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# Sexual Risk Behaviors Among Persons Diagnosed With Primary and Secondary Syphilis Who Reported High-Risk Substance Use: Data From the National Notifiable Diseases Surveillance System, 2018

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## Abstract

**Background:** Recent increases in high-risk substance use (HRSU; i.e., injection drug use, heroin, methamphetamine, crack/cocaine) have coincided with rising primary and secondary (P&S) syphilis rates. To further understand these trends, we examined sexual risk behaviors among women, men who have sex with women only (MSW), and men who have sex with men (MSM) who were diagnosed with P&S syphilis in 2018 and reported HRSU.

**Methods:** Data on HRSU and sexual risk behaviors among persons with P&S syphilis were drawn from syphilis case reports in 2018 from the National Notifiable Diseases Surveillance System. Persons with P&S syphilis were asked about sexual risk behaviors in the past 12 months including exchange sex for drugs/money, sex while intoxicated and/or high on drugs, sex with a person who injects drugs (PWID), sex with an anonymous partner, and number of sex partners. We describe percentages and adjusted prevalence ratios (aPRs) for women, MSW, and MSM reporting these behaviors by age, race/Hispanic ethnicity, type of drug used, and incarceration history (both in the past 12 months).

**Results:** Among 19,634 persons diagnosed with P&S syphilis in 2018 with information on HRSU, 29.3% of women, 22.7% of MSW, and 12.4% of MSM reported HRSU. Among those reporting HRSU, percentages reporting exchange sex ranged from 17% to 35% (highest for women), whereas reports of anonymous sex ranged from 44% to 71% (highest for MSM). In

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this population, sexual risk behaviors were more commonly reported among those with a recent incarceration history than those without such history. Among those reporting injection drug use or heroin use, percentages reporting sex with a PWID ranged from 51% to 77%. In adjusted models, HRSU was significantly associated with one or more sexual risk behaviors for women (aPR, 2.63 [95% confidence interval {CI}, 2.39–2.90]; MSW: aPR, 1.38 [95% CI, 1.31–1.46]; and MSM: aPR, 1.30 [95% CI, 1.26–1.34]).

**Conclusions:** Collaborative partnerships across the US public health system could help address barriers to timely clinical care among persons diagnosed with P&S syphilis who report HRSU.

National rates of primary and secondary (P&S) syphilis increased by 173% among women and 61% among men between 2014 and 2018.[1] Although almost half of syphilis cases in 2018 were among men who have sex with men (MSM), syphilis continues to increase sharply among women and men who have sex with women only (MSW).[1] Although most research on the intersection of injection drug use (IDU) and sexually transmitted infections (STIs) focuses on HIV and acute hepatitis infections, increases in IDU, heroin use, and methamphetamine use coincide with rising heterosexual syphilis rates.[2]

There is evidence that the association between syphilis and high-risk substance use (HRSU; i.e., IDU, heroin, methamphetamine, crack/cocaine) may be influenced by sexual risk behaviors among those with HRSU and their partners. An event-level analysis showed that heterosexual sex, in which either or both partners used methamphetamine, was significantly more likely to include anal intercourse and sex with a new partner, both of which are factors that can increase STIs.[3] In a nationally representative study, young persons who injected drugs (PWID) were more likely to have sex with a partner who has an STI than those who used noninjection drugs, indicating a link between injection drug behaviors and high-risk sexual networks.[4] Similarly, women and gay, bisexual, and other MSM who inject illicit drugs or use other high-risk substances may engage in exchange sex (e.g., trading sex for drugs or money). Exchange sex can increase STI through inconsistent condom use[5,6] and exposure to new, or multiple, sexual partnerships.

