

The Relationship Between the Supply of Fast-food Chains and Cardiovascular Outcomes

David A. Alter, MD, PhD, FRCPC¹⁻⁴

Karen Eny¹

ABSTRACT

Objective: To examine the extent to which inter-regional differences in fast-food concentrations account for variations in all-cause mortality and acute coronary syndromes throughout Ontario, Canada.

Methods: Nine distinct fast-food chains were selected based on top sales data in 2001. The per capita rate of fast-food outlets per region was calculated for each of 380 regions throughout Ontario. Outcome measures, obtained using 2001 vital statistics data and hospital discharge abstracts, included regional per capita mortality rates and acute coronary syndrome hospitalization rates; head trauma served as a comparator. All regional outcomes were adjusted for age, gender, and socio-economic status, and were analyzed as continuous and rank-ordered variables as compared with the provincial average.

Results: Mortality and admissions for acute coronary syndromes were higher in regions with greater numbers of fast-food services after adjustment for risk. Risk-adjusted outcomes among regions intensive in fast-food services were more likely to be high outliers for both mortality (Adjusted Odds Ratio (OR): 2.52, 95% confidence intervals (CI): 1.54-4.13, $p < 0.001$) and acute coronary hospitalizations (Adjusted OR: 2.62, 95% CI 1.42-3.59, $p < 0.001$) compared to regions with low fast-food service intensity. There was no relationship between the concentration of fast-food outlets and risk-adjusted head-trauma hospitalization rates.

Interpretation: Inter-regional cardiac outcome disparities throughout Ontario were partially explained by fast-food service intensity. Such findings emphasize the need to target health promotion and prevention initiatives to highest-risk communities.

MeSH terms: Coronary disease; human; risk; food supply; restaurants; mortality

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

1. Institute for Clinical Evaluative Sciences, Toronto, ON
2. Division of Cardiology, Schulich Heart Centre, Sunnybrook & Women's College Health Sciences Centre, Toronto
3. Department of Health Policy, Management and Evaluation, University of Toronto, Toronto
4. Faculty of Medicine, University of Toronto

Correspondence: Dr. David A. Alter, Institute for Clinical Evaluative Sciences G106-2075 Bayview Avenue, Toronto, ON M4N 3M5 Tel: 416-480-5838, Fax: 416-480-6048, E-mail: david.alter@ices.on.ca

Acknowledgements: We express our sincere gratitude to Ms. Wendy Cooke and Ms. Adele Bross for their efforts in helping to abstract locations of fast-food outlets for this study. We also thank Drs. Don Redelmeier and Geoff Anderson for their helpful comments on an earlier version of this manuscript.

Sources of support: Dr. Alter is a New Investigator at the Canadian Institutes of Health Research and is co-funded by the Heart and Stroke Foundation of Canada. Karen Eny (University of Guelph, Undergraduate student majoring in Applied Human Nutrition) was supported by the Heart and Stroke Foundation of Canada's John D. Schultz Science Student Scholarship.

The Institute for Clinical Evaluative Sciences is supported in part by a grant from the Ontario Ministry of Health. The results, conclusions, and opinions are those of the authors, and no endorsement by the Ministry or the Institute is intended or should be inferred.

Cardiovascular disease is the leading cause of death in North America.^{1,2} Available evidence has demonstrated marked inter-regional variations in cardiovascular mortality in Canada, and worldwide.³⁻⁶ The positive correlation between the prevalence of atherogenic risk factors and mortality have led many to hypothesize that inter-regional mortality variations may be attributable in part to differences in patient lifestyle behaviours, physician prevention and counseling initiatives, and/or government-supported health promotion activities across communities.⁷⁻¹⁰

The fast-food industry generates \$5.1 billion in sales per year,¹¹ and accounts for nearly 4.7% annual Gross Domestic Product of "Specified Expenditures as a Share of Personal Disposable Income in Ontario."¹² Over the past four decades, increasing service demands have led to an exponential growth in the supply of fast-food restaurants throughout the country.¹³⁻¹⁵ While population health surveys have demonstrated the presence of lower body-mass indexes (BMI) and healthier nutritional food consumption among communities with improved cardiovascular health and outcomes,¹⁶⁻¹⁸ no study has specifically examined the relationship between mortality variations and fast-food supply in Canada, or elsewhere. Moreover, given the positive correlation between socio-economic status, health status, and survival,^{19,20} one may hypothesize that the impact of the fast-food industry may affect outcomes differently in lower as compared to higher socio-economic communities.

