Vancouver Homeless Count 2013

Final report

EBERLE PLANNING AND RESEARCH

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1 Key Findings

The Vancouver Homeless Count conducted on March 13, 2013 is the seventh homeless count measuring the number of homeless people in the City of Vancouver. While always an undercount, 1,600 homeless persons were counted, comprised of 273 unsheltered homeless persons and 1,327 sheltered homeless. The total number of homeless people counted in Vancouver has remained stable for three years at approximately 1,600 persons, and the number of unsheltered homeless is down by 33 persons from 2012.

Since the first homeless count in 2002, the number of people found homeless in Vancouver peaked in 2010 at 1,715 people, and has since declined to 1,600 persons in 2013. The count results since 2011 suggest a stabilization of the total number homeless in Vancouver at approximately 1,600 individuals. Especially different since 2005 is the composition of Vancouver's homeless population: fewer are unsheltered, a decline of 54%, and more are sheltered, an increase of 72%.

TRENDS

The count shows that Vancouver's homeless continue to be disproportionately male, Aboriginal, middle aged and older, and in poor health. The homeless are in fact getting older and in worse health with each count.

There are now double the number of homeless persons over age 55 (264) compared to 2005 (121) and seniors age 55+ now represent 19% of the homeless population, up from 2005 when they comprised 10%. A larger share reported income from OAS/GIS/CPP and other pensions - 6% in 2013, up from 2% in 2008, which may be related to the aging of the homeless population.

The 2013 Count results show that Vancouver's homeless are in poorer health today than in any year prior. A growing share of those who are homeless report two or more health conditions, 56% in 2013, up from 35% in 2005. The incidence of every type of health condition surveyed by the count has been rising since 2008. The incidence of reported and suspected mental illness among Vancouver's homeless continues on an upward trend in 2013 at 46% compared to 2008 when 28% reported mental illness. The incidence of addictions is trending higher, from 51% in 2008 to 63% in 2013.

The share of Aboriginal persons within the homeless population has ranged from a high of 38% in 2008 to a low of 30% this year, an overall declining trend. The number of Aboriginal homeless persons counted in 2013 was 365. However there continues to be a significant overrepresentation of Aboriginal persons among the homeless compared to the population of Vancouver (2%).

DEMOGRAPHIC PROFILE

Many homeless people have health issues. More than 80% of the homeless had one or more health conditions. Just over one quarter had one health condition and 56% had two or more health conditions. Only 18% were reported to have no health conditions. Overall the data suggest that both the sheltered and unsheltered homeless are similar in the incidence of health conditions.

Three to six months is the most common length of time homeless reported (which may be linked to the opening period for HEAT and winter shelters), followed by 5 years or longer. Responses vary significantly among the sheltered and unsheltered homeless. Among the sheltered population, 3-6 months was the most common length of time homeless, while over one quarter of people who are unsheltered have been homeless for 5 years or more. Sixty percent of the unsheltered homeless have been homeless for a year or more. The figures also show that 21 people were newly homeless in the week before the count, indicating a substantial flow into homelessness from other precarious housing situations.

The homeless population age 55 and older represents 19% of the total homeless population. In comparison, those age 55 and older represented 26% of the City of Vancouver 2011 population so this age group is under-represented among the homeless.

In 2013 the Aboriginal population is still overrepresented among the homeless, representing 30% of the homeless population and only 2% of Vancouver's population. The incidence of Aboriginal identity is significantly higher among the unsheltered homeless (39%) than the sheltered homeless (27%).

HEAT/Winter SHELTER CLIENTS

Compared with clients staying in year round shelters, individuals counted in the HEAT/Winter Response shelters were more likely to:

- Be male
- Of Aboriginal identity

Their age structure is similar to the year round clients as well as the unsheltered homeless.

Compared to the unsheltered homeless, HEAT/Winter clients:

- had been homeless for a shorter period of time, and
- had similar patterns of health conditions and income sources.

2 Introduction

This report presents the findings of the 2013 Vancouver Homeless Count. It provides an estimate of the Vancouver's homeless population *on one day* - March 13, 2013, describes characteristics of the homeless population and reviews trends in Vancouver since 2005.

The City of Vancouver commissioned the count so that it would have up-to-date information to assist with its priority to end street homelessness by 2015. There has been much effort and resources expended by the City, BC Housing, Streetohome Foundation, non-profit housing organizations, the Mental Health Commission and others to tackle the problem of homelessness in Vancouver in recent years and counting the homeless is one way to understand the impact of these actions. In addition, looking ahead, a good understanding of the homeless population is critical for planning purposes.

2.1 Purpose and objectives

The purpose of the count is to provide:

- an updated enumeration of homeless persons in Vancouver;
- a demographic profile of those enumerated on the day of the count; and,
- an analysis of trends in homelessness since 2005.

2.2 Definitions

The count used the same definition of homelessness used in previous City and regional homeless counts. Someone was considered homeless for the purpose of this count if:

- they did not have a place of their own where they could expect to stay for more than 30 days and if they did not pay rent.

This included people who:

- had no physical shelter – staying on the street, in doorways, in parkades, in parks and on beaches, etc.; or,
- were temporarily accommodated in emergency shelters, safe houses for youth, transition houses for women and their children fleeing violence or detox facilities; or,
- were staying at someone else's place where they did not pay rent (immediate family excluded), or
- people with no fixed address found at hospitals or jails.

For example, someone who stayed in a garage would be considered homeless if they do not pay rent, even if they considered the garage to be their home. Emergency shelters are not considered permanent housing, thus shelter clients are included in the homeless population. Someone who stayed at a friend's place where they did not pay rent was also homeless for the purpose of this count. People who were sofa surfing were included in the count if we found them (included as part of the unsheltered homeless population). Sofa surfers as a

population are significantly undercounted in most homeless counts because they are difficult to find and enumerate. Similarly, families staying with other families and not paying rent would not be included in the count if they did not visit a place where they would be counted. Someone paying rent in an SRO is not considered homeless for the purpose of this count.

2.3 Method

The 2013 Vancouver Homeless Count used the same method as past city and regional homeless counts to ensure comparability. It measured homelessness from 12:01 am to 11:59 pm on March 13th, 2013, and consisted of two components to enumerate the sheltered homeless and the unsheltered homeless. The survey focused on six key variables - age, gender, Aboriginal identity, income source, health conditions and length of time homeless (unsheltered only) and used a simplified data collection approach involving volunteer interviewers and direct data collection from some shelters and other sources. The count was led by City of Vancouver staff. Eberle Planning and Research (which has been involved in a number of City and Regional counts) was hired as a count advisor to provide technical assistance on all aspects of the count, including providing oversight and quality control, to provide assistance with count coordination, data analysis and report writing.

The homeless count is explicitly designed to avoid double counting. Screening questions eliminate those who have already been interviewed, who paid rent, or who stayed in a shelter, safe house, transition house or detox facility where they were included in the sheltered count. People approached are offered a candy or cigarette prior to being asked the three screening questions. This approach ensures there is no incentive for homeless people to complete an interview more than once.

Sheltered homeless

The sheltered component enumerated homeless individuals staying at emergency shelters, transition houses, safe houses, and detox facilities and people with “no fixed address” staying in hospitals and jails overnight on March 12/13th. These individuals are referred to as the ‘sheltered homeless’. Four approaches were used to gather information from the sheltered homeless.

1. Interviews were conducted in eleven shelters, including HEAT and Winter Response shelters. Volunteers visited these shelters on the evening of March 12th to interview those staying overnight. This is up from nine shelters in 2012 in an effort to improve response rates in shelters where most homeless are found.
2. Transition house, safe house and detox facility staff used the sheltered survey to gather the necessary information from clients.
3. BC Housing provided aggregate client data for the evening of March 13, 2013 for 15 shelters that provide regular reports to the agency.
4. Agencies such as Vancouver Coastal Health, Providence Health Care and the Vancouver Police Department provided anonymous information on individuals

staying in their facilities on count night who have no fixed address (NFA) and who were not discharged after midnight on March 12th.

In addition, staff at each shelter, transition house and safe house was asked to complete a shelter "statistics" form to provide the total number of occupants and turnaways on count night. This served as a cross check against the surveys, and ensured that all shelter clients were enumerated, including people who were missed by the survey or who refused to participate.

Unsheltered Homeless

The unsheltered count took place in the daytime hours on March 13. Trained volunteers interviewed homeless people at pre-identified locations such as meal programs, drop in centres, parks, alleys and public spaces. People found in the daytime who stayed overnight in these places are referred to as the 'unsheltered homeless'. People who stayed in emergency accommodation the night before were screened out from completing the survey. In addition, some service agencies completed the survey with their clients using count materials.

In advance of the count, the City's Homeless Advocate, in consultation with local advocacy groups, outreach staff and others knowledgeable about where the homeless may be found, identified locations and created a series of maps marking known homeless locations to guide interviewers in their assigned area.

Beginning early in the morning on March 13th, volunteer interviewers approached people in their assigned areas to request an interview. If they agreed to participate, individuals at these locations were asked a series of screening questions to determine if:

a) they had already answered the survey; or,
b) they had a place they paid rent for; or,
c) they had stayed in emergency accommodation covered by the sheltered component, including hospitals, jails etc.[1]

Glossary

Unsheltered homeless - People who had no physical shelter, but stayed outside, on the street, in doorways, parkades, parks and on beaches and people who stayed at a someone's place where they did not pay rent (sofa surfing).

Sheltered homeless - Stayed in an emergency shelter, safe house, and transition house for women and children fleeing violence. Includes one recovery house and people with no fixed address staying overnight in hospitals or jails or detox facilities.

Children - Young people under the age of 19 who were accompanied by a parent during the count.

Youth - Young people under the age of 25 who were not accompanied by a parent during the count.

Seniors - People aged 55 years and older.

[1] People who stayed in an overnight location covered by the sheltered component (shelter, safe house or transition house or participating NFA facility) were not interviewed.

The interview ended if individuals answered positively to any of the above questions. If the interviewee qualified for the survey, the interviewer proceeded to complete the survey with the interviewee.

Like in all previous years except 2011, volunteers were asked wake people to interview them.

In addition, some agencies in frequent contact with sofa surfers, particularly youth and women, were asked to complete interviews with these individuals on count day.

Volunteers and count coordination

Volunteer interviewers recruited by the City were comprised mainly of experienced and skilled outreach workers, social service personnel or people with relevant experience, including previous counts.

The City was divided into three areas with an Area Coordinator responsible for each. A Shelter Coordinator was responsible for determining which shelters to send volunteers, coordinating with shelter staff to ascertain the best time/locations for interviews to take place, and managing volunteer shelter interviewers.

The City recruited all volunteers and the count team managed training registration, assigned locations, coordinated volunteers on count night/day, and collected and returned completed packages at the end of their shifts. An "area station" was set up in each area on count day allowing for volunteer sign in, pick up and return of completed packages, and the ability to shift volunteers around in case of "no shows".

2.4 Limitations

All homeless counts underestimate the number of people who are homeless at any one time. The Vancouver count is no different. It did not enumerate every homeless person in the city on March 13, 2013. Although every effort was made to enumerate all homeless people, it was not possible to assign volunteers to all parts of the city for an entire day; some would be missed and some homeless people did not wish to be identified. This method does not count all people who were homeless and sofa surfing, as they are by their very nature, hidden. That being said, the count provides the best available information on the size, composition and trends in the homeless population in Vancouver.

It should also be noted that a point-in-time count, such as this, does not reflect the number of people who move in and out of homelessness over a longer period of time, for example, one year. It counts only those people who had no place of their own on March 13, 2013. If an individual had a place on March 12 or March 14 they would not be included in this total. The point in time approach is consistent with past counts and allows for comparisons.

People who refuse to be interviewed are not included in the reported number of homeless people found on the day of the count, as these people may decide to participate later in the day (and would therefore be double counted) or they may not, in fact, be homeless. If they

are homeless, then they are missed, emphasizing that the count is an undercount. There were 138 people who were observed to be homeless but who were not interviewed on March 13, 2013.

2.5 Report organization

Section 3 provides the total number of people identified as homeless, and the distribution by type of homelessness (sheltered and unsheltered). Section 4 describes trends in the characteristics of the homeless population since 2005. Section 5 shows detailed demographic and other characteristics of the homeless population in 2013, both sheltered and unsheltered. Section 6 profiles the clients of HEAT and Winter Response shelters.

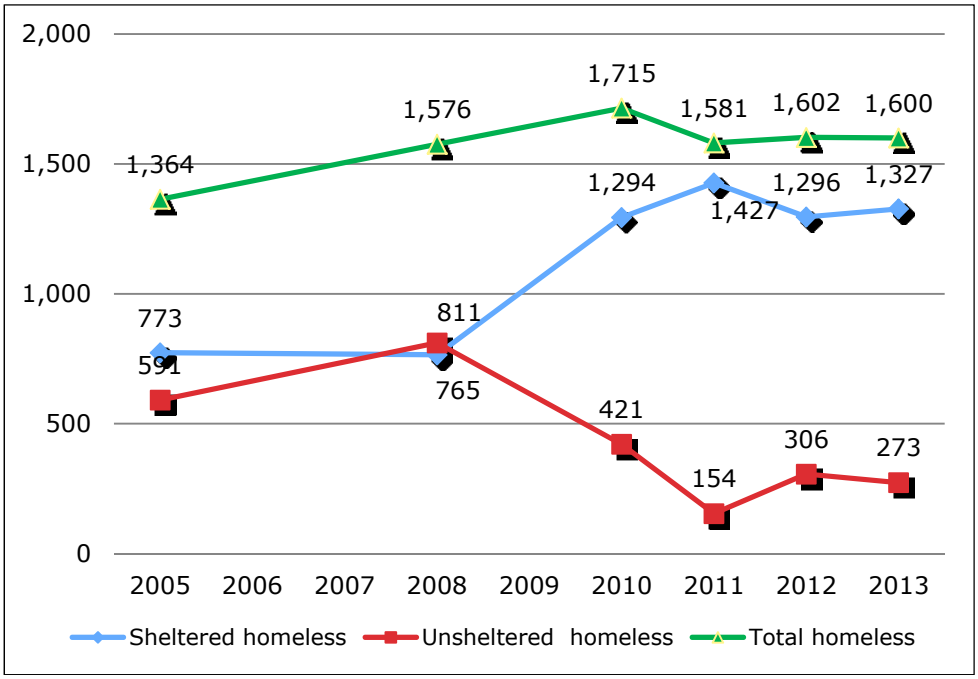
3 Number and distribution of Vancouver's homeless

There were 1,600 homeless people counted in Vancouver on March 13, 2013, virtually the same number as in 2012 and 2011.

Figure 1 and Table 1 show the number of homeless counted in Vancouver in 2005, 2008, 2010, 2011, 2012, and 2013.[2] After increasing each year since 2005, and reaching a high point in 2010 of 1,715 homeless persons, the total number of homeless people in Vancouver has declined and stabilized at about 1,600 persons in each of the last three years.

Figure 1 also shows the sharp decline in the number of unsheltered homeless counted from over 800 persons in 2008 to approximately 300 persons in 2012 and about 270 persons in 2013, suggesting a stabilization of the number of unsheltered homeless in Vancouver.

Figure 1 - Vancouver homeless population trends 2005 to 2013



[2] The 2005 count is used in this report as the comparative baseline because significant policy changes were made in 2005 which significantly impacted future counts. Examples of these significant policy changes includes changes to the shelter system such as increasing operating hours to 24 hours and providing healthy meals by BC Housing and decreasing barriers to access for income assistance by the former Ministry of Employment and Income Assistance.

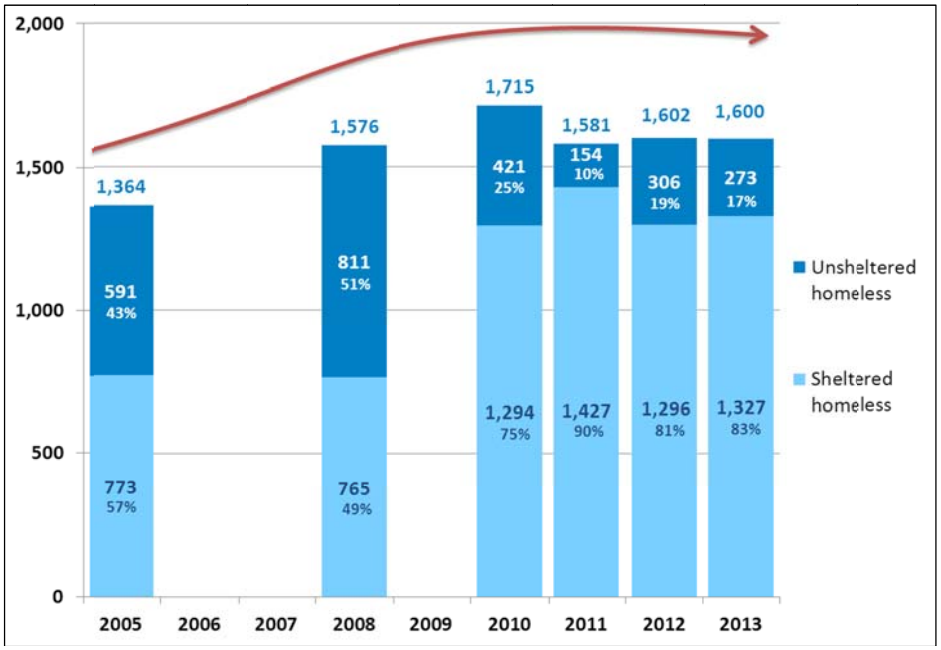
Table 1 - Vancouver homeless population trends 2005 to 2013

Number of homeless	Sheltered homeless	Unsheltered homeless	Total homeless
2005	773	591	1,364
2008	765	811	1,576
2010	1,294	421	1,715
2011	1,427	154	1,581
2012	1,296	306	1,602
2013	1,327	273	1,600
Change (2005-2013)	554	-318	236
% Change (2005-2013)	72%	-54%	17%

There were fewer unsheltered homeless persons counted this year than in all previous years except 2011. In 2011, 154 people were counted who were unsheltered the evening of the count, whereas in 2012 and 2013 this figure is higher, at 306 people and 273 respectively. Whether 2011 was an anomaly or a greater undercount than usual is unknown.

Figure 2 depicts the changing distribution of Vancouver's homeless population in terms of their sheltered and unsheltered status. In 2013, like in 2012 (1,296), over 80% (1,327) of the homeless were accommodated indoors in shelters, safe houses, transition houses, detox facilities or hospitals or jails on count night, compared with 90% (1,427)in 2011, 75% (1,294) in 2010 and only 49% (765) in 2008.

Figure 2- Distribution of the homeless population 2005-2013



Trends show the number staying in shelters from one year to the next is variable and can fluctuate based on the number of shelter beds available at any one time and on the weather.

Longer-term changes are more indicative of overall trends than year-to-year figures. From 2005 to 2013 the number of homeless people in Vancouver has increased by 17% or by 236 people. The City's population increased by 13% (from 2005 to 2012) so the number of people homeless has grown at a faster rate.