Social and environmental factors, including urbanicity, poverty, incarceration, and health care access, contribute to disparities in HIV/STI rates[7,8] and may influence STI transmission in people with HRSU. To illustrate, a study by Reno and colleagues[9] exposed the unique challenges in linkage to health care for PWID with syphilis in nonurban counties of Missouri; however, this study's focus was on local variation in syphilis rates rather than on sexual risk behaviors that may have contributed to syphilis acquisition in this population. Similarly, national-level behavioral surveillance data used to inform HIV prevention efforts often focus on sexual risk behaviors among PWID rather than those among STI-affected populations who use other high-risk substances but may not inject drugs.[10,11] Thus, the purpose of this study was to describe the association between reported HRSU and the prevalence of sexual risk behaviors among persons diagnosed with P&S syphilis using 2018 national syphilis surveillance data.

# METHODS

## Measures

Primary and secondary syphilis case report data for 2018 were extracted from the National Notifiable Diseases Surveillance System (NNDSS), the system through which the Centers for Disease Control and Prevention receives syphilis and other notifiable sexually transmitted disease data from all 50 states and the District of Columbia.[12] Case report data included standardized variables that capture clinical, demographic, and behavioral data. Behavioral data, including recent HSRU and sexual risk behaviors, were primarily based on self-report and were obtained through case interviews or investigation by the local health department.

## Sexual Risk Behaviors (Past 12 Months)

The outcome of this analysis, sexual risk behavior in the past 12 months, was based on 5 separate variables collected for reported cases of P&S syphilis: (1) exchanged drugs/money for sex, (2) sex while intoxicated and/or high on drugs, (3) sex with a person who injects drugs (PWID), (4) sex with an anonymous partner, and (5) the number of sex partners, coded dichotomously into “6 or more” sex partners to align with previous work.[13] The proportion of cases reporting each sexual risk behavior was calculated using a denominator made up of those with a “yes” or “no” response for that behavior. These 5 variables were also combined into a single dichotomous variable coded as “0” or “1 or more” reported sexual risk behaviors.

## HRSU (Past 12 Months)

High-risk substance use was based on 7 variables collected for P&S syphilis cases: an individual variable that assessed reported IDU (any type of drug) and separate variables for reported use of heroin, methamphetamine, crack, cocaine, “other drug use,” or “no drug use”; mode of administration (e.g., injected, smoked, snorted, etc.) was not collected for the non-IDU drug variables. As with the sexual risk behaviors, the reference period for drug use was during the past 12 months. These variables were collected and reported with values of “yes,” “no,” “missing,” or “unknown.” However, in some jurisdictions, variables on specific drug use were likely collected in a “check all that apply” format, where a reported value of “missing” or “unknown” could indicate either a “no” response or be missing or unknown. To match how data were analyzed previously,[13] a person was coded as having reported using a specific drug if they were coded as “yes” for that specific drug. A person was coded as “no” if they responded “no” for that specific drug, or if a case was reported as missing or unknown for that specific drug and also responded “yes” to either the variable “no drug use” or one of the other specific drug variables. For this analysis, any crack or cocaine use was combined into one measure (crack/cocaine). We then used the 4 drug variables (IDU, heroin, methamphetamine, and crack/cocaine) to create a single dichotomous variable coded as “0” or “1 or more” to identify any HSRU.

### Demographic Variables

For this analysis, men diagnosed with P&S syphilis were categorized as MSM if they reported having sex with any male partner in the last 12 months; men who reported having sex with only female partners in the last 12 months were categorized as MSW. Other demographic variables examined include age (15–24, 25–34, 35+ years), race/Hispanic ethnicity (Hispanic, non-Hispanic White ("White"), non-Hispanic Black ("Black"), multiple or other race), and incarceration history in the past 12 months (yes/no).

### Data Analysis

Of the 35,063 P&S syphilis cases diagnosed and reported through NNDSS in 2018, 20,360 (58.0%) had data on one or more HRSU variables. Of those, 19,634 (96.4%) were able to be classified as women (n = 3066), MSW (n = 3705), and MSM (n = 12,863) to make up our analytic sample. We estimated percentages and 95% confidence intervals (CIs) for specific sexual risk behaviors and used Wald $\chi^2$ tests to assess significant differences in the percentage reporting these behaviors across sex by sex of sex partner subgroups (women, MSW, and MSM), White and Black race/ethnic groups, and incarceration history in the past 12 months. We used a 2-sided $\alpha$ level of 0.05 for statistical tests. Because drug use variables were not defined as mutually exclusive categories for this study, we only visually inspected the percentages in sex risk behaviors across drug types rather than report statistical significance.