The objective of this study was to examine the extent to which inter-regional differences in fast-food concentrations accounted for variations in all-cause mortality and acute coronary syndromes, and to examine the interaction among socio-economic status, fast-food intensity and outcomes throughout Ontario, Canada.

METHODS

Data sources

We identified nine leading fast-food chains based on market shares, total sales, and data availability.²¹ They included: McDonalds®, KFC®, Taco Bell®, Wendy's®, Harvey's®, Swiss Chalet®, Dairy Queen®, Pizza Hut®, and Burger King®. For each fast-food chain, we abstracted postal codes to identify the geo-

TABLE 1

The Relationship Between the Supply of Fast Foods and Risk-adjusted Outcomes*

Regional Outcome Category	Supply of Fast Food (Tertile) (Number of outlets per 100,000 people)	Incremental Increase in the Prevalence of Risk-adjusted Outcomes per 100,000 as Compared to Reference Category	P value
Mortality	0-9.5 outlets	Reference category	
	9.6-19.2 outlets	35.2	0.02
	≥19.3 outlets	62.4	<0.001
Acute coronary syndromes	0-9.5 outlets	Reference category	
	9.6-19.2 outlets	28.4	0.07
	≥19.3 outlets	47.2	0.003
Head trauma	0-9.5 outlets	Reference category	
	9.6-19.2 outlets	0.35	0.76
	≥19.3 outlets	1.6	0.15

* Incorporates 2001 data. The supply of fast food is reflected by the per-capita rate tertile of fast-food outlets within each neighbourhood region (Forward Sortation Area). Regional outcomes reflect the per-capita rate for all-cause mortality, acute coronary syndrome and head-trauma hospitalizations adjusted for age, gender, and socio-economic status.

graphical region of each outlet using 2001 electronic public access files (Canada 411™ and Canada Post™).

The Registered Persons Data Base (RPDB) provided information related to the age, gender, residential postal codes, and the presence and date of death (where applicable) for all Ontario residents. The RPDB was used to identify the population characteristics (of those alive and those who had died) during the pertinent study period (Calendar year 2001). Socio-economic status was identified using resident Forward Sortation Areas (the first three digits of the postal codes) and official 1996 Census data. Information pertaining to disease-specific hospitalizations during the study period was obtained from the Canadian Institute of Health Information (CIHI). The study received research ethics approval from Sunnybrook & Women's College Health Sciences Centre.

Geographical regions

Each geographical region in Ontario was identified using the Forward Sortation Area (FSA). There were 504 FSAs in Ontario; the median population size for each FSA was 28,371 people (interquartile range: 17,317 – 42,741). We excluded any FSA consisting of fewer than 1,000 people, due to small population sizes. Given that rural regions may have a different composition of fast-food chains (and may favour smaller business restaurants rather than corporate chains), we only included those FSAs that had at least one of the nine unique fast-food chains examined. In total, 380 Forward Sortation Areas comprised the number of geographical regions in this study.

Fast-food outlets

All fast-food chains were aggregated together, regardless of food type, and tallied within each Forward Sortation Area. Given that the number of fast-food restaurants was hypothesized to correlate with population density, we divided the number of fast-food outlets by the population size within each geographical region.

