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Global Epidemiology of HIV Among Women and Girls Who Use or Inject Drugs: Current Knowledge and Limitations of Existing Data

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Abstract

Background—Women and girls who use and inject drugs are a critical population at risk of HIV. In this article, we review data on the epidemiology of drug use and injection among women globally and HIV prevalence among women and girls who use and inject drugs.

Results—Women and girls comprise one-third of people who use and inject drugs globally. There is substantial variation in HIV prevalence in this population, between and within countries. There is a pronounced lack of data examining HIV risk among particularly vulnerable subpopulations of women who use and inject drugs, including women who have sex with women, transgender women, racial and ethnic minority women, and young women. Women who use and inject drugs experience stigma and discrimination that affect access to services, and high levels of sexual risk exposures.

Conclusions—There are significant gaps in our understanding of the epidemiology of drug use and injecting among women and girls and HIV risk and prevalence in this population. Women are frequently underrepresented in studies of drug use and HIV risk and prevalence among people who inject drugs, limiting our understanding of possible sex differences in this population. Most research originates from developed countries and may not be generalizable to other settings. A great deal of work is needed to improve understanding of HIV among particularly vulnerable subpopulations, such as transgender women who use drugs. Better data are critical to efforts to advocate for the needs of women and girls who use and inject drugs.

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Keywords

HIV; prevalence; women; girls; people who inject drugs; people who use drugs

HIV among women and girls is a significant concern. Of the 35 million people estimated to be living with HIV infection globally in 2013, 46% were women or girls older than 15 years.¹ In generalized heterosexual epidemics in Sub-Saharan Africa, women constitute the majority (58%) of those living with HIV.¹ In regions where HIV is concentrated among key at-risk populations, the proportion of newly diagnosed people who are female is increasing.¹ People who inject drugs (PWID) are one of these at-risk populations. An estimated 13% of current PWID are thought to be living with HIV globally.¹ People who use drugs, including those who do not inject, also face HIV infection through sexual risk behaviors and through overlapping sexual and drug-using networks.² In this article, we examine the available data on the epidemiology of HIV among women and girls who use and inject drugs and explore the nature of associated risks and vulnerabilities (Box 1).

EPIDEMIOLOGY OF DRUG USE AND INJECTION AMONG WOMEN

The Global Burden of Diseases, Injuries, and Risk Factors Study 2010 (GBD 2010) estimated the global and regional sex-specific prevalence of opioid, amphetamine, and cocaine dependence. Full methodological details are provided elsewhere³; briefly, estimates were derived by applying sophisticated modeling techniques to published data on the prevalence of each substance use disorder among women and men.³ The resulting estimates show that the prevalence of drug dependence is consistently lower among women compared with men; nonetheless, substantial numbers of women around the world experience substance use disorders (Table 1). In 2010, an estimated 4.7 million women world-wide were opioid dependent (age-standardized global prevalence 0.14%) compared with 10.8 million men (0.31%).⁵ An estimated 6.3 million women and 11 million men were amphetamine dependent (0.18% and 0.31%, respectively), and 2.1 million women and 4.8 million men were dependent on cocaine (0.06% and 0.14%, respectively) (Table 1).⁴

Although there was considerable uncertainty around regional estimates of drug dependence among women, regional variation was still apparent. The highest prevalence of amphetamine dependence among women was found in Southeast Asia and Australasia (both 0.31%).⁴ Australasia also had the highest prevalence of opioid dependence (0.25%).⁵ The prevalence of cocaine dependence among women was the highest in North America (0.33%) and Tropical Latin America (0.26%).⁴ South and Southeast Asia were home to the largest absolute numbers of amphetamine-dependent women (1.4 million and 1 million, respectively).⁴ South Asia also had the largest numbers of opioid-dependent women (1.3 million)⁵; the largest numbers of cocaine-dependent women were in North America (0.5 million).⁴

GBD 2010 also estimated that approximately 3.8 million women injected drugs in 2010 (Table 1), for a global age-adjusted prevalence of injecting drug use among women of 0.11% compared with 0.32% among men.^{3,6} Prevalence among women was the highest in

Australasia (0.25%), North America (0.22%), and Eastern Europe (0.20%). East Asia had the largest absolute number of women who injected drugs (0.8 million).

