Enquête sur la santé dans les collectivités canadiennes. Le lien entre l'APT et une maladie chronique, une maladie coronarienne ou le diabète (déclarés par l'intéressé) a été déterminé par régression logistique après avoir apporté des ajustements pour tenir compte des effets de facteurs confusionnels. Nos analyses de l'APT ont pris en compte l'âge, le sexe, l'appartenance ethnique, l'indice de masse corporelle, le tabagisme, le temps écoulé depuis l'immigration, le revenu, l'instruction et l'APPL.

Résultats : Une APT élevée était associée à la probabilité réduite d'avoir une maladie chronique (RC=0,89), quel que soit le niveau d'APPL. Des associations significatives ont aussi été observées à l'égard des maladies coronariennes (RC=0,61) et du diabète (RC=0,72).

Conclusion : Une APT élevée est associée à une probabilité réduite d'avoir une maladie chronique, peu importe le niveau d'APPL. Il est donc important que les questionnaires sur l'activité physique évaluent soigneusement l'APT en plus de l'APPL.

Mots clés : profession; exercice; épidémiologie; maladies chroniques; force dépensée

Coming Events / Activités à venir

To be assured of publication in the next issue, announcements should be received by **July 31, 2008** and valid as of **August 31, 2008**.

Announcements received after **July 31, 2008** will be inserted as time and space permit.

Pour être publiés dans le prochain numéro, les avis doivent parvenir à la rédaction avant le **31 juillet 2008** et être valables à compter du **30 août 2008**. Les avis reçus après le **31 juillet 2008** seront insérés si le temps et l'espace le permettent.

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