Outcomes

Our outcome measures included region-specific per capita mortality rate, and region-specific per capita acute coronary syndrome hospitalization rate (i.e., unstable angina and acute myocardial infarctions) during the 2001 calendar year. Unstable angina was defined using the most responsible diagnostic fields (International Classification of Diseases, 9th Revision, Clinical Modification [ICD-9-CM] Code 411, 413), as was acute myocardial infarction (International Classification of Diseases, 9th Revision, Clinical Modification [ICD-9-CM] Code 410). Previous studies in Ontario have validated these codes against clinical chart abstraction.^{22,23} We also compared each region's outcome (and their 95% confidence interval) to the provincial average using risk adjustments (indirect standardization) for age and gender. Each region was then categorized into one of three subgroups: "low-outlier", "average", or "high-outlier", based upon their rank when compared to the provincial average.

As a comparator, we explored the relationship between fast-food supply and head trauma (International Classification of Diseases, 9th Revision, Clinical Modification [ICD-9CM] Code 800-804).

We chose head trauma as a neutral variable given the lack of evidence supporting any clear biological ties to regional nutritional behaviours.

Analyses

The per capita distribution of fast-food outlets per Forward Sortation Area was categorized into equal tertiles, defined as follows: fewer than 9.6 outlets per 100,000 population; 9.6 to 19.3 outlets per 100,000 population; greater than 19.3 outlets per 100,000 population. Using ordinary least squares regression, we then examined how the concentration of fast-food outlets was correlated to the average age, socio-economic status, and size of the population. The relationship between fast-food outlet intensity (i.e., tertile) and risk-adjusted outcomes were examined with and without adjustments for median neighbourhood household income using least squares regression techniques. Given that one of our objectives was to explain whether the relationships between fast-food intensity and outcomes are different across socio-economic status, we tested the significance of an interaction among medium household income, fast-food intensity and risk-adjusted regional outcomes.

Multiple ordinal logistic regression techniques were used to examine whether fast-food service intensity predicted the likelihood that a region was classified as a "high-outlier", "average" or "low-outlier" outcome performer, after adjusting for median neighbourhood household income.

As a sensitivity analysis, we examined the relationship between the per-capita rate of fast-food outlets per region and outcomes by modeling the fast-food chains as a con-

TABLE II

The Relationship Between the Supply of Fast Foods and Risk-adjusted Outcome Rankings

Regional Outcome Category	Supply of Fast Food (Tertile) (Number of outlets per 100,000 people)	Adjusted Odds Ratio (for poorer risk-adjusted outcome ranking) (+/- 95% CI)	P value
Mortality	0-9.5 outlets	Reference category	
	9.6-19.2 outlets	1.48 (0.90-2.42)	0.34
	≥19.3 outlets	2.52 (1.54-4.13)	<0.001
Acute coronary syndromes	0-9.5 outlets	Reference category	
	9.6-19.2 outlets	1.65 (1.04-2.63)	0.04
	≥19.3 outlets	2.26 (1.42-3.59)	<0.001
Head trauma	0-9.5 outlets	Reference category	
	9.6-19.2 outlets	1.06 (0.47-2.42)	0.89
	≥19.3 outlets	1.14 (0.51-2.53)	0.75

* Incorporates 2001 data. The supply of fast food is reflected by the per-capita rate tertile of fast-food outlets within each neighbourhood region (Forward Sortation Area). Regional outcomes reflect the per-capita rate for all-cause mortality, acute coronary syndrome and head-trauma hospitalizations adjusted for age, gender, and socio-economic status. Outliers are identified using the 95% CI and comparing to the provincial averages. Outliers whose lower 95% CI lies above the provincial average is identified as a high-outlier; conversely, outliers whose upper 95% CI lies below the provincial average is identified as a low-outlier. The relationship between fast-food intensity and outlier status incorporated ordinal logistic regression and reflects the likelihood that fast-food supply is situated among sequentially poorer outcome regions.

tinuous rather than as a categorical variable. We also analyzed our data by log transforming outcomes. Log transformation did not significantly alter our results.

Statistical significance was defined as $p < 0.05$. All analyses were conducted using SASTM version 8.2 statistical software.

