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Violence and Emergency Department Use among Community-Recruited Women Who Experience Homelessness and Housing Instability

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Abstract Women who experience housing instability are at high risk for violence and have disproportionately high rates of emergency department (ED) use. However, little has been done to characterize the violence they experience,

or to understand how it may be related to ED use. We recruited homeless and unstably housed women from San Francisco shelters, free meal programs, and single room occupancy (SRO) hotels. We used generalized estimating equations to examine associations between violence and any ED use (i.e., an ED visit for any stated reason) every 6 months for 3 years. Among 300 participants, 44% were African-American, and the mean age was 48 years. The prevalence of violence experienced in the prior 6 months included psychological violence (87%), physical violence without a weapon (48%), physical violence with a weapon (18%), and sexual violence (18%). While most participants (85%) who experienced physical violence with a weapon or sexual violence in the prior 6 months had not visited an ED, these were the only two violence types significantly associated with ED use when all violence types were included in the same model ($OR_{\text{physical/weapon}} = 1.83$, 95% CI 1.02–3.28; $OR_{\text{sexual}} = 2.15$, 95% CI 1.30–3.53). Only violence perpetrated by someone who was not a primary intimate partner was significantly associated with ED use when violence was categorized by perpetrator. The need to reduce violence in this population is urgent. In the context of health care delivery, policies to facilitate trauma-informed ED care and strategies that increase access to non-ED care, such as street-based medicine, could have substantial impact on the health of women who experience homelessness and housing instability.

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Introduction

Violence is associated with homelessness [1–3]. In fact, almost half of homeless people from five US cities report a history of violence, and rates of violence are higher among those with longer durations of homelessness [4]. Among persons experiencing homelessness, emergency department (ED) use is also disproportionately high, which is due to a combination of factors. Factors include an increased burden of chronic illness, infections, and injury; challenges accessing ongoing primary health and preventive care; premature aging; difficulty obtaining and storing medication and other unmet health needs; adverse impacts of unmet subsistence needs including food and shelter; and challenges involved with fully addressing complex health conditions during standard primary care visits [5–8]. Research focused on unstably housed individuals shows that multiple and concurrent health conditions are associated with higher rates of ED use [9], and individuals experiencing homelessness are more likely to visit an ED for violence-related injuries [10].

Women who experience homelessness are at particularly high risk for multiple types of violence and victimization from multiple perpetrators, including primary intimate partners and people who are not primary intimate partners (e.g., neighbors, ex-boyfriends, and family members) [11, 12]. However, many studies regarding characteristics of homeless persons using an ED include sample populations composed mostly (almost 80%) of men [13–15], and few studies have focused on victimization associated with ED use in women. In one of few studies to address this topic, we reported that violent victimization in women experiencing homelessness and housing instability predicts more ED visits over time, even after adjusting for psychiatric comorbidity and social determinants of health [16]. Given that homelessness has been increasing, particularly in US cities across the west coast and Hawaii [17–19], these issues are becoming more pressing at a population level.

To better understand the prevalence of and factors associated with ED use in persons experiencing homelessness [7], we conducted a community-based study among women experiencing homelessness and housing instability, with a focus on multiple types of victimization. Prior work in this area is limited. We aimed to gain a more comprehensive understanding of the issue by examining multiple categories of victimization separately and estimating associations for multiple, co-occurring

types of violence. We also accounted for preexisting health conditions that may contribute to ED use in this population apart from physical trauma associated with the violence itself. Our goal was to inform the development of services targeting unstably housed women and strategies for their ED care.

