Public Health Reports

Homelessness, Unsheltered Status, and Risk Factors for Mortality: Findings From the 100,000 Homes Campaign

Public Health Reports
Vol. XX: 1-8

DOI: 10.1177/0033354916667501
phr.sagepub.com

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Abstract

Objectives: People who live in unsheltered situations, such as the streets, often have poorer health, less access to health care, and an increased risk of premature mortality as compared with their sheltered counterparts. The objectives of this study were to (1) compare the characteristics of people experiencing homelessness who were sleeping primarily in unsheltered situations with those who were accessing homeless shelters and other sheltered situations, (2) identify correlates of unsheltered status, and (3) assess the relationship between unsheltered status and increased risk of mortality.

Methods: Using primary data collected as part of the 100,000 Homes Campaign—a national effort to help communities find homes for vulnerable and chronically homeless Americans—we estimated 2 generalized linear mixed models to understand the correlates of unsheltered status and risk factors for mortality. Independent variables included demographic characteristics; history of homelessness, incarceration, foster care, and treatment for mental illness or substance use; sources of income; and past and present medical conditions. The study sample comprised 25 489 people experiencing homelessness who responded to an assessment of their housing and health as part of the 100,000 Homes Campaign from 2008 to 2014.

Results: In the full model, the following characteristics were associated with unsheltered status: being a veteran (adjusted odds ratio [aOR] = 1.10); having <high school education (aOR = 1.09); accessing informal income (aOR = 2.37); and having a history of foster care (aOR = 1.14), chronic homelessness (aOR = 1.36 for 1-5 years, aOR = 1.95 for >5 years), incarceration (aOR = 1.32), or substance use (aOR = 1.10 for ever abusing drugs or alcohol, aOR = 1.13 for ever using intravenous drugs, aOR = 1.98 for drinking alcohol every day for past month). Being unsheltered (aOR = 1.12), being female (aOR = 1.22), or receiving entitlements (aOR = 1.63) increased respondents' odds of having risk factors for mortality.

Conclusions: These findings highlight the need to assertively reach out to vulnerable populations and provide interventions to assist them during their transition—for example, as they exit incarceration or age out of foster care. Such a response could prevent unsheltered homelessness and thereby address increased mortality risk. Connecting people with resources to increase their access to employment, benefits, and other sources of income is especially important.

Keywords

homeless, unsheltered, mortality

People living in unsheltered situations—staying at a primary nighttime residence not intended for human habitation (eg, streets, parks, cars, abandoned buildings)[1]—often report poorer health and more symptoms of physical illness than their sheltered counterparts.[2,3] Unsheltered people frequently have serious mental illness,[3-5] cognitive disorders,[6] substance use disorders,[5-8] co-occurring mental health and substance use conditions,[7] and chronic health conditions.[5,9] Although their needs are high, they tend to receive acute rather than preventive care[10] and less frequent outpatient encounters.[3,7]

Studies show that people living in unsheltered situations are at increased risk for premature death[11] and that those who

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died while in unsheltered situations had high rates of chronic medical illness, serious mental illness, substance use disorders, and acute care utilization.[12,13] These studies led to the identification of a set of conditions or characteristics that confer particularly high risk for premature death among people living in unsheltered situations.[14-16]

The most recent point-in-time estimates of homelessness indicate that 42.6% of the >350 000 single adults who were homeless in the United States on 1 day in January 2015 were living in unsheltered situations, including one-third of homeless veterans and two-thirds of chronically homeless people.[1] Although this number represents a 32.3% decline in unsheltered homelessness since 2007, the raw numbers indicate that unsheltered homelessness is still a concern.

Previous studies have assessed the correlates and predictors of unsheltered homelessness and premature mortality among homeless populations using small study samples, often limited to service users or people in a limited geographic area. Unsheltered populations present substantial challenges to data collection because they are often not identified as homeless in local homelessness management information systems, as is the case for people seeking shelter.[17] Data collected as part of the 100,000 Homes Campaign provide an opportunity to address these challenges. The 100,000 Homes Campaign was a national effort led by Community Solutions—a nonprofit focused on finding solutions to complex social problems—to help 186 communities find homes for 100 000 vulnerable and/or chronically homeless Americans from July 2010 through July 2014. A primary strategy of the 100,000 Homes Campaign was to identify, in each participating community, every person living on the streets or in shelters and assess their housing and health using standardized instruments administered by trained volunteer interviewers.[18]

Our study had 3 objectives: (1) to compare characteristics of people experiencing homelessness who were sleeping primarily in unsheltered situations with the characteristics of those who were accessing homeless shelters and other sheltered situations, (2) to identify correlates of unsheltered status, and (3) to assess the relationship between unsheltered status and increased risk of mortality.