RESULTS

Fast-food outlet distribution

Among the 9 unique fast-food chains examined, there were 1,630 fast-food outlets (median: 3 outlets per geographical region). The number of region-specific fast-food outlets was correlated with the population size per region (spearman $r = 0.33$; $p < 0.001$). After adjusting for population size, there was a median of 15.2 outlets per 100,000 individuals per Forward Sortation Area (Inter-quartile range (IQR): 7.5-22.3 per 100,000 individuals). While the absolute per-capita rate of fast-food outlets weakly and inversely correlated with the average population age per region ($r = -0.12$; $p = 0.02$), there was no significant relationship between fast-food outlet concentration and median household neighbourhood income.

Fast-food outlets and outcomes

The median age-gender standardized mortality and acute coronary syndrome hospitalization rates were 583 per 100,000 (IQR: 499.5-671.5 per 100,000) and 226 per 100,000 [IQR: 168.5-334.5 per 100,000] across Ontario respectively. Mortality and admissions for acute coro-

nary syndromes were higher among regions with greater number of fast-food services after adjustments for risk (Table I). Each increase of one fast-food outlet per 100,000 people in a region corresponded to an additional one death per 100,000 persons, after adjusting for baseline socio-demographic differences ($p < 0.001$). While lower neighbourhood income regions were associated with a higher prevalence of acute coronary syndromes and mortality, there were no significant interactions among socio-economic status, per-capita rates of fast foods, and outcomes in Ontario ($p = 0.42$ for all-cause mortality; $p = 0.52$ for acute coronary syndromes).

Risk-adjusted outcomes among communities with more intensive supplies of fast-food services were more likely to be high outliers for both mortality (Adjusted OR: 2.52, 95% CI: 1.54-4.13, $p < 0.001$) and acute coronary hospitalizations (Adjusted OR: 2.62, 95% CI: 1.42-3.59, $p < 0.001$) than were regions with low fast-food service supply intensity (Table II).

In contrast to outcomes of mortality and acute coronary syndrome hospitalizations, there was no relationship between the concentration of fast-food outlets and risk-adjusted rates of head trauma ($R^2 = 0.007$; $p = 0.27$) throughout the province.

DISCUSSION

Health services researchers continue to examine reasons for regional variations in health status and outcomes.^{7,8,24-26} Cardiovascular mortality rates have been

shown to vary two-fold across communities throughout Canada.^{3,27} Canadian researchers have recently demonstrated that over 40% of such regional outcome variations are explained by differences in the prevalence of traditional cardiac risk factors, such as smoking and obesity.^{8,27} While self-reported nutritional behaviours have also been associated with cardiovascular outcomes in selected regions,^{17,28} ours is the first study to illustrate the positive relationship between the supply of fast-food restaurants and the prevalence of cardiovascular disease and death across communities.

Fast foods represent the largest component of food establishment sales.²⁹ Reports from the US Department of Labor, Bureau of Labor Statistics, have demonstrated a 339% increase in food expenditures spent away from home in the United States between 1974 and 1994 – a 1.7-fold magnitude increase over food dollars spent at home over the same time period.¹³ Given the exponential growth in fast-food supply during the past several decades, one may reasonably hypothesize that a large component of such increasing expenditures originates from accelerated community fast-food demands and consumption.^{11,12,30,31} Numerous studies have concluded that the poor nutritional value, the excessive salt content, and the degree of saturated fats and trans-fatty acid associated with fast-food products likely perpetuate the prevalence of hypercholesterolemia, hypertension, type-II diabetes mellitus, obesity, and cardiovascular disease in westernized societies.³²⁻³⁵

The relationships between fast-food restaurants and outcomes were similar in high- and low-income communities. The lack of an interaction among socio-economic status, fast-food supply, and outcomes may suggest that the community fast-food demands are driven by multiple factors, such as taste preferences, advertising, affordability, and convenience.¹⁴ Such influencing factors likely extend across all social and economic spectra in a similar and consistent fashion. In this regard, our results are consistent with at least one other study, which demonstrated that the impact of self-reported fast-food eating behaviours on BMI were similar among low- and high-income individuals.³⁶