Methods

We conducted the current study within a probability sample of community-recruited homeless and unstably housed women living in San Francisco. As previously described [11], recruitment was accomplished by a mobile outreach team that approached women at free meal programs, homeless shelters, and a probability sample of low-cost single room occupancy (SRO) hotels. This recruitment strategy is based on methods developed by Burman and Koegel, which were designed to recruit representative samples of homeless individuals [20]. It recognizes health and violence risks involved with high-turnover SRO environments [21]; it also recognizes the realities of frequent transitions between literal homelessness and unstable housing [22, 23]. Employing this methodology ensured that the group of women recruited reflected San Francisco's larger population of women experiencing homelessness and housing instability rather than relying on a convenience sample, which may have included groups or social networks of individuals with similar characteristics (e.g., friends, associates, or people who use certain types of services). This approach also ensured the inclusion of women who did and did not access health care, rather than only those who presented for care.

Population

Inclusion criteria for the current study were female sex at birth, age ≥ 18 years, and a history of housing instability (slept in a public area, a homeless shelter or a battered women's shelter, or stayed with a series of acquaintances because there was no other place to sleep [i.e., "couch-surfed"]). Women living with HIV were oversampled on additional recruitment days to address questions specific to HIV-related complications.

Participants provided written informed consent for all study activities. We interviewed study participants every 6 months for up to 3 years between June 2008 and July 2012. Reimbursement of \$15 was given for each

study interview, and \$5 per month was given to update contact information. The Institutional Review Board at the University of California, San Francisco approved all study procedures.

Information and Data

The outcome of the study was self-reported ED use during the prior 6 months. We did not limit ED use to violence-related visits, but rather included all ED visits for two reasons. First, limiting a health care assessment to a patient's main symptoms may discount important contributing causes [24]. Second, violence is under-reported and under-recognized in health care encounters [25–27].

We used violence variables based on the Severity of Violence Against Women Scales [28], which we previously tested and reported, including psychological, physical, and sexual violence perpetrated by both primary intimate partners and people who were not primary intimate partners [11]. Dissimilar from our prior work, we made a distinction between physical violence with and without weapons in the current study. The existing health conditions we included were cold or flu symptoms, HIV infection, chronic health conditions (i.e., heart disease, high blood pressure, diabetes, emphysema, asthma, or hepatitis), and sexually transmitted infections or gynecological symptoms (i.e., severe pelvic pain, burning during urination, blood in the urine, abnormal discharge or odor, new sores, lumps or warts on the genitals)[29].

Analysis

We employed chi-square tests and generalized estimating equation (GEE) logistic models to estimate associations between dependent and independent variables. Dependent and independent variables were measured in the same 6-month period; responses at each 6-month study interview were treated as repeated measures.

Prior research indicates that violence increases the risk of homelessness in women [1, 30] and also predicts worse future mental health in this population [16]. The existing evidence therefore suggests that homelessness and mental health may be on the causal pathway between violence and health care use; thus, adjusting for these mediating factors could remove a portion of the effect from violence (i.e., “over-adjust”) [31, 32]. To

assess violence effects alone, as well as conditioned on homelessness and mental health [33], we created adjusted models with and without each factor. We defined homelessness as spending any nights sleeping in a shelter or public place (e.g., car, abandoned building, a park, or the street). Mental health status was measured by the SF-12 mental health composite score, a value ranging from 0 to 100, where higher scores indicate better health, and the average score in the general population is 50/100 [34].

In addition to the main study analysis, we conducted a separate analysis to better understand temporality of associations. The additional analysis lagged ED visits by one study interview (i.e., violence was assessed at time t and ED use was assessed at time $t + 6$ months). We also estimated associations between ED use and the number of violence types reported (range 0–4). Finally, potential effect modification and interaction between HIV and other study factors, as well as between violence types, were also considered. All analyses were done using Stata Version 15.0 (Stata Corp., College Station, TX).