We used log-linked binomial regression models stratified by women, MSW, and MSM to assess the association between HRSU and any reported sexual risk behavior. We reported unadjusted and adjusted prevalence ratios (aPRs) controlling for age, race/Hispanic ethnicity, and incarceration history from these models.

### Sensitivity Analysis

In 2018, 44 states included sex of sex partner in ≥70% of male P&S syphilis case reports. In sensitivity analyses, our results remained robust after restricting to states with sex of sex partners data for ≥70% of male P&S syphilis cases; thus, we retained all states in this analysis.

## RESULTS

Overall, women with P&S syphilis had the highest prevalence of any reported HRSU (29.3% [901 of 3066]), followed by MSW (22.7% [841 of 3705]) and MSM (12.5% [1607 of 12,863]; Table 1). For all subgroups, reported HRSU was highest among Whites and lowest among Blacks. Among those with incarceration history, 72.0% of women, 54.0% of MSW, and 47.9% of MSM reported HRSU.

Among P&S syphilis cases reporting HRSU, there were notable differences in the type of sexual risk behavior reported for women, MSW, and MSM (Table 1). The percentage reporting exchange sex for drugs/money was highest for women (35.3%) compared with MSW (16.8%) and MSM (16.6%; $P < 0.0001$). Reported anonymous sex was higher for MSM (71.1%) compared with MSW (45.9%) and women (44.1%; $P < 0.0001$). By race/

ethnic groups, percentages reporting of exchange sex (48.9% vs. 35.2%; $P = 0.0064$) and anonymous sex (66.7% vs. 41.6%, $P < 0.0001$) were higher among Black than White women. Similarly, a higher percentage of Black MSW reported exchange sex than White MSW (27.3% vs. 14.3%; $P = 0.0004$). Conversely, White women were more likely to report sex with PWID than Black women (57.6% vs. 25.7% $P < 0.0001$), and a similar pattern was seen for White and Black MSW (53.5% vs. 21.3%, $P < 0.0001$).

Among P&S syphilis cases reporting HRSU, a higher percentage of women with incarceration history reported engaging in sexual risk behaviors than those without incarceration history, including exchange sex (40.7% vs. 29.9%, $P = 0.0026$), sex with a PWID (57.4% vs. 38.3%, $P < 0.0001$), anonymous sex (50.8% vs. 36.7%, $P = 0.0002$), and 6 or more sex partners (26.2% vs. 15.0%, $P = 0.0003$). Higher percentages of MSM with incarceration history than those without reported engaging in exchange sex (28.8% vs. 12.3%, $P < 0.0001$) and sex with a PWID (49.8% vs. 23.2%, $P < 0.0001$), but percentages were similar for anonymous sex (73.5% vs. 69.6%, $P = 0.2320$) and lower for 6 or more sex partners (31.3% vs. 39.8%, $P = 0.0118$).

Similarly, reported sexual risk behaviors among P&S syphilis cases varied by the type of drug use reported (IDU, heroin, methamphetamine, crack/cocaine; Fig. 1; Supplemental Table 1, http://links.lww.com/OLQ/A745). Among women, 55.4% who reported crack/cocaine use also reported exchange sex, compared with heroin (51.6%), any IDU (44.1%), and methamphetamine use (26.9%; Fig. 1A). There were no notable differences by type of reported drug use in the percentages who had sex while high/intoxicated (Fig. 1B); however, there were stark differences in percentages reporting having sex with a PWID by type of drug use reported (Fig. 1C). Sex with a PWID was highest for women reporting IDU (76.5%), followed closely by heroin (69.8%), methamphetamine (52.8%), and crack/cocaine (40.2%). The same pattern held for both MSW and MSM. A higher percentage of women reported using crack/cocaine reported anonymous sex (68.9%) compared with those who used other high-risk substances (36%–52%), mirrored by a similar trend for MSW (54.0% vs. 44%–49%; Fig. 1D). The percentages of MSM reporting anonymous sex and 6 or more sex partners did not vary widely by the type of drug use reported (Fig. 1E).

