Neighbourhood Effects on Hospitalization in Early Childhood

Lan T.H. Vu, MD, PhD,¹ Nazeem Muhajarine, PhD²

ABSTRACT

Objective: To determine whether characteristics of neighbourhoods in which children live, such as socio-economic disadvantage, physical infrastructure, programs and services, social disconnection, smoking prevalence, and overcrowding, are related to hospitalization rates from birth to age six, independent of individual-level factors.

Methods: We studied a population of 8,504 children born in Saskatoon, Canada, over a three-year period (1992-1994). The birth cohort was retrospectively followed until children reached age six. Birth registry records were linked to health care utilization files to create continuous histories of health care utilization for each child. Information on the neighbourhood in which the child's family resided at his or her birth was extracted from Statistics Canada's 1991 Census and numerous local sources. A longitudinal and multilevel design was employed to examine the effect of neighbourhood characteristics and individual-level factors on childhood hospitalization rate.

Results: Male children, children born to mothers under 20 years of age, Aboriginal children, children in low-income families, and those with adverse birth outcomes had significantly higher rates of hospitalization. In addition to these individual factors, children living in economically disadvantaged neighbourhoods, neighbourhoods in poor physical condition, and neighbourhoods with higher average household size had significantly higher rates of hospitalization.

Conclusions: The kind of neighbourhood families live in has an impact on their children's risk of hospitalization, above and beyond the family's own characteristics. These findings provide additional support for a 'healthy community' approach that uses community development and healthy public policy to create safe, health-promoting neighbourhoods for all families.

Key words: Children's hospitalization; neighbourhood effects; adverse birth outcomes; family income status

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

Can J Public Health 2010;101(2):119-23.

The determinants of hospitalization in children are complex, multifactorial, and not well understood. While earlier models of health care utilization focused on individual-level factors,^{1,2} more recently, the importance of using a multilevel approach that includes environmental variables has been recognized. Childhood illness and hospitalization rates vary across geographical areas,³⁻⁵ suggesting that place of residence may include important environmental factors that influence these outcomes. However, most previous studies have employed ecological or small area designs or have lacked meaningful definitions of place of residence, leading to weak inferences about the contribution of place-based factors. Furthermore, multilevel research on children's health to date has tended to focus on neighbourhood socio-economic characteristics⁶⁻⁸ to the exclusion of other potentially influential aspects of neighbourhoods, such as physical infrastructure (roads, parks, housing, etc.) and access to services.⁹

This study employed a longitudinal and multilevel design to examine the impact of neighbourhood characteristics on hospitalization rates in early childhood, including not only socio-economic disadvantage, but also physical infrastructure, programs and services, social disconnection, smoking prevalence, and household size.

METHODS

Source population and data extraction

The study employed a population sample of 8,504 singleton children born between April 1, 1992 and March 31, 1994 in the city of Saskatoon (population approximately 230,000), Saskatchewan,

Canada. Births were identified through the registry of the provincial government's vital statistics branch. Birth registry records for the cohort were then linked to health care utilization files maintained by the health ministry to create continuous histories of health care utilization from birth to six years of age.

For each child, the neighbourhood of residence at birth was identified. Neighbourhoods in this study are specific geo-spatial units with identifiable boundaries, defined by the municipal government and recognized by city residents. Information on neighbourhood characteristics was obtained from Statistics Canada's 1991 census and local data sources, such as the municipal planning department and custom-developed neighbourhood surveys.

Study outcome

The outcome studied was hospitalization rate, a count measure calculated by dividing the number of hospitalizations from birth to

Author Affiliations

1. Department of Epidemiology, Hanoi School of Public Health, Hanoi, Vietnam
2. Department of Community Health and Epidemiology, College of Medicine, University of Saskatchewan, Saskatoon, SK; Saskatchewan Population Health and Evaluation Research Unit, Saskatoon, SK

Correspondence: Dr. Nazeem Muhajarine, Department of Community Health and Epidemiology, Health Sciences Building, University of Saskatchewan, 107 Wiggins Road, Saskatoon, SK S7N 5E5, Tel: 306-966-7940, Fax: 306-966-7920, E-mail: Nazeem.Muhajarine@usask.ca

Disclaimer: Part of the data (deidentified) used for this study was provided by Saskatchewan's Ministry of Health. However, the authors take full responsibility for all analyses, interpretation and presentation of the results.