Results

Over 90% of eligible individuals agreed to participate in the study, resulting in a sample of 300 women who completed 1600 interviews. Participants had variable study follow-up periods due to rolling recruitment, death during the study period, and loss to follow-up. As a result, 171 (57%) participants completed at least six interviews, 45 (15%) completed five interviews, 29 (10%) completed four, 17 (6%) completed three, 18 (6%) completed two, and 20 (7%) completed one. Increasing age was significantly associated with an increasing number of study visits, while “other” race/ethnicity and physical violence without a weapon were associated with fewer study visits. Among completed interviews, we observed 0% item non-response for variables used in the current analysis. We did not impute data from missed visits.

The median age of study participants was 48 years and 70% were ethnic minority women (Table 1). Almost 60% of study participants reported homelessness during at least one study visit. Almost two-thirds (62%) of participants reported at least one existing chronic health condition during the study, 78% reported cold or flu symptoms, and 13% reported an STI or gynecological

symptoms. In addition, half of the study population was HIV-positive due to oversampling women living with HIV.

Among study participants, 87% experienced psychological violence, 48% experienced physical violence without a weapon, 18% experienced physical violence with a weapon, and 18% experienced sexual violence during the entire study (Table 1, Fig. 1). In combination, 87% experienced any type of violence, and 52% experienced more than one type of violence during the study. Among the 1600 interviews completed, 694 (43%) included 0 type of violence reported during the prior 6 months, 593 (37%) included only one type of violence experienced, 231 (14%) included two types of violence, 60 (4%) included three types of violence, and 22 (1%) included four types of violence (Table 2, Fig. 1). Positive significant associations were observed between each violence type, with odds ratios ranging from 8.63, 95% CI 4.09–18.22 (psychological violence and sexual violence) to 32.73, 95% CI 16.33–65.60 (psychological violence and physical violence with no weapon).

Almost three-fourths (72%) of participants reported an ED visit during the study period. In adjusted analyses that accounted for repeated measures, age, race, sleeping in a shelter or public place, existing health conditions, and one type of violence at a time, all four types of violence were significantly associated with ED use ($OR_{\text{psychological}} = 1.43$, 95% CI 1.11–1.85; $OR_{\text{physical/no weapon}} = 1.83$, 95% CI 1.32–2.54; $OR_{\text{physical/weapon}} = 2.82$; 95% CI 1.66–4.78; $OR_{\text{sexual}} = 3.04$; 95% CI 1.87–4.93). In adjusted analyses that included all violence types together, physical violence with a weapon ($OR_{\text{physical/weapon}} = 1.83$; 95% CI 1.02–3.28) and sexual violence ($OR_{\text{sexual}} = 2.15$; 95% CI 1.30–3.53) were the only violence types that maintained a significant association with ED use (Table 1).

When homelessness was added to the final model (adjusted odds ratio = 1.89, 95% CI 1.42–2.51), other estimates did not change appreciably, and levels of significance did not change (Table 1). Similarly, when mental health status was added to the final model (adjusted odds ratio 0.98; 95% CI 0.97–0.99), other estimates did not change appreciably and levels of significance did not change (Table 1).

When violence types were adjusted and restricted by whether the perpetrator was or was not a primary intimate partner, all four types of violence were associated with ED

use only when the perpetrator was not a primary intimate partner (Table 3). When all visits were included in adjusted analysis, but violence was lagged by 6 months relative to ED visits, associations were no longer significant ($OR_{\text{physical/weapon}} = 0.95$; 95% CI 0.95–1.81 and $OR_{\text{sexual}} = 1.69$; 95% CI 0.93–3.07). We did not observe effect modification or interaction between violence variables or between violence variables and HIV. However, we did observe a dose-response relationship between the number of violence types experienced and ED use (Table 4).

