The health of homeless immigrants

S Chiu,[1] D A Redelmeier,[2,3] G Tolomiczenko,[4,5] A Kiss,[6] S W Hwang[1,2]

► Additional full multivariate models are published online only at http://jech.bmj.com/content/vol63/issue11

[1] Centre for Research on Inner City Health, The Keenan Research Centre in the Li Ka Shing Knowledge Institute of St. Michael's Hospital, Toronto, Canada; [2] Division of General Internal Medicine, Department of Medicine, University of Toronto, Canada; [3] Sunnybrook Health Sciences Centre, Institute for Clinical Evaluative Sciences, Toronto, Canada; [4] Crohn's and Colitis Foundation of Canada, Toronto, Canada; [5] Department of Psychiatry, University of Toronto, Canada; [6] Department of Research Design and Biostatistics, Sunnybrook Health Sciences Centre, Institute for Clinical Evaluative Sciences, Toronto, Canada

Correspondence to:
Dr S W Hwang, Centre for Research on Inner City Health, St. Michael's Hospital, 30 Bond Street, Toronto, Ontario M5B 1W8, Canada;
hwangs@smh.toronto.on.ca

Accepted 15 June 2009
Published Online First
3 August 2009

ABSTRACT

Background: This study examined the association between immigrant status and current health in a representative sample of 1189 homeless people in Toronto, Canada.

Methods: Multivariate regression analyses were performed to examine the relationship between immigrant status and current health status (assessed using the SF-12) among homeless recent immigrants ($\leqslant$10 years since immigration), non-recent immigrants (>10 years since immigration) and Canadian-born individuals recruited at shelters and meal programmes (response rate 73%).

Results: After adjusting for demographic characteristics and lifetime duration of homelessness, recent immigrants were significantly less likely to have chronic conditions (RR 0.7, 95% CI 0.5 to 0.9), mental health problems (OR 0.4, 95% CI 0.2 to 0.7), alcohol problems (OR 0.2, 95% CI 0.1 to 0.5) and drug problems (OR 0.2, 95% CI 0.1 to 0.4) than non-recent immigrants and Canadian-born individuals. Recent immigrants were also more likely to have better mental health status (+3.4 points, SE $\pm$1.6) and physical health status (+2.2 points, SE $\pm$1.3) on scales with a mean of 50 and a SD of 10 in the general population.

Conclusion: Homeless recent immigrants are a distinct group who are generally healthier and may have very different service needs from other homeless people.

Immigration has always been a determinant of population growth of North America. In 2006, 37.5 million (12%) of the total US population were foreign born.[1] Similarly, immigrants represented 6.2 million (20%) of the total population in Canada.[2] These individuals often display the ''healthy immigrant effect'', that is, being generally healthier than their native-born counterparts. The ''healthy immigrant effect'' is believed to be strongest among recent immigrants since screening tends to disqualify individuals with serious medical conditions and also because younger, healthier and better educated individuals may self-select into the immigration process. Over time, however, this effect diminishes, and the health status of foreign-born individuals tends to converge towards that of non-immigrants.[3–6]

The health of immigrants has been assessed using various measures such as life expectancy, the presence of disability and, most commonly, the prevalence of chronic conditions.[7] Studies in the USA and Canada demonstrate that recent immigrants are less likely than native-born subjects to have chronic conditions, but this disparity decreases substantially over time.[3 4 8 9] Those immigrating in the past year, 1–5 years ago, 5–10 years ago, 10–15 years ago and $\geqslant$15 years ago were 56%, 52%, 48%, 49% and 24% less likely, respectively, to report a chronic condition than US-born individuals.[8] Data from the National Population Health Survey in Canada showed that the prevalence of chronic conditions increased among immigrants who had lived in Canada for > 10 years and approached levels comparable to that seen in Canadian-born individuals.[9]

A smaller number of studies have examined mental health and substance use among immigrants to the USA and Canada.[10–14] The US literature has focused primarily on Hispanic immigrants. Most studies found that mental health and substance use is less common among immigrants than among non-immigrants.[11–13] Moreover, after increased length of residence in the host country, there was an equalisation of risk for mental health and substance use problems between immigrants and non-immigrants.[10–14]

It is uncertain to what degree the ''healthy immigrant'' effect can be generalised to highly disadvantaged and marginalised groups such as the homeless. There has been a paucity of research on homeless immigrants in general,[15 16] and we are unaware of any study in the peer-reviewed literature that has specifically focused on the health of homeless immigrants. We therefore conducted this study to compare the demographic characteristics and health status of recent immigrants, non-recent immigrants and native-born individuals in a representative sample of homeless people in Toronto, Canada. The primary goal of this study was to examine the association between immigrant status and current health status.