Table 2 shows the changes that have occurred within two time periods - 2005 to 2008, and 2008 to 2013. In the first period, the three years from 2005 to 2008, there was an increase in the total number homeless of 16% (over 5% per year) and this included a significant increase in the number of unsheltered homeless (37%) while the sheltered population remained constant (there was a relatively constant supply of shelter beds). The second period, from 2008 to 2013, reveals a different picture. In the five years from 2008 to 2013, the total number of people counted as homeless has been relatively stable, for a total increase of 24 persons - 2% over the five years or 0.4% per year. In that same period, 538 fewer individuals were unsheltered, with a roughly equal change (in the opposite direction) in the number of sheltered individuals (again due to an increase in shelter beds beginning in 2008).

Table 2 - Change in homelessness by time period

Time Period	**Change 2005-2008**		**Change 2008-2013**	
Homeless Population	Number	Percent Change	Number	Percent Change
Sheltered homeless	-8	-1%	562	73%
Unsheltered homeless	220	37%	-538	-66%
Total homeless	212	16%	24	2%

Most of the homeless on March 13, 2013 were adults and unaccompanied youth (1,574 persons or 98%). Twenty-six accompanied children and youth (under 25 years) were counted. Of these, 17 stayed in a year round shelter, 8 stayed in transition houses and one was staying in hospital.

Most homeless persons stayed in a year round shelter (51%), followed by Winter and HEAT shelters (24%). Detox facilities reported 48 individuals with NFA. There were no overnight placements in hotels by the Ministry of Social Development.[3]

[3] Dave Jagpal, Manager, Integration Services, Ministry of Social Development, Vancouver Coastal Region, BC Ministry of Social Development.

Table 3 - Homeless by Shelter Type and Accompanied Status, March 13, 2013

Homeless category	Adults and youth		Children		Total homeless	
	Number	Percent	Number	Percent	Number	Percent
Sheltered homeless	1,301	83%	26	100%	1,327	83%
Year-round Shelters	792	50%	17	65%	809	51%
Winter & HEAT shelters	381	24%	0	0%	381	24%
Detox facilities	48	3%	0	0%	48	3%
Transition houses	18	1%	8	31%	26	2%
Safe houses	13	1%	0	0%	13	1%
Recovery house	17	1%	0	0%	17	1%
No fixed address	32	2%	1	4%	33	2%
Unsheltered homeless	273	17%	0	0%	273	17%
Total homeless	1,574	98%	26	2%	1,600	100%

Youth - under 25 and unaccompanied
Children - under 19 and accompanied

Shelter, safe house and transition house providers were asked to report how many people were turned away the night of March 12/13th, 2013 either because the shelter was full or the individual seeking shelter was not appropriate for their facility. Table 4 shows that 124 total turnaways were reported in 2013 on count night, compared to 112 turnaways in 2012. Most turnaways occurred at year round shelters (87). Individuals turned away are not included in the total count figures, as they may have been enumerated as unsheltered homeless in the daytime component or may have found accommodation in another shelter.

Table 4 - Turnaways, March 12/13, 2013

Shelter category	Turnaways	
	Number	Percent
Year round shelters	87	70%
Winter Response / HEAT shelters	25	20%
Transition houses	10	8%
Safe houses	2	2%
Total turnaways	124	100%

Explanation of difference between total homeless and demographic totals

As in previous years, detailed survey or demographic information is not available for each individual. While the total number of homeless people counted in Vancouver on count day 2013 was 1,600 persons, the demographic profile and trends analysis that follow provide information on 1,425 people for whom some demographic data was obtained either via the survey or through direct data transfer, representing 89% of the homeless counted in 2013. The remainder did not complete the shelter survey (but were counted). Table 5 shows the breakdown for 2013. Profile data in the following tables excludes 149 individuals who were enumerated on count night, for whom no corresponding demographic data is available[4] and

[4] This occurs for many reasons, including individuals who did not wish to be interviewed, or were not present when interviewing took place. Nonetheless, as the shelters provide occupancy statistics for

26 accompanied children under 19 years of age with a parent or guardian for whom separate demographic information was not collected.[5] This is an improvement in the global response rate from 2012, when 83% of homeless persons were completely enumerated.

Table 5 - Difference between total homeless and demographic totals 2013

Type of data	Sheltered homeless	Unsheltered homeless	Total homeless	Percent
Demographic data total (Survey or database records)	1,152	273	1,425	89%
Occupied shelter bed (No survey or database record)	149	0	149	9%
Accompanied children (No survey or database record)	26	0	26	2%
Total homeless	1,327	273	1,600	100%

that evening, we know that beds were used and the individuals would have reported being in a shelter the night before and thus not interviewed had they been approached during the daytime count.

[5] Interviews were not conducted with children under the age of 19 years if they were with a parent on count day. Demographic information is available for unaccompanied youth (< 19 years), and is included in the demographic profile.

4 Homeless trends 2005 - 2013

This section reports on the demographic and other trends of homeless individuals in Vancouver as enumerated in homeless counts since 2005.[6] Age, gender and Aboriginal identity have higher response rates, while other variables have higher item non-response rates. With the exception of age, gender and Aboriginal identity, this analysis focuses on the incidence or share of respondents reporting a certain characteristics, not the total number.

4.1 Gender

Men continue to comprise the majority of homeless persons counted, accounting for almost three quarters of the homeless population. The share of men among the homeless has been similar in all counts (73-72%) except in 2010 when the share of men counted was 78% of the total homeless. Women have comprised about 26-27% of the homeless counted each year. The number of homeless women counted has ranged between 330 and 360. More homeless women were counted in 2013 (361) than in any preceding year. Homeless counts are generally viewed as less successful in counting homeless women as women tend to stay with others to avoid absolute homelessness.

Table 6 - Gender trends

Gender	2005		2008		2010		2011		2012		2013	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Men	928	73%	948	72%	1,155	78%	901	73%	960	73%	1,017	73%
Women	330	26%	348	27%	333	22%	327	27%	347	26%	361	26%
Transgendered	8	1%	15	1%	n/a	n/a	5	<1%	6	<1%	7	<1%
Total respondents	1,266	100%	1,311	100%	1,488	100%	1,233	100%	1,313	100%	1,385	100%
Not known	25		61		21		264		21		40	
Total	1,291		1,372		1,544		1,497		1,334		1,425	

4.2 Age

The largest share of Vancouver's homeless population continues to be between the ages of 35 and 54 years (50%). The biggest shift occurring is the aging of the homeless population. People age 55 and over now represent 19% of the homeless population, up significantly from 2005 when they comprised 10% of the homeless. In absolute terms, in 2005 there were 121 homeless persons age 55+ counted compared to today, with 264 persons age 55+, representing a more than doubling of this population.

Since 2005, the number of homeless children and youth counted has ranged between 175 and 200 , representing approximately 12 to 14% of the total homeless population. The highest figure was in 2012 with 194 children and youth. The most children counted was in 2012 (57), while the largest number of homeless youth age 19-24 years counted was 159, in

[6] SPARC. 2005. *On our streets and in our shelters: Results of the 2005 Greater Vancouver Homeless Count.* RSCH. 2008. *Still on our streets: Results of the 2008 Metro Vancouver Homeless Count.* City of Vancouver. 2010. *Vancouver Homeless Count 2010. Off the street and into shelters.* RSCH 2011 *One step forward: Results of the 2011 Metro Vancouver Homeless Count.* City of Vancouver. 2012. *Sixth Homeless Count in City of Vancouver - March 2012. Significant changes since 2005.*

2010. Counts may also be less successful in finding youth who tend to sofa surf and avoid services, thus remaining hidden. In 2013 there were 36 homeless children under age 19 years, down from 57 in 2012 and about the same number of 19-24 year olds (139).

Table 7 - Age groups trends

	Total homeless 2005		Total homeless 2008		Total homeless 2010		Total homeless 2011		Total homeless 2012		Total homeless 2013	
Age groups	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Under 19	30	2%	19	2%	25	2%	44	4%	57	4%	36	3%
19-24	149	12%	135	10%	159	11%	146	13%	137	10%	139	10%
25-34	273	22%	258	20%	264	18%	197	17%	267	20%	256	19%
35-44	402	33%	425	32%	363	25%	251	22%	316	24%	358	26%
45-54	260	21%	361	28%	445	30%	250	22%	339	26%	324	24%
55-64	98	8%	95	7%	163	11%	122	11%	163	12%	195	14%
65+	23	2%	19	1%	41	3%	33	3%	40	3%	69	5%
Total respondents	1,235	100%	1,312	100%	1,460	100%	1,133	100%	1,319	100%	1,377	100%
Not stated	56		60		84		114		45		48	
Total	1,291		1,372		1,544		1,176		1,364		1,425	

4.3 Aboriginal identity

Table 8 shows the results from the Aboriginal identity question for 2005 to 2013. The share of Aboriginal persons within the homeless population has ranged from a high of 38% in 2008 to a low of 30% this year, an overall declining trend. The largest number of homeless persons with Aboriginal identity was counted in 2008 at 456 persons, and in 2012 and 2013 this figure is down to approximately 365 persons.

Table 8 - Aboriginal Identity trends

	Total homeless 2005		Total homeless 2008		Total homeless 2010		Total homeless 2011		Total homeless 2012		Total homeless 2013	
Aboriginal ID	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Aboriginal	352	35%	456	38%	448	36%	268	31%	362	32%	369	30%
Not aboriginal	658	65%	749	62%	805	64%	594	69%	768	68%	867	70%
Total respondents	1,010	100%	1,205	100%	1,253	100%	862	100%	1,130	100%	1,236	100%
Not stated	281		167		291		290		204		189	
Total	1,291		1,372		1,544		1,157		1,334		1,425	

4.4 Income

Table 9 displays the results for income sources for the 2008 to 2013 counts.[7] There have been some changes since 2008 and note the significant item non-response to this question, particularly in more recent years including 2013, which may affect its representativeness.

The share of the homeless population reporting income assistance as an income source was 38% in 2013, the lowest percentage reported since 2008. At the same time, the portion reporting disability benefit in 2013 rose to 24% from around 20% in previous years, so that combined, these income sources were reported by 62% of the homeless, down from 68% in 2011. A larger share reported income from OAS/GIS/CPP and other pensions - 6% in 2013, up from 2% in 2008, which may be related to the aging of the homeless population. The share reporting income from employment has fluctuated over time showing no discernable trend. The share reporting no income has generally been trending upward from 7% in 2008 to 14% in 2013.

Table 9 - Income source trends

Sources of income (more than 1 possible)	Total homeless 2008		Total homeless 2010		Total homeless 2011		Total homeless 2012		Total homeless 2013	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Government transfers										
Income assistance or welfare	533	43%	632	47%	286	44%	339	41%	381	38%
Disability benefit	258	21%	286	21%	132	20%	176	21%	239	24%
Employment Insurance	13	1%	35	3%	17	3%	16	2%	15	2%
OAS GIS and CPP	21	2%	48	4%	28	4%	38	5%	56	6%
Other sources										
Employment	242	19%	151	11%	97	15%	96	12%	135	14%
No income	83	7%	130	10%	71	11%	135	16%	157	16%
Other	611	49%	409	30%	329	50%	160	19%	148	15%
Total Respondents	1,242	100%	1,344	100%	655	100%	834	100%	999	100%
Not stated	130		200		506		500		426	
Total	1,372		1,544		1,157		1,334		1,425	

4.5 Health

The 2013 count results show that Vancouver's homeless are in poorer health today than they have been in any count prior to this year. This trend is consistent with an aging homeless population and may be linked with the successful housing of a substantial number of homeless people (those who have not been housed may have more complex needs or are becoming less well over time and/or are aging). A growing share of those who remain homeless report two or more health conditions, 58% in 2013, up from 35% in 2005. The share with one health condition has been declining over time. The incidence of no reported or perceived health conditions has been steady in 2012 and 2013 at 16-17-%, but down from 26% in 2005.

[7] The 2005 income question was asked differently and cannot be compared.

Table 10 - Incidence of health conditions trends

Health condition	Total homeless 2005		Total homeless 2008		Total homeless 2010		Total homeless 2011		Total homeless 2012		Total homeless 2013	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
No health conditions	263	26%	369	29%	277	21%	55	10%	156	17%	179	16%
One health condition	396	39%	329	26%	415	32%	208	38%	290	32%	289	26%
2 or more health conditions	349	35%	556	44%	622	47%	289	52%	451	50%	636	58%
Total respondents	1,008	100%	1,254	100%	1,314	100%	552	100%	897	100%	1,104	100%
Not stated	283		118		230		605		437		321	
Total	1,291		1,372		1,544		1,157		1,334		1,425	

Table 11 reports on trends in specific types of health conditions, and mirrors the trend described above. It shows that the incidence of every type of health condition surveyed by the count has been rising since 2008. Reported and suspected mental illness among Vancouver's homeless continues on an upward trend in 2013 at 46% compared to 2008 when 28% reported mental illness. The incidence of addictions is trending higher, from 51% in 2008 to 63% in 2013, as is the incidence of physical disability. The incidence of medical conditions has remained largely stable.

Table 11 - Type of health conditions trends

Health condition	Total homeless 2008		Total homeless 2010		Total homeless 2011		Total homeless 2012		Total homeless 2013	
(more than 1 possible)	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Addiction	643	51%	721	55%	344	56%	532	59%	694	63%
Physical disability	324	26%	368	28%	157	25%	265	30%	375	34%
Medical condition	495	39%	503	38%	186	30%	325	36%	469	42%
Mental illness	354	28%	471	36%	251	41%	361	40%	512	46%
Total respondents	1,254	100%	1,314	100%	n/a	100%	897	100%	1,104	100%
Not stated	118		230		n/a		437		321	
Total	1,372		1,544		1,157		1,334		1,425	

4.6 Length of time homeless

The 2013 count results for length of time homeless show that people reporting a homeless period of one year or more have consistently formed the largest share of the homeless population, varying between 45% and 49% since 2008. A smaller share reported under 1 month as their length of time homeless, 10%, the smallest share since 2005. Proportionally more homeless people reported 1-6 months as the length of time homeless in 2013 at 34% compared to 27% in 2011. A question about the length of time homeless was not asked in 2012.

Table 12 – Length of time homeless trends

Length of time homeless	Total homeless 2005		Total homeless 2008		Total homeless 2010		Total homeless 2011		Total homeless 2013	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Under 1 month	253	25%	145	12%	177	13%	145	12%	76	10%
1 month to 6 months	271	26%	319	27%	371	28%	319	27%	268	34%
6 months to under 1 year	134	13%	152	13%	173	13%	152	13%	93	12%
1 year or more	376	36%	585	49%	595	45%	585	49%	363	45%
Total respondents	1,034	100%	1,201		1,316		1201	100%	800	
Not stated	257		171		228				52	
Total	1,291		1,372		1,544				852	

4.7 Where the unsheltered homeless stayed

As in most counts from 2005 to 2012, two thirds of the unsheltered homeless stayed outside including in a car/garage or public place on March 13, 2013. About one third stayed at someone else's place, a share that has been fluctuating over time. The year 2011 was an unusual year with a high proportion staying at someone else's place, and a small proportion outside. A declining share reported staying at "other" places (2%) in 2013 compared to other years (5-20%).

Table 13 - Where unsheltered homeless stayed trends

Location	2005		2008		2010		2011		2012		2013	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Combined outside and car/garage and public bldg	411	70%	548	71%	284	69%	49	33%	205	69%	180	66%
Someone else's place	111	19%	129	17%	101	25%	69	47%	74	25%	87	32%
Other	69	12%	90	12%	24	6%	29	20%	17	6%	6	2%
Total Respondents	591	100%	767	100%	409	100%	147	100%	296	100%	273	100%

5 Demographic profile

The following profile presents a demographic picture of the homeless adults and youth counted in Vancouver on March 13th, 2013. Each table shows results for the sheltered and unsheltered homeless as well as for the total homeless population.

As in past counts, response rates varied by question, particularly among the sheltered homeless. Age and gender questions had high response rates allowing for reporting of actual numbers. Other variables including income source and health conditions had lower response rates, ranging from 85% to 63%, and only shares or proportions are reported.

5.1 Gender

Men represent almost three quarters of the homeless population counted in Vancouver in 2013, and women about one quarter. Most homeless women stayed in a shelter of some kind (316) - only 45 women were counted as unsheltered homeless representing 12% of homeless women. Men comprised the largest number (222) and share (82%) of the unsheltered population. Only seven transgendered homeless persons were counted and they were found in both sheltered and unsheltered locations.

Table 14 - Gender[8]

	Sheltered homeless		Unsheltered homeless		Total homeless	
Gender	Number	Percent	Number	Percent	Number	Percent
Men	795	71%	222	82%	1,017	73%
Women	316	28%	45	17%	361	26%
Transgender	4	0%	3	1%	7	1%
Total respondents	1,115	100%	270	100%	1,385	100%
Not known	37		3		40	
Total	1,152		273		1,425	

5.2 Age

Half of the homeless people counted on March 13, 2013 were between the ages of 35 and 54 years. Overall, adults aged 25-54 years represented slightly just over two thirds of the city's homeless population (69%). There were 175 children and youth under age 25 years enumerated during the count, representing 13% of the total, with most age 19-24 years. Thirty six of these young people were under age 19, and all but five were sheltered. The largest number of unsheltered homeless persons (77) was between the ages of 35 and 44 years.

Over 260 homeless people enumerated on count day were age 55 years or older and most of them were between the ages of 55 and 64 years. Most of them were sheltered (222) with only 42 being unsheltered. The population age 55 and older represents 19% of the total homeless population. In comparison, those age 55 and older represented 26% of the City of Vancouver 2011 population so this age group is under-represented among the homeless.

[8] Interviewers were instructed to record gender based on observation.

Table 15 - Age

Age groups	Sheltered homeless		Unsheltered homeless		Total homeless	
	Number	Percent	Number	Percent	Number	Percent
0-18	31	3%	5	2%	36	3%
19-24	112	10%	27	10%	139	10%
25-34	201	18%	55	21%	256	19%
35-44	281	25%	77	30%	358	26%
45-54	269	24%	55	21%	324	24%
55-64	162	15%	33	13%	195	14%
65+	60	5%	9	3%	69	5%
Total respondents	1,116	100%	261	100%	1,377	100%
Not stated	36		12		48	
Total	1,152		273		1,425	

The median age of Vancouver's homeless population[9] was 42 years (half are younger, half are older), so they are somewhat older than Vancouver residents in general (with a median age of 39.7 years according to the 2011 Census). The youngest person counted in 2013 was under 1 year old and the oldest person counted was 84 years of age.

5.3 Aboriginal identity

Table 16 shows that 30% of Vancouver's homeless population in 2013 self identified as Aboriginal. Persons of Aboriginal identity continue to be over-represented among the city's homeless population, compared with the Vancouver population (2%).[10] The incidence of Aboriginal identity is significantly higher among the unsheltered homeless (39%) than the sheltered homeless (27%).

Table 16 - Aboriginal identity

Aboriginal identity	Sheltered homeless		Unsheltered homeless		Total homeless	
	Number	Percent	Number	Percent	Number	Percent
Aboriginal	264	27%	105	39%	369	30%
Not Aboriginal	702	73%	165	61%	867	70%
Total respondents	966	100%	270	100%	1,236	100%
Not stated	186		3		189	
Total	1,152		273		1,425	

[9] Excludes approx 600 clients reported by BC Housing.
[10] Statistics Canada. Community Profile. City of Vancouver. 2011 National Household Survey.