Our results serve to reinforce the importance of community profiling when exploring inter-regional variations in health status and outcomes.³⁷ The ability to distinguish high- from low-mortality regions by the fast-food supply of restaurants in a neighbourhood underscores the need for targeted health promotion and prevention strategies to communities with poorest health profiles and lifestyle behaviours.^{27,38} Other policy implications may include tax-based or financial reform initiatives and restrictions in the availability of fast-food restaurants,³⁹ which together may curtail fast-food demands and promote the consumption of healthier nutritional products in high-mortality regions.

Our study has several important limitations. First, the ecological cross-sectional design examined communities, not individuals. Our study was not designed to examine the relationship between fast-food consumption and individual outcomes – an analysis which would necessitate a longitudinal study of sufficient duration to account for the cumulative effects of fast-food exposure over time. Accordingly, we cannot presume causality between fast-food consumption and health-related outcomes per se. Notwithstanding, our analysis did adjust for differences in the age, gender, and socio-economic composition of communities – three of the most important determinants of population outcomes. Furthermore, available evidence has demonstrated that temporal trends in the relative variation of fast-food consumption have remained consistent across demographic subgroups,⁴⁰ suggesting some level of stability in regional market shares over

time. Second, we examined only a selected number of fast-food restaurants. While the selection of such restaurants was based on top available sales, it is possible that smaller rural communities may have consisted of a preponderance of small-business independent fast-food restaurants as opposed to multi-chain conglomerates, which tend to be concentrated in larger urban communities. Nonetheless, we did restrict the analysis to communities containing at least one of the selected fast-food chains to minimize such biases. Moreover, fast-food sales in Ontario account for nearly half of the total fast-food sales in Canada.¹¹ Therefore, our results are likely to be generalizable to other regions worldwide, and unlikely to change were a wider array of fast-food restaurants to be selected.

In conclusion, inter-regional differences in the supply of fast-food restaurants predicted variations in all-cause mortality and acute coronary syndrome hospitalizations across communities in Ontario. Such findings reinforce the importance of health promotion and prevention strategies, especially when targeted to communities characterized by poorer health and higher mortality.

REFERENCES

1. Incidence of Cardiovascular Disease. Heart and Stroke Foundation, 2002. Available on-line at: <http://www1.heartandstroke.ca/Page.asp?PageID=33&ArticleID=581&Src=heart&From=SubCategory>. (Accessed August 20, 2003).
2. Heart Disease and Stroke Statistics-2003 Update. Dallas, TX: American Heart Association. 2003.
3. Bondy SJ, Jaglal S, Slaughter PM. Area variation in heart disease mortality rates. In: Naylor CD, Slaughter PM (Eds.), *Cardiovascular Health and Services in Ontario*. Toronto, ON: Institute for Clinical Evaluative Sciences, 1999;51-62.
4. Tunstall-Pedoe H, Kuulasmaa K, Mahonen M, Tolonen H, Ruokokoski E, Amouyel P. Contribution of trends in survival and coronary-event rates to changes in coronary heart disease mortality: 10-year results from 37 WHO MONICA project populations. Monitoring trends and determinants in cardiovascular disease [comment]. *Lancet* 1999;353(9164):1547-57.
5. Sans S, Kesteloot H, Kromhout D. The burden of cardiovascular diseases mortality in Europe. Task Force of the European Society of Cardiology on Cardiovascular Mortality and Morbidity Statistics in Europe. [republished from *Eur Heart J* 1997;18(8):1231-48; PMID: 9458415]. *Eur Heart J* 1997;18(12):1231-48.
6. Pilote L, Califf RM, Sapp S, Miller DP, Mark DB, Weaver WD, et al. Regional variation across the United States in the management of acute myocardial infarction. GUSTO-1 Investigators. Global Utilization of Streptokinase and Tissue Plasminogen Activator for Occluded Coronary Arteries [comment]. *N Engl J Med* 1995;333(9):565-72.