METHODS

Setting and study population

Toronto is Canada's largest city with a population of 5 million, of whom 2.3 million (46%) are immigrants.[17] A representative sample of homeless persons were recruited in Toronto, where about 5000 individuals are homeless each night, and a total of 29 000 unique individuals use shelters over the course of 1 year.[18 19] We defined homelessness as living within the last 7 days at a shelter, public place, vehicle, abandoned building or someone else's home, and not having a home of one's own. Based on a pilot study, we determined that about 90% of homeless people in Toronto slept at shelters, and that 10% did not use shelters but used meal programmes.[20] We therefore recruited 90% of our study participants at shelters and 10% at meal programmes.

We contacted every homeless shelter in Toronto and obtained permission to enrol participants at 58 (91%) of 64 shelters (20 shelters for men, 12 for women, six for men and women, 12 for youths aged 16–25 years, and eight for adults accompanied by dependent children). The number of beds at each shelter ranged between 20 and 406. Recruitment at meal programmes took place at

18 sites selected at random from 62 meal programmes in Toronto that served homeless people. Because the goal of recruiting at meal programmes was to enrol homeless people who did not use shelters, we excluded individuals at meal programmes who had used a shelter within the last 7 days to avoid over-representing those using both.

Recruitment took place over 12 consecutive months in 2004–5. We stratified enrolment to achieve a 2:1:1 ratio of men without dependent children, women without dependent children and adults accompanied by dependent children. The number of participants recruited at each site was proportionate to the number of homeless individuals served monthly. We selected participants at random from bed lists or meal lines using a random number generator and assessed their eligibility. We excluded people who did not meet our definition of homelessness, who were unable to communicate in English and who were unable to give informed consent. We also excluded homeless shelter users who were encountered at meal programmes and those who did not have a valid Ontario health insurance number, which was required for tracking of health-care use subsequent to the recruitment interview.

Each participant provided written informed consent and received $15 for completing the survey. This study was approved by the research ethics board at St. Michael's Hospital, Toronto, Canada.

Survey

Research team members administered the survey to each participant by a face-to-face interview conducted immediately after recruitment at shelters and meal programmes. Information on demographic characteristics was collected from the participants. Adults who had any children under 18 years old living with them were considered as being accompanied by children. Participants self-identified their race/ethnicity from categories adapted from the Statistics Canada Ethnic Diversity Survey.[21] The most commonly selected categories were White, Black and First Nations; all other categories were classified as Other.

Immigrant status was determined based on participants' responses regarding whether they were born in Canada, age when they moved to Canada (if an immigrant) and age at the time of the interview. Participants were defined as recent immigrants if they moved to Canada $\leqslant$10 years ago. Participants were defined as non-recent immigrants if they moved to Canada >10 years ago, or as Canadian-born individuals if originally born in this country. The cut-off of 10 years between recent and non-recent immigrants was used because past research suggests that immigrants report a distinctive sense of comfort and familiarity with their new country after approximately one decade.[7]

Participants were asked to identify the single most important thing keeping them from getting out of homelessness. Their free responses were coded by the interviewer as belonging to one of seven mutually exclusive categories: insufficient income, lack of suitable/adequate housing, lack of job/employment, addiction(s) to alcohol and/or drugs, family or domestic instability, mental health condition, and all other reasons.

A count of chronic health conditions was obtained by asking participants if they had any of the following nine conditions: diabetes; anaemia; high blood pressure; heart disease or stroke; liver problems including hepatitis; arthritis, rheumatism or joint problems; cancer; problem walking, lost limb or other handicap; and HIV infection or AIDS. This classification of chronic conditions was utilised by a national survey of homeless individuals in the USA.[22]

