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SUPPLEMENT ARTICLE

Serious Mental Illness Among Young People Who Inject Drugs: An Assessment of Injection Risks and Healthcare Use

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Background. Data on behavioral correlates of mental illness among young people who inject drugs (PWID) are limited. We examine injection risks and healthcare use among young PWID with probable serious mental illness (PSMI).

Methods. People who inject drugs were recruited and interviewed in 20 US cities for 2015 National HIV Behavioral Surveillance. Probable serious mental illness was assessed using the Kessler-6 screening scale. Bivariate analyses using log-linked Poisson regression with generalized estimating equations adjusted for design covariates were conducted to examine associations between PSMI and behaviors among PWID ages 18–29 years.

Results. Of 1769 young PWID, 45% had PSMI. Compared to those without PSMI, PWID with PSMI were more likely to report injecting more than once a day, receptive syringe sharing, sharing of other injection equipment, and unmet needs for medical care and substance use disorder (SUD) treatment. Those with PSMI were less likely to use syringe services programs than those without PSMI.

Conclusions. Approximately half of young PWID had PSMI. People who inject drugs with PSMI engaged in high-risk injection behaviors and encountered barriers to healthcare. Human immunodeficiency virus prevention programs such as Syringe Services Programs (SSPs) could benefit from screening for mental illness among young PWID and strong linkage to healthcare, including mental health and SUD treatment.

Keywords. mental health treatment; people who inject drugs; programs; serious mental illness; syringe services.

The rise in the number of young people who inject drugs (PWID) in the United States [1] during the opioid crisis is a growing concern for human immunodeficiency virus (HIV) prevention. Comparisons to national surveys show that younger PWID in community samples often experience higher rates of major depression, alcohol dependence, antisocial personality disorder, and borderline personality disorder than the general population of 18- to 29-year-olds [2]. Mental illness has been linked to increased HIV risk among PWID [3–5]. People who inject drugs with mental illness are more likely to report higher frequency of injection [6], receptive syringe sharing [7, 8], and equipment sharing [9, 10] compared to PWID without mental illness. Although some mental illnesses may predate substance use disorders (SUD) [11], substance use can also cause or exacerbate mental illness (eg, substance-induced major depression). Psychological distress and mental health disorders, especially depression, are highly incident [12] and prevalent [13] among PWID in both SUD treatment and nontreatment settings. For example, psychiatric and SUD comorbidity was high among a sample of people, recruited from a Syringe Services Program (SSP), who injected heroin [14]; more than half were diagnosed with a lifetime Axis I disorder (eg, major depression) or antisocial personality disorder. In addition, the vast majority of PWID in a community sample in Canada reported depressive symptomology (81.4%) with more than half reporting severe depressive symptomology (57.7%) [4]. Severe symptomology is associated with greater levels of risky injection practices [15]. The use of brief screening tools in a range of healthcare settings to identify possible mental illness is critical to ensure adequate linkage to care.

Young PWID who practice unsafe injection practices are at especially high risk for HIV. A study comparing sociodemographic and risk behaviors found that HIV infection was more likely to be recent in PWID who were young (18–29 vs ≥40 years) and had receptively shared syringes [16]. Although there is lower prevalence of HIV among younger PWID in comparison to their older counterparts, their behaviors such as receptive syringe sharing place them at increased risk of HIV infection and could lead to a rapid spread in this vulnerable population [17, 18]. An investigation of young PWID in the United States found that some mental illnesses (ie, substance-induced depression and borderline personality disorder), but not all (ie, primary

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major depression, anxiety disorders, and antisocial personality disorders), were associated with risky injection behavior in a community sample of young PWID [19].

A large gap exists between the number of people with co-occurring mental health and SUDs and the number receiving treatment for these conditions [20]. Adults with co-occurring mental disorders have higher rates of perceived unmet need for mental healthcare [21], and mental health conditions are associated with increased barriers to access health and social services [22]. Few data are available to inform service provision for the potentially synergistic effects of mental illness and SUD comorbidity on the risk behaviors among PWID [5] and their prevention and healthcare use. Even less is known about young PWID in the context of the current opioid crisis [2]. More information about how mental illness relates to injection risk behaviors among PWID such as sharing syringes and equipment, as well as possible protective health behaviors such as obtaining needed medical care and SUD treatment and using SSPs (community-based prevention programs providing access to and disposal of sterile syringes and injection equipment; and vaccination, testing, and linkage to care and treatment for infectious diseases), would allow for more targeted prevention work with this population. This analysis aimed to understand the relationship between probable serious mental illness (PSMI), injection risk behaviors, and healthcare use among young PWID across 20 cities with high acquired immune deficiency syndrome prevalence in 2015.