Source of funding: This research was supported through a grant by the Canadian Population Health Initiative, Canadian Institute for Health Information.

Conflict of Interest: None to declare.

age six by total number of children observed. Hospitalization was defined as any contact with the health care system involving an overnight hospital stay of one or more days.¹⁰ If a child was hospitalized more than once, each episode was counted as a separate hospitalization.

Predictor variables

We examined the influence on hospitalization rate of factors at two levels: individual and neighbourhood. Individual-level variables relate to parents and children. Parental factors were: marital status (married/common-law, single parent, and unknown), mother's age (<20 years, 20-40 years, and >40 years), and father's age (same categories as mother's age). In addition, family socio-economic status was measured using an annual assessment of whether the child's family had received government income support. Variables related to children were: Aboriginal status, gender, age, and birth outcome status (normal birth, one adverse birth outcome such as preterm or low birth weight, and two or more adverse birth outcomes).

At the neighbourhood level, six factors were examined. Four of the six domains were derived from principal component analysis of multiple items relating to neighbourhood context (socio-economic disadvantage, physical condition, social disconnection, and availability and accessibility of programs and services for young children), and two domains consisted of single items (average household size, smoking prevalence). The constructs reflected in each domain are some of the key neighbourhood factors that have been theorized to influence children's growth and development.^{9,11,12} The Appendix presents the variable items comprising each domain.

Statistical approach

We employed a three-stage strategy¹³⁻¹⁵ to build multilevel models for hospitalization rate. The first model was fitted with no explanatory variables and the second model included individual-level variables. Individual-level variables were entered one at a time as random effects; if a significant variance component was reported, the variable was kept as a random effect; otherwise the variable was constrained to be fixed across neighbourhoods. Finally, in the third stage, variables at both neighbourhood and individual levels were included, to test for the effects of neighbourhood variables independent of the individual-level variables. The goodness of fit of the model was evaluated by examining the change in variance among the three models. In the second model, the variance at the individual level was significant ($p=0.03$); in the final model, with the addition of neighbourhood factors, this variance became non-significant ($p=0.9$), indicating the improvement of the model fit when neighbourhood factors were added.

A three-level non-linear Poisson model was built for the hospitalization rate. Level 1 accounted for repeated measurements nested within an individual subject, such as yearly recipient status of income assistance from birth to six years. Level 2 accounted for individual-level non-repeated variables, and Level 3 incorporated neighbourhood characteristics. To work with the rates rather than the counts, an additional parameter known as an offset was used. The offset parameter was calculated as follows: 1) Offset was set to be equal to the log (base e) of 12 months if the child was observed for a whole year within the six-year period; 2) If a child was observed for only part of a follow-up year (e.g., became lost to

Table 1. Study Sample Characteristics

Category	Frequency	Percent
Mother's marital status		
Married/Common Law	5831	68.6
Single	2480	29.2
Unknown	193	2.2
Mother's age (years)		
20-40	7597	89.3
<20	835	9.8
>40	72	0.9
Father's age (years)		
20-40	6951	81.7
<20	251	3.0
>40	413	4.9
Unknown	889	10.4
Birth outcome		
Normal	7396	87.0
One adverse birth outcome	718	8.4
More than one adverse birth outcome	390	4.6
Gender		
Male	4412	51.9
Female	4092	48.1
Child's Aboriginal status		
Non-Aboriginal	7543	88.7
Aboriginal	961	11.3
Family income assistance status by follow-up year		
Received assistance in Year 1	1191	14.1
Received assistance in Year 2	1700	20.2
Received assistance in Year 3	1616	19.3
Received assistance in Year 4	1700	20.1
Received assistance in Year 5	2040	24.1
Received assistance in Year 6	2211	26.2

follow-up by moving out of the study region), the offset parameter was set to be equal to the log of the number of actual months (a value between 1 and 11) that the child was in the study.