Methods

Measures

This study used primary data collected as part of and prior to the 100,000 Homes Campaign from 2008 through 2014 in 96 communities to assess 2 characteristics of people experiencing homelessness: sheltered status and risk factors for mortality. Sheltered status was based on respondents' selection of 1 of 6 responses to the question "Where do you sleep most frequently?" Respondents who indicated any of the following unsheltered locations were classified as unsheltered: streets, car/van/recreational vehicle, subway/bus, and beach/riverbed. Sheltered locations included shelters. Respondents who listed only "other"—or listed "other" along with sheltered locations—were excluded from analyses because we could not rule out the possibility that they were unsheltered at least some of the time. This study was approved by the University of Pennsylvania Institutional Review Board.

The selection of risk factors for premature mortality was based on work conducted in Boston, Massachusetts, that identified a profile of people experiencing homelessness who were at high risk of premature death: sleeping in unsheltered situations for at least 6 months and having at least 1 high-risk condition.[14-16] The 100,000 Homes Vulnerability Index, which was used in the 100,000 Homes Campaign, assessed the following high-risk conditions through respondents' self-report[19]:

- Trimorbidity of substance use (past or present), severe mental illness (indicated by past involuntary commitment for psychiatric treatment), and chronic medical illness (indicated by past or present diagnosis of 2 or more of the following: heart disease, diabetes, asthma, emphysema, cancer, hepatitis C, tuberculosis)
- Intensive health care service use indicated by a hospitalization (past year) or frequent emergency department visits (3 or more visits in past 3 months)
- >60 years of age
- Living with HIV or AIDS
- Liver or kidney disease
- History of frostbite, hypothermia, or immersion foot

The survey also collected information on demographic characteristics (education, race, sex, age, veteran status), the duration and frequency of homelessness, history of incarceration or foster care, sources of income, history of mental health treatment, current alcohol abuse and history of other substance use and related treatment, and past and present medical conditions. "Active" income included on- and off-the-books employment; "passive" income was from pensions, benefits, and public assistance; and other informal income came from recycling, panhandling, and the drug and sex trades.[20] Because rates of unsheltered homelessness vary substantially by geographic region—based largely on climate—we assessed average temperature in January for each state in which a 100,000 Homes Campaign community was located.[1]

Sample

Many of the 96 communities that contributed data were missing survey data. Communities were excluded from this study if ≥50% of data were missing on the item assessing sheltered status, ≥50% of data were missing on 2 or more other variables, and ≥75% of data were missing on 1 or more other variables. These criteria applied to 34 of the 96 communities, reducing the sample size from 50 607 respondents in the 96 communities to 36 540 respondents in the remaining 62 communities. Only respondents with complete data on sheltered status and all key predictors were included in the analyses,

resulting in a final analytic sample of 25 489. Although the differences between included and excluded cases were substantial, driven largely by sample size, the differences were small.

Analyses

We used Pearson's χ^2 tests to assess differences in the characteristics of sheltered and unsheltered respondents. We conducted 2 multivariate analyses. First, to understand the correlates of unsheltered status, we fit a generalized linear mixed model with demographic, homelessness, mental/behavioral health, institutional, and income characteristics as fixed effects and community as a random effect. Second, to assess if unsheltered status and other correlates were associated with increased mortality risk, we fit a generalized linear mixed model of the likelihood of meeting 1 or more of the previously outlined 6 high-risk conditions as a function of unsheltered status and demographic, homelessness, institutional, and income characteristics. Each multivariate analysis controlled for average state temperature in January. We also conducted a corresponding univariate analysis, entering each correlate as a fixed effect, with community as a random effect. All analyses were conducted with SAS/STATA 9.4.[21]