METHODS

Sampling and Eligibility

Data for this analysis were collected in 2015 as part of National HIV Behavioral Surveillance (NHBS) among PWID; methods are described in detail elsewhere [23]. In short, NHBS was conducted in 20 metropolitan statistical areas, which represented approximately 45% of all diagnosed HIV infections in 2014 in urban areas with a population of at least 500 000 [24]. Participation was limited to persons who were aged at least 18 years, residents of the city, able to complete the interview in English or Spanish, did not already complete the survey, and were able to provide informed consent. Eligible participants also needed to (1) report injecting a drug not prescribed for them during the past 12 months and (2) present physical evidence of recent injection (eg, track marks) or (3) adequately describe their injection practices.

Participants were recruited using respondent-driven sampling (RDS) [25]. Recruitment started with a limited number of initial participants, called "seeds," who were purposefully chosen by project staff. Eligible seeds were asked to recruit, using a system of coded coupons, up to 5 persons whom they knew personally and who injected drugs. Those persons, in turn, completed the interview and recruited others. Recruitment by eligible participants continued in successive waves until sample size was reached or until a predetermined date.

Trained interviewers administered a standardized questionnaire using portable computers to collect information about behavioral risks for HIV infection, HIV testing history, and use of HIV prevention services. Blood-based rapid HIV testing was performed in the field for all consenting participants, and blood specimens were collected for confirmatory laboratory-based testing. In exchange for their time, participants received $20–$30 for completing the interview and $10–$25 for HIV testing (amount determined locally). Participants who agreed to recruit others received an additional $10 for each recruit who completed the interview. No personally identifying information was collected. Activities were approved by the Centers for Disease Control and Prevention [26, 27] and local institutional review boards for each of the 20 participating cities.

Measures

Variables used for this analysis included background characteristics, PSMI, drug injection history, injection risk behaviors, and prevention behaviors and healthcare use. All participants completed the Kessler-6 screening scale for serious mental illness [28]. The Kessler-6 has been demonstrated to accurately identify people likely to have a psychiatric disorder in the general population [28], people with HIV infection [29], and people with SUDs [30]. In addition, the 10-item version of the Kessler-6 was found to be a reliable indicator of affective disorder among PWID [31]. An example item includes the following: "During the past 30 days, how often did you feel hopeless?" Respondents with scores of 13–24 were classified as having PSMI (scale range 0–24) [28].

Household income was dichotomized into at/below versus above the federal poverty level according to US Department of Health and Human Services Poverty Guidelines 2015 [32]. Homelessness was defined as living on the street, in a shelter, a single room occupancy hotel, or in a car, at any time in the past 12 months. Time since first injection was calculated based on participant age at first injection and current age. Participants were asked how often they injected any drug in the past 12 months; responses were dichotomized as more than once a day or once a day or less. Receptive syringe sharing was defined as injecting with a needle or syringe that had already been used by someone else, and distributive sharing was defined as giving a needle or syringe to someone else after they had already used it for injection.

Participants were asked about their awareness of pre-exposure prophylaxis (PrEP) by asking whether they ever heard of people who do not have HIV taking PrEP; they were also asked whether they had received HIV testing in the past 12 months. Participants were asked whether they currently had health insurance or healthcare coverage, whether they had seen a healthcare provider in the past 12 months, and whether

there was any time in the past 12 months when they needed medical care but did not get it because they could not afford it. Participants were asked about participating in SUD treatment in the past 12 months including outpatient, inpatient, residential, detox, methadone treatment, or 12-step programs; they were also asked whether they tried to get into a program to treat drug use in the past 12 months but were unable to. Participants were considered to use SSPs as their primary source of syringes if they only obtained their syringes from a SSP in the past 12 months, or whether a SSP was the most common place where they got their syringes in the past 12 months among all of their sources.