Mental health problems, alcohol problems and drug problems in the last 30 days were assessed using the Addiction Severity Index (ASI).[23 24] The ASI has been validated with homeless people and has been used in numerous studies, including a nationwide survey of homeless people in the USA.[25–28] Problems were dichotomised as present or absent based on criteria previously used with homeless populations.[22] These criteria included the classification of participants as having mental health problem if their ASI mental health score was $\geqslant$0.25, alcohol problem if their ASI alcohol score was $\geqslant$0.17 and drug problem if their ASI drug score was $\geqslant$0.10.[22] We used the SF-12 health survey, a health status instrument that has been validated in homeless populations,[29] to generate scores for the physical and mental component subscales.[30] These scores range from 13 to 69 for physical health and from 10 to 70 for mental health, standardised to a mean of 50 and standard deviation (SD) of 10 in the general population in the USA.[30]

Statistical analyses

We compared the characteristics of participants by immigrant status using χ^2 and analysis of variance (ANOVA). We developed regression models to determine whether immigrant status was associated with count of chronic conditions (Poisson regression), mental health problems, alcohol problems and drug

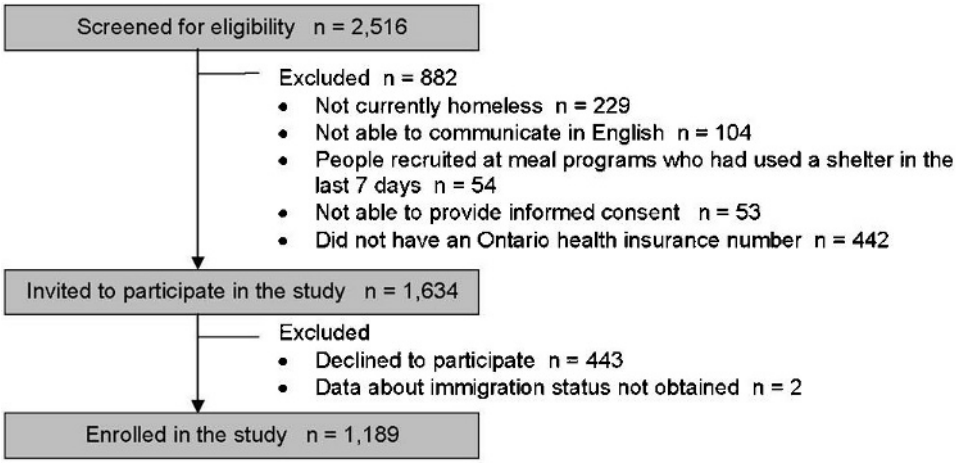

Figure 1 Flow diagram of participant recruitment.

Table 1 Characteristics of study participants

	All participants (n = 1189)	Recent immigrants (n = 116)	Non-recent immigrants (n = 261)	Canadian-born individuals (n = 812)	
	N (%)	N (%)	N (%)	N (%)	p value
Age					<0.001
<25 years	283 (24)	49 (42)	37 (14)	197 (24)	
25–39 years	405 (34)	54 (47)	86 (33)	265 (33)	
40–49 years	339 (29)	8 (7)	80 (31)	251 (31)	
⩾50 years	162 (14)	5 (4)	58 (22)	99 (12)	
Sex					<0.001
Male	642 (54)	38 (33)	122 (47)	482 (59)	
Accompaniment by dependent children	283 (24)	56 (48)	80 (31)	147 (18)	<0.001
Marital status					<0.001
Single/never married	747 (63)	65 (56)	146 (56)	536 (66)	
Divorced/separated	284 (24)	27 (23)	87 (33)	170 (21)	
Married/partnered	136 (11)	24 (21)	23 (9)	89 (11)	
Widowed	22 (2)	0 (0)	5 (2)	17 (2)	
Race/ethnicity†					<0.001
White	662 (56)	10 (9)	58 (22)	594 (73)	
Black	264 (22)	62 (53)	134 (51)	68 (8)	
First Nations	100 (8)	0 (0)	2 (1)	98 (12)	
Other	163 (14)	44 (38)	67 (26)	52 (6)	
Region of birth					<0.001
Canada	812 (68)	0 (0)	0 (0)	812 (100)	
USA	12 (1)	0 (0)	12 (5)	0 (0)	
Central and South America	47 (4)	10 (9)	37 (14)	0 (0)	
Caribbean and Bermuda	114 (10)	29 (25)	85 (33)	0 (0)	
Europe	64 (5)	10 (9)	54 (21)	0 (0)	
Africa	84 (7)	43 (37)	41 (16)	0 (0)	
Asia	56 (5)	24 (21)	32 (12)	0 (0)	
Education					<0.001
Some high school or less	597 (50)	41 (35)	97 (37)	459 (57)	
High school or equivalent	253 (21)	31 (27)	62 (24)	160 (20)	
Vocational training, college, or above	336 (28)	44 (38)	101 (39)	191 (24)	
Income per month					0.012
<$500	573 (48)	71 (61)	119 (46)	383 (47)	
$500–999	317 (27)	27 (23)	72 (28)	218 (27)	
⩾$1000	268 (23)	13 (11)	65 (25)	190 (23)	
Lifetime years of homelessness, mean (SD)	3.7 (5.5)	1.1 (2.2)	2.8 (4.2)	4.4 (6.0)	<0.001
Count of chronic medical conditions					<0.001
None	478 (40)	72 (62)	113 (43)	293 (36)	
1	333 (28)	28 (24)	70 (27)	235 (29)	
2	206 (17)	11 (10)	46 (18)	149 (18)	
3 or more	171 (14)	5 (4)	32 (12)	134 (17)	
Smokes cigarettes currently	847 (71)	43 (37)	145 (56)	659 (81)	<0.001
Mental health problem in the last 30 days	444 (37)	27 (23)	92 (35)	325 (40)	0.002
Alcohol problem in the last 30 days	349 (29)	6 (5)	59 (23)	284 (35)	<0.001
Drug problem in the last 30 days	474 (40)	12 (10)	70 (27)	392 (48)	<0.001
Mental component subscale score‡, mean (SD)	40.7 (13.2)	42.2 (12.6)	40.2 (13.3)	40.7 (13.2)	0.41
Physical component subscale score‡, mean (SD)	46.1 (11.1)	49.5 (9.5)	45.5 (10.7)	45.8 (11.4)	0.003