Results

Characteristics

Of the 25 489 survey respondents, 13 761 (54.0%) reported sleeping most frequently in an unsheltered situation. Compared with their sheltered counterparts, unsheltered respondents were more frequently located in areas with warmer temperatures; were male and white or other/mixed race; had a history of military service, incarceration, or foster care; and reported use of drugs and alcohol and treatment related to substance use and mental health. Compared with sheltered respondents, unsheltered respondents were less likely to have more than a high school education and more likely to obtain income through informal sources. Unsheltered respondents reported substantially longer durations of homelessness but less frequent episodes of homelessness than sheltered respondents. Also, compared with sheltered respondents, unsheltered respondents reported higher rates of each high-risk condition measured by the Vulnerability Index, except for frequent hospitalizations, being >60 years of age, and living with HIV/AIDS. Unsheltered status was more common in areas with higher temperatures and among respondents with less than a high school education, those identifying as a mixed/other race or white, males, and those who reported being homeless for 5 or more years (Table 1).

Correlates of Unsheltered Status

Results of the generalized linear mixed model for unsheltered status indicated that respondents who identified as black or Hispanic, female or transgender, and ≥60 years of age had lower odds of sleeping in an unsheltered situation; those who reported less than a high school education and a history of military service had slightly higher odds of being unsheltered. Duration of homelessness was significantly related to sleeping in an unsheltered situation: the adjusted odds of being unsheltered was 1.36 for those who had been homeless 1 to 5 years and 1.95 for those who had been homeless more than 5 years. A history of incarceration and foster care also increased the risk of sleeping in an unsheltered situation (Table 2).

Respondents' use of alcohol and drugs and lack of treatment related to both substance use and mental health increased their likelihood of sleeping in an unsheltered situation. Respondents who reported drinking alcohol every day for a month, ever abusing alcohol or drugs, ever using drugs intravenously, and ever being hospitalized against their will had increased odds of sleeping in an unsheltered situation, whereas respondents who had ever been treated for substance abuse had lower odds of being unsheltered. Finally, respondents who reported receiving more formal sources of income (eg, entitlements) had lower odds of being unsheltered (Table 2).

Although the multivariate model attenuated some of the univariate effect sizes as expected, results were generally consistent between these sets of analyses. The only exception was the effect of past substance abuse treatment, with unadjusted odds of 1.21 in the univariate analysis and adjusted odds of 0.84 in the multivariate analysis (Table 2).

Correlates of Risk Factors for Mortality

Results of the generalized linear mixed model for risk factors for mortality indicated that respondents who were sleeping in an unsheltered situation had 12% higher adjusted odds of having at least 1 risk factor for mortality. Other correlates of increased risk of mortality included being female, having served in the military, being homeless for more than 5 years, and having previously been incarcerated. Self-identifying as black and receiving income related to employment protected against risk factors for increased mortality, whereas receiving income from entitlements and other informal sources increased the likelihood of endorsing risk factors for mortality. Results were relatively consistent between multivariate and univariate analyses (Table 3).

Discussion

Our finding that unsheltered respondents were significantly different from sheltered respondents is consistent with other studies finding that people living in unsheltered situations were more frequently veterans than nonveterans,[6,22] had a history of incarceration,[6] obtained lower levels of education,[10] had significant substance use histories,[6,7,22] and were persistently homeless more frequently.[5,10,17,23,24] In addition, unsheltered respondents more frequently reported a history of foster care and accessing informal income than not. Each of these characteristics was associated with unsheltered status among the study sample;

Table 1. Characteristics of respondents to the 100,000 Homes Vulnerability Index, by sheltered status: 2007-2014 (62 US communities; n = 25 489)[a]