Table 17 displays the results for length of time homeless for the people staying at shelters where interviews took place (HEAT/Winter response and a couple of others) and the unsheltered homeless.[11] Responses vary significantly among the sheltered and unsheltered homeless. It shows that 3-6 months is the most common length of time homeless reported (which may be linked to the opening period for HEAT and winter shelters), followed by 5 years or longer. Among the sheltered population, 3-6 months was the most common length of time homeless, while over one quarter of people who are unsheltered have been homeless for 5 years or more. Sixty percent of the unsheltered homeless have been homeless for a year or more.

The table also shows that 21 people were newly homeless (became homeless in the week before the count), suggesting a substantial flow into homelessness from other precarious housing situations.

Table 17 - Length of time homeless

	Sheltered		Unsheltered		Total Homeless	
Time Homeless	Number	Percentage	Number	Percentage	Number	Percentage
Under 1 week	15	3%	6	2%	21	3%
1 week to under 1 month	46	9%	9	3%	55	7%
1 month to under 3 mos	91	17%	32	12%	123	15%
3 months to under 6 mos	116	22%	29	11%	145	18%
6 mos to less than 1 yr	64	12%	29	11%	93	12%
1 yr to less than 2 yrs	76	14%	37	14%	113	14%
2 yrs to less than 5 yrs	64	12%	51	19%	115	14%
5 years and longer	64	12%	71	27%	135	17%
Total Responses	536	100%	264	100%	800	100%
Not Stated	43		9		52	
Total	579		273		852	

[11] BC Housing does not provide data for this variable.

5.4 Sources of income

Respondents were asked to identify their sources of income, with more than one being possible. Income assistance was the most frequent response (38%), followed by disability benefit (24%) for a combined total of 62%. Roughly equal proportions reported no income (16%), employment (14%) and other sources (15%). Examples of other income sources include sex work, selling drugs, theft, Workers Compensation, selling things and window cleaning. OAS/GIS/CPP and other pensions were reported by 56 individuals (out of 69 people that were age 65 or older).

Table 18 - Sources of Income

Sources of income (more than 1 possible)	**Sheltered homeless**		**Unsheltered homeless**		**Total homeless**	
	Number	Percent	Number	Percent	Number	Percent
Government transfers						
Income assistance or welfare	269	36%	112	43%	381	38%
Disability benefit	193	26%	46	18%	239	24%
Employment Insurance	14	2%	1	0%	15	2%
OAS/GIS/CPP and other pensions	42	6%	14	5%	56	6%
Other sources						
No income	119	16%	38	15%	157	16%
Employment	115	16%	20	8%	135	14%
Other	65	9%	83	32%	148	15%
Binning, bottle collecting	9		25		34	
Panhandling	7		22		29	
Sex work	0		4		4	
Criminal activity	1		8		9	
Other	55		28		83	
Total Respondents	737		262		999	
Not stated	415		11		426	
Total	1,152		273		1,425	

The unsheltered homeless were more likely to report income assistance (43%) compared to the sheltered homeless (36%) and less likely to report disability benefits (18% versus 26%).

- About one third of the unsheltered homeless reported other income sources including binning, bottle collecting or panhandling.
- Employment (full, part-time and casual) was a source of income for 16% of the sheltered homeless enumerated, compared to only 8% of the unsheltered homeless.
- The incidence of pension income was the same for both the sheltered and unsheltered homeless.

5.5 Health conditions

The 2013 Vancouver Homeless Count survey asked about people's health, specifically whether they had a medical condition or illness, physical disability, addiction, and/or mental illness. Medical condition refers to chronic problems like asthma and diabetes, and physical

disability refers to an impairment affecting mobility or movement. The numbers presented in Table 19 and Table 20 include both self-reported health conditions, as well as the perceived health conditions identified by interviewers.[12] In these cases, the interviewer's perception was coded for the homeless individual.

Table 19 shows that more than 80% of the homeless had one or more health conditions. 26% of the homeless population had one health condition and 58% had two or more health conditions, meaning that 84% of those counted had one or more health conditions. Only 16% of the homeless were reported to have no health conditions.

Table 19 - Incidence of health conditions

	Sheltered homeless		Unsheltered homeless		Total homeless	
Health condition	Number	Percent	Number	Percent	Number	Percent
No health conditions	129	15%	50	19%	179	16%
One health condition	230	27%	59	22%	289	26%
Two or more conditions	480	57%	156	59%	636	58%
Total respondents	839	100%	265	100%	1,104	100%
Not stated	313		8		321	
Total	1,152		273		1,425	

Includes self identified and perceived

Note: High non-response rate amongst sheltered homeless may limit representativeness.

The unsheltered homeless were somewhat more likely to have two health conditions (59%) than the sheltered homeless (57%) although the difference was not large. Overall the data suggest that the two populations are similar in the incidence of health conditions.

Table 20 shows that addiction was the most common health issue among the homeless counted. Sixty three percent of those counted and who answered this question had a self identified or perceived addiction. The incidence of addiction was similar among both the sheltered and unsheltered homeless at 62-63%. The next most common health problem was mental illness (46%). Reported and perceived mental illness was more prevalent among the sheltered homeless (49%) compared to the unsheltered homeless (39%). However, the unsheltered homeless were more likely to have a medical condition.

[12] Perceived conditions account for a small share of total positive answers, mostly among unsheltered homeless.

Table 20 - Type of health conditions

Health condition (more than 1 possible)	Sheltered homeless		Unsheltered homeless		Total homeless	
	Number	Percent	Number	Percent	Number	Percent
Medical condition	341	41%	128	48%	469	42%
Physical disability	288	34%	87	33%	375	34%
Addiction	529	63%	165	62%	694	63%
Mental illness	409	49%	103	39%	512	46%
Total respondents	839	100%	265	100%	1,104	100%
Not stated	313		8		321	
Total	1,152		273		1,425	

Includes self identified and perceived

5.6 The unsheltered homeless

5.6.1 Where stayed last night

One of the screening questions asked the unsheltered homeless where the individual stayed the previous night. Of the 273 unsheltered respondents, the largest share (66%) reported staying outside including in cars, garages, public buildings, vehicles and other places that are not considered fit for human habitation. Almost one third of the unsheltered homeless (87 people) stayed temporarily at someone else's place (where they did not pay rent and had no security of tenure).

Table 21 - Where the unsheltered homeless stayed

Location	Number	Percent
Outside	180	66%
Someone else's place	87	32%
Other	6	2%
Total respondents	273	100%

5.6.2 Reasons for not staying in a shelter

Those who stayed outside were asked why they did not stay in a shelter. The most common reason stated was that they dislike shelters (42%). When asked to specify further, reasons for this included bedbugs, crime, overcrowded conditions, and the presence of drugs and alcohol. Thirteen percent said they were turned away from a shelter because it was full; an additional eight individuals (3%) noted that they did try to stay in a shelter, but were turned away because they were considered inappropriate for the shelter.[13] Sixteen percent said they were able to stay with a friend for the evening and did not need to stay in a shelter.

[13] An individual is considered 'inappropriate' for a shelter for example, if they are too young to stay in an adult shelter, or there were no beds available for their gender.

Table 22 - Why unsheltered homeless did not use a shelter

Reason (select only one)	Number	Percent
Dislike	109	42%
Bedbugs and other pests	18	7%
Noise	1	0%
Crime	10	4%
Drugs and alcohol are present	6	2%
Overcrowded	11	4%
Other dislike	35	13%
Turned away – full	33	13%
Able to stay with friends	42	16%
Turned away - inappropriate	8	3%
Didn’t know them	2	1%
Couldn't get to it	12	5%
Other reasons	56	21%
Total respondents	262	100%
No answer	11	
Total	273	

6 Profile of Heat and Winter Response shelter clients

Clients of two different groups of shelters operating in Vancouver at count time are profiled: low barrier shelters operated on a temporary basis beginning in the winter of 2008 called HEAT shelters and Winter Response shelters, and Other Shelters (composed of year-round and seasonal shelters).[14] [15] The unsheltered homeless are included for comparison.

On March 13, 2013, 381 people stayed overnight in HEAT and Winter Response shelters, but only 289 completed interviews providing demographic information, so the following tables are based on 289 clients (76% of all HEAT/Winter Response clients). There was a low response rate for Other Shelters on certain questions, including income and medical conditions, so these are excluded from some tables.

GLOSSARY

HEAT Shelters
Homeless Emergency Action Team shelters are temporary low barrier shelters in place until planned permanent supportive housing is opened.

Winter Response Shelters
Winter Response shelters are temporary low barrier winter shelters operating in the City of Vancouver from November to April each winter.

Year-round Shelters
Permanent shelters funded by BC Housing and others, open year-round. Offer 24/7 service, meals and other services including case management.

Seasonal Shelters
Formerly known as 'cold/wet weather' services, these beds and mats typically open from November through March. Support services are on a more limited basis than in year-round service.

Extreme Weather Response (EWR) Shelters
EWR shelters provide extra overnight shelter spaces during periods of extreme weather, often mats. They are dependent on volunteers and have limited support services.

[14] In some tables Other Shelter data is unavailable due to poor response rates.
[15] There were no EWR shelters operating on count night.

6.1 HEAT/Winter compared with Other Shelters and Unsheltered

Table 23 shows that HEAT and Winter Response shelter clients were more likely to be male (82%) than Other Shelter clients (68%). Other Shelters accommodated more homeless women (265) than HEAT/Winter shelters (51) or compared to the unsheltered population (45). Overall the gender distribution in HEAT/Winter shelters more closely resembled the unsheltered population.

Table 23 - Gender

	HEAT/Winter		Other Shelters		Unsheltered homeless	
Gender	Number	Percent	Number	Percent	Number	Percent
Men	236	82%	559	68%	222	82%
Women	51	18%	265	32%	45	17%
Transgender	0	0%	4	0%	3	1%
Total respondents	287	100%	828	100%	270	100%
Not known	2		35		3	
Total	289		863		273	

The age profile of the three populations is similar. About half were between 25 and 44 years and slightly fewer clients (proportionately) under 25 used the HEAT/Winter shelters (11%), while they accounted for 13% of the Other Shelter clients (excluding accompanied children) and 12% of unsheltered homeless. More older homeless persons (55 and over) stayed in the Other shelters (330 people) compared to Heat/Winter (54) although the proportions among their total clienteles are similar - approximately 20%.

Table 24 - Age

	HEAT/Winter		Other Shelters		Unsheltered homeless	
Age groups	Number	Percent	Number	Percent	Number	Percent
Under 19	3	1%	28	3%	5	2%
19-24	28	10%	84	10%	27	10%
25-34	70	25%	131	16%	55	21%
35-44	71	25%	210	25%	77	30%
45-54	58	20%	211	25%	55	21%
55-64	43	15%	119	14%	33	13%
65+	11	4%	49	6%	9	3%
Total respondents	284	100%	832	100%	261	100%
Not stated	5		31		12	
Total	289		863		273	

HEAT/Winter Response shelter clients were more likely to self identify as Aboriginal (34%) compared to Other Shelter clients (25%). However, more Aboriginal homeless persons stayed in Other Shelters on count night in absolute terms (168 compared to 96 in

HEAT/Winter shelters). The incidence of Aboriginal identity was highest among the unsheltered homeless (39%).

Table 25 - Aboriginal identity

	HEAT/Winter		Other Shelters		Unsheltered homeless	
Aboriginal identity	Number	Percent	Number	Percent	Number	Percent
Aboriginal	96	34%	168	25%	105	39%
Not Aboriginal	186	66%	516	75%	165	61%
Total respondents	282	100%	684	100%	270	100%
No answer	7		179		3	
Total	289		863		273	

6.2 HEAT/Winter compared with Unsheltered

Responses from Other Shelters are excluded from the next set of tables due to the low number of responses.

A distinct pattern is distinct with respect to length of time homeless. HEAT/Winter clients have been homeless for a shorter period of time than the Unsheltered homeless population. Only 12% of the Heat/Winter clients reported a length of time homeless 5 years or longer, compared over one quarter among the Unsheltered. Similarly, 8% of HEAT/winter clients had been homeless for under 1 month, compared to 5% among the unsheltered. The most frequent length of time homeless among the HEAT/winter clients was 3-6 months.

Table 26 - Length of time homeless

	HEAT/Winter		Unsheltered homeless	
Time Homeless	Number	Percentage	Number	Percent
Under 1 week	2	1%	6	2%
1 week to under 1 month	19	7%	9	3%
1 month to under 3 months	40	14%	32	12%
3 months to under 6 mos	72	25%	29	11%
6 mos to less than 1 yr	38	13%	29	11%
1 yr to less than 2 yrs	41	14%	37	14%
2 yrs to less than 5 yrs	41	14%	51	19%
5 years and longer	35	12%	71	27%
Total Responses	288	100%	264	100%
Not Stated	1		9	
Total	289		273	

The incidence of income assistance as a source of income was the same for both the HEAT/Winter and Unsheltered populations, however, a larger share of HEAT/Winter Shelter

clients reported disability benefit as an income source (26%) than the unsheltered population (18%). The only other difference was that the unsheltered homeless were more likely to report "other income sources" which include sex work, selling drugs, selling things, theft etc.

Table 27 - Sources of Income

Sources of income (more than 1 possible)	**HEAT/Winter**		**Unsheltered homeless**	
	Number	Percent	Number	Percent
Government transfers				
Income assistance or welfare	128	44%	112	43%
Disability benefit	76	26%	46	18%
Employment Insurance	6	2%	1	0%
OAS/GIS/CPP and other pensions	10	3%	14	5%
Other sources		0%		0%
No income	43	15%	38	15%
Employment	35	12%	20	8%
Other	28	10%	83	32%
Total Respondents	289	100%	262	100%
Not stated	0		11	
Total	289		273	

HEAT/Winter shelter clients and the Unsheltered homeless were equally likely to report having two or more health conditions. HEAT/Winter clients were more likely to report one health condition, and less likely to report no health conditions, suggesting they are in poorer health than the Unsheltered Homeless.

Table 28 - Incidence of health conditions

	HEAT/Winter		**Unsheltered homeless**	
Health condition	Number	Percent	Number	Percent
No health conditions	36	13%	50	19%
One health condition	77	27%	59	22%
Two or more conditions	173	60%	156	59%
Total respondents	286	100%	265	100%
Not stated	3		8	
Total	289		273	

There is no is discernable difference in the responses to type of health condition reported among the two populations, suggesting a very similar health profile, with the exception of physical disability, which appears to be disconcertingly high among the unsheltered homeless (60%) compared to the HEAT/Winter clients (39%).

Table 29 - Type of health conditions[16]

Health condition	HEAT/Winter		Unsheltered homeless	
(more than 1 possible)	Number	Percent	Number	Percent
Medical condition	144	50%	128	48%
Physical disability	111	39%	87	33%
Addiction	200	70%	165	62%
Mental illness	118	41%	103	39%
Total respondents	286	100%	265	100%
Not stated	3		8	
Total	289		273	

In summary, compared with Other Shelter clients, individuals counted in the HEAT/Winter Response shelters were more likely to:

- Be male
- Of Aboriginal identity

Their age structure is similar to the Other Shelter clients (and the unsheltered homeless).

Compared to the Unsheltered homeless, HEAT/Winter clients:

- had been homeless for a shorter period of time than the unsheltered homeless, and
- had similar patterns of health conditions and income sources.

[16] Health conditions include self-reported and perceived figures.

The Hotel Study: Multimorbidity in a Community Sample Living in Marginal Housing

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Objective: The health of people living in marginal housing is not well characterized, particularly from the perspective of multimorbid illness. The authors investigated this population in a community sample.

Method: A prospective community sample (N=293) of adults living in single-room occupancy hotels was followed for a median of 23.7 months. Assessment included psychiatric and neurological evaluation, multimodal MRI, and viral testing.

Results: Previous homelessness was described in 66.6% of participants. Fifteen deaths occurred during 552 person-years of follow-up. The standardized mortality ratio was 4.83 (95% CI=2.91–8.01). Substance dependence was ubiquitous (95.2%), with 61.7% injection drug use. Psychosis was the most common mental illness (47.4%). A neurological disorder was present in 45.8% of participants, with definite MRI findings in 28.0%. HIV serology was positive in 18.4% of participants, and hepatitis C virus serology in 70.3%. The median number of multimorbid illnesses (from a list of 12) was three. Burden of multimorbidity was significantly correlated with lower role functioning score. Comorbid addiction or physical illness significantly decreased the likelihood of treatment for psychosis but not the likelihood of treatment for opioid dependence or HIV disease. Participants who died during follow-up appeared to have profiles of multimorbidity similar to those of the overall sample.

Conclusions: This marginally housed cohort had greater than expected mortality and high levels of multimorbidity with adverse associations with role function and likelihood of treatment for psychosis. These findings may guide the development of effective health care delivery in the setting of marginal housing.

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Enclaves of marginal or substandard urban housing with low-income tenants are associated with substance dependence, mental illness, and infectious diseases (1, 2). This is the case in both resource-rich and resource-limited settings (2). In the Downtown Eastside neighborhood of Vancouver, British Columbia, single-room occupancy hotels have low barriers to tenancy and are often the only alternative to homelessness. In response to an epidemic of overdose deaths in this neighborhood, a supervised injecting facility was established (3). Specific initiatives were also deployed to facilitate access to highly active antiretroviral therapy (4). These initiatives limited overdose deaths (3) and decreased HIV-/AIDS-related morbidity and mortality as well as new HIV diagnoses (4). However, knowledge concerning the general health of people living in marginal housing is poor (5). Street homelessness, or living in shelters, is associated with high mortality and is linked to psychiatric disorders, including substance abuse (6, 7). Living in marginal housing may be associated with mortality similar to that associated with homelessness (8).

Increasing emphasis is being placed on the role of multimorbidity in determining health outcomes (9). In aging populations, physical illness may predispose to psychiatric disorders (10). For the relatively younger residents of single-room occupancy hotels, physical illness may be a consequence of substance dependence and mental illness (11). The implications of injected opioid dependence for infectious disease are relatively well defined (12). Less is known about risks related to stimulant drugs, particularly crack cocaine and methamphetamine, which are often used nonparenterally (13–15). Neurological disorders in the homeless include traumatic brain injury (TBI) (16) and cognitive impairment (17). The prevalence of other neurological disorders, such as seizures, movement disorders, and stroke, is unknown. The relationships between neurological illness, substance dependence, and mental illness are unclear, as are the implications for psychosocial function and the ability to access medical care. This information is important to inform efforts to control HIV and hepatitis C virus (HCV) through the implementation of "seek, test, treat, and

retain" strategies (18, 19). To begin to establish an evidence base addressing these issues, we initiated a longitudinal cohort study of multimorbidity in residents of single-room occupancy hotels. We report the baseline findings and mortality for the initial 2-year phase of follow-up.

Method

Study Enrollment and Design

The study was carried out in Vancouver, British Columbia, with staggered recruitment from single-room occupancy hotels located in a low-income neighborhood and managed by a not-for-profit housing agency. In Canada, below-standard housing is defined as falling short in at least one of the following criteria: adequacy (not in need of repairs, according to residents), affordability (costs <30% of before-tax household income), or suitability (makeup of bedrooms and household). In many single-room occupancy hotels, the need for repairs is obvious even from casual observation. Rents generally range from 40% to 65% of the income provided by social service benefits. The single-room occupancy hotels typically comprise single rooms of 80 to 120 square feet (8–12 m^2), with a sink and possibly a hotplate. Toilet and shower facilities, located at the end of hallways, are shared by 10 to 15 tenants. All single-room occupancy hotels housing study participants were over 75 years old and had evidence of bedbug, cockroach, and mouse infestation.