7. Bobak M, Marmot M. East-West mortality divide and its potential explanations: Proposed research agenda. *BMJ* 1996;312(7028):421-25.
8. Jaglal S, Bondy SJ, Slaughter PM. Risk factors for cardiovascular disease. In: Naylor CD, Slaughter PM (Eds.), *Cardiovascular Health and Services in Ontario*. Toronto, ON: Institute for Clinical Evaluative Sciences, 2003;63-82.
9. Zhang J, Kesteloot H. Differences in all-cause, cardiovascular and cancer mortality between Hong Kong and Singapore: Role of nutrition. *Eur J Epidemiol* 2001;17(5):469-77.
10. Kromhout D, Menotti A, Kesteloot H, Sans S. Prevention of coronary heart disease by diet and lifestyle: Evidence from prospective cross-cultural, cohort, and intervention studies [Review] [49 refs]. *Circulation* 2002;105(7):893-98.
11. Foodservice Industry Sales, Ontario and Canada, 2002. Ministry of Food and Agriculture, 2003. Available on-line at: www.gov.on.ca/OMAFRA/english/stats/food/indsales02.html (Accessed August 20, 2003).
12. Selected Economic Indicators, Ontario and Canada, 2001. Ministry of Food and Agriculture, 2003. Available on-line at: www.gov.on.ca/OMAFRA/english/stats/food/indicators.html (Accessed August 20, 2003).
13. Clemens LH, Slawson DL, Klesges RC. The effect of eating out on quality of diet in premenopausal women. *J Am Diet Assoc* 1999;99(4):442-44.
14. Lin BH, Guthrie J, Frazão E. Nutrition contribution of foods away from home. In: Frazão E (Ed.), *America's Eating Habits: Changes and Consequences*. USDA/ERS, 1999;213-42.
15. Stockmyer C. Remember when mom wanted you home for dinner? *Nutr Rev* 2001;59(2):57-60.
16. Morris RW, Whincup PH, Lampe FC, Walker M, Wannamethee SG, Shaper AG. Geographic variation in incidence of coronary heart disease in Britain: The contribution of established risk factors. *Heart* 2001;86(3):277-83.
17. Huijbregts P, Feskens E, Rasanen L, Fidanza F, Nissinen A, Menotti A, et al. Dietary pattern and 20 year mortality in elderly men in Finland, Italy, and The Netherlands: Longitudinal cohort study. *BMJ* 1997;315(7099):13-17.
18. Zhou B, Wu Y, Yang J, Li Y, Zhang H, Zhao L. Overweight is an independent risk factor for cardiovascular disease in Chinese populations. *Obes Rev* 2002;3(3):147-56.
19. Evans RG. Introduction. In: Evans RG, Barer ML, Marmor TR (Eds.), *Why Are Some People Healthy and Others Not? The Determinants of Health of Populations*. New York, NY: Aldine de Gruyter, 1994;3-26.
20. Alter DA, Naylor CD, Austin P, Tu JV. Effects of socioeconomic status on access to invasive cardiac procedures and on mortality after acute myocardial infarction. *N Engl J Med* 1999;341(18):1359-67.
21. Sector Leaders in Ontario. *Ontario Restaurant News* [August 2001], 15-19 Ishcom Publications, 2001.
22. Austin PC, Daly PA, Tu JV. A multicenter study of the coding accuracy of hospital discharge administrative data for patients admitted to cardiac care units in Ontario. *Am Heart J* 2002;144(2):290-96.
23. Tu JV, Austin P, Naylor CD, Iron K, Zhang H. Acute myocardial infarction outcomes in Ontario. In: Naylor CD, Slaughter PM (Eds.), *Cardiovascular Health and Services in Ontario*. Toronto, ON: Institute for Clinical Evaluative Sciences, 1999;83-110.
24. Hahn RA, Heath GW, Chang MH. Cardiovascular disease risk factors and preventive practices among adults—United States, 1994: A behavioral risk factor atlas. Behavioral Risk