Drug dependence and injecting drug use is associated with substantial mortality, but mortality rates are lower among women who use and inject drugs compared with men. In a systematic review of mortality among regular and dependent opioid users, women had significantly lower all-cause and overdose mortality risk relative (RR) to men (all-cause RR = 0.78, $P < 0.0005$; overdose RR = 0.58, $P = 0.01$).⁷ There are few sex-disaggregated data on mortality among regular or dependent users of amphetamine; a study from the Czech Republic found that women who used amphetamine had half the mortality risk of men who used amphetamine (RR = 0.49; 95% CI: 0.24 to 0.95).⁸ These findings are consistent with sex differences in mortality among PWID; across 37 studies included in a meta-analysis, all-cause crude mortality was lower among female compared with male injectors (mortality risk ratio = 0.76; 95% CI: 0.69 to 0.82).⁹ Notably, however, most of the studies on sex-specific mortality among PWID have been undertaken in high-income countries^{9,10}; there may be less of a sex disparity in mortality rates between women and men who inject drugs in low- and middle-income countries, at least in relation to non-AIDS mortality (Table 2).¹⁰

Although crude mortality rates are consistently lower among women who use and inject drugs compared with men, standardized mortality ratios are higher among women who use and inject drugs.^{7,9} This suggests that women who use drugs experience greater levels of excess mortality than their age-matched peers in the broader community compared with men who use drugs. This is due at least in part to the generally lower mortality rates of women compared with men, with drug use making a substantial additional contribution to mortality risk among women who use drugs.

EPIDEMIOLOGY OF HIV INFECTION AMONG WOMEN WHO USE OR INJECT DRUGS

Of the 81 countries reporting data on HIV prevalence among PWID to UNAIDS since 2011, only 48 reported data disaggregated by sex; 4 countries reported data for men only.¹¹ Until recently, UNAIDS did not routinely collect data on HIV prevalence among transgender women; however, from 2015, these data will be collected for all groups, including PWID. Among reporting countries, there was considerable geographic variation in HIV prevalence among women who inject drugs (range, 0%–65%; Table 3). It should be noted that these estimates carry substantial uncertainty given the sometimes very small sample sizes and the reliance on data from a limited number of locations that may not be representative of the overall national prevalence. Furthermore, country-level data can obscure substantial geographic variation in HIV prevalence within a country; in studies from several Chinese provinces, HIV prevalence among women who inject drugs ranged from 5% to 84%.¹²

Figure 1 illustrates the rate ratio of HIV prevalence among women who inject drugs compared with men who inject drugs, again using the most recent data reported to UNAIDS. In the majority of these countries (28 of 41), HIV prevalence is higher among women than men who inject drugs. However, sex disparities in HIV prevalence among PWID, in either direction, were not statistically significant for most countries. These findings are consistent

with an earlier review of studies undertaken in Central and Eastern Europe and Central Asia, which reported inconclusive evidence regarding the disparity in HIV prevalence between women and men who inject drugs.¹³ Another review focusing specifically on Central Asia found no statistically significant sex difference in HIV prevalence among PWID.¹⁴ In a review of sex differences in settings in which HIV prevalence among PWID is greater than 20%, women who inject drugs were more likely than their male counterparts to be living with HIV infection (pooled odds ratio = 1.18; 95% CI: 1.10 to 1.26).¹² However, among the 6 countries reporting similarly high HIV prevalence among PWID to UNAIDS (Estonia, Romania, Philippines, Mauritius, Pakistan, and Ukraine), there was no consistent trend in either direction (Fig. 1).