Following the baseline assessment (see Table 1 for instruments used [20–41]), the study design included monthly follow-up for up to 5 years. Inclusion criteria were living in one of four single-room occupancy hotels and ability to communicate in English. Inability to provide informed consent was the sole exclusion criterion. Informed consent was obtained to communicate clinically significant findings to the participants' physicians. Medical care was provided free of charge through the Canadian health system. Participants received a modest honorarium. The protocol was approved by the ethics board of the University of British Columbia.

Assessment of Mortality

Mortality is the only outcome reported from follow-up. For participants who died, hospital records were obtained from the year before death; health care providers were interviewed; and coroner's reports were requested.

Assessment of Substance Dependence

A lifetime review of substance exposure was obtained, and drug-dependence-related sections of the Mini-International Neuropsychiatric Interview were completed. A description, on a week-by-week basis, of all alcohol and prescription, licit, and illicit drugs used over the previous 4 weeks was recorded, as well as scores for the Maudsley Addiction Profile for the same period. A urine drug screen also was obtained.

Assessment and Diagnosis of Mental Illness

Records of hospitalization for mental illness were obtained, dating as far back as 50 years. The Mini-International Neuropsychiatric Interview was administered, and it was supplemented by a clinical interview and mental status examination carried out by a psychiatrist. All available clinical information (see Table 1) was used to make psychiatric and substance dependence diagnoses using procedures from the Best Estimate Clinical Evaluation and Diagnosis form (30), as previously used for genetic studies (42) and adapted in this study to DSM-IV criteria rather than DSM-III-R criteria. Previous reports of these diagnostic procedures indicated between-rater reliabilities of 0.53 to 0.91 for major mental disorders (43). The two diagnosticians in this study (F.V.R. and W.G.H.) used this diagnostic process independently for 98 participants. For the major mental illness categories reported, the kappa values were 0.77 for psychosis, 0.60 for mood disorders, and 0.61 for anxiety disorders. For substance dependence, the kappa values were 0.81 for alcohol, 0.74 for methamphetamine, 0.71 for cocaine, and 0.73 for opioids. Level of psychosocial functioning was rated using the Role Functioning Scale (40) and the Social and Occupational Functioning Assessment Scale in DSM-IV (41).

Assessment and Diagnosis of Physical Illness

Medical history was reviewed with a structured interview. Inquiry into neurological symptoms included history of seizures (most recent and treatment) and TBI, including duration of loss of consciousness, confusion or memory loss, dizziness, headache or blurred vision, and need for hospitalization. A screening neurological examination was carried out by a psychiatrist or a neurologist, and ratings were completed. Cognitive disorders were diagnosed on the basis of clinical findings from the history, the neurological examination, and neuropsychological testing, according to DSM-IV criteria.

An MRI scan was obtained using a Philips 3.0-T Achieva scanner (Philips Healthcare, Amsterdam). Sequences included a full-brain three-dimensional spoiled gradient echo, fluid attenuated inversion recovery, three-dimensional venous blood-oxygen-level-dependent imaging, and MR angiography. All MRI scans were reviewed by a neuroradiologist, and findings were reported according to standardized definitions (44).

Blood samples drawn for testing at the British Columbia Centre for Disease Control included serology for HIV, hepatitis B virus (HBV), and HCV, as well as qualitative polymerase chain reaction for HCV. A CBC and differential with platelet count was conducted, and AST and ALT levels were determined.

Statistical Analysis

The standardized mortality ratio was calculated (by H.W.). This was the ratio of the observed number of deaths to the number of deaths expected if the study cohort experienced the age- and sex-specific death rates seen in the 2009 Canadian general population. The Boice-Monson method was used to calculate the 95% confidence interval.

The likelihood-ratio chi-square test was used to compare the prevalence of seizures and of cognitive impairment in those with and without a history of TBI (this and subsequent analyses were conducted by W.G.H.). A similar approach was used to compare risk behavior in the past 30 days between participants who were infectious (with HIV, HCV, or HBV) and those who were not.

To examine the consequences of multimorbidity for psychosocial function, we selected 12 illnesses (psychosis; alcohol, stimulant, or opioid dependence; movement disorder; TBI; seizures; cognitive impairment; brain infarction; and active HIV, HCV, or HBV infection). Each participant was assigned a multimorbidity score representing the sum of illnesses present, with a range of 0–12. If an illness, such as stroke, was not assessed because of contraindications for MRI or serology for an illness was missing, that illness was scored as absent. Spearman correlation was performed between the multimorbidity score and the total score for the Role Functioning Scale, as well as the score for the Social and Occupational Functioning Assessment Scale.

To investigate the possible effects of multimorbidity on likelihood of treatment, we examined treatment history regarding psychosis (antipsychotic drug treatment prescribed), opioid dependence (methadone prescribed), and HIV (highly active antiretroviral therapy prescribed). In the group of participants with psychosis, we used the likelihood-ratio chi-square statistic to

TABLE 1. Baseline Assessment Measures for Tenants Living in Single-Room Occupancy Hotels

Variable and Assessment Measure
Sociodemographic data
Standard interview incorporates questions from the Canadian Community Health Survey (20). (Administered by a research assistant.)
Substance use
Initial interview records lifetime history of use, age of first exposure, and periods of heavy use for alcohol and illicit drugs. (Administered by a research assistant.)
Fagerström Test for Nicotine Dependence (21). (Administered by a research assistant.)
Maudsley Addiction Profile (22): assesses drug use, related mental and physical symptoms, and risk behaviors for the past 30 days. Includes a rating of frequency of thoughts of ending life, scored on a scale of 0 to 4, with 2 representing "sometimes." (Administered by a research assistant.)
Time-Line Follow-Back (23): records alcohol and drug use (prescribed and illicit, types, amounts, and pattern) over the previous 4 weeks, as well as money spent on alcohol and illicit drugs. (Administered by a research assistant.)
Urine drug screen: detects amphetamines, methamphetamine, barbiturates, benzodiazepines, cocaine (crack), marijuana, methadone, 3,4-methylenedioxymethamphetamine (Ecstasy), opiates, and tricyclic antidepressants. (Administered by a research assistant.)
Mental illness
Mini-International Neuropsychiatric Interview (24, 25): a semistructured clinical interview used to collect information allowing a diagnosis of DSM-IV axis I disorders, validated in substance-using and general medical samples. (Administered by a research assistant.)
International Personality Disorder Examination, Screener (26): a screening instrument for DSM-IV personality disorders. (Administered by a research assistant.)
Positive and Negative Syndrome Scale (27): a 30-item scale rated after an interview and mental status examination by a psychiatrist, used to assess the severity of a range of symptoms of psychosis and general mental health. (Administered by a psychiatrist.)
Beck Depression Inventory (28): a self-report measure of depression, including an assessment of suicidal ideation, scored on a scale of 0 to 3, with 1 representing thoughts of killing self, without intent. (Administered by a research assistant.)
Trauma History Questionnaire (29): measures exposure to traumatic life events and records frequency and age of exposure. (Administered by a research assistant.)
Best Estimate Clinical Evaluation and Diagnosis (30): information obtained from all assessments and from hospital records is used to make DSM-IV diagnoses of substance dependence and mental illness. (Psychiatrist assessment.)
Cognitive functioning
Wechsler Test of Adult Reading (31): provides an index of premorbid intellectual ability. (Administered by a research assistant/neuropsychologist interpretation.)
Stroop color and word test (32): measures the ability of the individual to separate word and color naming stimuli; this requires sustained attention and inhibition of a dominant response set. (Administered by a research assistant/neuropsychologist interpretation.)
Intradimensional-extradimensional shift task from the Cambridge Neuropsychological Automated Test Battery (33): evaluates attentional shifting to attributes of a complex stimulus array. (Administered by a research assistant/neuropsychologist interpretation.)
Rapid Visual Information Processing Task from the Cambridge Neuropsychological Automated Test Battery (34): a test that requires monitoring and responding to specific digit sequences and inhibiting responses to distracters. (Administered by a research assistant/neuropsychologist interpretation.)
Hopkins Verbal Learning Test, Revised (35): a brief assessment of memory, which includes many of the elements also found in detailed tests, such as the California Verbal Learning Test. (Administered by a research assistant/neuropsychologist interpretation.)
Iowa gambling task (36): assesses decision making in response to differential incentive conditions, sensitive to orbitofrontal functioning, and used to evaluate decision making. (Administered by a research assistant/neuropsychologist interpretation.)
Neurological illness
Traumatic brain injury: inquiry into serious head or facial injury, the event causing the injury, the extent of the injury, duration of loss of consciousness, need for hospitalization, duration of symptoms of dizziness, blurred vision, and confusion or memory loss. (Administered by a research assistant/neuropsychologist interpretation.)
Extrapyramidal Symptom Rating Scale (37): rated after a movement disorders examination. (Administered by a psychiatrist or neurologist.)
Barnes Akathisia Rating Scale (38): rated after a movement disorders examination. (Administered by a psychiatrist or neurologist.)
Cambridge Neurological Inventory (39): a focused neurological examination for motor coordination and sensory integration soft signs, including anomia. (Administered by a psychiatrist or neurologist.)
Medical illness
Serology for HIV, hepatitis B virus, and hepatitis C virus, qualitative polymerase chain reaction for hepatitis C virus; blood samples were drawn for testing at the British Columbia Centre for Disease Control.
CBC and differential, platelet count, AST, ALT.
Psychosocial functioning
Role Functioning Scale (40): a rating of daily functioning in four domains (work productivity, independent living, and immediate and extended social network relationships; each rated on a scale of 1 to 7). Higher scores represent better function. (Administered by a research assistant.)
Social and Occupational Functioning Assessment Scale (41): rated on a scale of 0 to 100, with higher scores representing better functioning. (Administered by a research assistant.)

compare the use of antipsychotic drugs among participants with psychosis only with the use among participants with psychosis and comorbid opioid dependence or HIV. Similar comparisons were performed in the opioid-dependent group, using methadone treatment as the outcome, and in the HIV-infected group, using highly active antiretroviral therapy as the outcome.

TABLE 2. Demographic Characteristics of Tenants Living in Single-Room Occupancy Hotels

Characteristic	N	Median	Interquartile Range
Age (years)	293	44.1	37.1–50.9
Monthly income (Canadian dollars)	286	870	610–1,100
Months in current hotel at baseline	292	16	2–52
Months since last homeless	195	38	8–93
	Total N	N	%
Female	293	68	23.2
Current marital status			
Married or common-law	293	50	17.1
Separated or divorced	293	67	22.9
Single	293	176	60.1
Ethnicity			
White	293	172	58.7
Black	293	7	2.4
Asian	293	8	2.7
Aboriginal	293	83	28.3
Mixed/other	293	23	7.8
Education			
Did not complete high school	293	168	57.3
Completed high school	293	113	38.6
Completed a college or university program	293	12	4.1
Earned income in addition to benefits	291	23	7.6
Homeless in the past	293	195	66.6
Jailed in the past	293	71	24.2

Results

Participants

Participants were enrolled in a staggered fashion between November 13, 2008, and July 31, 2011. On a hotel-by-hotel basis, all tenants were approached to participate, and 293/406 (72.2%) agreed and met inclusion criteria. Table 2 summarizes participants' demographic characteristics. At enrollment, most participants had lived in their current single-room occupancy hotel for over a year. Two-thirds had a history of homelessness. By the end of the period of observation, 150/292 (51.4%) participants were living in the same hotels as at enrollment. Most others were living nearby in different hotels, and only 15/292 (5.1%) had become homeless.

Mortality

As a consequence of the staggered enrollment to allow completion of baseline assessments, participants had a variable period of follow-up or months at risk, ending January 31, 2012 (minimum for all participants, 6 months; 31/293 (11%) were lost to follow-up before the sixth monthly assessment). The median period of risk was 23.7 months, taken into account as part of the calculation of standardized mortality ratio. During 552 person-years of observation, 15/293 (5.1%) participants died. Coroner's reports were obtained for the seven who died outside hospital settings. No deaths were attributed to suicide, 10 were a consequence of physical illness, and five were drug overdose-related (see Table S1 in the data supplement that accompanies the online edition of this article). The standardized mortality ratio was 4.83 (95% confidence interval=2.91–8.01) compared with age- and sex-matched Canadian population data.

Substance Dependence and Mental Illness

Substance dependence affected nearly all participants (Table 3). In the previous year, 179/290 (61.7%) participants had injected drugs, and 241/292 (82.5%) participants reported ever having injected. Mental illness affected the majority of participants, most commonly psychosis. Current suicidal ideation (defined as a score ≥1 on the suicidal ideation item of the Beck Depression Inventory [1=thoughts of suicide but would not carry it out] *and* a score ≥2 on the suicidal ideation item of the Maudsley Addiction Profile [2=thoughts of ending life sometimes]) was present in 28/288 (9.7%) participants. Only a minority (30/293 [10.2%]) had a history of long-term psychiatric hospitalization, with a greater number reporting hospitalization for mental illness in a general hospital (105/293 [35.8%]). Similar proportions suffered from schizophrenia or other chronic form of psychosis or from substance-induced psychosis (see Table S2 in the online data supplement).

Neurological Illness and Viral Exposure

Movement disorders were the most common neurological finding and were often associated with exposure to stimulant or antipsychotic drugs or both (Table 3; see also Table S3 in the data supplement). Of those with

TABLE 3. Prevalence of Multimorbid Illness Among Single-Room Occupancy Hotel Tenants

Clinical Characteristic	Total N	Baseline		Lifetime	
		N	%	N	%
Substance dependence, any (nicotine excluded)[a]	293	279	95.2	287	98.0
Stimulant use (cocaine and/or methamphetamine)	293	240	81.9	257	87.7
Opioid use (heroin or other)	293	115	39.2	179	61.9
Alcohol dependence	293	56	19.1	140	47.8
Tobacco use (daily)	289	240	83.0	260	90.0
Mental illness, any[b]	293	218	74.4	250	85.3
Psychotic illness, any	293	139	47.4	172	58.7
Mood disorder, any	293	87	29.7	155	52.9
Anxiety disorder, any	293	70	23.5	92	31.4
Neurological illness (active and/or current treatment)[c]	273	125	45.8		
Movement disorder[d]	269	52	19.3		
Brain infarction on MRI, any	232	26	11.2		
Aneurysm on MR angiography	232	20	8.6		
Traumatic brain injury (definite)[e]	293	31	10.6		
Seizures in past year and/or current treatment	292	26	8.9		
Clinical cognitive impairment (according to DSM-IV criteria)	293	19	6.5		
Other neurological illness[f]	293	4	1.4		
Other MRI findings[g]	232	7	3.0		
Infection					
Anti-HIV positive	283	52	18.4		
Anti-hepatitis C virus positive	283	199	70.3		
Hepatitis C viremia (hepatitis C virus seropositive only)	190	145	76.3		
AST:platelet ratio index (hepatitis C virus seropositive only)[h]					
0–0.7	191	139	72.8		
>0.7	191	52	27.2		
>2	191	11	5.8		
Hepatitis B virus surface antigen positive	283	3	1.1		

[a] Additional details on the prevalence of individual substance dependence are presented in Table S2 in the online data supplement.
[b] Additional details on the prevalence of individual mental illnesses are presented in Table S2 in the data supplement.
[c] Additional details on the prevalence of individual neurological disorders are presented in Table S3 in the data supplement.
[d] Data indicate parkinsonism, dyskinesia, or akathisia symptoms representing a score of moderate or greater on the Extrapyramidal Symptom Rating Scale or the Barnes Akathisia Rating Scale.
[e] Data are for participants with evidence of previous traumatic brain injury (TBI) on MRI (N=19) or history of TBI (loss of consciousness ≥5 minutes or confusion ≥1 day) and persistent symptoms referable to TBI, including seizures or organic personality disorder (N=12).
[f] Data are for participants with myotonic dystrophy (N=1), multiple sclerosis (N=1), narcolepsy (N=1), or AIDS white-matter encephalopathy (N=1).
[g] Data are for participants with Chiari type 2 malformation (N=2), heterotopic gray matter (N=2), demyelination, (N=1), skull-base lesion (N=1), or AIDS white-matter encephalopathy (N=1).
[h] The ratio was calculated using the local laboratory upper limit of normal, which equaled 35; analysis was limited to those with anti-hepatitis C virus positive serology because the predictive value of the index is best evaluated in this population; values >0.7 are associated with hepatic fibrosis and those >2 with hepatic cirrhosis.

a movement disorder, the frequencies of the most common syndromes were as follows: parkinsonism, N=11/52 (21.2%); dyskinesia, N=23/52 (44.2%); and akathisia, N=34/52 (65.4%).

Pathological findings on MRI were found in 65/232 (28.0%) participants; brain infarction was the most common finding. The prevalence rate was 13/143 (9.1%) for those 30–49 years old, 11/57 (19.3%) for those 50–59 years old, and 2/11 (18.2%) for those 60–67 years old. For those with brain infarction, rates of seizures, movement disorder, or clinically significant cognitive impairment did not differ significantly from those of participants with no brain infarction. Of the 20 aneurysms detected on MR angiography, all were 7 mm or less in size, and one each was located in the anterior or posterior communicating artery. A participant who died from a subarachnoid hemorrhage did not have an aneurysm detected on the earlier MRI.

A history of serious head or facial injury was endorsed by 186/292 (63.7%) participants; more narrowly defined TBI was less frequent (Table 3). Examples of MRI findings related to TBI are presented in Figure S1 in the online data supplement. Seizures were more common in those with definite TBI (N=15/31 [48.4%]) than in those without (N=11/262 [4.2%] $p<0.001$). Similarly, clinical diagnoses of cognitive impairment were more frequent among participants with definite TBI (N=10/31 [32.3%]) compared with those without (N=9/262 [3.4%] $p<0.001$).

Positive serology for HCV and for HIV was common. Nine new cases of HCV, two new carriers of HBV, and one

new case of HIV were detected at study entry. The AST: platelet ratio index was above a threshold of 2.0, suggestive of hepatic cirrhosis, in 5.8% of participants (Table 3; see also Table S4 in the data supplement). Only 10 participants reported previous interferon-based treatment for HCV. In contrast, nearly all those with positive HIV serology had received antiretroviral therapy, with 42/47 (89.4%) of those with available data having virologic suppression in the past (see Table S5 in the data supplement). Behaviors known to increase the risk of viral transmission, including penetrative sex without a condom, injection drug use, needle sharing, and crack pipe sharing, were reported by 207/270 (76.7%) members of the cohort (see Table S5 in the data supplement). Injection drug use was more prevalent in those at risk of spreading HCV, HIV, or HBV than those not at risk ($p<0.001$). Of those who had injected in the previous month, 109/146 (74.7%) reported using the supervised injecting facility.