In unadjusted analysis, women, MSW, and MSM diagnosed with P&S syphilis who reported HRSU were more likely to report sexual risk behaviors than those without HRSU (Table 2). This association remained after adjusting for age, race/Hispanic ethnicity, and incarceration history (women: aPR, 2.63 [95% CI, 2.39–2.90]; MSW: aPR, 1.38 [95% CI, 1.31–1.46]; and MSM: aPR, 1.30 [95% CI, 1.26–1.34]).

## DISCUSSION

Our exploratory, cross-sectional analysis shows a substantial overlap in reported HRSU and sexual risk behaviors among P&S syphilis cases. The variation in sexual risk behaviors by sex and sex of sex partners, race/Hispanic ethnicity, and incarceration history in this population suggests that a combination of different sexual risk behaviors may contribute to the spread of STIs among persons diagnosed with syphilis reporting HRSU. Furthermore, sexual risk behaviors in this population, such as exchange sex, may indicate the potential

lack of basic health needs, such as adequate food, education, employment, and housing.[14] Addressing structural, financial, personal, and cultural barriers that may affect timely clinical care for syphilis is a critical lesson learned from previous national syphilis elimination efforts[15] that is uniquely relevant to groups with HRSU in need of sexual health care.

In this population, sexual risk behaviors varied by type of drug use reported. Behaviors that involved sex with multiple or anonymous partners were generally higher among those, particularly women, who reported using crack/cocaine. Furthermore, more than half of those reporting IDU or heroin use diagnosed with syphilis had sex with a PWID (51%–77%). Studies have shown the network-level risks accompanying sex with a PWID can have critical implications for HIV/STI transmission.[16–18] The network-level risk factors that contribute to HIV/STI infection intensifies the need for HIV/STI screening and prevention services for those with HRSU, their sex partners, and other members of their sexual networks.[19]

Strengthening partnerships between STI control programs and other areas of the US health care system where people with STI and other risk factors commonly receive services may facilitate HIV/STI screening, diagnosis, and treatment. The STI National Strategic Plan 2021–2025 provides a framework for developing a coordinated approach to the STI epidemic within settings such as schools and institutions of higher learning, career training programs, military bases, correctional institutions, homeless service providers, crisis centers, substance use treatment facilities, and syringe service programs.[20] Persons with HRSU may be concentrated in specific geographic areas and may benefit from screening guidelines that are tailored to local syphilis epidemiology. Increasing communication and collaboration across organizations serving those with HRSU could increase the timeliness of syphilis treatment and reduce HIV acquisition. Future studies focused on syphilis increases could examine how partnering strategies among health agencies within state, tribal, territorial, and local jurisdictions influence syphilis testing and treatment outcomes for disproportionately affected groups.

Our analysis was limited to persons diagnosed and reported with P&S syphilis; thus, we could not identify risk factors that may have contributed to syphilitic infection. Sexual risk behaviors and HRSU were both measured in the past 12 months and could co-occur, so it was impossible to determine their temporal relationship. Although syphilis case data are reported through the NNDSS using standardized variables, there may have been variations in how sexual risk behaviors and drug use data were collected and reported. Syphilis case report data do not include data on opioid use other than heroin, so it was impossible to examine sexual risk behaviors among those who use fentanyl or other synthetic opioids. In our analytic sample (n = 19,634), 32% were missing 1 or more of the 5 sexual risk behavior measures used in the analysis. If those missing sexual risk behavior information were less likely to have reported engaging in that behavior, the prevalence presented here would be an overestimate. The behavioral estimates presented could also be affected by missing data on HRSU or the sex of sex partners. In addition, recall bias and the stigma surrounding both drug use and sexual risk behaviors may lead to misclassification and underestimate the percentage of HRSU with syphilis who participated in these behaviors. Finally, it is

possible that persons reporting HRSU are more likely to report other potentially stigmatizing behaviors (e.g., anonymous sex) leading to amplified associations.