Discussion

Results presented here confirm that rates of violence against women experiencing homelessness and housing instability are substantially higher than rates of violence in the general population, even more common than previously reported in other homeless populations, and higher among women who present for emergency care. Compared with 1.6% of U.S. women [35] and 0.14% of all US adults [36] who report sexual assault in the prior 12 months, 6.1% of participants reported sexual assault during the first year of study participation. Compared with 0.005% of all US adults who report violent crime involving a weapon in the prior year [36], 9.0% of participants reported physical violence with a weapon during the first year of study participation. Compared with almost 50% of homeless men and women from five US cities who report a lifetime history of physical violence [4], almost 50% of women participating in the current study reported physical violence in the past 6 months alone. In addition to violence, homelessness and mental health status were also independently associated with ED use; however, there was no evidence suggesting that these factors mediated the effect of violence on ED use. Given the recent increases in homelessness, particularly in the Western United States [17–19], our findings indicate an urgent need for violence prevention in homeless and unstably housed women. They also indicate a growing need for trauma-informed ED care as well as strategies to increase access to non-ED care, such as street-based medicine, for the 85% of victimized women who do not access emergency services.

Violence Prevention

The rate of gun-involved physical violence among study participants experiencing homelessness was 1800 times

Table 1 Associations between study factors (past 6 months) and emergency department use (past 6 months) in homeless and unstably housed San Francisco women over a 3-year time period ($N = 300$, 1600 observations)

	Overall prevalence among participants	Odds ratio (95% CI) unadjusted	Odds ratio (95% CI) adjusted for all violence types	Odds ratio (95% CI) adjusted for all violence types and homelessness	Odds ratio (95% CI) adjusted for all violence types and mental health
Homeless [○]	175 (58%)	2.23 (1.71–2.92)*	–	1.89 (1.42–2.51)*	–
Mental health score [▷]	Mean = 42	0.97 (0.96–0.98)*	–	–	0.98 (0.97–0.99)*
Age at baseline (10 years)	Mean = 47	0.91 (0.76–1.09)	0.85 (0.70–1.02)	0.90 (0.75–1.08)	0.86 (0.71–1.04)
Race/ethnicity					
Caucasian	90 (30.0%)	(ref)	(ref)		
African-American	130 (43.3%)	0.98 (0.67–1.43)	1.00 (0.68–1.45)	0.98 (0.67–1.43)	1.10 (0.75–1.62)
Latina	15 (5.0%)	0.78 (0.37–1.62)	0.70 (0.35–1.39)	0.74 (0.38–1.45)	0.75 (0.38–1.48)
Other	55 (18.3%)	2.23 (0.81–6.14)	1.69 (0.67–4.23)	1.97 (0.81–4.82)	1.91 (0.72–5.10)
Mixed race	10 (3.3%)	1.55 (0.96–2.51)	1.46 (0.90–2.38)	1.50 (0.93–2.42)	1.59 (0.96–2.62)
HIV positive	152 (50.7%)	0.76 (0.56–1.05)	0.72 (0.53–1.00)	0.78 (0.56–1.08)	0.74 (0.53–1.02)
Any chronic conditions [‡]	186 (62.0%)	1.91 (1.44–2.53)	1.82 (1.35–2.45)*	1.82 (1.35–2.44)*	1.75 (1.30–2.36)*
Any STI or gynecological symptoms	40 (13.3%)	2.34 (1.68–3.26)*	1.64 (1.16–2.32)*	1.55 (1.09–2.20)*	1.55 (1.10–2.19)*
Cold/flu symptoms	227 (75.7%)	3.42 (2.40–4.87)*	3.08 (2.15–4.40)*	3.07 (2.15–4.38)*	2.97 (2.05–4.29)*
Psychological violence	260 (86.7%)	1.69 (1.31–2.18)*	1.19 (0.90–1.58)	1.16 (0.88–1.53)	1.15 (0.86–1.52)
Physical violence, no weapon	145 (48.3%)	2.04 (1.49–2.79)*	1.33 (0.91–1.96)	1.24 (0.84–1.83)	1.20 (0.82–1.77)
Physical violence, with a weapon	53 (17.7%)	3.32 (1.94–5.69)*	1.83 (1.02–3.28)*	1.82 (1.02–3.26)*	1.83 (1.02–3.28)*
Sexual violence	54 (18.0%)	3.52 (2.14–5.78)*	2.15 (1.30–3.53)*	1.95 (1.15–3.29)*	2.15 (1.30–3.57)*