- Factor Surveillance System State Coordinators. *MMWR CDC Surveill Summ* 1998; CDC Surveillance Summaries. 47(5):35-69.
25. Cottel D, Dallongeville J, Wagner A, Ruidavets JB, Arveiler D, Ferrieres J, et al. The North-East-South gradient of coronary heart disease mortality and case fatality rates in France is consistent with a similar gradient in risk factor clusters. *Eur J Epidemiol* 2000;16(4):317-22.
 26. Jenum AK, Stensvold I, Thelle DS. Differences in cardiovascular disease mortality and major risk factors between districts in Oslo. An ecological analysis. *Int J Epidemiol* 2001;30(Suppl 1):S59-S65.
 27. Filate WA, Johansen HL, Kennedy CC, Tu JV. Regional variations in cardiovascular mortality in Canada. *Can J Cardiol* 2003;19(11):1241-48.
 28. Pietinen P, Vartiainen E, Seppanen R, Aro A, Puska P. Changes in diet in Finland from 1972 to 1992: Impact on coronary heart disease risk. *Prev Med* 1996;25(3):243-50.
 29. Burklow J, Aubertin A. Fast food chains move toward healthier choices. *J Natl Cancer Inst* 1991;83(5):325-26.
 30. Kearns RA, Barnett JR. "Happy Meals" in the Starship Enterprise: Interpreting a moral geography of health care consumption. *Health Place* 2000;6(2):81-93.
 31. Cram P, Nallamothu BK, Fendrick AM, Saint S. Fast food franchises in hospitals. *JAMA* 2002;287(22):2945-46.
 32. American Diabetes Association. Evidence-based nutrition principles and recommendations for the treatment and prevention of diabetes and related complications. *Diabetes Care* 2002;25(Suppl 1):S50-S60.
 33. McCrory MA, Fuss PJ, Saltzman E, Roberts SB. Dietary determinants of energy intake and weight regulation in healthy adults. [Review] [38 refs]. *J Nutr* 2000;130(2S Suppl):276S-279S.
 34. Katan MB. Trans fatty acids and plasma lipoproteins. [Review] [25 refs]. *Nutr Rev* 2000;58(6):188-91.
 35. Oomen CM, Ocke MC, Feskens EJ, Erp-Baart MA, Kok FJ, Kromhout D. Association between trans fatty acid intake and 10-year risk of coronary heart disease in the Zutphen Elderly Study: A prospective population-based study [comment]. *Lancet* 2001;357(9258):746-51.
 36. Jeffery RW, French SA. Epidemic obesity in the United States: Are fast foods and television viewing contributing? *Am J Public Health* 1998;88(2):277-80.
 37. Naylor CD. Summary, reflections and recommendations. In: Naylor CD, Slaughter PM (Eds.), *Cardiovascular Health and Services in Ontario: An ICES Atlas*. Toronto, ON: Institute for Clinical Evaluative Sciences, 1999;355-77.
 38. Puska P, Nissinen A, Tuomilehto J, Salonen JT, Koskela K, McAlister A, et al. The community-based strategy to prevent coronary heart disease: Conclusions from the ten years of the North Karelia project. *Annu Rev Public Health* 1985;6:147-93.
 39. Nestle M, Jacobson MF. Halting the obesity epidemic: A public health policy approach. *Public Health Rep* 2000;115(1):12-24.
 40. Nielsen SJ, Siega-Riz AM, Popkin BM. Trends in energy intake in U.S. between 1997 and 1996: Similar shifts seen across age groups. *Obes Res* 2002;10:370-78.

Received: June 14, 2004

Accepted: December 16, 2004

RÉSUMÉ

Objectif : Examiner la mesure dans laquelle les différences interrégionales dans la concentration des restaurants rapides expliquent les écarts dans la mortalité toutes causes confondues et dans les syndromes coronariens aigus à l'échelle de l'Ontario.