This study documents the associations between HRSU and sexual risk behaviors among persons diagnosed with P&S syphilis using national syphilis case report data from 2018. The intersection between HRSU, exchange sex, and incarceration history among persons diagnosed with syphilis supports research that HRSU may accompany structural factors that increase HIV/STI risk, such as reduced access to social and economic resources.[21] In addition, our results showing more than 50% of persons with IDU or heroin use reported sex with a PWID strengthen existing evidence that HRSU and sexual risk behavior can co-occur to facilitate HIV/STI transmission.[22] The recommendations put forth by the STI National Strategic Plan to better coordinate efforts for STI prevention, care, and treatment across national, state, and local programs will be critical as the sexual health needs of persons with HRSU are addressed.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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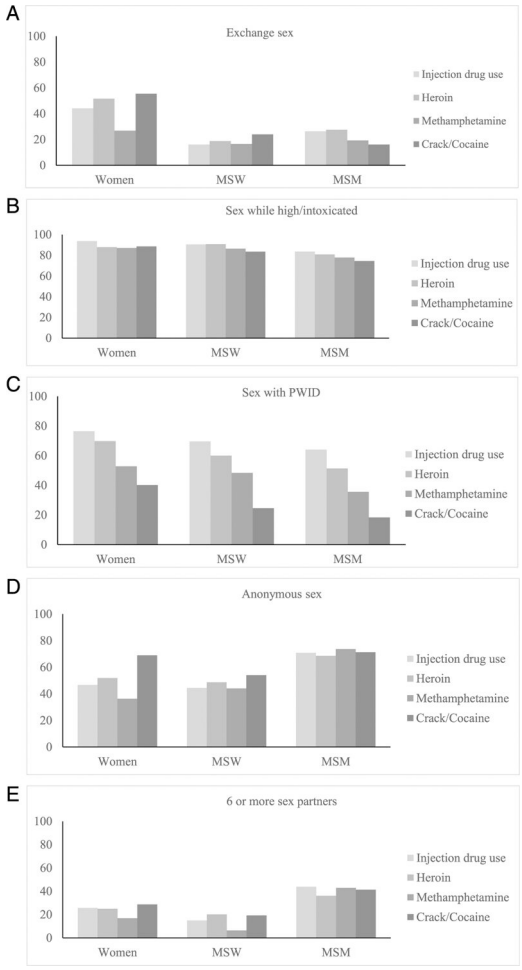


**Figure 1.**

Prevalence of sexual risk behaviors in the past 12 months among women, MSW, and MSM diagnosed with primary and secondary syphilis who reported HRSU, by drug type, United States, 2018. Note: Percentages were calculated among persons for whom data for that behavior were reported (persons with missing or unknown responses were excluded from the denominator). PWID indicates persons who inject drugs.

**TABLE 1.**

Prevalence of Reported Sexual Risk Behaviors Among Women, Men Who Have Sex With Women Only (MSW), and Men Who Have Sex With Men (MSM) Diagnosed With Primary and Secondary Syphilis Who Reported High-Risk Substance Use (HRSU) by Demographic Characteristics, United States, 2018