RESULTS

Characteristics of the study population and neighbourhoods

Tables 1 and 2 present the characteristics of the study population and the neighbourhoods. On average, 20% of children in this study population were considered to live in low-income families (i.e., their families received income assistance from the government in a given year). As Table 2 shows, neighbourhoods in Saskatoon vary considerably on the characteristics we assessed; for example, the prevalence of smoking ranged 20-fold from the neighbourhood with the lowest rate to the highest.

Multilevel predictors of hospitalization

Table 3 presents the final multilevel model. At the individual level, being younger, male, Aboriginal, from a low-income family, having one or more adverse birth outcomes, and being born to a mother under 20 years of age increased children's risk of hospitalization. A significant interaction effect between low income and adverse birth outcomes was found. The impact of one or more adverse birth outcomes on hospitalizations was stronger for children in low-income families, compared to families that did not receive income assistance.

Three neighbourhood factors were significantly associated with hospitalization, over and above the effects of individual-level factors. First, children who lived in low-income neighbourhoods were more likely to be hospitalized. The attributable risk of neighbourhood socio-economic disadvantage (corresponding to a difference in the value of the neighbourhood variable from the 10th to 90th percentile) was 10%. Second, better neighbourhood physical condition was associated with a lower hospitalization rate (attributable risk 18.3%). Figure 1 depicts the impact of neighbourhood physi-

Table 2. Neighbourhood Variables

	Minimum Value	Maximum Value	Percentile		
			10 th	50 th	90 th
Socio-economic disadvantage score (-)	-1.79	3.07	-1.01	-0.27	1.09
Physical condition score (-)	8.00	16.25	9.02	10.33	12.4
Social disconnection score (-)	-1.63	3.12	-1.09	-0.19	1.11
Programs and services accessibility and availability score (+)	0.7	26.5	1.24	4.05	9.99
Average household size (-)	1.5	3.5	2.1	2.53	3.29
Smoking prevalence (per 100) (-)	1.96	41.94	6.33	17.71	35.48

Note: (-) higher score indicates more negative condition; (+) higher score indicates more positive condition

Table 3. Final Multilevel Model Indicating Individual and Neighbourhood Characteristics Associated with Children's Hospitalization Rate from Birth to Age Six, Saskatoon Birth Cohort, 1992-94

Variable	Coefficient β (Standard Error)	Relative Risk (e^{β})	p-value
Age	-0.30 (0.01)	0.74 (0.73, 0.76)	<0.001
Longitudinal family income assistance status	0.17 (0.05)	1.19 (1.07, 1.31)	0.001
Child's gender (female vs. male)	-0.38 (0.03)	0.68 (0.64, 0.73)	<0.001
Aboriginal status (Registered Indian vs. other)	0.70 (0.05)	2.01 (1.83, 2.22)	<0.001
Single parent (vs. married/common law)	0.03 (0.05)	1.03 (0.93, 1.14)	0.41
One adverse birth outcome	0.20 (0.06)	1.22 (1.09, 1.37)	<0.001
More than one adverse birth outcome	0.92 (0.08)	2.51 (2.15, 2.94)	<0.001
Mother's age <20 (vs. age 20 to 40)	0.17 (0.06)	1.19 (1.05, 1.33)	0.012
Mother's age >40 (vs. age 20 to 40)	-0.04 (0.17)	0.95 (0.66, 1.38)	0.54
Father's age <20 (vs. age 20 to 40)	-0.15 (0.1)	0.86 (0.71, 1.05)	0.08
Father's age >40 (vs. age 20 to 40)	-0.04 (0.09)	0.96 (0.81, 1.15)	0.45
Interaction between family income and one adverse birth outcome	0.27 (0.11)	1.31 (1.06, 1.63)	0.02
Interaction between family income and more than one adverse birth outcome	0.19 (0.18)	1.21 (0.85, 1.72)	0.09
Neighbourhood physical condition score*	0.05 (0.01)	1.05 (1.03, 1.07)	0.03
Neighbourhood socio-economic disadvantage score*	0.05 (0.02)	1.05 (1.01, 1.09)	0.05
Neighbourhood average household size*	0.11 (0.04)	1.12 (1.03, 1.21)	0.04