There may be subnational variation in the disparity of HIV prevalence between women and men who inject drugs. In China, women entering methadone maintenance treatment have higher HIV prevalence than their male counterparts but only in provinces with low HIV prevalence among people who use drugs; in provinces with high HIV prevalence among people who use drugs, the opposite is seen.¹⁵ In the United States, at the national level, HIV prevalence is similar among women and men who inject drugs,^{16,17} but sex disparities in prevalence and risk exposure are evident in some urban areas.^{14,18,19} These findings suggest the importance of local factors in determining sex disparities in HIV prevalence among PWID.^{12,14}

Compared with women who inject drugs, less attention has been given to HIV prevalence among women who use drugs such as heroin and cocaine through non-injecting routes of administration. In some settings, HIV prevalence among non-injecting drug users has been found to be similar to that of PWID.^{20–22} HIV risk among women who use, but do not inject drugs, largely seems to be related to sexual risk behaviors, including sex with men who inject drugs, unprotected sex, and multiple partners. Women who use but do not inject drugs are more likely than men to have sexual partners who inject drugs.^{20,23} There is inconsistent evidence about the prevalence of HIV among women who use (but do not inject) drugs compared with their male counterparts. In one study of non-injecting drug users in Mexico, for example, women were more likely than men to report sex with someone who injected drugs but had statistically similar HIV prevalence to men (2.7% compared with 4.4%).²⁰ In other settings, women who use drugs have greatly elevated HIV prevalence compared with men, such as in a Spanish cohort of non-injecting heroin users (10.9% compared with 1.7% in men).²⁴

HIV-positive PWID have higher all-cause and drug-related mortality rates than HIV-negative PWID.^{9,10} HIV-positive women who inject drugs have similar high rates of mortality as HIV-positive men who inject drugs, although few studies have examined this outcome by gender⁹; this is in contrast to typical patterns and patterns in HIV-negative PWID, whereby women have lower mortality rates than men.⁹

HIV AMONG SUBPOPULATIONS OF WOMEN WHO USE AND INJECT DRUGS

Women Who Have Sex With Women

The prevalence of illicit drug use is consistently higher among women who have sex with women (WSW), compared with other women,²⁵ as is prevalence of injecting among WSW relative to women with male sexual partners only.^{26,27} Furthermore, WSW have a greater risk of illicit drug dependence than women with male sexual partners only (pooled RR = 3.50; 95% CI: 1.87 to 6.53).²⁸

There has been little research examining HIV prevalence specifically among WSW who use and inject drugs, despite high levels of HIV risk behaviors among this group.^{29–31} WSW who inject drugs may have higher HIV prevalence than other women who inject drugs, at least in the United States.^{30–32} In a recent study of women who use drugs in New York City, HIV prevalence was 13.3% among WSW who inject drugs and 3.9% among other women who inject drugs.³⁰ Among women who use drugs, but do not inject, there may not be a difference in HIV prevalence by sexual minority status, but this is based on limited research evidence,³⁰ with more work needed in diverse settings.

Transgender Women

There are very few data on the prevalence of drug use and injecting among transgender women. A recent review of research published from 2007 to 2012 found that only 1.3% of substance use studies reported nonbinary gender identities, and transgender people represented fewer than 0.1% of participants in these studies.³³ However, studies that have included data on transgender women suggest that a history of illicit or injecting drug use is common, ranging from approximately 30% among a clinic-based samples in the United States and Spain,^{34,35} up to 50% in community-based samples the United States and Portugal.^{36,37} Emerging data among young transgender women describe drug use prevalence as high as 69%.³⁸

Prevalence of injecting drug use among transgender women varies widely by context. A surveillance study in Pakistan found that fewer than 2% of *hijra* injected drugs in the previous year,³⁹ whereas 42% of transgender women attending a sexual health clinic in Australia had injected drugs.⁴⁰ A systematic review of literature from the United States estimated that 12% of transgender women had a history of injecting drug use.⁴¹ Recent data suggest that transgender women may be more likely to use stimulants compared with cisgender women,⁴² and stimulant use has been associated with greater sexual risk taking.⁴³

Although there has been some research on HIV prevalence among transgender women,⁴⁴ data on the prevalence of HIV infection among transgender women who use drugs is scant.⁴³ Surveillance studies in some countries collect data on HIV among drug users and among transgender women; however, they are analyzed as separate risk groups, rendering an estimate of HIV prevalence among transgender women who use drugs impossible.^{45,46} One US study of substance users found a self-reported HIV prevalence of 21% among

transgender women⁴⁷; self-reported HIV status is likely to underestimate true HIV prevalence.