Variable	Sheltered (n = 11 728)		Unsheltered (n = 13 761)			Unsheltered Rate (n = 13 761)[c]	
	No.	% (95% CI)	No.	% (95% CI)	*P* Value[b]	No.	% (95% CI)
Average state temperature in Jan, °F					<.001		
<25	2412	20.6 (19.8-21.3)	1272	9.2 (8.8-9.7)		1272	34.5 (33.0-36.1)
25-34	4014	34.2 (33.4-35.1)	3347	24.3 (23.6-25.0)		3347	45.5 (44.3-46.6)
35-44	1674	14.3 (13.6-14.9)	2084	15.1 (14.5-15.7)		2084	55.5 (53.9-57.0)
≥45	3628	30.9 (30.1-31.8)	7058	51.3 (50.5-52.1)		7058	66.0 (65.2-66.9)
Demographic characteristics							
Education					<.001		
<High school	3434	29.3 (28.5-30.1)	4801	34.9 (34.1-35.7)		4801	58.3 (57.2-59.4)
High school / GED / trade school	4901	41.8 (40.9-42.7)	5642	41.0 (40.2-41.8)		5642	53.5 (52.6-54.5)
Some college	2450	20.9 (20.2-21.6)	2438	17.7 (17.1-18.4)		2438	49.9 (48.5-51.3)
College graduate	943	8.0 (7.5-8.5)	880	6.4 (6.0-6.8)		880	48.3 (46.0-50.6)
Race/ethnicity					<.001		
Non-Hispanic white	3860	32.9 (32.1-33.8)	5050	36.7 (35.9-37.5)		5050	56.7 (55.6-57.7)
Non-Hispanic black	5471	46.6 (45.7-47.6)	5386	39.1 (38.3-40.0)		5386	49.6 (48.7-50.5)
Hispanic	1291	11.0 (10.4-11.6)	1508	11.0 (10.4-11.5)		1508	53.9 (52.0-55.7)
Mixed/other[d]	1106	9.4 (8.9-10.0)	1817	13.2 (12.6-13.8)		1817	62.2 (60.4-63.9)
Sex					<.001		
Male	8237	70.2 (69.4-71.1)	10 410	75.6 (74.9-76.4)		10 410	55.8 (55.1-56.5)
Female	3442	29.3 (28.5-30.2)	3298	24.0 (23.3-24.7)		3298	48.9 (47.7-50.1)
Transgender/other[e]	49	0.4 (0.3-0.5)	53	0.4 (0.3-0.5)		53	52.0 (42.3-61.7)
Age, y					.161		
18-29	1389	11.8 (11.3-12.4)	1497	10.9 (10.4-11.4)		1497	51.9 (50.0-53.7)
30-39	1803	15.4 (14.7-16.0)	2142	15.6 (15.0-16.2)		2142	54.3 (52.7-55.9)
40-49	3420	29.2 (28.3-30.0)	4089	29.7 (29.0-30.5)		4089	54.5 (53.3-55.6)
50-59	3978	33.9 (33.1-34.8)	4724	34.3 (33.5-35.1)		4724	54.3 (53.2-55.3)
≥60	1138	9.7 (9.2-10.2)	1309	9.5 (9.0-10.0)		1309	53.5 (51.5-55.5)
Served in US military	1779	15.2 (14.5-15.8)	2262	16.4 (15.8-17.1)	.006	2262	56.0 (54.4-57.5)
Homelessness characteristics							
Years spent homeless					<.001		
<1	3644	31.1 (30.2-31.9)	2557	18.6 (17.9-19.2)		2557	41.2 (40.0-42.5)
1-5	5603	47.8 (46.9-48.7)	6405	46.5 (45.7-47.4)		6405	53.3 (52.4-54.2)
>5	2481	21.2 (20.4-21.9)	4799	34.9 (34.1-35.7)		4799	65.9 (64.8-67.0)
Times homeless and rehoused in past 3 y	8509	72.6 (71.7-73.4)	9152	66.5 (65.7-67.3)		9152	51.8 (51.1-52.6)
<4	8509	72.6 (71.7-73.4)	9152	66.5 (65.7-67.3)		9152	51.8 (51.1-52.6)
≥4	1207	10.3 (9.7-10.8)	1331	9.7 (9.2-10.2)		1331	52.4 (50.5-54.4)
Not reported	2012	17.2 (16.5-17.8)	3278	23.8 (23.1-24.5)		3278	62.0 (60.7-63.3)
Institutional history							
Ever been incarcerated	8651	73.8 (73.0-74.6)	11 278	82.0 (81.3-82.6)	<.001	11 278	56.6 (55.9-57.3)
Ever been in foster care	1696	14.5 (13.8-15.1)	2385	17.3 (16.7-18.0)	<.001	2385	58.4 (56.9-60.0)
Income[f]							
Active (employment)	2880	24.6 (23.8-25.3)	2984	21.7 (21.0-22.4)	<.001	2984	50.9 (49.6-52.2)
Passive (entitlements)	7822	66.7 (65.8-67.5)	8474	61.6 (60.8-62.4)	<.001	8474	52.0 (51.2-52.8)
Other informal income	1220	10.4 (9.8-11.0)	3812	27.7 (27.0-28.4)	<.001	3812	75.8 (74.6-76.9)
Mental health							
Ever treated for mental health problems	6319	53.9 (53.0-54.8)	7389	53.7 (52.9-54.5)	.769	7389	53.9 (53.1-54.7)
Ever hospitalized against will	2257	19.2 (18.5-20.0)	3303	24.0 (23.3-24.7)	<.001	3303	59.4 (58.1-60.7)
Substance use							
Drank alcohol every day for past month	1196	10.2 (9.7-10.7)	3171	23.0 (22.3-23.7)	<.001	3171	72.6 (71.3-73.9)
Ever abused drugs or alcohol	7261	61.9 (61.0-62.8)	9438	68.6 (67.8-69.4)	<.001	9438	56.5 (55.8-57.3)
Ever used intravenous drugs	1852	15.8 (15.1-16.5)	2912	21.2 (20.5-21.8)	<.001	2912	61.1 (59.7-62.5)
Ever treated for drug or alcohol abuse	5291	45.1 (44.2-46.0)	6490	47.2 (46.3-48.0)	.001	6490	55.1 (54.2-56.0)
Increased mortality risk	6584	56.1 (55.2-57.0)	8155	59.3 (58.4-60.1)	<.001	8155	55.3 (54.5-56.1)
Trimorbidity	566	4.8 (4.4-5.2)	977	7.1 (6.7-7.5)	<.001	977	63.3 (60.9-65.7)
Substance abuse	7723	65.9 (65.0-66.7)	10 168	73.9 (73.2-74.6)	<.001	10 168	56.8 (56.1-57.6)