Human immunodeficiency virus serostatus was determined by performing an HIV test at the time of the survey. Participants were considered HIV negative if they had a nonreactive rapid HIV test result or a negative laboratory test result if a rapid test was not conducted and no self-report of a previous HIV-positive test result. Participants were considered HIV-positive if they had a reactive rapid HIV test result confirmed by supplemental laboratory-based testing, or a positive result by laboratory-based testing without a rapid HIV test. All participants with an HIV-positive test result were referred to appropriate local HIV medical care services, and all participants were offered referrals for relevant social and medical needs (eg, housing, wound care).

Data Analysis

Participants were included in this analysis based on the following criteria: aged 18–29 years, had no missing recruiter information, had a valid HIV test result, and completed the interview. We used log-linked Poisson regression models with generalized estimating equations to examine associations of PSMI with injection risk behaviors and with prevention behaviors and healthcare use among PWID ages 18–29 years. We considered potential confounders based on published literature, epidemiologic relevance, and statistically significant ($P < .05$) association with PSMI. Consequently, the model for each outcome included gender. In addition, all models accounted for RDS sampling methodology and the dependence among observations linked to one another in recruitment networks by clustering on recruitment chain and adjusting for self-reported network size and the city of interview. Adjusted prevalence ratios (aPRs) and 95% confidence intervals (CIs) are reported. All analyses were conducted using SAS 9.4 (SAS Institute Inc., Cary, NC).

RESULTS

The analysis sample included 1769 young PWID (Table 1), with a median age of 26 years (data not shown), 69% of whom were male, 65% were white, 21% Hispanic/Latino, and 7% black. Seventy-one percent lived at or below the poverty level, the majority were homeless in the past 12 months (77%), and more than half had been incarcerated in the past 12 months (53%). Forty-one participants (2%) were HIV positive.

The primary drug injected for the majority of young PWID (78%) was heroin, 41% began injecting drugs at age 18 years or younger, and 37% had been injecting for more than 6 years. Approximately half of the young PWID (45%) scored at or above the cutoff for PSMI on the Kessler-6. Scores ranged from 0 to 24; the mean scale score was 11.80 (standard deviation = 5.09).

Injection risk behaviors were higher among those with PSMI than among those without PSMI (Table 2). Those with PSMI were more likely to report injecting more than once a day (83% vs 76%; aPR = 1.19; CI, 1.02–1.38), receptive syringe sharing (56% vs 47%; aPR = 1.21; CI, 1.08–1.36), receptive sharing of injection equipment (74% vs 64%; aPR = 1.26; CI, 1.12–1.42), receptive sharing of a syringe to divide drugs (52% vs 41%; aPR = 1.22; CI, 1.11–1.35), and distributive syringe sharing (61% vs 55%; aPR = 1.13; CI, 1.01–1.26) than those without PSMI.

There were no significant differences in whether those with PSMI received an HIV test in the past 12 months or had heard of PrEP. No significant differences were observed between PWID with and without PSMI on whether they had health insurance, saw a healthcare provider, or attended SUD treatment in the past 12 months. However, those with PSMI were more likely to report that they were unable to get medical care due to cost (38% vs 23%; aPR = 1.42; 95% CI, 1.25–1.60) and unable to get into SUD treatment in the past 12 months (37% vs 25%; aPR = 1.33; 95% CI, 1.20–1.46). They were also less likely to report that SSPs were their most common source of syringes (30% vs 34%; aPR = 0.88; 95% CI, 0.78–0.99).

DISCUSSION

Approximately half of the sample of more than 1700 young PWID from 20 geographically diverse communities in the United States were classified as having PSMI. The PWID with PSMI were more likely to engage in injection practices that put them at risk for HIV, report trouble accessing SUD treatment, and have unmet needs for medical care. Use of SSPs as the primary source of syringes was low among young PWID and even lower among those with PSMI.