Percentages do not always sum to 100% owing to rounding.
†Race/ethnicity was self-identified by participants. ‡Measured using the SF-12 health survey.

problems (logistic regression), and physical and mental component subscale scores (linear regression) after adjustment for age, sex, accompaniment by children, race/ethnicity, education, income and lifetime years of homelessness. Owing to the forced correlation between region of birth and immigrant status, region of birth was not included in the regression models. Analyses were conducted with unweighted data and computed using SAS V.9.1 software.

RESULTS

Of 2516 individuals screened at homeless shelters and meal programmes, 1189 people were included in the study (fig 1). In total, 882 (35%) were ineligible because 229 (9%) did not meet our definition of homelessness, 104 (4%) were unable to communicate in English, 54 (2%) were homeless shelter users encountered at meal programmes and 53 (2%) were unable to give informed consent. Because this study was part of a larger study of homeless people's healthcare utilisation, 442 individuals (18%) were excluded because they did not have an Ontario health insurance number. Most of these 442 individuals were refugees, refugee claimants or recent migrants to the province of Ontario. Of 1634 eligible individuals, 443 declined to participate. We enrolled 1191 (73% of those eligible) participants in the study; of these, information on immigrant status was obtained for 1189 individuals and was missing for two individuals.

Characteristics of the 1189 homeless study participants are displayed in table 1. A total of 116 (10%) study participants were recent immigrants, 261 (22%) were non-recent immigrants and 812 (68%) were Canadian-born individuals. Mean age was 28.0 years for recent immigrants, 39.7 years for non-recent immigrants and 36.2 years for Canadian-born individuals ($p<0.001$). Compared with non-recent immigrants and Canadian-born individuals, recent immigrants were more likely to be female, accompanied by dependent children, married and to have a non-Caucasian racial status (table 1). Recent immigrants were also more highly educated and had a somewhat shorter duration of homelessness.

Homeless recent immigrants were unlikely to have alcohol problems, drug problems and mental health problems (table 1). Although mental health problems were also less prevalent among recent immigrants (23%) than among non-recent immigrants (35%) and Canadian-born individuals (40%), the gradient across the three groups was less steep ($p = 0.002$) than that for alcohol and drug problems. Recent immigrants were also less likely to have chronic conditions and more likely to have better SF-12 physical health scores than non-recent immigrants and Canadian-born individuals (table 1).

These three groups gave significantly different responses regarding the single most important thing keeping them from getting out of homelessness ($p<0.001$) (table 2). Recent immigrants were more likely to report financial reasons (ie, insufficient income or lack of job/employment) and housing reasons (ie, lack of suitable/adequate housing). In contrast, recent immigrants were less likely to report mental health conditions or addictions than non-recent immigrants and Canadian-born individuals.