* The coefficients and the relative risks derived from the coefficients correspond to an effect equivalent to one unit change in the independent variable.

cal condition on hospitalization. The lighter areas represent neighbourhoods in better physical condition. These neighbourhoods also have smaller dots, which indicate a lower hospitalization rate. Third, greater average household size was associated with a higher risk of hospitalization (attributable risk 12.4%). Taken together, the effects of these three neighbourhood factors were sizeable, with a combined attributable risk of 40%.

DISCUSSION

These results support the hypothesis that neighbourhood characteristics influence childhood hospitalization independent of the effects of family socio-economic status and other individual factors. Other multilevel studies have reported associations between neighbourhood socio-economic status and adverse birth outcomes,^{16,17} chronic disease among adults,¹⁸ and health behaviours.^{19,20} This study differed from previous research in that it examined young children from birth to age six; used a longitudinal design; and controlled for a wide range of neighbourhood characteristics.

How might lower socio-economic neighbourhoods harm the health of children regardless of their own family income level? Some have suggested that the neighbourhood socio-economic context could affect health outcomes indirectly by shaping the physical condition, social environment and services, and amenities available in neighbourhoods.^{11,21,22} In this study, physical condition and availability and accessibility of programs and services for families were taken into account, so these factors were not confounders of the association between neighbourhood socio-economic context and hospitalization. However, we did not control for other amenities, such as grocery stores and public transportation. Lack of access to healthy food and other essentials may have contributed to the relationship we observed between low-income neighbourhoods and higher hospitalization rates. Socio-economic disadvantage may

Figure 1. Map of Saskatoon neighbourhoods showing physical condition score and children's hospitalization rate, birth to age six

also affect neighbourhoods' social environment,^{11,21,23} possibly by increasing social isolation and affecting social and cultural norms.¹² While our 'social disconnection' variable took into account some aspects of the social environment, such as transiency and voter participation (see Appendix), there are other dimensions we did not capture.

In addition to socio-economic disadvantage, we found the physical condition and average household size of neighbourhoods to have significant impacts on childhood hospitalization. The physical conditions in this study reflect housing conditions, traffic volume, road conditions, and level of noise within a neighbourhood – factors that have been found to be associated with health problems in children, such as lead poisoning and respiratory diseases.^{9,24-27} The association between average household size and hospitalization may reflect the fact that neighbourhoods with more crowded

Appendix. Summary of Six Neighbourhood Domain Measures

Neighbourhood Domain	Item	Source of Data
Socio-economic disadvantage (Cronbach alpha=0.94)	• Proportion of Aboriginal ancestry • Proportion of low-income families • Proportion of population with less than Grade 9 education • Proportion of population who do not own their homes • Average cars per person • Proportion of single-parent families • Proportion of population 15-64 yrs employed	Census 1991, Statistic Canada
Physical condition (Cronbach alpha=0.73)	• Condition of neighbourhood, proportion of housing in need of major repair, street width, road condition, appearance, noise level, number of stoplights and crosswalks	Neighbourhood Observation Survey, Saskatoon
Social disconnection (Cronbach alpha=0.84)	• Proportion of voter participation in civic elections • Proportion of voter participation in federal elections • Proportion of population who moved in the preceding year • Ethnic diversity index: the higher the sum, the more diversified the population. • Crime incidence: Reported property crimes (break and entry, vandalism, arson, etc.)	City of Saskatoon and Census 1991, Statistics Canada
Availability and accessibility of programs and services	• Takes into account both number of programs and services (early childhood education, parenting, counseling, birth/prenatal, nutrition, childcare, sports and recreation) and accessibility (cost, hours, transportation assistance, physical access, etc.)	Neighbourhood Programs and Services Survey, Saskatoon
Average household size	• Average number of people per household	Census 1991, Statistics Canada
Smoking prevalence	• Proportion of current smokers	Tobacco Use Survey, Saskatoon Health Region