Our analysis showed high rates of PSMI similar to other community samples of PWID [12]. Approximately three fourths of all lifetime mental disorders onset by the mid-20s [33], and focusing on treatment of comorbid mental health issues such as depression in younger PWID may incur bidirectional benefits. Those who embark on mental health treatment may be more likely to achieve gains in risk reduction [6] and be retained in SUD treatment [34]. One study found that although mental illnesses such as anxiety were linked to syringe sharing, use of psychotropic medications was negatively related to this risk [35]. Substance use care can also play a key role in improving mental health outcomes [12]; although not specific to PWID,

Table 1. Sample Characteristics and Prevalence of Probable Serious Mental Illness[a] Among Young People Who Inject Drugs, 20 US Cities, 2015

Characteristic	Total		No Probable Serious Mental Illness		Probable Serious Mental Illness	
	n	%	n	%	n	%
Background Characteristics						
Gender						
Female	547	31	260	27	281	35
Male	1212	69	696	72	509	64
Transgender	8	<1	5	<1	3	0
Age (Years)						
18–24	586	33	302	31	279	35
25–29	1183	67	661	69	514	65
Race/Ethnicity						
White	1146	65	639	66	502	63
Black/African American	124	7	69	7	52	7
Hispanic/Latino[b]	371	21	189	20	178	22
Other	126	7	64	7	61	8
Household income at/below federal poverty level	1238	71	655	69	572	73
Education <high school graduation	439	25	224	23	210	26
Homeless[c,d]	1357	77	684	71	664	84
Incarcerated[d]	945	53	543	56	397	50
HIV serostatus positive	41	2	22	2	18	2
Drug Injection History						
Age at first injection ≤18 years	718	41	370	38	342	43
Years since first injection >6 years	648	37	340	35	303	38
Primary Drug Injected						
Speedball[e]	152	9	73	8	78	10
Heroin	1384	78	769	80	604	76
Powder cocaine	22	1	10	1	11	1
Crack cocaine	5	0	3	0	2	0
Methamphetamine	165	9	88	9	77	10
Oxycontin or painkillers	10	1	6	1	4	1
Multiple	31	2	14	1	17	2
Total[f]	1769	100	963	100	793	100

Abbreviations: HIV, human immunodeficiency virus.

[a]Defined as scoring 13 or higher on the Kessler-6 scale, a screening scale for serious mental illness.

[b]Hispanics/Latinos can be of any race.

[c]At any time in during the past 12 months, lived on the street, in a shelter, a single room occupancy hotel, or in a car.

[d]Past 12 months.

[e]Heroin and cocaine being injected together.

[f]Numbers and totals may not add up to 100% due to missing data and rounding.

reductions in psychiatric symptoms were found among patients after admission to drug dependence treatment [34].

In this study, young PWID with PSMI were significantly more likely to engage in risky injection practices including higher frequency of injection, receptive and distributive syringe sharing, backloading, and sharing of injection equipment. Another study of young PWID in the United States found that substance-induced lifetime and past year major depression and borderline personality disorder were associated with receptive sharing [19]. Outcomes related to mental illness, such as feelings of hopelessness, difficulties regulating emotions, and low self-efficacy, may further inhibit the ability of PWID to implement harm reduction strategies to reduce their risk of HIV [19].

Although those with PSMI were not less likely to be uninsured, and they reported engaging in medical care and substance abuse treatment at similar percentages as those without PSMI, those with PSMI reported more unmet needs for healthcare and were more likely to be unable to get into SUD treatment. Prior research with general populations has shown that those with SMI have higher healthcare utilization and expenditures than those without [36]. Although insurance coverage for behavioral health increased for young adults 19–25 years of age after implementation of the Affordable Care Act, this did not translate into increases in SUD treatment among this group [37]. Prior research with HIV-negative PWID showed high levels of unmet service needs, especially mental health services, and suggests that although those with HIV may receive assistance through

Table 2. Injection Risk, Prevention, and Healthcare Use and Behaviors Among Young People Who Inject Drugs by Probable Serious Mental Illness[a], 20 US Cities, 2015