(continued)

Table 1. (continued)

Variable	Sheltered (n = 11 728)		Unsheltered (n = 13 761)			Unsheltered Rate (n = 13 761)[c]	
	No.	% (95% CI)	No.	% (95% CI)	*P* Value[b]	No.	% (95% CI)
Severe mental illness	2257	19.2 (18.5-20.0)	3303	24.0 (23.3-24.7)	<.001	3303	59.4 (58.1-60.7)
Chronic medical illness	2449	20.9 (20.1-21.6)	3362	24.4 (23.7-25.1)	<.001	3362	57.9 (56.6-59.1)
Health care service use	5245	45.7 (44.8-46.6)	6330	47.2 (46.3-48.0)	.017	6330	54.7 (53.8-55.6)
Hospitalization in past year	4716	41.2 (40.3-42.1)	5660	42.3 (41.4-43.1)	.076	5660	54.5 (53.6-55.5)
Frequent emergency room visits (≥3 in past 3 mo)	2014	17.5 (16.8-18.2)	2541	18.9 (18.2-19.6)	.004	2541	55.8 (54.3-57.2)
>60 y of age	899	7.7 (7.2-8.1)	1044	7.6 (7.1-8.0)	.813	1044	53.7 (51.5-55.9)
Living with HIV/AIDS	386	3.3 (3.0-3.6)	504	3.7 (3.4-4.0)	.101	504	56.6 (53.4-59.9)
Living with liver and/or kidney disease	1363	11.8 (11.2-12.4)	2050	15.1 (14.5-15.7)	<.001	2050	60.1 (58.4-61.7)
Ever had frostbite/hypothermia/immersion foot	742	6.4 (5.9-6.8)	1466	10.7 (10.2-11.3)	<.001	1466	66.4 (64.4-68.4)