Multimorbidity

Of the 12 illnesses evaluated in greater detail, the median multimorbidity score (the sum of illnesses present) was 3 (Figure 1), with an interquartile range of 2–4. The median multimorbidity burden was 3 for both male and female participants and was not correlated with age (Spearman $r_a=0.06$). Greater multimorbidity was correlated with lower scores on the Role Functioning Scale ($r_a=-0.21$, $p<0.001$; N=289) and the Social and Occupational Functioning Assessment Scale ($r_a=-0.20$, $p<0.001$; N=290). This finding was similar when the sample was limited to those with complete data for all 12 multimorbidity assessments, including MRI and serology (Role Functioning Scale: $r_a=-0.22$, $p=0.001$; Social and Occupational Functioning Assessment Scale: $r_a=-0.23$, $p<0.001$; N=215).

The prevalence of treatment of three illnesses—psychosis (32.6%), opioid dependence (49.6%), and AIDS (61.5%)—was suboptimal (Table 4). Participants with psychosis with multimorbidity (opioid dependence and/or HIV/AIDS) were less than half as likely to have their psychosis treated than those with psychosis alone ($p=0.003$). In contrast, the presence of multimorbidity did not influence the likelihood of treatment for opioid addiction or HIV/AIDS.

At baseline, participants who subsequently died had a greater multimorbidity score (median=4) than those who were alive at follow-up (median=3); however, this difference was not statistically significant.

Discussion

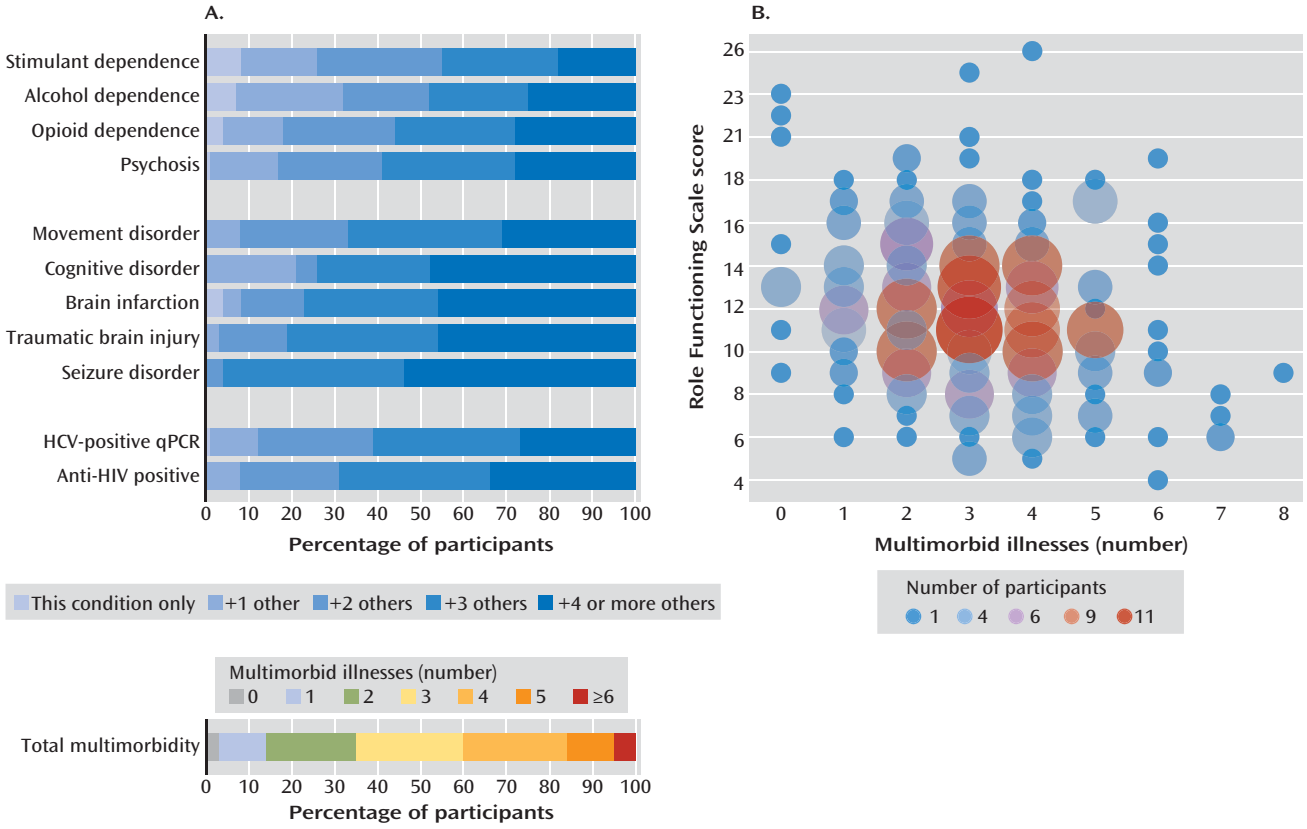
In our sample, participants with a high prevalence of previous homelessness and considerable social disadvantage living in marginal housing had a high level of mortality. Substance dependence, mental and neurological illnesses, and infectious diseases were common. Drug dependence played a direct role in one-third of deaths; most others represented complex multimorbidity. Greater multimorbidity was associated with poorer psychosocial functioning. The high level of directly observed mortality among persons living in single-room occupancy hotels is consistent with findings from analyses of administrative data sets comprised of persons living in similar circumstances in Canada (8) and is similar to data reported for those living in literal homelessness in the United States and Scandinavia (6, 7, 45).

In the community setting of our sample, there are approximately 7,100 single-room occupancy hotel rooms, and there are an estimated 1,600 homeless persons living on the street or in shelters (46). A recent study of street and shelter homelessness in Vancouver found an ethnic and educational background similar to that in our sample, with a slightly younger mean age (38.0 years compared with 44.1 years) and a larger proportion of women (37.2% compared with 23.3%) (47). Two-thirds of our sample had a history of homelessness. We cautiously suggest that many of the present findings may be relevant to the Vancouver homeless population and perhaps other homeless populations. However, obtaining the comprehensive evaluations reported, including detailed review of medical and psychiatric records, neurological examination, MRI, and neuropsychological testing, as well as serology and liver function testing to allow diagnosis of multimorbidity, makes replication of our study challenging.

Substance dependence was nearly universal. Dependence on cocaine or methamphetamine has long been associated with psychotic symptoms (48, 49). The estimated prevalence of psychosis in our sample (47.4%) was higher than the estimated prevalence in a meta-analysis of studies of the homeless (12.7%) (11). However, our estimate of the prevalence of schizophrenia and schizoaffective disorder was 12.6%, consistent with the meta-analysis and with a recent study using the Mini-International Neuropsychiatric Interview for diagnosis in a sample of homeless persons in three cities in our province (47). The findings from urine drug screens were consistent with the high prevalence of substance-induced psychosis in our sample, contributing to the high overall prevalence of psychosis. Although the prevalence of schizophrenia and related psychotic illness was still high in absolute terms, only a minority of those with psychosis represented mentally ill patients who had previously been cared for in an asylum or similar institutional setting.

Neurological illness was also common. The high frequency of movement disorders is likely related to stimulant drug use as well as exposure to antipsychotic drugs (50, 51). However, most participants with stimulant dependence in our study did not have movement disorders. The prevalence of brain infarctions that we observed appears to be similar to reported rates for healthy persons ages 30–49 (9.1% in the present study compared with 4%–9% in other reports) but higher for those ages 50–59 (19.3%

FIGURE 1. Multimorbidity in Tenants Living in Single-Room Occupancy Hotels[a]



[a] Panel A shows the distribution of total multimorbid illnesses (0–12) in the cohort. The lower part of the panel shows the percentage of participants with increasing multimorbidity for each of the 12 conditions assessed. Since only three participants had persistent HBV infection, there is no bar to represent this group. Two of these participants scored +3, and one scored +4. Panel B shows the relationship between multimorbidity (0–12), scores on the Role Functioning Scale, and the number of participants at each intersection of multimorbidity number and level of function. The Role Functioning Scale comprises four items (work productivity, independent living [self-care], immediate social network relationships, and extended social network relationships); each item is scored on a scale of 1 to 7, with higher scores indicating better functioning. HCV=hepatitis C virus; qPCR=quantitative polymerase chain reaction.

compared with <9%) and 60–69 (18.2% compared with <12%) (44, 52). The high prevalence of crack cocaine use in our cohort may have contributed to risk for brain infarction (53, 54). Those with MRI evidence of infarction did not have elevated rates of seizures, movement disorders, or clinically obvious cognitive impairment. The relatively high rate of aneurysms may be related to stimulant dependence (55, 56). Most aneurysms were not in a size range or location associated with risk of rupture (57); however, ongoing use of stimulants could modify the predictive value of anatomical risk factors. The broadest definition of TBI yielded a high prevalence, similar to that reported for people living in homeless shelters (16). More narrowly defined TBI was more likely to be associated with ongoing symptoms, such as seizures or cognitive impairment, in contrast to brain infarctions that appeared relatively silent.

The very high rates of HIV and HCV in our cohort were similar to those reported in a previous study of people living in the same neighborhood (58). The high rate of previous successful treatment for HIV/AIDS confirms that with appropriately deployed strategies, patients with HIV/AIDS are amenable to therapeutic intervention (4). However, the rates of ongoing treatment were disappointing, although not as low as those for treatment of opioid dependence and psychosis. Infection with HCV was least likely to be treated (58), even in the presence of relatively high rates of participants with elevated biomarkers suggesting fibrosis or cirrhosis. This finding is consistent with findings from other reports indicating that social disadvantage, poor health literacy, and disengagement from the health care system are risk factors for low likelihood of treatment of HCV (19). Of additional concern, behaviors increasing the risk of spreading infection were common. As oral drug treatments for HCV become available, a greater emphasis should be placed on the challenges of delivering this care in a population with multimorbid illness (19). In particular, the high prevalence of stimulant use, the absence of substitution treatment analogous to methadone, and the potential difficulties accessing care in the face of ongoing psychosis and other mental illness will require the development of

TABLE 4. Treatment of Opioid Addiction, Psychosis, or HIV/AIDS Among Single-Room Occupancy Hotel Tenants

Treatment Provided	N	%
Antipsychotic medication		
Of total number with psychosis (N=135)	44	32.6
Without opioid dependence or HIV/AIDS multimorbidity (N=64)	29	45.3
With opioid dependence or HIV/AIDS multimorbidity (N=71)	15	21.1[a]
Methadone		
Of total number with opioid dependence (N=113)	56	49.6
Without psychosis or HIV/AIDS multimorbidity (N=52)	24	46.0
With psychosis or HIV/AIDS multimorbidity (N=61)	32	52.5
Antiretroviral medication		
Of total number with HIV/AIDS treatment indicated (N=52)	32	61.5
Without opioid dependence or psychosis multimorbidity (N=16)	9	56.3
With opioid dependence or psychosis multimorbidity (N=36)	23	63.9

[a] Significant difference from participants without multimorbidity, p=0.003.

comprehensive strategies, perhaps modified from those proposed for opioid addiction and HIV infection (59).

Multimorbidity was highly prevalent, with co-occurring substance dependence, mental and neurological illnesses, and infectious diseases. Multimorbidity is reported to increase in association with greater socioeconomic deprivation (10). Even within the narrowed range of severe social deprivation in our cohort of persons living in single-room occupancy hotels, greater multimorbidity was associated with poorer psychosocial function. Multimorbidity was also associated with a lower likelihood of treatment of psychosis but not opioid dependence or HIV. Internationally, in the overall population, more severe mental illnesses, such as bipolar disorder, are more likely to be treated than less severe illnesses (60). This relationship may break down in the face of multimorbidity between mental illness, substance dependence, and physical illness.

The opportunity to investigate a reasonably large cohort of persons living with social disadvantage in single-room occupancy hotels was the unique feature of our study. Other investigators have described the challenges of gaining access to single-room occupancy hotels and other types of marginal housing, resulting in a paucity of information on the health status of tenants (5). While we cannot be certain that our observations generalize to other settings, many clinicians in urban practice are familiar with smaller numbers of individuals in public clinics with similar multimorbidity. Local assessment of specific health needs in marginally housed populations may be as important as locally based assessment in the homeless (11). Although we attempted to be thorough and detailed with our assessment and analysis strategy, undoubtedly other illnesses were missed, and the psychiatric diagnoses could change over time. Our sample of women was likely too small to permit informative sex-based analyses. Finally, our assessment of mortality had at least two limitations. Although only 11% of participants could not be followed up for at least 6 months, we were unable to systematically search death records or coroner's reports to determine whether these individuals had died. If some of those lost to follow-up had died, our standardized mortality rate might be too conservative. Second, although none of the outside-of-hospital deaths in our sample were attributed to suicide, this cause of death may be underestimated. Four of the seven participants who died outside hospital settings were seen at least 1 month before death, and none expressed suicidal ideation according to the previously described criteria. However, since five of these seven deaths were attributed to overdoses, excluding suicide as a cause is difficult.

In conclusion, mortality was high in this cohort of persons living in marginal housing. Multimorbidity was common, and provision of treatment was inadequate. Collaborative care strategies may have a role in improving the health of persons living in these circumstances and needs to be investigated (61, 62).

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Table ST1. Demographic and Clinical characteristics of Participants Who Died

Age	Sex	Concurrent or contributing illnesses	Cause of death[a]
55	M	COPD, hypertension, hyperlipidemia	Accidental drug overdose - cocaine
50	M	None	Accidental mixed drug intoxication - cocaine, morphine, methadone, methamphetamine
44	M	Chronic alcohol consumption, respiratory failure, substance intoxication, chronic pancreatitis, HCV, seizure disorder, severe steatohepatitis, acute bronchopneumonia	Acute subdural hematoma due to blunt force head injury
59	M	Respiratory failure, septic shock, acute kidney injury, DIC, COPD, hepatic dysfunction	Pneumonia
43	M	Subarachnoid hemorrhage, cardiac arrest, HIV, chronic renal failure, chronic microcytic anemia, thrombocytopenia, remote AIDS dementia	Subarachnoid hemorrhage
41	M	Recurring bronchopneumonia, recurrent infective endocarditis, remote tricuspid valve replacement, HCV, polysubstance abuse, chronic renal failure, adrenal insufficiency, severe peripheral vascular disease, dilated cardiomyopathy	Accidental mixed intoxication with cocaine and opioids
52	M	Corneal ulcer, harmful use of alcohol	Natural disease process - pneumonia
57	M	Uremic encephalopathy, AIDS, bilateral renal cell cancer, chronic renal failure	Uremia
64	M	COPD, alcohol dependence, DVT/PE	Metastatic non-small cell lung cancer
59	F	MSSA bacteremia, mitral valve endocarditis, atrial fibrillation, multiple embolic strokes, polyneuropathy, myelopathy, chronic renal disease secondary to sepsis, respiratory failure requiring tracheostomy	Multiple organ failure
55	M	None	Acute myelogenous leukemia
47	F	HCV, MRSA infection, bipolar disorder	Accidental mixed drug intoxication - cocaine and methadone

Table ST1. Demographic and Clinical characteristics of Participants Who Died

Age	Sex	Concurrent or contributing illnesses	Cause of death[a]
59	M	HIV, HCV	Natural disease process - sepsis as a consequence of streptococcal pneumonia and bleeding duodenal ulcer
39	M	Cryptococcal septicemia, HCV, cirrhosis, hepatic failure, bleeding esophageal varices, MRSA positive	Respiratory failure
30	F	HCV, psychosis NOS, polysubstance abuse	Mixed drug toxicity - morphine, cocaine, methamphetamine

[a] Hospital records were available from the year prior to death for 12/15 cases. Coroner's reports were obtained for 8 cases, including all who died outside of hospital.

Table ST2. Substance Dependence and Mental Illness in Participants Living in Single Room Occupancy Hotels.

Clinical Characteristic	At baseline (N=293)		Lifetime (N=293)	
	N	%	N	%
Substance dependence				
Cocaine	204	69.6	234	79/9
Methamphetamine	66	22.5	92	31.4
Heroin	100	34.2	171	58.4
Other opioid	757	19.5	152	51.9
Cannabis	92	31.4	123	42.0
Mental illness				
Substance-induced psychosis	50	17.1	78	26.6
Schizophrenia	21	7.1	21	7.1
Schizoaffective disorder	16	5.5	16	5.5
Bipolar with psychosis	9	3.1	12	4.1
Major depression with psychosis	2	0.7	9	3.1
Delusional disorder	1	0.3	2	0.7
Psychosis Not Otherwise Specified	38	13.0	42	14.3
Psychosis due to a general medical condition[a]	2	0.7	3	1.0
Substance-induced mood disorder	16	5.5	36	12.3
Bipolar-I	14	4.8	19	6.5
Bipolar-II	4	1.4	10	3.4
Major depression	48	16.4	84	28.7
Dysthymia	4	1.4	8	2.7
Mood disorder due to a general medical condition[b]	1	0.3	4	1.4
Panic disorder	26	8.9	44	15.0
Agoraphobia	8	2.7	20	6.8
Generalized anxiety disorder	19	6.5	19	6.5
Social phobia	12	4.1	12	4.1
Post-traumatic stress disorder	27	9.2	37	12.6
Obsessive-compulsive disorder	7	2.4	7	2.4

[a] Baseline: post-anoxic, interferon-related, n=1 each; lifetime: post-anoxic, traumatic brain injury related, anti-retroviral treatment-related, n=1 each
[b] Baseline: interferon-related (n=1); lifetime: interferon-related, spinal cord abscess, traumatic brain injury, toxin exposure related n=1 each

Table ST3. Neurological Findings.