homes present a more conducive environment for the spread of communicable and respiratory diseases; for example, household crowding has been found to increase young children's risk of acute lower respiratory infection.²⁸

Three other neighbourhood factors – social disconnection, smoking prevalence, and availability and accessibility of programs and services for children and families – were not found to be significantly associated with hospitalization rate. This might be due to inter-correlations among neighbourhood variables, if, for example, the most socio-economically disadvantaged neighbourhoods also have high social disconnection and smoking rates. Neighbourhood socio-economic disadvantage and physical condition together may capture the underlying mechanisms of neighbourhood effects on childhood hospitalization better than these other domains singularly.

Study limitations may have reduced the accuracy with which we were able to estimate the effect of neighbourhood factors on childhood hospitalization. For instance, duration of residence in a neighbourhood (i.e., exposure time) was not measured, which, depending on the underlying risk profile of a neighbourhood, could have resulted in either under- or overestimation of the neighbourhood effect. The impact of the neighbourhood may have been underestimated because we did not examine whether neighbourhood factors influence childhood hospitalization indirectly through their effects on adverse birth outcomes. In other words, since neighbourhood socio-economic disadvantage has been shown to affect birth outcomes,²⁹ controlling for the effect of adverse birth outcomes on hospitalization may have resulted in over-control. On the other hand, if there were individual-level socio-economic influences on hospitalization that our measure of family socio-economic disadvantage failed to take into account, this would lead to an overestimation of the neighbourhood's effect. However, we did control for single parent status, mother's age, and Aboriginal ethnicity, which, taken together, likely captured many of the unmeasured individual-level confounders related to socio-economic status, such as health behaviours, education level, and psychosocial factors. One other study limitation is that the neigh-

bourhood data were collected at a single point in time, and therefore we could not examine the effects of neighbourhood stability or change on children. The interpretation of the study findings should be read with the consideration of these potential limitations in mind.

Our results suggest that efforts aimed at reducing childhood morbidity might be more effective if they targeted neighbourhood risk factors in addition to the usual individual factors. The environmental factors identified in this study could affect children's health in many ways, and addressing them through community development and healthy public policies makes sense from the perspective of population health promotion. Strengthening neighbourhoods' economic well-being, improving air quality, enhancing the pedestrian-friendliness of streets, and providing safe, affordable, adequate housing for all citizens are fundamental strategies for healthy communities.