*95% CI does not include 1

[‡]Chronic conditions: heart disease, high blood pressure, diabetes, emphysema, asthma, or hepatitis[○] Any nights spent sleeping in a shelter or public place (e.g., car, abandoned building, or the street)[▷] SF-12 mental health composite score ranging from 0 to 100 where higher scores indicate better health (general population average = 50/100)

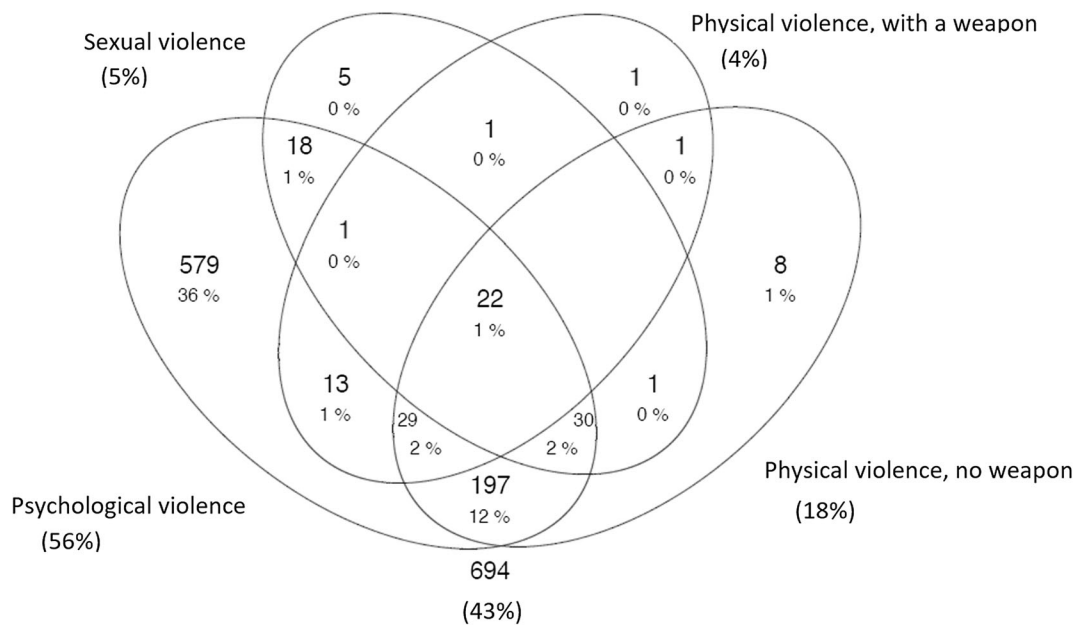


Fig. 1 Overlapping violence types experienced during the study ($N = 1600$ observations)

higher than the general population, and sexual violence was 44 times higher.

These findings are consistent with prior research linking unstable living situations with violence against low-income women. For example, our prior research indicates that the prevalence of physical violence is high in low-income women and more common in those who are unable to meet basic subsistence needs (i.e., insufficient access to housing, food, clothing, and hygiene needs) [11]. Similarly, multiple studies show that longer periods of homelessness predict violence in unstably housed women [37, 38]. While improving services for victimized women is an important endeavor, preventing violence should be the priority. Considered in combination, the existing evidence suggests that housing is central to violence against low-income women. Preventing violence in this population will require the provision of safe, affordable housing.

The Expansion of Street-Based Care for a Growing Population

Considering decreases in affordable housing and increases in US homelessness over the past five years [17–19], the provision of affordable housing may not be an option for reducing violence in many parts of the country. Absent housing, there is a need for the expansion of community and street-based care provision for

the growing number of people who experience homelessness. While the existing evidence supports community-based care for improving the health of homeless individuals [39], including those with severe mental illness [40] or additional complications like HIV infection [41], community and street-based programs are still relatively rare.