Table 3 shows the findings from multivariate regression analyses examining the association between immigrant status and current health problems. In models adjusted for age, sex, accompaniment by dependent children, race/ethnicity, education, income and lifetime years of homelessness, homeless recent immigrants were significantly less likely to have chronic conditions, mental health problems, alcohol problems and drug problems than homeless non-recent immigrants and homeless Canadian-born individuals. Recent immigrants also had significantly better mental and physical health status. In all models, the health status of non-recent immigrants was not significantly different from that of Canadian-born individuals.

DISCUSSION

This study confirms that a strong "healthy immigrant effect" is found among homeless individuals in Toronto, Canada. Recent immigrants who are homeless are physically and mentally healthier and less likely to have chronic conditions and substance use problems than native-born homeless individuals. Moreover, length of time since immigration is a critical factor, as the health status of homeless individuals who immigrated more than 10 years ago is not significantly different from that of homeless non-immigrants. It has been hypothesised that this phenomenon may arise because immigrants adopt lifestyles and behaviours similar to those of the native-born population.[4 9]

However, an alternative explanation is that recent immigrants are more vulnerable to becoming homeless with fewer physical and mental health problems which are highly prevalent among native-born individuals who are homeless. Thus, economic and housing factors may be more important in precipitating and prolonging homelessness among recent immigrants. This hypothesis is consistent with participants' self-reported reasons for what was keeping them from getting out of homelessness. Recent immigrants were more likely to report insufficient income, lack of employment and lack of suitable housing as primary factors, and less likely to report mental health, alcohol use or drug use. Previous studies have documented that recent immigrants face an initial disadvantage in the labour market, earning wages well below those of the native-born population.[31–34] Recent immigrants also have substantially higher rates of poverty than native-born individuals (22% vs 16% in Canada, and 17% vs 13% in the USA).[35 36]

These findings have two major implications. First, recent immigrants who become homeless are generally much healthier than other homeless individuals, and they are much less likely to need treatment for substance abuse. Thus, interventions that specifically focus on job skills, training and employment may be especially advantageous for this group. Second, although

Table 2 Reasons cited by participants as the single most important thing keeping them from getting out of homelessness

	All participants (n = 1189)	Recent immigrants (n = 116)	Non-recent immigrants (n = 261)	Canadian-born individuals (n = 812)
	N (%)	N (%)	N (%)	N (%)
Insufficient income	378 (32)	43 (37)	83 (32)	252 (31)
Lack of suitable/adequate housing	218 (18)	27 (23)	49 (19)	142 (18)
Lack of job/employment	158 (13)	21 (18)	37 (14)	100 (12)
Addiction(s) to alcohol and/or drugs	114 (10)	2 (2)	12 (5)	100 (12)
Family or domestic instability	73 (6)	9 (8)	23 (9)	41 (5)
Mental health condition	53 (4)	1 (1)	14 (5)	38 (5)
Other	195 (16)	13 (11)	43 (16)	139 (17)

$p<0.001$ for the distribution of reasons among recent immigrants, non-recent immigrants and Canadian-born individuals.

Table 3 Association between immigrant status and health status

	Count of chronic health conditions	Mental health problem in the last 30 days	Alcohol problem in the last 30 days	Drug problem in the last 30 days	SF-12 mental component subscale score	SF-12 physical component subscale score
	Adjusted risk ratio† (95% CI)	Adjusted odds ratio† (95% CI)			Mean difference (SE)	
Immigrant status						
Canadian-born‡	1.0	1.0	1.0	1.0	0.0	0.0
Non-recent immigrant	0.8 (0.7 to 1.0)	0.9 (0.6 to 1.3)	0.8 (0.5 to 1.2)	0.7 (0.5 to 1.0)	0.0 ± 1.2	0.6 ± 1.0
Recent immigrant	0.7* (0.5 to 0.9)	0.4** (0.2 to 0.7)	0.2** (0.1 to 0.5)	0.2** (0.1 to 0.4)	3.4* ± 1.6	2.2 ± 1.3

*$p<0.05$ level; **$p<0.01$ level.
†Adjusted for age, sex, accompaniment by dependent children, race/ethnicity, education, income and lifetime years of homelessness. ‡Reference group.
Full multivariate models are shown in the online Appendix.

homeless recent immigrants have lower levels of mental health problems than other homeless people, their prevalence of mental health problems is still quite high (23%). This finding demonstrates the need for access to culturally appropriate mental health services for recent immigrants who become homeless. Finally, further work is needed to develop strategies to prevent recent immigrants from becoming homeless as a result of primarily economic reasons.