	No Probable Serious Mental Illness			Probable Serious Mental Illness			Multivariable Analysis[c]
Risk, Prevention, and Healthcare Behaviors	Total[b]	*n*	%	Total[b]	*n*	%	aPR (95% CI)
Injection Risk Behaviors							
Inject more than once a day	963	734	76	792	654	83	**1.19 (1.02–1.38)**
Receptive syringe sharing[d,e]	963	449	47	790	439	56	**1.21 (1.08–1.36)**
Receptive sharing of injection equipment[e,f]	963	616	64	792	584	74	**1.26 (1.12–1.42)**
Receptive sharing of syringe to divide drugs (eg, backloading)[e,g]	963	395	41	791	411	52	**1.22 (1.11–1.35)**
Distributive syringe sharing[e,h]	962	533	55	790	483	61	**1.13 (1.01–1.26)**
Prevention and Healthcare							
Received HIV testing[e,i]	935	539	58	773	445	58	0.99 (0.90–1.10)
Heard of PrEP[i]	943	98	10	779	84	11	1.03 (0.87–1.21)
Has health insurance	956	637	67	781	518	66	0.98 (0.89–1.08)
Saw a healthcare provider[e]	963	728	76	793	618	78	1.07 (0.97–1.18)
Unable to get medical care due to cost[e]	962	226	23	792	299	38	**1.42 (1.25–1.60)**
Attended substance use disorder treatment[e]	963	478	50	792	400	51	1.03 (0.93–1.13)
Unable to get into substance use disorder treatment[e]	962	239	25	793	293	37	**1.33 (1.20–1.46)**
Syringe Service Program (SSP) most common syringe source[e,j]	962	328	34	792	236	30	**0.88 (0.78–0.99)**

Abbreviations: aPR, adjusted prevalence ratio; HIV, human immunodeficiency virus; PrEP, pre-exposure prophylaxis.

[a]Defined as scoring 13 or higher on the Kessler-6 scale, a screening scale for serious mental illness.

[b]Numbers and totals may not add up to 100% due to missing data and rounding.

[c]Log-linked Poisson regression was generated using generalized estimating equations clustered on recruitment chains stemmed from initial recruits ("seeds") in respondent-driven sampling. Prevalence ratios are adjusted (aPR) for counfounding of gender and for sampling method including injection drug use network size and city of interview. Reference group is prevalence among participants with no probable serious mental illness.

[d]Injecting with a syringe or needle that had already been used by someone else.

[e]Past 12 months.

[f]Used a cooker (eg, spoon, bottle cap) or cotton (to filter particles from drug solution) that had already been used by someone else or shared water for rinsing.

[g]Divided a drug solution by using a syringe that had already been used by someone else for injection.

[h]Gave their needle or syringe to someone else to use after they had already used it for injection.

[i]Denominator is limited to participants who did not report a previous positive HIV-test result.

[j]SSP is either the only or the most common source of syringes.

NOTE: Bold text indicates $P < .05$.

the Ryan White CARE Act, seronegative PWID may benefit from similar community service programs [38]. It may be that those with mental illness require additional medical services than those without and perceive increased barriers to care.

Although a prior study investigating co-occurring mental health and SUDs found that people with mental health disorders are more likely to receive SUD treatment [20], this analysis found similar rates of treatment between those with and without PSMI. However, although the other study found a low perceived need for SUD treatment, more than one third of young PWID with PSMI in this sample reported trying but being unable to get into SUD treatment. Perhaps the increased severity and risk of injection drug use, and additional obstacles faced by PWID in obtaining care, led to more perceived need and unmet needs in this sample. Prior research has shown that psychiatric distress can be a motivator for SUD treatment seeking [39].

The SSPs provide harm reduction tools and strategies and are an effective way to reduce injection risk behaviors [40]. They also can serve as a primary linkage to other critical health and prevention services such as HIV care, PrEP and postexposure prophylaxis services, and SUD and healthcare programs. The majority of SSPs offer referrals to medication-assisted treatment [41], and PWID who regularly use an SSP are more likely to reduce their injection frequency [42] than those who do not. Overall use of SSPs in this sample was low, as indicated by the low proportion of young PWID reporting SSPs as their primary source for syringes. The SSP use was even less common among those with PSMI. These findings highlight a need to improve access to SSPs for HIV prevention and as a gateway to healthcare, with strong bidirectional referral systems between SSPs and other local prevention and healthcare providers. Given that the majority of PWID in this sample report having received healthcare in the past 12 months, there are opportunities for integrating SSPs into behavioral healthcare services or providing referral into SSP services when available through encounters with medical professionals in clinics or emergency departments. Among a study of people who use drugs, those with psychological distress were approximately 10 times more likely to have a nonfatal overdose in the past year [18]; many would have come into contact with emergency responders, which possibly provides an opportunity for screening and referral to SSPs and other desired care (eg, SUD treatment).