Understanding Violence Patterns to Improve ED Care

We found that ED use over a 6-month period was significantly associated with multiple types of violence experienced during the same period, but not 6 months later. This may reflect the fact that emergency departments are meant to provide acute, stabilizing care for patients, but not to address longer-term health outcomes.

The odds of ED use increased, as the number of violence types experienced increased. The knowledge that many low-income women who present to the ED have experienced multiple types of violence could improve care and referral for additional services. However, providers can only assist those who visit the ED and report this issue. While ED visits were associated with multiple types of violence, the majority of participants who experienced violence had not visited the ED in the same 6-month period. It may be that participants did not seek any care, which would be consistent with prior research

Table 2 Overlapping violence type combinations experienced during the study

Violence combinations	Frequency among all interviews
No violence	694
1 violence type	
Psychological (P) violence only	579
Physical violence/weapon (PHW) only	1
Physical violence/no weapon (PHNW) only	8
Sexual violence (S) only	5
2 violence types	
P & PHW	13
P & PHNW	197
P & S	18
PHW & PHNW	1
PHW & S	1
PHNW & S	1
3 violence types	
P & PHW & PHNW	29
P & PHW & S	1
P & PHNW & S	30
PHW & PHNW & S	0
4 violence types	
P & PHW & PHNW & S	22
Total	1600

reporting substantial barriers to care-seeking among women who survive violence [42, 43], and underreporting of violence in health care settings

Table 3 Associations between perpetrator-specific violence (past 6 months) and emergency department use (past 6 months) in homeless and unstably housed San Francisco women over a 3-year time period ($N = 300, 1600$ observations)

	Odds ratio (95% CI) adjusted [Ⓜ]
Psychological violence by a primary intimate partner	1.22 (0.90–1.65)
Psychological violence by a non-primary intimate partner [Ⓜ]	1.29 (1.00–1.66)
Physical violence, with no weapon by a primary intimate partner	1.53 (0.93–2.51)
Physical violence, with no weapon by a non-primary intimate partner [Ⓜ]	1.66 (1.16–2.38)*
Physical violence, with a weapon by a primary intimate partner	1.06 (0.37–3.04)
Physical violence, with a weapon by a non-primary intimate partner [Ⓜ]	3.21 (1.72–5.96)*
Sexual violence by a primary intimate partner	1.88 (0.84–4.21)
Sexual violence by a non-primary intimate partner [Ⓜ]	2.93 (1.60–5.40)*
Any violence by a primary intimate partner	1.33 (0.91–1.96)
Any violence by a non-primary intimate partner [Ⓜ]	1.32 (1.02–1.70)*

*95% CI does not include 1

[Ⓜ] Someone who was not a primary intimate partner (e.g., neighbor, ex-boyfriend, or family member)

Table 4 Dose-response association between number of violence types experienced (past 6 months) and emergency department use (past 6 months) in homeless and unstably housed San Francisco women over a 3-year time period ($N = 300, 1600$ observations)

	Adjusted [Ⓜ] odds ratio (95% CI)
0 Violence types reported	(Ref)
1 Violence type reported	1.23 (0.92–1.64)
2 Violence types reported	1.68 (1.16–2.44)*
3 Violence types reported	3.70 (2.01–6.82)*
4 Violence types reported	4.88 (1.89–12.59)*

*95% CI does not include 1

[Ⓜ] Adjusted for age, race-ethnicity, HIV, chronic conditions, and STD or flu/cold symptoms

[25–27]. On the other hand, it may be that participants obtained non-emergency care. In either case, low-barrier access to care for acutely injured or otherwise traumatized women experiencing homelessness is worthy of future investigation.