Abbreviations: CI, confidence interval; GED, general equivalency diploma.
[a]Data source: Community Solutions.[19]
[b]Based on Pearson's χ^2 test of significance to compare the difference between sheltered and unsheltered respondents.
[c]Unsheltered rate indicates the prevalence of people living in unsheltered situations who have each characteristic indicated in this table. Percentages are by row, with the denominator being the total number of sheltered and unsheltered respondents for each characteristic.
[d]Includes respondents self-identifying as Asian, Native Hawaiian / other Pacific Islander, Native American, mixed race, or other.
[e]Includes respondents self-identifying as transgender or other.
[f]Items reflect separate dichotomous variables, not mutually exclusive categories. Active income includes on- and off-the-books employment; passive income includes pensions, benefits, and public assistance; and other informal income includes income from recycling, panhandling, and the drug and sex trades.

however, other characteristics (ie, identifying as black, female, and >60 years of age) protected against unsheltered status. In univariate analyses, a history of substance abuse treatment was associated with increased odds of being unsheltered. In the multivariate model, however, respondents who indicated ever receiving treatment for substance abuse were more likely to be sheltered than those who had not received treatment, which perhaps reflects sheltered respondents' access to services or a function of the requirements for obtaining shelter.

The relationship between foster care and homelessness as an adult is well documented: compared with the general population, those who are homeless report a history of foster care 6 to 9 times more frequently.[25] Housing instability—characterized by running away from foster care or frequently transitioning among foster homes—is associated with an increased risk of homelessness among youth aging out of foster care, indicating a lack of social support or ability to access resources.[26] A history of foster care is also associated with longer durations of homelessness and younger age at first episode of homelessness,[27] as well as long-term difficulties related to mental health, chronic and acute health conditions, and employment difficulties that persist beyond middle age.[28] Although research has not linked foster care to unsheltered homelessness, experiences in adulthood that are related to a history of foster care are consistent with risk factors for unsheltered homelessness.

Respondents who were receiving entitlement income had almost 30% higher adjusted odds of being sheltered than those who were not receiving entitlement income, a finding that is consistent with research conducted among veterans experiencing homelessness that found that those receiving compensation related to service-connected disabilities were less likely to be unsheltered than those who were not receiving compensation[7] and less likely to be persistently homeless.[17] This relationship, which holds true even for families that are avoiding housing instability or eviction, may symbolize "uncertainty of income," making it difficult to budget or plan for accessing shelter, which usually comes with a price.[29] The finding that respondents accessing other informal income were significantly more likely to be unsheltered than those who were not accessing other informal income may be related to uncertainty of income, but it may also be a symptom of living in an unsheltered situation.

Compared with sheltered respondents, those living in unsheltered situations had higher odds of meeting Vulnerability Index criteria for increased risk of mortality. The correlates of increased risk of mortality were similar to what was found for unsheltered status, with 2 important differences: respondents receiving entitlements and women were less likely to be unsheltered but had greater odds of increased risk of mortality, 1.63 and 1.22, respectively. More certain income—such as that received through entitlements—may be related to the ability to budget for shelter; however, eligibility for these entitlements is based on disability, which likely contributes to recipients' risk of mortality.

To our knowledge, no studies have assessed mortality or mortality risk among unsheltered women, but a 2004 study of women staying in homeless shelters found that the mortality rate among women <45 years of age was 5 to 30 times higher than expected and about twice as high as expected among women ≥45 years of age.[30] Future research should examine the subpopulation of female respondents to identify factors associated with their increased risk of mortality—including the role of unsheltered status—and appropriate responses.

Table 2. Results of a mixed effects logistic regression model[a] assessing correlates of unsheltered status among respondents to the 100,000 Homes Vulnerability Index: 2007-2014 (62 US communities; n = 25 489)[b]