REFERENCES

1. Andersen R, Newman JF. Societal and individual determinants of medical care utilization in the United States. *Milbank Mem Fund Q Health Soc* 1973;51(1):95-124.
2. Phillips KA, Morrison KR, Andersen R, Aday LA. Understanding the context of healthcare utilization: Assessing environmental and provider-related variables in the behavioral model of utilization. *Health Serv Res* 1998;33:571-96.
3. McConnochie KM, Roghmann KJ, Liptak GS. Hospitalization for lower respiratory tract illness in infants: Variation in rates among counties in New York State and areas within Monroe County. *J Pediatr* 1995;126(2):220-29.
4. Claudio L, Tulton L, Doucette J, Landrigan PJ. Socioeconomic factors and asthma hospitalization rates in New York City. *J Asthma* 1999;36(4):343-50.
5. Gottlieb DJ, Beiser AS, O'Connor GT. Poverty, race, and medication use are correlates of asthma hospitalization rates. A small area analysis in Boston. *Chest* 1995;108(1):28-35.
6. Ellen I, Mijanovich T, Dillman K. Neighbourhood effects on health: Exploring the links and assessing the evidence. *J Urban Affairs* 2001;23(3-4):391-408.
7. Pickett KE, Pearl M. Multilevel analyses of neighbourhood socioeconomic context and health outcomes: A critical review. *J Epidemiol Community Health* 2001;55(2):111-22.
8. Bradley RH, Corwyn RF. Socioeconomic status and child development. *Annu Rev Psychol* 2002;53:371-99.
9. Corburn J, Osleeb J, Porter M. Urban asthma and the neighbourhood environment in New York City. *Health & Place* 2006;12(2):167-79.
10. Black CRN, Burchill CA. Utilization of Hospital Resources. Vol II: Methods and Tables. Winnipeg: Manitoba Centre for Health Policy and Evaluation. December 1993.

11. Macintyre S, Maciver S, Sooman A. Area, class and health: Should we be focusing on places or people? *J Soc Policy* 1993;22(2):213-34.
12. Wilson WJ. Studying inner city social dislocations: The challenge of public agenda research. *Am Sociol Rev* 1991;56(1):1-14.
13. Raudenbush SW, Bryk AS, Cheong YF, Congdon R. HLM5-Hierarchical Linear and Non-linear Modeling. Scientific Software International, Inc., 2001.
14. Yang M. Review of HLM 5.04 for Windows. Center of Multilevel Modelling, Institute of Education, University of London, 2001.
15. Snijders T, Boskers R. *An Introduction to Basic and Advanced Multilevel Modeling*. London: Sage Publications, 1999.
16. Wasserman CR, Shaw GM, Selvin S, Gould JB, Syme SL. Socioeconomic status, neighbourhood social conditions, and neural tube defects. *Am J Public Health* 1998;88:1674-80.
17. Liu SY, Pearlman DN. Hospital readmissions for childhood asthma: The role of individual and neighborhood factors. *Public Health Rep* 2009;124(1):65-78.
18. Diez-Roux AV, Nieto FJ, Muntaner C, Tyroler HA, Comstock GW, Shahar E, et al. Neighborhood environments and coronary heart disease: A multilevel analysis. *Am J Epidemiol* 1997;146(1):48-63.
19. Kleinschmidt I, Hills M, Elliott P. Smoking behaviour can be predicted by neighbourhood deprivation measures. *J Epidemiol Community Health* 1995;49 Suppl 2:S72-S77.
20. Reijneveld SA. Neighbourhood socioeconomic context and self reported health and smoking: A secondary analysis of data on seven cities. *J Epidemiol Community Health* 2002;56(12):935-42.
21. Robert S. Socioeconomic position and health: The independent contribution of community socioeconomic context. *Annu Rev Sociol* 1999;25:509-16.
22. Trout D. *The Thin Red Line: How the Poor Still Pay More*. San Francisco, CA: West Coast Regional Office, Consumers Union of US, 1993.
23. Sooman A, Macintyre S. Health and perceptions of the local environment in socially contrasting neighborhoods in Glasgow. *Health Place* 1995;1(1):15-26.
24. Sargent JD, Brown MJ, Freeman JL, Bailey A, Goodman D, Freeman DH, Jr. Childhood lead poisoning in Massachusetts communities: Its association with sociodemographic and housing characteristics. *Am J Public Health* 1995;85(4):528-34.
25. Hwang SW, Martin RE, Tolomiczenko GS, Hulchanski JD. The relationship between housing conditions and health status of rooming house residents in Toronto. *Can J Public Health* 2003;94(6):436-40.
26. Browning CR, Cagney KA. Neighborhood structural disadvantage, collective efficacy, and self-rated physical health in an urban setting. *J Health Soc Behav* 2002;43(4):383-99.
27. Dales R, Wheeler AJ, Mahmud M, Frescura AM, Liu L. The influence of neighborhood roadways on respiratory symptoms among elementary schoolchildren. *J Occup Environ Med* 2009;51(6):654-60.
28. Cardoso MR, Cousens SN, de Goes Siqueira LF, Alves FM, D'Angelo LA. Crowding: Risk factor or protective factor for lower respiratory disease in young children? *BMC Public Health* 2004;4(1):19.
29. Muhajarine N, Vu L. Neighbourhood contexts and low birthweight: Social disconnection heightens single parents risks in Saskatoon. *Can J Public Health* 2009;100(2):130-34.