Strengths and limitations

This study has several strengths. Our findings provide new insights into the relationship between immigration, homelessness and health, the intersection of which has been the subject of little previous research. We enrolled a large representative sample of homeless single men, single women and adults with dependent children in a major North American city, including shelter users and non-shelter users. Rigorous methods were used to select participants randomly at each site. We also achieved a high response rate, with 73% of eligible individuals successfully recruited.

This study has certain limitations. Our study did not include homeless individuals who used neither shelters nor meal programmes, and thus our findings may not be generalisable to this subgroup of homeless persons. Refugees and refugee claimants were excluded from this study, and previous research has found that refugees generally have poorer physical and mental health than other immigrants because of their experiences prior to arrival and the less stringent screening process which they undergo.[37 38] Thus, our study's findings should not be generalised to homeless refugees. In addition, our findings may not be generalisable to undocumented immigrants, who constitute a very small proportion of immigrants in Canada and who were also excluded from this study. Homeless people who were unable to communicate in English were not enrolled in this study; however, these individuals accounted for only 4% of those screened for eligibility. Finally, this cross-sectional study does not control for cohort effects (such as recent immigrants potentially undergoing more rigorous screening than previous cohorts of immigrants).

Conclusions

This study demonstrates that the "healthy immigrant effect" can be generalised to highly disadvantaged and marginalised groups such as the homeless. Moreover, these findings indicate that homeless recent immigrants are a relatively distinct group who are generally healthier and more likely to report economic and housing issues as barriers preventing them from getting out of homelessness than other homeless people. Longitudinal data are needed to better understand the health and housing trajectories of homeless recent immigrants compared with other homeless individuals. Further research is needed to better understand the needs of this subgroup of people experiencing homelessness and to identify effective interventions.

What is already known on this subject

- Homeless people have much poorer health status than the general population.
- Immigrants tend to be healthier than their native-born counterparts in the general population (the "healthy immigrant effect").

What this study adds

- Compared with other homeless people, homeless recent immigrants have fewer physical and mental health problems and are more likely to report economic and housing issues as barriers preventing them from getting out of homelessness.
- The "healthy immigrant effect" can be generalised to highly marginalised groups such as the homeless.
- About one-quarter of homeless recent immigrants have had mental health problems in the past 30 days.

Acknowledgements: The Centre for Research on Inner City Health and the Institute for Clinical Evaluative Sciences gratefully acknowledge the support of the Ontario Ministry of Health and Long-Term Care. SWH is the recipient of a New Investigator Award from the Canadian Institutes of Health Research. DAR is supported by the Canada Research Chair in Medical Decision Sciences. The authors thank Marko Katic, Department of Research Design and Biostatistics, Sunnybrook Health Sciences Centre, for expert programming and analyses. The funders for this study did not play any role in the study design, in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication. The authors also thank the shelters and meal programmes that allowed the recruitment of participants and the interviews to be conducted at their sites. The views expressed in this publication are the views of the authors and do not necessarily reflect the views of the Ontario Ministry of Health and Long-Term Care or any of the other above named organisations.

Funding: This project was supported by operating grants from the Agency for Healthcare Research and Quality (1 R01 HS014129-01) and the Canadian Institutes of Health Research (MOP-62736), and by an Interdisciplinary Capacity Enhancement grant on Homelessness, Housing, and Health from the Canadian Institutes of Health Research (HOA-80066).

Competing interests: None.

Ethics approval: Ethics approval was received from St. Michael's Hospital Research Ethics Board, Toronto, Canada.

Contributors: SC, DAR, GT, AK and SWH contributed to the study concept and design. SWH originated and supervised the overall study. SC oversaw all aspects of the data collection. SC, AK and SWH analysed and interpreted the data. SC and SWH drafted and revised the manuscript critically for important intellectual content. DAR, GT and AK critically revised the manuscript for important intellectual content. SWH is the

guarantor of the paper and accepts full responsibility for the work and the conduct of the study, had access to the data and controlled the decision to publish. All authors approved the final version of the manuscript to be published.