Variable	Unadjusted OR (95% CI)	*P* Value[c]	aOR[d] (95% CI)	*P* Value
Average state temperature in Jan, °F				
≥45	1 [Reference]		1 [Reference]	
<25	0.17 (0.07-0.43)	<.001	0.14 (0.06-0.35)	<.001
25-34	0.38 (0.19-0.75)	.006	0.39 (0.20-0.75)	.005
35-44	0.44 (0.17-1.11)	.081	0.50 (0.21-1.20)	.122
Education				
High school / GED / trade school	1 [Reference]		1 [Reference]	
<High school	1.18 (1.11-1.26)	<.001	1.09 (1.02-1.17)	.01
Some college	0.81 (0.75-0.88)	<.001	0.86 (0.79-0.93)	<.001
College graduate	0.72 (0.65-0.81)	<.001	0.81 (0.72-0.91)	<.001
Race/ethnicity				
Non-Hispanic white	1 [Reference]		1 [Reference]	
Non-Hispanic black	0.66 (0.62-0.71)	<.001	0.65 (0.61-0.70)	<.001
Hispanic	0.88 (0.80-0.97)	.013	0.83 (0.75-0.93)	<.001
Other/mixed[e]	1.06 (0.96-1.17)	.251	1.00 (0.90-1.11)	.964
Sex				
Male	1 [Reference]		1 [Reference]	
Female	0.76 (0.72-0.81)	<.001	0.89 (0.83-0.96)	.001
Transgender/other[f]	0.64 (0.42-0.99)	.045	0.62 (0.39-0.98)	.04
Age, y				
18-29	1 [Reference]		1 [Reference]	
30-39	1.08 (0.97-1.20)	.181	1.02 (0.91-1.14)	.717
40-49	1.08 (0.98-1.19)	.103	0.96 (0.86-1.06)	.404
50-59	1.03 (0.94-1.13)	.516	0.92 (0.83-1.02)	.106
≥60	0.87 (0.77-0.99)	.03	0.87 (0.76-0.99)	.036
Served in US military	1.09 (1.01-1.17)	.027	1.10 (1.01-1.19)	.025
Years spent homeless				
<1	1 [Reference]		1 [Reference]	
1-5	1.5 (1.40-1.61)	<.001	1.36 (1.26-1.46)	<.001
>5	2.46 (2.27-2.66)	<.001	1.95 (1.79-2.12)	<.001
Substance use				
Drank alcohol every day for past month	2.56 (2.37-2.77)	<.001	1.98 (1.82-2.15)	<.001
Ever abused drugs or alcohol	1.51 (1.42-1.60)	<.001	1.10 (1.02-1.19)	.012
Ever used intravenous drugs	1.48 (1.38-1.59)	<.001	1.13 (1.04-1.22)	.004
Ever treated for drug or alcohol abuse	1.21 (1.15-1.28)	<.001	0.84 (0.78-0.90)	<.001
Mental health				
Ever treated for mental health problems	1.05 (1.00-1.12)	.064	0.97 (0.91-1.04)	.442
Ever hospitalized against will	1.33 (1.24-1.42)	<.001	1.20 (1.11-1.29)	<.001
Institutional history				
Ever been incarcerated	1.73 (1.62-1.85)	<.001	1.32 (1.22-1.42)	<.001
Ever been in foster care	1.29 (1.20-1.40)	<.001	1.14 (1.05-1.24)	.002
Income[g]				
Active income (employment)	1.06 (0.99-1.13)	.113	0.94 (0.88-1.01)	.105
Passive income (entitlements)	0.75 (0.70-0.79)	<.001	0.78 (0.73-0.83)	<.001
Other informal income	3.14 (2.90-3.39)	<.001	2.37 (2.18-2.57)	<.001

Abbreviations: aOR, adjusted odds ratio; CI, confidence interval; GED, general equivalency diploma; OR, odds ratio.
[a]Mixed effects logistic regression model with community entered as a random effect.
[b]Data source: Community Solutions.[19]
[c]Based on Wald χ^2 test for significance to compare whether the predictor is associated with the outcome.
[d]Adjusted for all other variables in the table.
[e]Includes respondents self-identifying as Asian, Native Hawaiian / other Pacific Islander, Native American, mixed race, or other.
[f]Includes respondents self-identifying as transgender or other.
[g]Active income includes on- and off-the-books employment; passive income includes pensions, benefits, and public assistance; and other informal income includes income from recycling, panhandling, and the drug and sex trades.