| | Sexual Risk Behaviors, Past 12 mo, Among Cases With Any HRSU* | | | | | |
|---|---|---|---|---|---|---|
| | **Any HRSU*,†** | **Exchanged Drugs/Money for Sex†** | **Sex While Intoxicated/High†** | **Sex With PWID†** | **Sex With Anonymous Partner†** | **6+ Sex Partners†** |
| Women | | | | | | |
| Total | 901/3066 (29.3) | 270/766 (35.3) | 628/713 (88.1) | 320/646 (49.5) | 338/767 (44.1) | 151/773 (19.5) |
| Age group, y | | | | | | |
| 15–24 | 174/977 (17.8) | 48/150 (32.0) | 122/137 (89.1) | 60/126 (47.6) | 66/146 (45.2) | 37/144 (25.7) |
| 25–34 | 387/1172 (33.0) | 129/335 (38.5) | 284/311 (91.3) | 150/282 (53.2) | 155/334 (46.4) | 70/335 (20.9) |
| ≤35 | 340/911 (37.3) | 93/281 (33.1) | 222/265 (83.8) | 110/238 (46.2) | 117/287 (40.8) | 44/294 (15.0) |
| Race/Hispanic ethnicity | | | | | | |
| Hispanic | 166/523 (31.7) | 36/132 (27.2) | 93/117 (79.5) | 40/103 (38.8) | 50/129 (38.8) | 20/149 (13.4) |
| Non-Hispanic White | 533/1108 (48.1)‡ | 164/466 (35.2)‡ | 385/427 (90.2) | 233/404 (57.6)‡ | 194/466 (41.6)‡ | 100/454 (22.0) |
| Non-Hispanic Black | 109/1168 (9.3) | 46/94 (48.9) | 80/94 (85.1) | 19/74 (25.7) | 60/90 (66.7) | 18/91 (19.8) |
| Non-Hispanic other/multiple race | 71/198 (35.9) | 17/58 (29.3) | 57/61 (93.4) | 21/52 (40.4) | 26/66 (39.4) | 10/62 (16.1) |
| Incarcerated in the past 12 mo | | | | | | |
| Yes | 363/504 (72.0)§ | 132/324 (40.7)§ | 298/318 (93.7)§ | 160/279 (57.4)§ | 165/325 (50.8)§ | 85/325 (26.2)§ |
| No | 395/2292 (17.2) | 112/375 (29.9) | 289/337 (85.7) | 118/308 (38.3) | 138/376 (36.7) | 54/360 (15.0) |
| | **Sexual Risk Behaviors, Past 12 mo, Among Cases With Any HRSU*** | | | | | |
| | **Any HRSU*** | **Exchanged Drugs/Money for Sex** | **Sex While Intoxicated/High** | **Sex With PWID** | **Sex With Anonymous Partner** | **6+ Sex Partners** |
| MSW | | | | | | |
| Total | 841/3705 (22.7)† | 129/766 (16.8)† | 621/733 (84.7) | 253/631 (40.1) | 352/767 (45.9) | 122/755 (16.2) |
| Age group, y | | | | | | |
| 15–24 | 116/722 (16.1) | 13/109 (11.9) | 83/102 (81.4) | 27/82 (32.9) | 46/107 (43.0) | 18/94 (19.2) |
| 25–34 | 325/1289 (25.2) | 40/297 (13.5) | 246/285 (86.3) | 110/261 (42.2) | 132/299 (44.2) | 53/300 (17.7) |
| ≤35 | 400/1694 (23.6) | 76/360 (21.1) | 292/346 (84.4) | 116/288 (40.3) | 174/361 (48.2) | 51/361 (14.1) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Race/Hispanic ethnicity | | | | | | |
| Hispanic | 167/623 (26.8) | 20/153 (13.1) | 119/148 (80.4) | 32/118 (27.1) | 68/152 (44.7) | 27/150 (18.0) |
| Non-Hispanic White | 416/1137 (36.6)‡ | 55/384 (14.3)‡ | 312/352 (88.6) | 168/314 (53.5)‡ | 175/386 (45.3) | 52/375 (13.9) |
| Non-Hispanic Black | 163/1631 (10.0) | 41/150 (27.3) | 130/155 (83.9) | 29/136 (21.3) | 78/150 (52.0) | 26/148 (17.6) |
| Non-Hispanic other/multiple race | 62/201 (30.8) | 6/51 (11.8) | 45/54 (83.3) | 15/46 (32.6) | 23/53 (43.4) | 9/52 (17.3) |
| Incarcerated in the past 12 mo | | | | | | |
| Yes | 401/743 (54.0)§ | 73/372 (19.6) | 346/383 (90.3)§ | 158/315 (50.2)§ | 183/376 (48.7) | 67/369 (18.2)§ |
| No | 333/2702 (12.3) | 48/319 (15.0) | 237/292 (81.2) | 60/247 (24.3) | 140/329 (42.6) | 37/300 (12.3) |