Racial and Ethnic Minority Women

People from racial and ethnic minorities who use drugs may experience greater harms associated with drug use, with racial and ethnic minority PWID twice as likely as PWID from racial and ethnic majorities to be living with HIV infection.⁴⁸ However, very little work on HIV among PWID has studied the intersection between race/ethnicity and sex. Studies that do consider this nexus find that racial and ethnic minority women who inject drugs are particularly impacted by HIV. In New York City, Black and Hispanic women who injected drugs had higher HIV prevalence than White female injectors, both before and after the implementation of harm reduction programs.⁴⁹ In a cohort of PWID in Vancouver, HIV prevalence and incidence was significantly higher among Aboriginal than non-Aboriginal participants; when these data were analyzed by sex, a nonsignificant trend for higher HIV incidence among Aboriginal women compared with non-Aboriginal women remained apparent.⁵⁰

Young Women and Girls

Drug use and injecting typically begins in adolescence and early adulthood. Particularly vulnerable young people, such as street-based youth, may begin injecting in their early teenage years.^{51,52} Young PWID have been observed to have higher levels of injecting-related HIV risk behaviors than their older counterparts.⁵³ There are very few sex-specific data regarding HIV prevalence among young PWID. In Ukraine, HIV prevalence was 18% in a cohort of young people (aged 15–24 years) who inject drugs and did not differ by sex.⁵⁴ A study of young people (aged 15–19 years) who inject drugs in Russia reported significantly higher HIV prevalence among young men (42%) compared with young women (29%).⁵⁵ In Tanzania, however, 55% of young women (aged 17–25 years) who injected drugs were HIV positive compared with 12% of young men who injected drugs.⁵⁶

RISK AND VULNERABILITY

Stigma and Discrimination

In most countries, drug use and injection attracts substantial levels of stigma. People who use drugs may experience rejection by their families and communities and discrimination in a range of contexts, including health care settings.^{57,58} There is evidence that in some contexts, women who use and inject drugs may be particularly affected by stigma and discrimination, due at least in part to their violation of restrictive gender norms that cast women as wives and mothers.^{58,59}

Social exclusion, stigma, and discrimination can potentiate HIV risk and undermine HIV prevention and treatment. Women who use and inject drugs may be reluctant to disclose their drug use and be hesitant to access health services, including drug treatment, for fear of discrimination.⁶⁰ Women and girls who use drugs may be excluded from family support structures, and those with limited financial or employment options may be more likely to

engage in sex work, increasing sexual HIV risk and attracting the additional stigma associated with sex work.

Sexual Risk

A substantial proportion of HIV infections among PWID are likely a result of sexual transmission.^{61,62} In some contexts, sexual risks may contribute to HIV infection among women who use drugs to a greater extent than among men who inject drugs.^{63,64} There are several reasons why sexual transmission of HIV may be greater among women who use drugs compared with men. As the receptive partner, a woman is at greater risk of heterosexual HIV transmission through vaginal or anal sex than a male insertive partner, although risk varies depending on the context and setting.⁶⁵ In a number of studies, women who use and inject drugs reported having engaged in more sexual HIV risk behaviors than their male counterparts.^{60,64,66} Furthermore, there may be greater overlap between women's sexual and drug use networks, such that women who use drugs are more likely than men who use drugs to have sexual partners who are also drug users.^{19,20}