Limitations

This study had several limitations. Because of missing data, a substantial portion of the original sample was excluded from analyses, which may affect the generalizability of the findings. In addition, there were significant—though not substantive—differences between respondents who were and were not

Table 3. Results of mixed effects logistic regression model[a] assessing risk factors for mortality among people responding to the 100,000 Homes Vulnerability Index: 2007-2014 (62 US communities; n = 25 489)[b]

Variable	Unadjusted OR (95% CI)	*P* Value[c]	aOR[d] (95% CI)	*P* Value
Unsheltered	1.21 (1.15-1.28)	<.001	1.12 (1.05-1.19)	<.001
Education				
<High school	1 [Reference]		1 [Reference]	
High school / GED / trade school	1.19 (1.12-1.26)	<.001	1.13 (1.06-1.20)	<.001
Some college	1.12 (1.04-1.20)	.002	1.11 (1.03-1.20)	.004
College graduate	1.25 (1.13-1.39)	<.001	1.29 (1.16-1.44)	<.001
Race/ethnicity				
Non-Hispanic white	1 [Reference]		1 [Reference]	
Non-Hispanic black	0.76 (0.71-0.81)	<.001	0.76 (0.71-0.81)	<.001
Hispanic	0.84 (0.76-0.92)	<.001	0.92 (0.83-1.01)	.083
Other/mixed[e]	0.95 (0.87-1.04)	.31	0.96 (0.88-1.06)	.435
Sex				
Male	1 [Reference]		1 [Reference]	
Female	1.16 (1.10-1.23)	<.001	1.22 (1.14-1.30)	<.001
Transgender/other[f]	1.49 (0.98-2.26)	.062	1.48 (0.97-2.27)	.069
Served in US military	1.26 (1.17-1.35)	<.001	1.27 (1.18-1.37)	<.001
Years spent homeless				
<1	1 [Reference]		1 [Reference]	
1-5	1.35 (1.26-1.43)	<.001	1.29 (1.21-1.38)	<.001
>5	1.83 (1.70-1.97)	<.001	1.65 (1.53-1.78)	<.001
Institutional history				
Ever been incarcerated	1.44 (1.36-1.53)	<.001	1.38 (1.29-1.48)	<.001
Ever been in foster care	1.15 (1.07-1.23)	<.001	1.06 (0.99-1.14)	.12
Income[g]				
Active income (employment)	0.55 (0.52-0.59)	<.001	0.61 (0.58-0.65)	<.001
Passive income (entitlements)	1.78 (1.69-1.88)	<.001	1.63 (1.54-1.73)	<.001
Other informal income	1.26 (1.18-1.35)	<.001	1.19 (1.11-1.28)	<.001

Abbreviations: aOR, adjusted odds ratio; CI, confidence interval; GED, general equivalency diploma; OR, odds ratio.
[a]Mixed effects logistic regression model with community entered as a random effect. The dependent variable was meeting at least 1 of 6 risk factors for mortality.
[a]Data source: Community Solutions.[19]
[c]Based on Wald χ^2 test for significance to compare whether the predictor is associated with the outcome.
[d]Adjusted for all other variables in the table.
[e]Includes respondents self-identifying as Asian, Native Hawaiian / other Pacific Islander, Native American, mixed race, or other.
[f]Includes respondents self-identifying as transgender or other.
[g]Active income includes on- and off-the-books employment; passive income includes pensions, benefits, and public assistance; and other informal income includes income from recycling, panhandling, and the drug and sex trades.

included in the final analytic sample, which may reflect selection bias. Second, we were unable to assess interrater reliability across interviewers and communities, which is a concern given that the level of training and experience among raters likely varied considerably. Third, the data were based on self-report, which may be unreliable, particularly as related to duration of homelessness, use of health care services, and medical conditions. Furthermore, the Vulnerability Index did not assess behavioral health conditions. Fourth, the data provided little information on respondents' sheltered status, which made it impossible to know about or control for the duration, frequency, and history of unsheltered status. Finally, due to the cross-sectional nature of the data, the results presented here cannot be used to infer causality.

Conclusion

This study identified several factors associated with increased odds that a person would be living in an unsheltered situation, be at increased risk of mortality, or both, including extended duration of homelessness, substance use, history of incarceration and foster care, lack of reliable income, and female sex. These findings highlight the need to reach out to these vulnerable populations and provide interventions that help people during their transition from incarceration to the community or as they age out of foster care. Connecting people with resources to increase their likelihood to obtain employment, access benefits, and find other sources of income is especially important.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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