Finding	Total N	N	%
Movement disorder			
Drug associated	269	49	18.2
Other[a]	269	3	1.1
Any brain infarction on MRI			
Lacunar infarction	232	15	6.5
Cerebellar infarction	232	7	3.0
Subcortical infarction	232	2	0.9
Cortical infarction	232	4	1.7
Hemorrhage	232	1	0.4
Clinical cognitive impairment (DSM-IV)	293	19	6.5
Amnestic disorder	293	1	0.3
Dementia	293	4	1.4
Cognitive disorder not otherwise specified	293	14	4.8

[a] Huntington's, HIV/AIDS-Parkinsonism, idiopathic akathisia (n=1 each)

Table ST4. Hepatitis C (n=272 with all APRI Data)*

	anti-HCV positive viremia positive (N=145)		anti-HCV positive viremia negative (N=45)		anti-HCV negative (N=82)		All (N=272)	
	N	%	N	%	N	%	N	%
anti-HIV positive	37	25.5	10	22.2	4	4.9	51	18.8
anti-HBc positive	78	53.8	31	68.9	7	8.5	116	42.6
HBV surface antigen positive	0	0.0	3	6.7	0	0.0	3	1.1
	Median	Interquartile range	Median	Interquartile range	Median	Interquartile range	Median	Interquartile range
Platelets (10^9/L)	236	175-285	250	212-301	294	252-335	255	203-307
Aspartate aminotransferase (U/L)	39	28-59	26	21-32	21	18-25	29	21-45
Alanine aminotransferase (U/L)	42	27-68	175-285	14-27	18-25	14-25	27	17-47
	N	%	N	%	N	%	N	%
APRI								
≤0.70	98	67.6	40	88.9	80	97.6	218	80.2
0.71 - 1.50	28	19.3	3	6.7	2	2.4	33	12.1
1.51 - 2.00	9	6.2	1	2.2	0	0.0	10	3.7
>2.00	10	6.9	1	2.2	0	0.0	11	4.0

* APRI: Aspartate aminotransferase:platelet ratio index, calculated with local laboratory upper limit of normal = 35, limited to anti-HCV positive as predictive value of the index is best evaluated in this population. Values >0.7 are associated with hepatic fibrosis, >2 with hepatic cirrhosis.
IQR: interquartile range

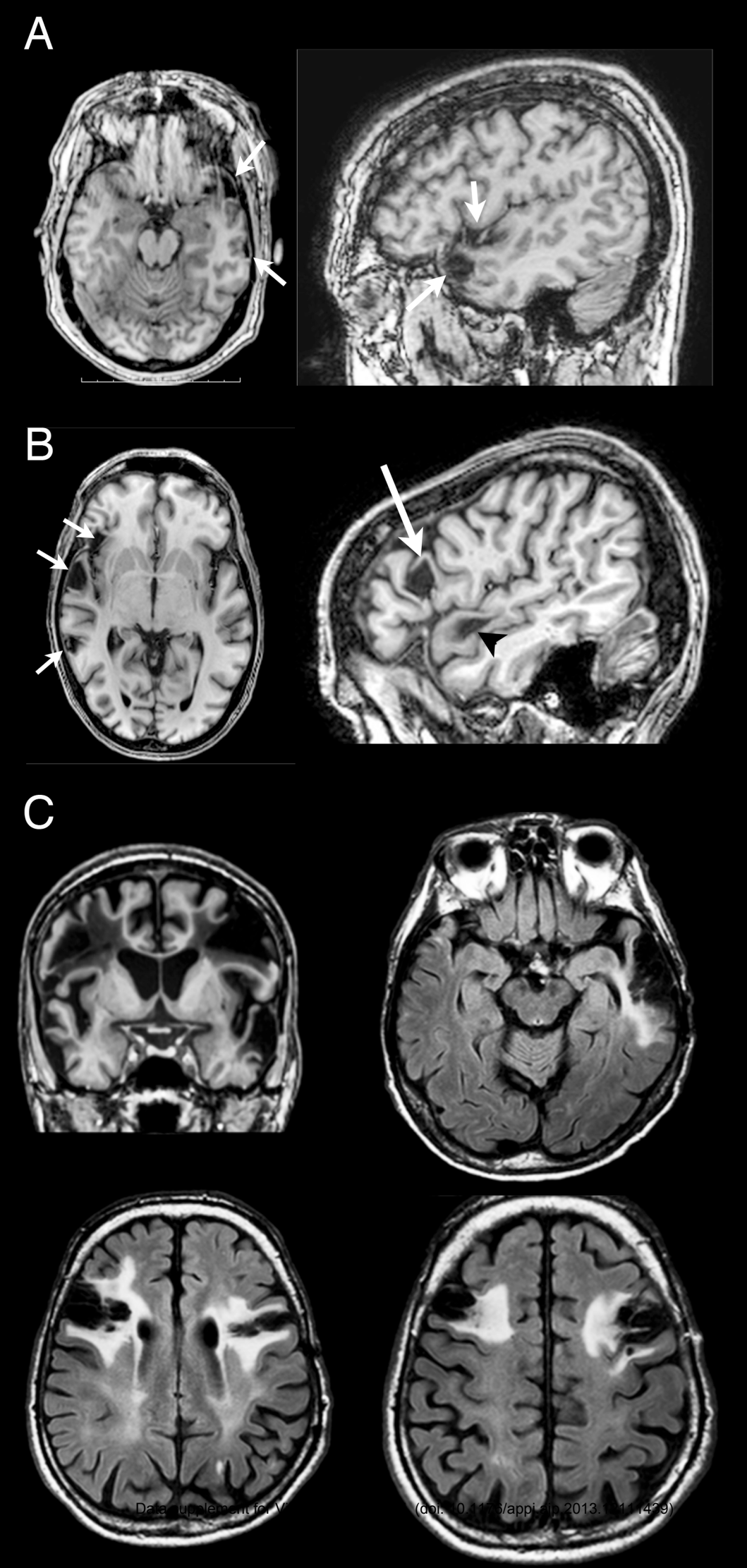
Table ST5. HIV/AIDS Assessment and Treatment History [a]

Characteristic			
	N	Median	Interquartile range
Age (yr)	52	45.3	39.5-51.3
Age at starting injection drug use (yr)	48	20.5	15.3-26.8
Age at starting antiretroviral therapy (yr)	47	37	32-46
Hotel Study start baseline viral load (c/mL)	47	35	35-54
Hotel Study start baseline CD4 (cells/mm3)	47	320	230-500
Follow-up time from anti-retroviral treatment start (mon)	47	90	41-147
	Total N	N	%
Female sex	52	17	32.7
Injection drug users	52	49	94.2
Ever achieved virologic suppression[b]	47	42	89.4
Start of anti-retroviral treatment			
During or before 1996	47	3	6.4
1997-1999	47	16	34.0
During or after 2000	47	28	59.6
AIDS diagnosed prior to starting anti-retroviral treatment	47	7	14.9
Therapy type at naive start			
Mono drug therapy	47	2	4.2
Double drug therapy	47	6	12.8
Triple drug therapy			
Single protease inhibitors	47	4	8.5
Boosted protease inhibitors	47	10	21.3
Non-Nucleoside reverse transcriptase inhibitors	47	22	46.8
Others	47	3	6.4
Adherence >95% in year 1	46	21	45.7

[a] Treatment History: complete data available for 47/52 HIV+
[b] Virologic suppression: plasma viral load of <50 c/mL at least twice consecutively

Figure S1. MRI examples of participants with traumatic brain injury.

A. 33 year old male with TBI (age unknown) akathisia related to crack cocaine use, cocaine (crack) and cannabis dependence, schizoaffective disorder
B. 48 year old female with TBI at age 20, dependent on cocaine (crack and injection), with psychosis (PNOS). Cleared HCV infection.
C. 53 year old male with TBI age 35, persistent seizure disorder, cognitive disorder (NOS), cocaine (crack) and heroin dependence, HCV and HIV



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Research article

Open Access

The Burnaby treatment center for mental health and addiction, a novel integrated treatment program for patients with addiction and concurrent disorders: results from a program evaluation

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Abstract

Background

Patients with addictions and concurrent disorders constitute the most underserved population in the system of care. There are numerous reasons why this population has so much difficulty accessing services, including behavioural issues, criminal engagement, and non-compliance with outpatient services. To improve services to this population which is marked by multiple morbidities, high mortality and insufficient access to health care, the government of British Columbia, Canada developed a program for people with both substance use disorder and one or more mental disorders who have not benefited from previous therapies.

Method

In July 2008, the Burnaby Treatment Centre for Mental Health and Addiction (BCMHA), a specialized and integrated tertiary care facility, was opened. The current article provides a description of the treatment program and a clinical profile of the population.

Results

The target population is being served, at intake clients present with high rates of psychopathology, childhood and adult trauma, and substance use.

Conclusion

While preliminary, these results indicate, that the novel approach of the Burnaby Centre may constitute a new path towards providing effective recovery for this population.

Keywords: Concurrent disorders; Integrated treatment; Marginalized populations

Background

Individuals with concurrent mental and substance use disorders tend to present with multiple physical health problems and substantial social and behavioural problems [1]. Individuals with concurrent disorders (CD) are overrepresented in forensic settings, regularly inhabit substandard housing [2,3] and constitute a significant percentage of the homeless population [4,5]. Individuals suffering from CD typically have difficulty engaging with traditional health care services and tend to rely heavily upon emergency care as their access point to the health care system [6]. The CD population exhibits extremely poor health outcomes and has a life expectancy that is considerably lower than the general population [7,8]. These and other concerns were recently emphasized by a group of leading American psychiatrists in a recent 'call for action' [9].

In the Canadian province of British Columbia (BC), the highest numbers of patients with CD and those with the most severe problems are found within inner-city neighbourhoods. In Vancouver, the area known as the Downtown Eastside (DTES) has a particularly high concentration of CD clients and has been the focus of considerable efforts to develop special treatment programs, including low threshold or harm reduction approaches [10]. Although there are existing treatment programs for substance abuse, mental health, and physical health issues, many health care providers in the DTES have expressed concern that these services are inaccessible to CD clients [11,12]. In longitudinal studies, having CD was associated with lower motivational readiness to change, lack of treatment engagement and attendance, and poor medication compliance [13,14]. Many of these individuals have 'behavioural issues', such as high impulsivity, aggression, and involvement in criminal activity [15]. These dysfunctional behaviours may be an expression of street entrenched life, mental disorders, substance intoxication/dependence, or a combination of all of these dimensions. Unfortunately, these types of behaviours will often disqualify CD clients from health services, and bring individuals into frequent contact with the criminal justice system [16]. Resources could be more effectively allocated if these concurrent conditions were treated consistently and if the available therapies were better tailored to the realities of this vulnerable population [17].

Development of a treatment model for individuals with CD in British Columbia

Despite an influx of resources into this vulnerable neighbourhood over the past 20 years, the health concerns facing DTES residents and clients with CD throughout the province of BC have not been resolved. Therefore, in 2008, an overall consensus for significant change drove the creation of a new approach to managing the health issues of CD clients. The development of a specialized program for clients with CD was mandated by the provincial government of BC. In April 2008, funding for the development of a specialized, 100 bed provincial treatment facility was announced, and in July of 2008, the Burnaby Treatment Centre for Mental Health and Addiction (BCMHA) was opened. The founding principles of BCMHA were developed by a panel of experts with ranging specialties from substance abuse treatment, psychological therapy and rehabilitation as well as representatives from acute care, community care, and forensic services. The model of care was designed to incorporate principles of strength-based care and the concepts of assertive treatment, motivation-based treatment, time-unlimited treatment, comprehensive programming, treatment approaches tailored to the receptiveness of clients (e.g. starting at low intensity), harm reduction leading to abstinence, stepped care, and cultural competence and sensitivity [18]. The BCMHA emphasizes two key strategies: 1) the management of relapse and crisis as the basis of achieving recovery for patients, and 2) long-term rehabilitation-focused care, reflecting a core belief that while recovery is a long process-it is the only alternative to reduce the serious mortality in this population.

The BCMHA was deemed to be a tertiary care program and given the mandate to provide comprehensive care to individuals with CD who present with severe mental health, physical health, substance use, and behavioural issues. Comprehensive care was defined as including all stages of treatment for each dimension of care, including withdrawal management, psychiatric care (excluding emergency care), psychosocial care, and medical care (excluding emergency/acute care).

The treatment program is designed for clients to stay up to 9 months at the inpatient facility/treatment program; thus reflecting the extensive change required during recovery from concurrent disorders. Although clients are encouraged to stay 9 months, there is considerable flexibility, as some clients will require shorter involvement while others will benefit from long-term care, therefore the center does not have strict and arbitrary time limits. The treatment team consists of care providers including psychiatrists, psychologists, physicians, nurses, counsellors, health care workers, social workers, in addition to occupational therapists, art and music therapists, and providers of alternative medicine. Treatment goals are determined in team meetings with the client. Treatment is based on best evidence as provided by international treatment guidelines and reviews of treatment efficacy. Treatment includes individual and group interventions targeting specific issues such as relapse prevention, contingency management, anger management, and motivational interviewing. Interventions are offered at different levels of complexities, allowing an individual to progress from simpler, low intensity approaches to more demanding and intensive interventions. Table 1 describes the different treatment components available to clients at BCMHA. Concurrently, clients receive medication treatment for mental health and medical issues. Clients are encouraged to progress from tightly supervised medical treatment to a weekly handout of medication.

Table 1. BCMHA recovery and clinical pathway model

The Provincial Health Services Authority (PHSA), who established access protocols under which the five regional health authorities in British Columbia could refer CD clients to the BCMHA, organizes the referral process for the BCMHA. According to the access protocol, the patients must have failed other programs on a regional level and must have significant issues in each of the four identified domains: mental health, substance use, physical health and behavioural. Furthermore, clients eligible for admission must have been unable to adequately engage with, receive services from, or benefit from traditional mental health and addiction programs.

The centre's mandate was to meet the needs of the vulnerable population in BC, and to help a population whose complexity of daily living made it difficult for them to benefit from existing services. As clients at the BCMHA are both difficult to engage in treatment and present with extremely challenging combinations of health problems, the present study's objective is to describe the needs of these patients by presenting baseline (intake) data to outline the level of mental illness in this population and to inform planning and tailoring of treatment services for these difficult to treat clients. A description of the characteristics of the client population and their initial responses to the intervention are presented.

Methods

This program evaluation consisted of a baseline assessment, and a follow up assessment at 6 months. Baseline data were collected from June 2009 to January 2010, and follow up assessment began in December 2009 and were completed in March 2010. All potential participants in the study were adult residents of the BCMHA who had been admitted in accordance with a standardized access process that was regulated by the BC Provincial Health Services Authority [19]. One hundred and twenty-eight clients who were consecutively admitted to the BCMHA were contacted to take part in an assessment, and assessed for eligibility by the intake team. We completed the baseline assessment for the pre-test within 6 weeks of intake. Clients were asked to respond in their baseline assessment regarding their status at intake. A total of 112 clients consented to participate in the study and 92 participants completed the minimal baseline assessment. Baseline information included information on mental disorders, substance use patterns, and health status. Due to funding restrictions that prevented tracking of patients who were discharged or had dropped out of the study, follow-up interviews were completed only of individuals who were still at the treatment centre. This study was reviewed and approved by the University of British Columbia Research Ethics Board.

We collected demographic information, which included age, gender, ethnicity, education, recent employment, and housing situation.

Mini-International Neuropsychiatric Interview (MINI) Plus [20] is a structured clinical interview to assess current and lifetime substance use and mental disorders according to the criteria of the Diagnostic and Statistical Manual, 4th edition (DSM-IV).

Childhood Trauma Questionnaire, short form (CTQ-SF) [21] is a retrospective self-report inventory that assessed different types of childhood maltreatment on five subscales: Physical Abuse, Emotional Abuse, Sexual Abuse, Physical Neglect, and Emotional Neglect. The questionnaire consists of 28 items answered on a 5-point Likert scale, including three items to assess minimization/denial. We adopted the severity classification proposed by the developers.

Trauma History Questionnaire (THQ) [22] is a 24-item self-report measure that examines

experiences with potentially traumatic events, including crime-related events (e.g., robbery, burglary), general disasters (e.g., accidents, natural or man-made disasters, war, injury, life-threatening illnesses, or deaths of others), and sexual and physical assault. For each item, the clients were asked to indicate the frequency and at what age they had experienced the event.

The Brief Symptom Inventory (BSI) [23] is a 53 item self-report questionnaire that measures nine dimensions of psychological distress over the past 7 days using a five-point Likert scale. The nine dimensions are: Somatization, Obsession-Compulsion, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation and Psychoticism. In addition to the average score for each individual dimension, we calculated the Global Severity Index (the average score of all items combined) as a measure of overall current distress.

The Maudsley Addiction Profile (MAP) [24] is a self-report measurement that assesses current substance use related problem behaviours. Participants were asked to indicate the frequency, amount, and route of administration of alcohol, cocaine (powder or crack cocaine), cannabis, opioids (heroin, nonprescribed methadone, or nonprescribed opioids), amphetamines (amphetamines or crystal methamphetamines), and nonprescribed benzodiazepines they used in the past 30 days.

Descriptive analyses were used to describe the sample, including numbers and percentages for dichotomized sociodemographic and clinical variables, and means and standard deviations (SD) for continuous variables. Comparison between baseline and follow-up MAP and BSI measures were assessed as indicators of the client's progress in treatment. Within this matched analysis, paired t-test and chi-square test were employed to examine the mean differences and the differences in proportions. All reported p-values are two-tailed and significance was set at $p \leq 05$. Analysis was performed using SAS version 9.1 (SAS Institute, Inc, Cary, North Carolina).

Results

Ninety-two participants completed the baseline assessment. The mean age at baseline was 40.2 years, and 21.7% identified as Aboriginal. Complete client demographic characteristics can be found in Table 2. The average length of stay at BCHMA for all clients discharged in 2010 was 4.8 months.

Table 2. Client's demographic characteristics

On the BSI, clients at intake scored highest in dimensions of obsession-compulsion (2.11) and depression (2.08). However, symptoms for all dimensions on the BSI were high. Full scores for the BSI can be found in Table 3.

Table 3. BSI dimensions scores and composite GSI score, and comparison of baseline and follow-up (FU) data for n = 47

Extremely high rates of trauma were found in this population using the CTQ and the THQ. More than half of the sample had experiences at least one form of trauma in their childhood; the most frequently reported experience was emotional abuse. On the THQ, general disasters and crime related events were most frequently reported. The full results for trauma histories are presented in Table 4.

Table 4. Results of the Childhood Trauma Questionnaire (CTQ, n = 75) and the Trauma History Questionnaire (THQ, n = 84)

Results from the MAP revealed high rates of substance use, with crack or powder cocaine use the most common substance used at 65.2%. The complete list of substances used is found in Table 5.

Table 5. Prevalence of substance use at baseline for all clients, and comparisons of baseline and follow-up substance use for individuals available for follow up (n = 47)

The MINI revealed that for lifetime mental disorders, major depressive episodes was the most frequently reported diagnosis (64.8%). For substance use disorders, drug dependence (78.4%) was more frequently reported than alcohol dependence (65.9%). The complete list of lifetime prevalence rates of mental and substance use disorders can be found in Table 6.

Table 6. Patient's lifetime prevalence rates of DSM-IV based mental and substance use disorder diagnoses

A total of 47 clients (51%) completed the follow-up assessment after six months. There was a significant reduction in psychopathology symptoms from intake to 6 months across all BSI dimensions. The means and SDs of the baseline and the follow-up BSI scores can be found in Table 3, along with the p-values for the comparisons. Specifically, participants improved in dimensions of somatization ($t(46) = 4.489$, $p = .006$), obsessive-compulsive ($t(46) = 3.900$, $p =$

.0004), interpersonal sensitivity ($t(46) = 3.428$, $p = .0014$), depression ($t(46) = 5.239$, $p < .0001$), anxiety ($t(46) = 4.507$, $p = <.0001$), hostility ($t(46) = 2.304$, $p = .0258$), phobic anxiety ($t(46) = 4.778$, $p < .0001$), paranoid ideation ($t(46) = 3.209$, $p = .0024$), psychoticism ($t(46) = 3.739$, $p = .0004$), and the GSI ($t(46) = 5.204$, $p < .0001$). Even after using a Bonferroni correction to account for multiple testing (resulting in an alpha of .005), the differences from baseline to follow-up remained significant on all dimensions except somatisation and hostility.

Results from the MAP indicated reduction of substance use to overall minimal use. The numbers and percentages of substance use at baseline versus follow-up are presented in Table 5. Specifically, the rates decreased significantly for alcohol ($\chi2(1) = 7.42$, $p = .006$), heroin ($\chi2(1) = 4.97$, $p = .026$), and cocaine ($\chi2(1) = 19.3$, $p < .0001$). Using a Bonferroni correction resulted in an alpha of .0083, indicating that the changes remained significant for alcohol and cocaine use. The differences from baseline to follow-up were not significant for illicit methadone ($\chi2(1) = 1.90$, $p = .168$), benzodiazepines ($\chi2(1) = 1.79$, $p = .181$), and amphetamines ($\chi2(1) = 1.79$, $p = .181$).