Méthode : Nous avons sélectionné les neuf chaînes de restaurants rapides dont les ventes étaient les plus élevées en 2001, puis calculé le taux de restaurants rapides par habitant pour chacune des 380 régions de l'Ontario. Les résultats, obtenus à partir des statistiques démographiques de 2001 et du registre des sorties des hôpitaux, comprenaient les taux régionaux de mortalité par habitant et les taux d'hospitalisation liés aux syndromes coronariens aigus; les traumatismes crâniens nous ont servi à établir des comparaisons. Nous avons ajusté tous les résultats régionaux selon l'âge, le sexe et le statut socio-économique, et nous les avons analysés selon une échelle continue et ordinaire par rapport à la moyenne provinciale.

Résultats : Après ajustement selon le risque, la mortalité et les hospitalisations liées aux syndromes coronariens aigus étaient supérieures dans les régions où l'on trouvait le plus grand nombre de restaurants rapides. Les résultats ajustés selon le risque dans les régions à forte concentration de restaurants rapides étaient plus susceptibles de présenter des valeurs aberrantes élevées, tant pour la mortalité (rapport de cotes ajusté (RC) = 2,52, intervalle de confiance (IC) de 95 % = 1,54-4,13, $p < 0,001$) que pour les hospitalisations liées aux syndromes coronariens aigus (RC ajusté = 2,62, IC de 95 % = 1,42-3,59, $p < 0,001$), que dans les régions à faible concentration de restaurants rapides. Nous n'avons constaté aucun lien entre la concentration des restaurants rapides et les taux d'hospitalisation pour traumatismes crâniens ajustés selon le risque.

Interprétation : Les disparités interrégionales dans les résultats cardiaques en Ontario s'expliquent en partie par le niveau de concentration des restaurants rapides, d'où la nécessité d'orienter les initiatives de promotion de la santé et de prévention en fonction des collectivités les plus vulnérables.

CALL FOR PAPERS ON GLOBAL HEALTH

The January/February 2006 issue of the *Canadian Journal of Public Health* will focus on global health.

We are inviting authors to submit original research articles (such as intervention studies, systematic reviews, or surveys), program descriptions and commentaries on topics addressing global and international health. These submissions will go through the regular peer review process.

For more information on submission requirements, please see our Information for Authors at: <http://www.cpha.ca/english/cjph/stylereq/style.htm>

All manuscripts should be submitted by **June 15, 2005** to the attention of:

Patricia Huston, MD, MPH
Scientific Editor
Canadian Journal of Public Health
400-1565 Carling Avenue, Ottawa, ON K1Z 8R1

If you have any questions or require further information on this Global Health issue of the journal, please contact the CJPH Editorial Office by e-mail at cjph@cpha.ca, or by phone at: (613) 725-3769, ext. 179.

APPEL DE COMMUNICATIONS SUR LA SANTÉ MONDIALE

Le numéro de janvier-février 2006 de la *Revue canadienne de santé publique* portera sur la santé mondiale.

Nous invitons les auteurs à nous soumettre des articles de recherche originaux (essais sur le terrain, études méthodiques, enquêtes), des descriptions de programmes et des commentaires sur des thèmes liés à la santé mondiale et internationale. Comme d'habitude, les soumissions feront l'objet d'une révision par les pairs.

Pour connaître nos critères de soumission, veuillez consulter les directives de rédaction à l'intention des auteurs sur le site : <http://www.cpha.ca/francais/cjph/stylereq/style.htm>

Tous les manuscrits doivent être envoyés d'ici le **15 juin 2005** aux soins de :

Patricia Huston, M.D., M.P.H.
Rédactrice-révisseuse scientifique
Revue canadienne de santé publique
1565, avenue Carling, bureau 400, Ottawa (Ontario) K1Z 8R1

Si vous avez des questions ou qu'il vous faut plus de détails sur le numéro de la Revue portant sur la santé mondiale, veuillez faire parvenir un courriel au Comité de rédaction de la RCSP à l'adresse cjph@cpha.ca ou composer le (613) 725-3769, poste 179.