| | Sexual Risk Behaviors, Past 12 mo, Among Cases With Any HRSU* | | | | | |
|---|---|---|---|---|---|---|
| | **Any HRSU*** | **Exchanged Drugs/Money for Sex** | **Sex While Intoxicated/High** | **Sex With PWID** | **Sex With Anonymous Partner** | **6+ Sex Partners** |
| MSM | | | | | | |
| Total | 1607/12863 (12.5) | 246/1485 (16.6) | 995/1334 (74.6) | 372/1243 (29.9) | 986/1387 (71.1) | 569/1406 (40.5) |
| Age group, y | | | | | | |
| 15–24 | 218/2739 (8.0) | 35/201 (17.4) | 135/185 (73.0) | 37/172 (21.5) | 130/189 (68.8) | 67/194 (34.5) |
| 25–34 | 705/5234 (13.5) | 122/658 (18.5) | 442/587 (75.3) | 175/557 (31.4) | 444/619 (71.7) | 273/627 (43.5) |
| 35+ | 682/4887 (14.0) | 88/624 (14.1) | 417/561 (74.3) | 160/512 (31.3) | 411/578 (71.1) | 229/583 (39.3) |
| Race/Hispanic ethnicity | | | | | | |
| Hispanic | 402/3105 (13.0) | 53/362 (14.6) | 227/326 (69.6) | 64/302 (21.2) | 240/329 (73.0) | 127/360 (35.3) |
| Non-Hispanic White | 741/4671 (15.9)‡ | 121/689 (17.6) | 467/590 (79.2) | 198/559 (35.4)‡ | 461/646 (71.4) | 278/647 (43.0) |
| Non-Hispanic Black | 291/3777 (7.7) | 49/273 (18.0) | 194/262 (74.1) | 67/250 (26.8) | 183/261 (70.1) | 100/250 (40.0) |
| Non-Hispanic other/multiple race | 152/995 (15.3) | 22/140 (15.7) | 95/136 (69.9) | 38/118 (32.2) | 91/132 (68.9) | 58/132 (43.9) |
| Incarcerated in the past 12 mo | | | | | | |
| Yes | 298/622 (47.9)§ | 76/264 (28.8)§ | 221/248 (89.1)§ | 115/231 (49.8)§ | 183/249 (73.5) | 82/262 (31.3)§ |
| No | 1078/11075 (9.7) | 128/1041 (12.3) | 701/926 (75.7) | 199/858 (23.2) | 690/991 (69.6) | 385/967 (39.8) |

Percentages were calculated among persons for whom data for that behavior were reported (persons with missing or unknown responses were excluded from the denominator).

*Any HRSU, in the past 12 months, was based on any “yes” response to 5 separate variables for reported injection drug use (any type of drug), heroin, methamphetamine, crack, or cocaine.

†Prevalence totals significantly different across sex subgroups, by $\chi^2$ test.

‡Significantly different from non-Hispanic Black, by $\chi^2$ test.

$^{\S}$Significantly different from no incarceration history in the past 12 months, by $\chi^2$ test.

PWID indicates persons who inject drugs.

**TABLE 2.**

Unadjusted and Adjusted PRs for Reported Sexual Risk Behaviors by High-Risk Substance Use (HRSU) Among Women, Men Who Have Sex With Women Only (MSW) and Men Who Have Sex With Men (MSM) Diagnosed With Primary and Secondary Syphilis, United States, 2018

| | Unadjusted PR | Adjusted PR |
|---|---|---|
| Any HRSU | | |
| Women | 2.89 (2.69–3.12) | 2.63 (2.39–2.90) |
| MSW | 1.50 (1.44–1.56) | 1.38 (1.31–1.46) |
| MSM | 1.33 (1.29–1.36) | 1.30 (1.26–1.34) |

All ratios, $P < 0.001$. Adjusted models control for age, race/Hispanic ethnicity, and incarceration history (past 12 months).

PR indicates prevalence ratio.