Discussion

The present study focused on describing a residential treatment program designed to address the needs of individuals with chronic and severe concurrent conditions. The data from the baseline assessments clearly presents that this population was suffering from severe concurrent disorders at the time of intake to the clinic. Compared to normative data provided by the authors of the BSI, the psychopathology distress not only exceeded the psychopathology of the general population, but also the psychopathology found among psychiatric inpatients [23]. The high levels of mental illness, concurrent disorders, and multiple traumatic experiences present in this population clearly demonstrate the importance of comprehensive and integrated care to achieve sustainable recovery.

Health care systems traditionally focus on mental health and addiction separately based on different philosophies of care. While many mental health services are increasing their treatment to include individuals with "mild to moderate" forms of substance dependence, and addiction services are increasing their treatment to include individuals with mild to moderate mental disorders, it is the individual with complex, severe, and concurrent conditions, that is still caught in the gap left between two incomplete and often incompatible treatment models [1,17]. However, increasingly are integrated treatment approaches of concurrent substance use and mental disorders accepted to be the most promising and best practice strategy [25].

Reflecting on the presented health issues in this sample, it is important to note the severity of problems present, and yet the limited access to care. This sample displayed major mental illness, trauma, and substance use, and although each of these issues requires medical attention, the clients' access to care prior to involvement with BCMHA was extremely limited. The high level of traumatic experiences from early childhood to adulthood presents a chronic condition that needs more attention both as a contributing factor to mental disorder and substance use order and as a potential roadblock to accessing services. Integrated treatment approaches that address both trauma/PTSD and substance use have shown some initial promising results but need to be further refined and evaluated [26]. Recovery and reintegration into society is only possible with a comprehensive and integrated long-term concept, including housing and social support. Stimulant use in this population is high as they are low in cost and broadly available, resulting in chronic substance use patterns that include a range of psychotropic substances and routine polysubstance use. Therefore, treatment must address polysubstance use, rather than dependence to one substance in particular.

As a result of the referral process, it is expected that these clients represent the most complex populations in mental health and addiction care in BC. BC's population is concentrated with about 60% in the metropolitan area of Vancouver and the lower mainland. It seems that access is more limited from some areas, such as very rural areas compared to cities and the metropolitan area of Vancouver. This was not specifically assessed, but may constitute an area of interest for further follow up.

The manner in which the BCMHA program understands and responds to relapse is central to the program. Relapse is a regular occurrence in substance use and CD clients, and was often the reason that BCMHA clients had been discharged from other programs or from housing facilities. Discharge often resulted in these clients living on the street despite their severe mental, addictive, and physical illnesses. From our experience with BCMHA we have learned that a comprehensive program can be used to achieve significant gains, as shown by the improvement in psychopathological symptoms and decreased substance use even before clients achieved abstinence or before mental health problems are fully resolved. These data suggest that it is possible to provide effective integrated care for patients who have not achieved full abstinence and who require longer-term care before being able to stay abstinent, as demonstrated by an average length of stay of 4.8 months, as compared to many 12-week programs.

Limitations

Our study has some methodological limitations that warrant discussion. Two important domains were not addressed sufficiently given the major health concerns in this population. First, the level of cognitive functioning and all related conditions, due to mild traumatic brain injury, and fetal alcohol spectrum disorder, etc. Second, the presence of possible Axis II personality and developmental disorders. The assessment of both domains is time consuming and needs highly trained interviewers. These areas need to be the focus of future studies. The high rates of chronic substance use behaviours and disorders raise concerns about the interference of substance use symptoms (e.g., intoxication or withdrawal) with proper psychiatric assessment. Although the reported mental disorder symptoms and diagnoses are based on standardized assessments, over- or underestimation cannot be excluded, given the level of our patient's impairment and the complexity of concurrent conditions. Furthermore, participant's information on both baseline and follow-up substance use behaviours was derived via self-reports without any biochemical validation, and thus may be affected by reporting bias. Similarly, self-reported information on trauma histories in childhood and adulthood was not confirmed by external sources and may be over- or underestimated in our study.

A major limitation of the follow-up results is the fact that they were based on the minority of patients who were still present in the facility at six months. Not only does this attrition result in low statistical power, but it is also very likely that these individuals are not representative of all patients accessing the BCMHA. As such, our follow-up results need to be regarded as preliminary and suggestive, and have to be confirmed with more systematic data collection that assesses mental health and substance use outcomes over a longer follow-up time period using an intention-to-treat approach. Finally, lack of a control condition, treatment attendance and compliance measures for patients, and treatment fidelity or manual adherence measures for staff limits conclusions regarding the actual impact of the specific psychiatric intervention. However, we hope that this initial data will provide incentive for a more comprehensive analysis of the situation of individuals with complex concurrent disorders.

Conclusions

As indicated earlier, the eligibility criteria for the BCMHA includes demonstrated failure in other treatment programs; BCMHA serves as a "last resort" tertiary care facility. There are no comparable, specialized programs in Canada focussing on these high need clients [27], which makes the BCMHA particularly interesting and challenging from both a system and a research perspective. With an interdisciplinary approach, it is possible to retain and support clients with the highest complexity of mental and substance disorders into treatment and achieve significant improvements. The current study does not seek to identify the roadblocks to accessing care, however, this is an important feature that needs to be further investigated into, as appropriate health care delivery is only achieved if and once appropriate services are accessed.

Many of the patients who participated in this study were never appropriately assessed before admission to BCMHA. Although a high prevalence of traumatic experiences or impairments in the cognitive functioning were known about these clients, no neuropsychological tests, brain imaging, or standardized psychometric tests in those fields were documented in the files or mentioned by them. Without standardized assessment or systematic outcome control it is hard to develop an appropriate care plan and provide the necessary supports. The need for better multi-dimensional assessment is a core prerequisite of any professional care for this population in the future. The consequences of all these poor health outcomes are devastating for this high need and high risk population, their families, their peers, and especially their children. The lack of appropriate capacity and quality of care needs to be addressed as a health crisis. For individuals with the highest morbidity, access and quality of care need to be improved. The approach offered by the BCMHA may constitute a decisive step towards this direction.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

CS: Co-PI, conceptualizing the study, writing protocol, supervising analysis, conceptualizing and writing the manuscript, and editing. IL: organizing the assessments, conducting literature review, interpretation and discussion of results, writing and editing of the manuscript. IT: supervising data management, training interviewer, conducting literature review, interpretation and discussion of

results, writing and editing of the manuscript. KL: data management, statistical analysis of the data. MA: developed Table 1, and editing of the manuscript. MK: PI of the evaluation study, writing protocol, editing the manuscript. All authors read and approved the final manuscript.

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Mental disorder, service use, and barriers to care among 500 homeless people in 3 different urban settings

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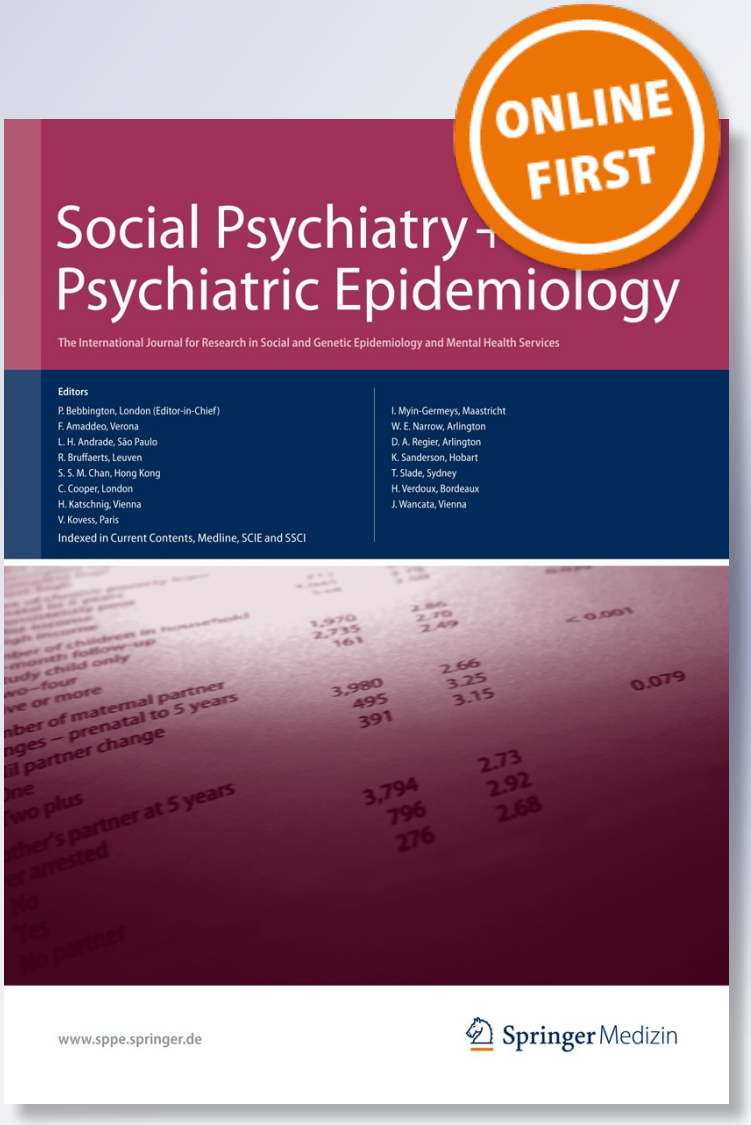

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ORIGINAL PAPER

Mental disorder, service use, and barriers to care among 500 homeless people in 3 different urban settings

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Abstract
Objective To determine the standardized rates of mental disorder, health service use and barriers to care in a representatively diverse sample of homeless adults in three different sized urban centers in British Columbia, Canada.
Method Five hundred homeless adults from Vancouver, Victoria and Prince George were recruited. The MINI-International Neuropsychiatric Interview PLUS was used to determine current and lifetime rates of mental disorder, mental disorder episodes and suicidality. Health service use and barriers to care were recorded.
Results Overall, 92.8 % of participants met criteria for a current mental disorder: 82.6 % for alcohol or drug dependence, 57.3 % anxiety disorder, 31.5 % mood disorder. Over half (53.4 %) met criteria for a concurrent disorder. Only 14.9 % had seen a psychiatrist and 12.7 % a mental health team in the year prior to the survey. Most common barriers included being poorly connected to the system of care and issues related to homelessness. Mental disorder rates across sites were high, however, differences were found that reflected the composition of the samples.
Conclusion Improving the mental health state of the homeless will require significant capacity for mental health and concurrent disorder programming that is tailored to the community it intends to serve. Demographic features of the population may help in directing assessments of need.

Keywords Homeless persons · Mental disorder · Health services · Substance dependence · British Columbia

Background

After more than 50 years of public health research on homelessness and health [1], homelessness continues to be a major global public health concern [2–5]. While mental disorder and addiction are among the most persistent and prevalent health concerns affecting the safety and well-being of homeless people, too few are able to access appropriate services given their mental health needs [4]. The traditional purpose of epidemiologic mental health surveys has been the assessment of psychiatric disorders, determining and projecting the amount and nature of treatment needs, and the development of tailored services [34]. Hence, the estimation of prevalence rates of mental disorders is of great importance as underestimating or overestimating may have direct implications to health service planning and delivery.

Underestimating mental disorder rates may lead to under-allocation of care, and the significant potential health burdens and costs associated with untreated mental health disorders [35]. In contrast, overestimating mental disorder rates may also lead to significant costs, including the economic impact of unnecessary services and the

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opportunity costs associated with using resources for mental health that might be better allocated to other types of social programs.

Although several studies have measured mental disorder prevalence rates in specific homeless populations, available data are of limited use to policy makers and public health planners for several reasons: (a) the diversity found in contemporary homeless populations, such as a significant number of women, is not represented in many previous reports on mental disorder; (b) differences in participant characteristics between homeless studies limit the generalizability of results; (c) previous research has focused almost exclusively on large urban centers with little data on smaller centers or comparing different-sized cities; (d) intra-study differences in design, sampling technique and inclusion criteria, has contributed to a wide range of prevalence rates when multiple studies have been combined for analysis. This has led Fazel et al. [5] to state in a 2008 systematic review and meta-regression analysis on mental disorder and homelessness, that 'service planning should not rely on our summary estimates but commission[ed] local surveys of morbidity to quantify mental health needs'.

Developing an effective mental health strategy to support, stabilize and reconnect the homeless population requires an accurate estimate of the burden of mental illness and a detailed understanding of its distribution. To our knowledge no Canadian studies are available in the peer-reviewed literature that used standardized instruments to report mental disorder in a sizable population of homeless people living on the streets and in homeless shelters, and very few studies have done so across different-sized urban settings. To date, Canadian estimates of mental disorder have been approximated using review articles from the United States, often using non-standardized self-report measures and previous diagnosis data [6–8]. Furthermore, differences between the US and Canada, such as the healthcare system, available support, the law enforcement system, and the composition of the homeless population may have an impact on the specific profile and characteristics of the homeless population. Currently, the academic evidence from which Canadian health agencies can base important public health planning on are at best incomplete and at worst inaccurate.

Aims of the study

To report standardized prevalence rates of mental disorder, health service use and barriers to care among a purposefully diverse sample of homeless men and women. To compare demographic features, mental disorders and health services utilization across three different cities in the province of British Columbia, Canada.

Materials and methods

Sample

Between May and September 2009, the British Columbia Health of the Homeless Survey (BCHOHS) recruited 500 homeless people in three cities in British Columbia, Canada: the metropolitan city of Vancouver, population 2,116,581 ($n = 250$); the capital island city of Victoria, population 330,088 ($n = 150$); and the fairly remote city of Prince George, population 83,225 ($n = 100$). Participants were to be at least 19 years old, willing and able to give informed consent, able to communicate and be understood in English, and to self-identify as being homeless during the month prior to study entry. Homelessness was defined as living on the streets or in a homeless shelter. Purposeful sampling was used to recruit a significant proportion of women, young people aged 19–24, individuals who identify as Aboriginal, and individuals living on the streets. Targets for sampling these subgroups were set at 50 % of the sample being recruited from the streets, at least 30 % of the participants being women, a minimum of 30 % of the sample identifying as Aboriginal, and at least 10 % of the participants being teenagers and young adults between 19 and 24 years of age.

Procedure

Inclusion criteria, recruitment, and procedures have been described in detail elsewhere [36]. Briefly, we recruited 500 homeless adults from multiple sites in three cities in British Columbia, Canada. Study participants were recruited through an intensive outreach campaign. A comprehensive list of the existing homeless services for all three cities was created through community consultation, previous knowledge and the Internet. In order to recruit individuals living on the street, research assistants surveyed places where homeless people were known to be and contacted existing street outreach teams and drop-in centers. To recruit individuals living in shelters, research assistants visited all homeless shelters in Victoria and Prince George, and selected homeless shelters in Vancouver. Recruitment was conducted on weekdays and occasionally on weekends.

Individuals approached and interested in participating were informed of the goals and rationale of the study and the requirements for participation. Participants attended a one-session, face-to-face interview with several instruments including a screening for study eligibility, a demographic questionnaire and the MINI-PLUS Neuropsychiatric Interview. Interviews were primarily administered in a research office; however, some interviews took place in a space on site (e.g., at a homeless shelter) where the participant felt

comfortable. Participants received CAD $30 for their time at the end of the meeting with the research assistant (RA), regardless if the research interview had been completed or not. Interviews were conducted by eight RAs who were supervised and trained for the application of the interview battery by a senior Clinician–Scientist. Each RA had extensive previous experience in working with homeless, substance using, and/or mentally ill individuals. Four RAs have been working with vulnerable populations in both clinical and research settings for several years. Two RAs have been involved in research projects prior to our survey, and two had clinical experience working with these populations. The training of the RAs included one information session on inter-rater reliability. The interview, excluding consent and screening, was designed to last approximately 1 h, but individual needs (e.g., taking breaks) of each participant were considered a priority over finishing the interview in a certain amount of time. Participants received $30 for their time spent with research at the end of the meeting with the interviewer. Ethical approval for this study was obtained from the Behavioural Research Ethics Board of the University of British Columbia and the Providence Health Care Research Institute. All participants gave informed consent prior to their inclusion in the study.

Measures

Diagnoses of mental disorders were established by using the MINI-International Neuropsychiatric Interview Plus Version 5.0.0 (MINI-PLUS) [9], a structured clinical interview for research settings based on the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) criteria. The DSM-IV has been used to measure psychopathology in homeless populations in previous studies [10, 11] and has been shown to be reliable and valid in several North-American and European community samples [9]. We administered modules for the following current and lifetime episodes and disorders: major depressive episode, (hypo)-manic episode, dysthymia, schizophrenic psychosis, general anxiety disorder (current only), panic disorder, agoraphobia, social phobia, posttraumatic stress disorder (PTSD), alcohol and drug dependence, suicidality (current only), and suicide attempt (lifetime only). Current diagnosis times vary by disorder and are described as follows: major depressive disorder and episode (past 2 weeks), dysthymia (2 years), suicidality, panic disorder, social phobia and PTSD (past month), (hypo) manic episode, psychotic disorders and agoraphobia ('currently'), alcohol and drug dependence (past 12 months). It was our intention to assess the co-occurrence and overlap of substance dependence and mental disorder in this paper. Hence, we do not show prevalence rates for independent mental disorders, but for mental disorders including substance-related mental disorders.

Selected and modified questions of the National Survey of Homeless Assistance Providers and Clients's (NSHAPC), Modules 'Service Needs' and 'Sources of Service Needs' were used to determined health service utilization. The NSHAPC is a comprehensive measure developed specifically for homeless populations and orientated toward assessing chronic health conditions, health service utilization and barriers to accessing care. The complete NSHAPC questionnaire comprises of 14 sections, each section having up to 28 questions.

Four of the questions selected for our research asked about health service using a list (e.g., "*In the past 12 months have you seen…[list])* and two questions were open ended (e.g., *"What are the reasons you do not have a regular medical doctor/nurse practitioner?"*). Open-ended questions we collected and grouped into themes based on responses all major themes were reported. Reponses could have fallen into more than one category.

In addition, a Demographic Questionnaire was used to capture sociodemographic features on the populations such as: age, gender, ethnicity, education, marital status and sleeping location at the time of interview. Based on previous homeless counts and the tendency of marginal subgroups within the homeless to be underrepresented a specific effort was made to include at least 30 % of the participants identifying as Aboriginal. Participants were asked to identify which ethnic group/descent they specifically identify with. The Aboriginal peoples who participated in this study represented nations throughout British Columbia and included: Cree, Carrier, Dene, Gitksan, Sekani, Ojibway, Coast Salish and Metis.

Analytic approach

The MINI-PLUS diagnostic algorithm was used to summarize mental health disorders and 95 % confidential intervals were estimated from binomial distribution. Demographic characteristics, mental disorder and service utilization rates were stratified by research location and differences across locations were compared using ANOVA for continuous variables and Pearson's Chi-square test for categorical variables. The F-statistics is 0.2 and the degrees of freedom for ANOVA is 2, as we have three study sites. Normal approximation to binomial distribution was used to estimate the confidence intervals.

Site differences were examined by ANOVA for continuous variables and Pearson's Chi-square for categorical variables; the analysis was conducted for the differences itself instead of pair-wise comparisons.

As this study comes with an exploratory data analysis approach, it was not intended to test a global null hypothesis where all individual hypotheses are true simultaneously.