Provenance and peer review: Not commissioned; externally peer reviewed.

REFERENCES

1. **Terrazas A,** Batalova J, Fan V. *Frequently requested statistics on immigrants in the United States*. Washington, DC: Migration Policy Institute, 2007. http://www.migrationinformation.org/USfocus/display.cfm?id=649 (accessed 22 May 2009).
2. **Chui T,** Tran K, Maheux H. *Immigration in Canada: a portrait of the foreign-born population, 2006 census: findings*. Ottawa: Social and Aboriginal Statistics Division, Statistics Canada. http://www12.statcan.ca/census-recensement/2006/as-sa/97-557/p1-eng.cfm (accessed 22 May 2009).
3. **Ali JS,** McDermott S, Gravel RG. Recent research on immigrant health from Statistics Canada's population surveys. *Can J Public Health* 2004;**95**:19–23.
4. **Perez C.** Health status and health behaviour among immigrants. *Suppl Health Rep* 2002;**13**. http://www.statcan.ca/english/freepub/82-003-SIE/2002001/pdf/82-003-SIE2002005.pdf (accessed 22 May 2009).
5. **Jasso G,** Massey DS, Rosenzweig MR, *et al*. Immigrant health: selectivity and acculturation. In: Anderson NB, Bulatao RA, Cohen B, eds. *Critical perspectives on racial and ethnic differences in health in later life*. Washington, DC: The National Academic Press, 2004:227–66.
6. **Antecol H,** Bedard K. Unhealthy assimilation: why do immigrants converge to American health status levels? *Demography* 2006;**43**:337–60.
7. **Dunn JR,** Dyck I. Social determinants of health in Canada's immigrant population: results from the National Population Health Survey. *Soc Sci Med* 2000;**51**:1573–93.
8. **Singh GK,** Siahpush M. Ethnic-immigrant differentials in health behaviors, morbidity, and cause-specific mortality in the United States: an analysis of two national data bases. *Hum Biol* 2002;**74**:83–109.
9. **Chen J,** Ng E, Wilkins R. The health of Canada's immigrants in 1995-95. *Health Rep* 1996;**7**:33–45.
10. **Ali J.** Mental health of Canada's immigrants. *Suppl Health Rep* 2002;**13**. http://www.statcan.ca/english/freepub/82-003-SIE/2002001/pdf/82-003-SIE2002006.pdf (accessed 22 May 2009).
11. **Burnam MA,** Hough RL, Karno M, *et al*. Acculturation and lifetime prevalence of psychiatric disorders among Mexican-Americans in Los Angeles. *J Health Soc Behav* 1987;**28**:89–102.
12. **Ortega AN,** Rosenheck R, Alegria M, *et al*. Acculturation and the lifetime risk of psychiatric and substance use disorders among Hispanics. *J Nerv Ment Dis* 2000;**530**:74–96.
13. **Vega WA,** Kolody B, Aguilar-Gaxiola S, *et al*. Lifetime prevalence of SDM-III-R psychiatric disorders among urban and rural Mexican Americans in California. *Arch Gen Psychiatry* 1998;**55**:771–8.
14. **Breslau J,** Auilar-Gaxiola S, Borges G, *et al*. Risk for psychiatric disorder among immigrants and their US-born descendants: evidence from the National Comorbidity Survey Replication. *J Nerv Ment Dis* 2007;**195**:189–95.
15. **Chan S,** Hiebert D, D'Addario S, *et al*. *The profile of absolute and relative homelessness among immigrants, refugees, and refugee claimants in the GVRD: final report*. Vancouver, BC: Mosaic, 2005. http://www.mosaicbc.com/PDF_files/The_Profile_of_Absolute_and_Relative_Homelessness.pdf (accessed 22 May 2009).
16. **Fiedler R,** Schuurman N, Hyndman J. Hidden homelessness: an indicator-based approach examining the geographies of recent immigrants at-risk of homelessness in Greater Vancouver. *Cities* 2006;**23**:205–16.
17. **Statistics Canada**. *2006 census highlights: fact sheet 7*. Ottawa: Statistics Canada, Office of Economic Policy, Labour and Demographic Analysis Branch. http://www.fin.gov.on.ca/english/economy/demographics/census/cenhi06-7.html (accessed 22 May 2009).