Received: June 2, 2009

Accepted: December 1, 2009

RÉSUMÉ

Objectif : Déterminer si les caractéristiques des quartiers où habitent les enfants comme une situation socioéconomique défavorisée, les infrastructures matérielles, les programmes et les services, la rupture sociale, la prévalence du tabagisme et le surpeuplement, influent sur les taux d'hospitalisation de la naissance à l'âge de six ans, indépendamment des facteurs individuels.

Méthode : Sur une période de trois ans (1992-1994), nous avons étudié une population de 8 504 enfants nés à Saskatoon, au Canada. La cohorte de naissance a été suivie rétrospectivement jusqu'à ce que les enfants atteignent l'âge de six ans. Le registre de naissance a été relié aux dossiers d'utilisation des soins de santé afin d'établir un historique continu de l'utilisation des soins de santé pour chaque enfant. Les renseignements sur les quartiers où résidaient les familles des enfants à leur naissance ont été tirés du Recensement de 1991 de Statistique Canada et de nombreuses sources locales. Nous avons eu recours à une enquête longitudinale et multiniveau pour examiner l'effet des caractéristiques des quartiers et des facteurs individuels sur le taux d'hospitalisation des enfants.

Résultats : Les garçons, les enfants nés de mères de moins de 20 ans, les enfants autochtones, les enfants provenant de familles à faibles revenus, ainsi que les enfants nés en mauvaise santé présentaient des taux d'hospitalisation beaucoup plus élevés. En plus de ces facteurs individuels, les enfants habitant des quartiers défavorisés sur le plan économique, des quartiers délabrés et des quartiers comportant des ménages de taille supérieure à la moyenne avaient des taux d'hospitalisation beaucoup plus élevés.

Conclusion : Le type de quartier où habitent les familles a une incidence sur le risque d'hospitalisation de leurs enfants, au-delà des caractéristiques propres aux familles. Ces résultats fournissent des arguments à l'appui de l'approche dite des « communautés saines », qui utilise le développement communautaire et des politiques publiques favorisant la santé afin d'établir des quartiers sécuritaires et favorables à la santé pour toutes les familles.

Mots clés : hospitalisation des enfants; effets du quartier; maladies du nourrisson et du nouveau-né; revenu familial

New online system for the CJPH

The *Canadian Journal of Public Health* (CJPH) has launched an online manuscript submission and review system designed to provide the authors and reviewers with a more convenient and user-friendly environment for submitting and reviewing manuscripts.

Canada has been a world leader in public and population health and the CJPH will now be able to better reflect this Canadian scientific leadership and showcase its best research, policy and thinking.

All manuscripts must now be submitted using the new system which is available at <http://journal.cpha.ca>.

Un nouveau système en ligne pour la RCSP

La *Revue canadienne de santé publique* (RCSP) lance un système de soumission et d'évaluation en ligne des manuscrits, qui se veut un moyen plus pratique et convivial pour les auteurs de soumettre des manuscrits et pour les évaluateurs de les évaluer.

Le Canada est un chef de file mondial en santé publique et des populations; la Revue pourra maintenant mieux refléter ce leadership scientifique canadien et faire connaître le meilleur de la recherche, des politiques et des réflexions dans son domaine.

Tous les manuscrits doivent désormais être soumis à l'aide du nouveau système, accessible sur <http://journal.cpha.ca>.