Therefore, multiple test adjustment was not applied in the analysis.

All analyses were performed using Statistical Analysis System SAS, SAS Institute Inc., North Carolina, USA, Version 9.1. All p values were two-sided and the significant level was set at $p < 0.05$.

Results

Sociodemographic characteristics

Five hundred participants were recruited into the study and completed the demographic questionnaire. Demographic characteristics stratified by survey location are shown in Table 1. The mean age of participants was 37.9 ± 11 years, 16.4 % were youth/young adults in the age range from 19 to 24 years, 39.2 % were female and 39.8 % of the participants identified as Aboriginal. In bivariate analyses, demographic features did not differ between survey locations except for two variables. When compared to Vancouver and Victoria, more participants from Prince George were currently sleeping in a shelter than on the street ($p < 0.001$), and more identified as Aboriginal ($p < 0.001$). Participants from Victoria were more likely to be sleeping on the street than those in Vancouver and PG ($p < 0.001$).

Mental disorder

In total, 489 (98 %) MINI-PLUS questionnaires were included for analysis and 11 were discarded due to incompleteness or lack of confidence indicated by the interviewer [9]. Current and lifetime mental disorder and mental disorder episode rates stratified by survey location are shown in Table 2. We found that 92.8 % of participants met criteria for at least one mental disorder or mental disorder episode and 82.6 % met criteria for current substance dependence disorder (alcohol or drug dependence). Over half of the participants (57.3 %) met criteria for a current anxiety disorder (general anxiety disorder, panic disorder, agoraphobia, and PTSD).

Mental disorders by location

Participants from Victoria compared to participants from Vancouver and Prince George had higher rates of current depressive episode, social phobia, general anxiety disorder (all $p < 0.001$) and current drug dependence ($p < 0.05$). Participants from Prince George had higher prevalence rates of alcohol dependence ($p < 0.001$) and lifetime suicide attempts ($p < 0.001$) than the other two sites (Table 2). When comparing participants in terms of their ethnicity, those who identified as being Aboriginal had significantly higher rates of alcohol dependence ($p < 0.0001$), while PTSD showed a trend towards significance, but did not meet the criterion for $p \leq 0.05$.

Health service utilization and barriers to care

Health service utilization rates for different categories of health services stratified by survey location are shown in Tables 3 and 4. In total, 63.2 % of participants reported having a regular medical doctor/nurse practitioner and 34.0 % felt that in the 12 months prior to the survey they

Table 1 Demographic characteristics of participants

Variable	Vancouver, $n = 250$ (%)	Victoria, $n = 150$ (%)	Prince George, $n = 100$ (%)	Total sample, $n = 500$ (%)
Age, mean (SD)	38.0 (±10.8)	37.4 (±11.6)	38.3 (±10.9)	37.9 (±11.0)
Youth (age ≤ 24)	36 (14.4)	29 (19.3)	10 (10.0)	75 (15.0)
Gender				
Female	93 (37.2)	56 (37.3)	47 (47.0)	196 (39.2)
Male	157 (62.8)	94 (62.7)	53 (53.0)	304 (60.8)
Ethnicity				
White	159 (63.6)	98 (65.3)	23 (23.0)	280 (56.0)
Aboriginal	76 (30.4)	48 (32.0)	75 (75.0)**	199 (39.8)
Other[a]	15 (6.0)	4 (2.7)	2 (2.0)	21 (4.2)
Current housing				
Street	125 (50.0)	101 (67.3)**	24 (24.0)	250 (50.0)
Shelter	125 (50.0)	49 (32.7)	76 (76.0)	250 (50.0)
Education				
Less than high school education	159 (63.6)	91 (60.7)	68 (68.0)	318 (63.6)
Married/common law	26 (10.4)	16 (10.7)	7 (7.0)	49 (9.8)

* $p < 0.05$, ** $p < 0.001$ from Chi-square test or Fisher's exact test

[a] Black/African (2.2 %); Asian (1.2 %); Hispanic/Latin American (0.8 %)

Table 2 Prevalence rates for current and lifetime metal disorders and disorder episodes for total sample and stratified by survey location

	Vancouver, (n = 240)	Victoria, (n = 149)	Prince George, (n = 100)	Total Sample, (n = 489)
Current disorders				
Drug dependence	157 (65.4)	118 (79.2)	68 (68.0)	343 (70.1)
Alcohol dependence	61 (25.4)	56 (37.6)	65 (65.0)**	182 (37.2)
Agoraphobia	70 (29.2)	51 (34.2)	18 (18.0)	139 (28.4)
Major depressive episode	55 (15.4)	37 (36.8)	19 (19.0)	111 (22.7)
Posttraumatic stress disorder	44 (18.3)	38 (25.5)	18 (18.0)	100 (20.5)
General anxiety disorder	46 (19.2)	43 (28.9)**	9 (9.0)	98 (20.0)
Social phobia	24 (10.0)	43 (28.9)**	22 (22.0)	89 (18.2)
Suicide risk[a]	37 (15.4)	28 (18.8)	15 (15.0)	80 (16.4)
Schizophrenic psychosis	28 (11.7)	28 (18.8)	17 (17.0)	73 (14.9)
Panic disorder	27 (11.3)	28 (18.8)	8 (8.0)	63 (12.9)
(Hypo)manic episode	21 (8.8)	21 (14.1)	17(17.0)	59 (12.1)
Dysthymia	7 (2.9)	5 (3.3)	1 (1.0)	13 (2.7)
Lifetime disorders				
Drug dependence	176 (73.3)	123 (82.6)*	75 (75.0)	374 (76.5)
Alcohol dependence	156 (65.0)	103 (69.1)	78 (78.0)*	337 (68.9)
Major depressive episode	92 (38.3)	97 (65.1)**	33 (33.0)	222 (45.4)
(Hypo)manic episode	94 (39.2)	78 (52.3)	45 (45.0)	217 (44.4)
Agoraphobia	87 (36.3)	75 (50.3)**	32 (32.0)	194 (39.7)
Suicide attempt	75 (31.3)	57 (38.3)	51 (51.0)**	183 (37.4)
Schizophrenic psychosis	49 (20.4)	53 (35.6)**	31 (31.0)	133 (27.2)
Panic disorder	40 (16.7)	44 (29.5)**	13 (13.0)	97 (19.8)
Dysthymia	10 (4.2)	5 (3.3)	8 (8.0)	23 (4.7)

Values are given as n (%)

* $p < 0.05$, ** $p < 0.001$ from Chi-square test or Fisher's exact test

[a] Moderate to high current suicide risk in MINI-PLUS (30)

had needed care but not received it. Main barriers to care included being poorly connected to the system and issues related to homelessness (Table 4).

Discussion

Mental disorder estimates from homeless studies in Western countries have found the prevalence rate of having at least one current mental disorder to be approximately 50–70 % [12–16]. In the present study, 92.8 % of participants met criteria for at least one current mental disorder or mental disorder episode, exceeding the high end of the range previously established in the literature. This number was driven primarily by a high prevalence of substance dependence (82.6 %), particularly drug dependence. Substance dependence makes up a substantial portion of the burden of illness carried by this population and will require dedicated efforts from health systems and community agencies to effectively meet the health needs of this underserved population.

Compared to the pooled prevalence rates of mental disorders from a systematic review of 29 homeless studies published between 1966 and 2007 [5] of mostly homeless males, the participants in our study reported much higher rates of current drug dependence (82.6 vs. 24.4 %), and similar rates of current alcohol dependence and psychotic disorders [5]. In all three settings surveyed, participants reported more drug dependence than alcohol dependence. This contradicts the majority of previous studies that found alcohol dependence to be most common [5, 12], but adds to more recent evidence that shows a trend of increased drug use and dependence in homeless populations and particularly among homeless women [17, 18]. When compared to other studies that used standardized instruments, our participants reported higher rates of both current and lifetime mood disorder episodes, anxiety disorders [4, 13, 15, 18], and comparable rates of posttraumatic stress disorder [19] and dysthymia [18]. Little comparable research is available on (hypo)manic episodes and bipolar disorders, however, the high rates of (hypo)manic symptoms reported by our participants (current, 12.1 %; lifetime, 44.4 %) warrants further research.

These findings describe a population in great need of mental health care and stable housing. Health service utilization rates exposed a discouraging reality. There is agreement in the medical and scientific communities that mental health recovery, aside from housing and physical recovery is essential for overcoming homelessness and reintegration into society, but participants in our study

Table 3 Prevalence rates of health care service use stratified by survey location

	Vancouver, $n = 247$ (%)	Victoria, $n = 150$ (%)	Prince George, $n = 100$ (%)	Total sample, $n = 497$ (%)
Health services used in the past 12 months				
Family doctor	141 (57.1)	105 (70.0)**	61 (61.0)	307 (61.8)
Emergency room	127 (51.4)	82 (54.7)	68 (68.0)*	277 (55.7)
Walk-in clinic	105 (42.5)	83 (55.3)*	33 (33.0)	221 (44.2)
Street nurse	44 (17.8)	71 (47.3)**	31 (31.0)	146 (29.4)
Nurse practitioner	37 (14.9)	64 (42.7)	29 (29.0)	130 (26.2)**
Hospital overnight[a]	56 (22.7)	36 (24.0)	22 (22.0)	114 (22.9)
Psychiatrist	35 (14.2)	26 (17.3)	13 (13.0)	74 (14.9)
Mental health team	33 (13.4)	16 (10.7)	14 (14.0)	63 (12.7)
Crisis or suicide prevention services	4 (1.6)	5 (3.3)	3 (3.0)	12 (2.4)
Services used for drug problems in the past 6 months				
Detox treatment	97 (39.3)	37 (24.7)	59 (59.0)**	193 (38.8)
Self-help group	84 (34.1)	30 (20.0)**	41 (41.0)	155 (31.2)
Residential treatment	89 (36.0)	25 (16.7)**	35 (35.0)	149 (30.0)
Counseling	69 (27.9)	19 (12.7)	40 (40.0)**	128 (25.8)
Methadone program	65 (26.3)	47 (31.3)	13 (13.0)*	125 (25.0)
Outpatient/day treatment	54 (21.9)**	16 (10.7)	7 (7.0)	77 (15.5)

* $p < 0.05$, ** $p < 0.001$

[a] Includes at least one night in a hospital, nursing home or convalescent home

Table 4 Health care utilization and perceived barriers to care

	Total sample N = 497 *n* (%)
Has a regular medical doctor (MD) or nurse practitioner (NP)	314 (63.2)
Reasons for not having an MD/NP[a]	
Person is or feels poorly connected to the system	78 (42.6)
Person feels he/she does not need one	35 (19.1)
Person did not look for one	35 (19.1)
Issues related to homelessness[b]	31 (16.9)
Due to negative past experiences with MDs or NPs	12 (6.6)
Utilized services of clinics instead of a MD or NP	116 (63.4)
Person felt he/she did not receive care when needed	169 (34.0)
Perceived reasons for not receiving care[c]	
Issues related to homelessness[a]	87 (51.5)
Poorly connected to the system	66 (39.1)
Mental health issue or addiction	53 (31.4)
Negative past experiences with health care system	32 (18.9)

[a] Includes only participants who reported not having a regular MD/NP; $n = 183$

[b] Issues related to homelessness, i.e., 'do not have a phone/phone number', 'too busy finding food, shelter or other necessities', etc

[c] Includes only participants who reported not receiving care when needing it; $n = 169$

reported limited contact with the mental health care system. A total of 92.8 % of participants met diagnostic criteria for one DSM-IV disorder, but only 14.9 % had seen a psychiatrist and only 12.7 % had seen a mental health team in the past year. While 16.4 % of participants were at moderate to high risk of suicide at the time of interview, only 2.4 % had accessed crisis or suicide prevention services in the previous year. Overall 82.6 % met criteria for substance dependence in the 12 months prior to the survey, but no more than 29.8 % had been in residential substance use treatment, 25.6 % had received outpatient counseling related to their substance use, and 15.4 % had received outpatient substance use treatment in the past year. In light of such findings, local and provincial-based health agencies have begun to acknowledge the need for more comprehensive and effective health care for this population and several initiatives are underway [20, 21]. There are only few services that aim to treat mental health and substance use issues in this population concurrently; however, these services are still the exception and only serve a small fraction of the estimated population needing support [20]. More capacity and more effective programming is urgently needed in the surveyed health authorities.

On a more positive note, close to two-thirds of participants reported having a regular medical doctor (MD) or nurse practitioner (NP). Although this is well below the 85 % estimated in the general population [22], it indicates a significant connection between homeless people and the system of care and adds evidence to claims [23] that augmenting primary care practices for homeless people will positively impact health care access and service use. Important to note, perception of being 'poorly connected to the system of care' was the number one reason that participants gave as to why they did not have an MD/NP and

the second most common reason given for why participants stated they did not receive care when they felt they needed it. These findings indicate the urgent need for health care policies for the homeless that are oriented towards connection and continuity of care.

Demographic results describe a population vastly disadvantaged in terms of education and social and physical resources. Effective long-term planning to improve the health of Canadian communities by improving the health of the homeless will need to address the specific vulnerabilities of homeless individuals. This could be at least in part achieved by addressing underlying issues, such as the high rates of substance dependence and concurrent disorders. Promising research on the biopsychosocial mechanisms underlying adverse childhood and trauma early in life and the highlighting risk of developing severe mental disorders and addiction provide scientific evidence for targeted and general preventive measures, such as supporting disadvantaged families. [24]. Disadvantages in childhood and repetitive experiences of maltreatment and neglect starting at an early age are among the most common experiences shared among this population, and have measurable effects on important areas of brain development implicated in addiction susceptibility, decision-making, impulse control, affect and mood and seem to influence the outcome of treating mental disorders, such as, e.g., cocaine dependence [24, 25]. One-fifth of our sample met diagnostic criteria for a current PTSD, while over half of all of the participants stated that they have experienced a traumatic event in their past, both findings suggesting a common history of impactful trauma.

Mental health in three different urban settings

High rates of mental disorder were found in all three cities surveyed indicating widespread need for adequate mental health and addiction services. No studies could be found that compared standardized mental disorder rates in homeless people in different-sized settings; however, results from one 1985 study [26] in the general population of North Carolina found lower rates of mental disorder in a rural setting compared to an urban setting. In contrast, our results showed that homeless people in the different-sized cities surveyed required similarly high levels of comprehensive mental health care but with different foci depending on the composition of the population. Although mental disorder rates were high in all three settings, several significant differences in the mental health and substance use profile could be identified. Participants from Victoria were more likely to be sleeping on the streets than in the other two sites and also had the highest prevalence rate of mental disorders overall. Due to the substance use restrictions and crowded conditions at many shelters, homeless people living with severe substance dependence, mental disorder or concurrent disorders may be less likely to use shelters and more likely to be sleeping in the street, abandoned buildings, parks, etc. Prince George had a significantly higher proportion of participants who had attempted suicide and who met criteria for alcohol dependence and also a higher proportion of people who identified as Aboriginal. Furthermore, we could confirm in our sample that participants who identified as Aboriginal had higher rates of alcohol dependence compared to participants of other ethnic groups. Research on Aboriginal health in Canada has found that compared to the non-Indigenous population, people of Aboriginal decent suffer from higher rates of suicide attempts and alcohol-related disorders as a result of historical and modern causes including cultural trauma, colonial oppression, displacement and poverty [27, 28]. Our results suggest that this disparity may persist even among the homeless where many health challenges are shared across ethnic boundaries. While the level of mental health disorders and addiction overall were similar there were differences in the levels of use of specific substances and of specific disorders. Further analysis will be needed to verify if these differences can be attributed to ethnicity or can be explained by confounding factors.

Health service utilization findings highlight the different needs of the three groups surveyed. For those in Victoria, the majority of who were sleeping on the street, the prevalence of receiving health care from a street nurse far exceeded that from the other two sites. Similarly, participants from Prince George, who met criteria for a higher prevalence of alcohol dependence, were more likely to have received health care from detox or had used detox treatment as a resource for drug problems. Unfortunately, although more participants from PG were at moderate to high risk of suicide at the time of interview and had attempted suicide in the past, no significant difference was found between sites in the use of crisis or suicide prevention. Results may also indicate service availability, for example, despite similar rates of substance dependence participants from Victoria were less likely to have been involved in a self-help group or to have received residential or outpatient treatment than participants in Vancouver. These results demonstrate, to some extent, the relationship between service need, service use and service availability, which can be used for more effective service planning and resourcing. For example, knowing that homeless people on the street have high rates of mental disorder and commonly access street nurses, suggests the need to properly train and resource that form of care as a gateway to more specific and appropriate services.

In sum, our results describe three BC homeless populations with high prevalence rates of mental disorders. These rates are exceeding those of the general population

by far, where 1-month prevalence rates are generally low [37]. While there are differences in Vancouver, Victoria and Prince George concerning individual diagnoses, the rate of mental disorder in all three cities was extremely high. Resourcing adequate mental health and concurrent disorder care for homeless people is needed not only in major urban centers, but also in more remote communities. Special attention to harm reduction and health care support for those who are substance dependent should be seen as a public health necessity, particularly in light of the relationship between street substance use, infectious disease transmission and mortality [29–31].

Limitations

First, no instruments that measure DSM-IV psychiatric disorders have been designed for the homeless population and although the MINI-PLUS has been used in previous homeless studies, it has not been validated specifically for the homeless population. We did not collect specific data on inter-rater reliability and interviews were neither sound nor camera recorded, so data were based on the handwritten records of the RAs and the completed questionnaires. In order to allow completion of the interview, we restricted the assessment to the more common mental disorders and did not assess mental disorders such as eating disorders or personality disorders. Thus, the overall estimated rates might underestimate the level of mental disorders and their co-morbidities. High rates of substance use disorders, as found in our participants, can make disentangling substance disorder-related symptoms from symptoms that are related to primary/independent mental disorders difficult especially in a one-time research. Furthermore, information regarding the connection between substance use and symptoms is subject to recall bias in participants, especially for those who had long-standing and interweaving experiences with mental disorder symptoms and substance use. We did not focus our assessments on further disentangling concurrent disorders from substance-related disorders, therefore we refrain from discussing this methodological and specific issue in more detail. As less than 5 % of the participants reported the respective mental disorder to be substance-related, we refrained from an attempt to disentangle substance-related disorder from the endogen/independent disorder, as it would have only minimal impact on the estimates overall.

Finally, the different characteristics of the samples restrict generalizations about the burden of mental illness in different-sized settings. Although these differences (i.e., higher proportion of Aboriginal homeless in Prince George, higher proportion of homeless people sleeping on the streets Victoria) were a natural reflection of local populations, consistent with recent local homeless counts [32, 33], it may not be considered a precise representations of the respective populations.

Conclusions

Homeless individuals are an extremely vulnerable and an underserved population. To address the health of this population more effectively health care capacity for treating mental health and addiction needs to be built and adapted to their specific needs. As the determinants and distributions of health in the homeless population vary depending on the demographic features shown by our study and others [34, 35], this process must include a sophisticated understanding of the diversity within the population. Future work needs to further address a number of issues, including: (1) co-occurring disorders; (2) the relationships between gender, ethnicity, age and mental health; (3) the differences in health-related vulnerabilities among key demographic groups and (4) the relationship between health care utilization and burden of illness.

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Conflict of interest None.

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