While violence is significantly associated with ED use, individuals often choose not to report it, especially if it is not the primary reason for their visit [44]. There are a variety of reasons for choosing not to divulge a recent violent experience. Some women may not consider such experiences unusually distressing or harmful due to the normalization of certain violence types in low-income women [45–47]. Others may consider such experiences distressing or harmful, but not disclose them due to a variety of issues. Issues include re-traumatization,

fear of retaliation by perpetrators, public exposure and cross examination, shame, a sense of responsibility, stigma within a community or social network, the time and cost of legal processes, and concerns with a victim's own criminal history (e.g., active warrants, bail, or parole restriction that would put the victim's freedom in jeopardy) [44]. In addition, mandatory reporting laws enacted in some states may discourage both physicians from screening for violence and women from reporting it [48–51], a scenario that has resulted in calls for victim outcome data to shape future health policy and legislation [50].

EDs provide a disproportionate amount of care for individuals experiencing homelessness [7]. The high level of violent victimization we found among study participants is important in two ways. First, most EDs screen for intimate partner violence at the time of triage. However, it was more common for study participants to report violence by someone who was not a primary intimate partner. Results presented here therefore suggest that the standard ED assessments for violence should be expanded beyond intimate partner violence to include all violence. Second, results suggest that ED providers may benefit from adopting trauma-informed strategies to optimize care for women who have experienced homelessness and housing instability. Taking the time to obtain a complete history of traumatic experiences may not be possible or appropriate in the ED given high patient volumes and acuity. To help address this barrier, Fischer and colleagues have developed trauma-informed strategies for ED care that focus on decreasing the immediate stress response to prevent the development of PTSD symptoms [52]. They include recognizing signs and symptoms of trauma survivors, de-escalating symptoms by providing “psychological first aide,” and increasing patient well-being by adequately controlling pain [52].

While EDs are adept at providing acute care for psychiatric emergencies [53], they may be underequipped or understaffed to provide trauma-informed care. In such cases, EDs could consider training a clinical champion in trauma-informed care. Champions could facilitate warm hand offs to primary care, mental health, and trauma recovery providers and assist patients in planning for self-care. The addition of trauma-informed champions

to ED care teams is consistent with the evolving role of EDs, which increasingly support primary care practices and after hours of care [54].

Limitations

The interpretation of the findings reported here is subject to several potential limitations, including the fact that data collection ended 7 years ago. Acknowledging that social and political landscapes are in constant flux, homelessness in San Francisco has actually increased since the study period [55, 56], while violence and ED use among homeless persons remain high [6], suggesting that our results could be underestimating current violence among homeless women. In addition, ED use was self-reported; however, prior studies show acceptable validity of self-reported health services use among people who experience homelessness [57, 58]. Also, while violence was more common in this sample of homeless and unstably housed women than the general population, combinations of multiple violence types were still relatively uncommon, and confidence intervals for ED use in the presence of multiple violence types were large. Future studies that include larger samples would improve reliability of these estimates. Finally, visit-level ED data were not collected. It was therefore not possible to analyze data by visit or isolate ED visits for which violent victimization was the primary cause.

Conclusions

Women experiencing homelessness also experience high rates and multiple types of violence. Homelessness and violence are likely under-identified in EDs, and the vast majority of women experiencing both do not access ED care. Our study supports policies “upstream” of ED use intended to increase housing and prevent homelessness, in addition to interventions designed to improve physical and psychosocial health of women who experience violence [30, 59, 60]. Our study also supports policies and programs “downstream” of ED use. In the context of ED health care delivery, this includes violence screening tools that account for all violence types, the exploration of ED-based trauma-informed care strategies, which may include the addition of “trauma champions” to ED teams, and the expansion of street-based health delivery services for the large majority

of victimized women who do not present to EDs. The implementation of such policies and practices could positively impact the health of the growing population of women experiencing homelessness.

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Compliance with ethical standards

The Institutional Review Board at the University of California, San Francisco approved all study procedures.

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