Individuals with severe mental illness (SMI) are disproportionately impacted by HIV. The prevalence of HIV infection in a mental health treatment sample was approximately 8 times the estimated US population rate [43]. A better understanding of the interaction between injection risk and SMI, especially barriers to safer injection practices, is needed. A recent analysis of persons with HIV estimated that 19% experienced generalized anxiety disorder symptoms and were more than 3 times as likely to have unmet needs for mental health services [44]. Additional research on barriers to medical care, such as stigma, readiness, and ability to access resources, is needed to optimize HIV prevention efforts for young PWID and ensure adequate treatment. Service providers who come into contact with young PWID through prevention, routine or emergency healthcare, or SUD treatment should be aware of mental health issues and establish strong relationships with mental and behavioral services to ensure that those who are seeking support can be quickly linked and enrolled into services.

Limitations

This analysis is subject to several limitations. First, the data are self-reported and subject to social desirability and recall bias. Prior literature indicates that self-report is a reliable and valid way to obtain information about drug use among PWID [45]. However, a recent study suggests that social desirability bias is associated with key health measures; these associations are likely not primarily due to depressive symptoms [46]. Second, this analysis did not directly measure unmet need for mental healthcare. Although it did capture unmet need for medical care due to cost, and unmet need for SUD treatment, this likely underrepresents the need for mental healthcare among this population and limits the ability to draw conclusions about gaps in non-SUD mental healthcare among this sample. Third, these data may not be representative of all young PWID. However, in the absence of a nationally representative sample, data collected from multiple, geographically diverse areas using sampling methods such as RDS to reach vulnerable populations are imperative to improved understanding of the scope of HIV risk among PWID. Fourth, future analyses should address the interactions of mental health on the dual risk of injection and sexual risk among PWID.

Finally, NHBS ascertains data from the past 12 months, whereas the Kessler-6 measures psychological distress over the past 30 days; therefore, behaviors and affect may not align. The NHBS data are cross-sectional and therefore limit the ability to understand how mental illness and injection drug use influence each other. A longitudinal study of PWID found that a large proportion were diagnosed with a mental illness during the time they were injecting [12]. Associations with PSMI may be related to other characteristics not included in this analysis. One study investigating recent injection risk behaviors found that current depressive symptoms accounted for little variance in risk behaviors among those with a history of mood disorders [5], suggesting that only including current symptoms may underrepresent the relationship between mental illness and injection risk. More importantly, the Kessler-6 is designed as a screening tool, not to diagnose specific mental illnesses. It is important for future research to understand how specific mental illnesses may differentially impact injection risk behaviors [47]. However, a study of PWID found that those with a history of mood disorders were more likely than those who had no history

to engage in a range of sex and injection-related risk behaviors; these varied little based on whether they had experienced depression or bipolar disorder [5].

CONCLUSIONS

This analysis underscored the pervasiveness of serious mental illness among young PWID in the United States. Approximately half met the criteria for PSMI, and those affected engaged in riskier injection practices and fewer prevention behaviors than their peers. It is likely that serious mental illness puts young PWID at higher risks at multiple points along the HIV care continuum with implications for onward transmission. However, those with PSMI in our analysis reported inability to acquire desired support services such as SUD and medical care, where their needs could be more adequately supported.

Additional interventions and linkage efforts to support access to SUD treatment and medical and mental health services among PWID with SMI is warranted [48], including colocation of services [22]. Those attending SSPs may benefit from a brief mental health history assessment during harm reduction and service provision. Simply asking about history of mental illness may be an efficient and effective way to identify vulnerable groups [5]. Active mental health referrals and linkage should be incorporated into SSP best practices [49]. Likewise, mental health treatment providers should be aware of injection risk behaviors with PWID [50] and make appropriate referrals to SSPs and to SUD treatment programs, specifically medically assisted treatment. Mental health screening is a recommended standard practice in SUD treatment [51]; screening those with mental illness for injection risks and linking them to SSPs when indicated is appropriate [22]. To prevent HIV infection among young PWID, a comprehensive, integrated approach that includes mental health screening and care is needed.

Notes

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