18. **City of Toronto**. *2006 street needs assessment: results and findings*. Toronto: City of Toronto, 2006. http://www.toronto.ca/housing/pdf/streetneedsassessment.pdf (accessed 22 May 2009).
19. **City of Toronto**. *Toronto report card on housing and homelessness 2003*. Toronto: City of Toronto, 2003. http://www.toronto.ca/homelessness/pdf/reportcard2003.pdf (accessed 22 May 2009).
20. **Hwang SW,** Chiu S, Kiss A, *et al*. Use of meal programs and shelters by homeless people in Toronto [abstract]. *J Urban Health* 2005;**82**:ii46.
21. **Statistics Canada**. *Ethnic diversity survey questionnaire, Apr 2002*. Toronto: Statistics Canada. http://www.statcan.gc.ca/imdb-bmdi/instrument/4508_Q1_V1-eng.pdf (accessed 22 May 2009).
22. **Interagency Council on the Homeless**. *Homelessness: programs and the people they serve. Findings of the National Survey of Homeless Assistance Providers and Clients*. Washington, DC: Interagency Council on the Homeless, 1999:6-2–6-3.
23. **McGahan PL,** Griffith JA, Parente R, *et al*. *Addiction Severity Index: composite scores manual*. Philadelphia: The University of Pennsylvania/Veterans Administration Centre for Studies of Addiction. http://www.tresearch.org/resources/compscores/CompositeManual.pdf (accessed 22 May 2009).
24. **McLellan AT,** Kushner H, Metzger D, *et al*. The fifth edition of the Addiction Severity Index. *J Subst Abuse Treat* 1992;**9**:199–213.
25. **Zanis DA,** McLellan AT, Canaan RA, *et al*. Reliability and validity of the Addiction Severity Index with a homeless sample. *J Subst Abuse Treat* 1994;**11**:541–8.
26. **Joyner LM,** Wright JD, Devine JA. Reliability and validity of the Addiction Severity Index among homeless substance misusers. *Subst Use Misuse* 1996;**31**:729–51.
27. **Drake RE,** McHugo GJ, Biesanz JC. The test-retest reliability of standardized instruments among homeless persons with substance use disorders. *J Stud Alcohol* 1995;**56**:161–7.
28. **Burt M,** Aron LY, Lee E. *Helping America's homeless*. Washington, DC: The Urban Institute Press, 2001:100–2.
29. **Larson CO.** Use of the SF-12 instrument for measuring the health of homeless persons. *Health Serv Res* 2002;**37**:733–49.
30. **Ware JE,** Kosinski M, Keller SD. *SF-12: how to score the SF-12 physical and mental health summary scales*, 2nd edn. Boston: The Health Institute, New England Medical Center, 1995:21–4.
31. **Chiswick B.** The effect of Americanization on the earnings of foreign-born men. *J Polit Econ* 1978;**86**:897–921.
32. **Grant M.** Evidence of new immigrant assimilation in Canada. *Can J Econ* 1999;**32**:930–55.
33. **Pendakur K,** Pendakur R. *The colour of money*. Working Paper Series no. 96-03. Vancouver: Research on Immigration and Integration in the Metropolis (RIIM), 1996:1–27.
34. **LaLonde RJ,** Topel RH. Immigrants in the American labor market: quality, assimilation and distributional effects. *Am Econ Rev* 1991;**81**:297–302.
35. **Lee K.** Groups vulnerable to poverty in CMSs and CSDs. *Urban poverty in Canada: a statistical profile*. Ottawa: Canadian Council on Social Development, 2000. http://www.ccsd.ca/pubs/2007/upp/vulnerable_populations.pdf (accessed 22 May 2009).
36. **DeNavas-Watt C,** Proctor BD, Smith JC. *U.S. income, poverty, and health insurance coverage in the United States*. Washington, DC: US Census Bureau, 2008. http://www.census.gov/prod/2008pubs/p60-235.pdf (accessed 22 May 2009).
37. **Kinnon D.** *Canadian research on immigration and health*. Ottawa: Health Canada, 1999. http://dsp-psd.pwgsc.gc.ca/Collection/H21-149-1999E.pdf (accessed 22 May 2009).
38. **Newbold B.** The short-term health of Canada's new immigrant arrivals: evidence from the LSIC. *Ethnicity Health*. Published Online First: 4 Mar 2009. doi:10.1080/13557850802609956