There is considerable overlap between drug use and sex work, particularly among women. Women who engage in both sex work and injecting drug use face the HIV risks associated with each. Among female sex workers, injecting drug use is a risk factor for HIV infection,^{67,68} and female sex workers who inject drugs may engage in greater levels of sexual risk behaviors than other sex workers.⁶⁹ It is less clear whether engaging in sex work confers additional HIV risk among women who inject drugs. Women who inject drugs and/or sex workers may be more likely to engage in injecting risk behaviors than other women who inject drugs,^{67,68} but there is inconsistent evidence about whether women who inject drugs and are sex workers have higher HIV prevalence than other women who inject drugs. Several studies report no difference in HIV prevalence by sex worker status,^{63,68,70,71} but in one Canadian cohort of PWID, women with a history of sex work had higher HIV prevalence than women without such a history.⁷² Further analysis of connections between HIV and sex work in women who inject drugs is provided in this issue by Strathdee et al.⁷³

There may be particular HIV risks associated with sex work among transgender women. Anti-transgender stigma and discrimination results in reduced educational and employment opportunities, leaving sex work as one of few income-generating options for transgender women⁷⁴; it is estimated that nearly half of transgender women (42%) in the United States engage in sex work.⁴¹ Unprotected receptive anal sex may be common among transgender female sex workers.^{41,75} Transgender women who have undergone vaginoplasty may engage in vaginal sex, but there is very little research examining HIV risk after this procedure.⁴⁴ The extent to which transgender women who use and inject drugs engage in sex work, and are exposed to HIV infection through sex work, is unclear.

Intimate Relationships With Men Who Inject Drugs

Relative to men who inject drugs, women who inject drugs more commonly report being initiated to injecting by an intimate partner and more commonly require assistance with injecting.^{76–78} In heterosexual intimate partnerships where both partners inject drugs, male partners are more likely than female partners to obtain drugs and injecting equipment, and

women may rely on their partner to inject them.^{79,80} In this context, sharing of injecting equipment may be perceived as a sign of trust and intimacy,⁸¹ but the reliance of women who inject drugs on male intimate partners for access to drugs and injecting expertise can confer additional HIV risk. Because of the unequal division of labor in acquiring and administering drugs, female partners tend to be injected after male partners and may feel unable to request that a male partner use new or sterile injecting equipment.⁸² However, it is also important to bear in mind that a “monogamous” injecting partnership between 2 HIV-negative people may be low-risk compared with other scenarios, such as injecting as part of a larger social group or seeking assistance from “professional” injectors.^{83,84}

Intimate Partner Violence

Women who use and inject drugs are exposed to high levels of intimate partner violence, including physical assaults, sexual coercion, and rape.⁸⁵ The relationship between drug use and intimate partner violence is bidirectional, with drug use increasing the risk of violence, and violence increasing the likelihood of subsequent drug use.⁸⁶ Among women who use drugs, intimate partner violence is associated with sex without condoms.⁸⁷ Women who use drugs and experience intimate partner violence may be reluctant to refuse to have sex without a condom or to request that their partner wear a condom for fear of provoking further violence.⁸⁵

DATA GAPS IN THE EPIDEMIOLOGY OF HIV AMONG WOMEN AND GIRLS WHO USE AND INJECT DRUGS

Globally, there are significant gaps in our understanding of the epidemiology of illicit drug use, including injecting drug use.³ Data on women who inject drugs are particularly limited, especially in low- and middle-income countries where injecting drug use is an emerging phenomenon. The poor visibility of women who use and inject drugs contributes to difficulties in deriving population size estimates, particularly in low- and middle-income countries, with women underrepresented in studies of HIV risk and prevalence among people who use and inject drugs.^{88,89} For example, in a national study of drug use in Pakistan, survey data suggested that there were 1.5 million women who used illicit drugs in 2012 and that women comprised 2% of heroin users; data from interviews with drug users, however, suggested that women were more likely to comprise 6% of heroin users.⁹⁰ Small numbers of women in studies of drug use and HIV among people who use and inject drugs limit our understanding of how these women and men experience HIV risk differently and obscure possible sex differences in HIV prevalence between women and men who use drugs.¹³ Special efforts may be needed to recruit women to studies of drug use and HIV prevalence and risk among PWID.⁸⁴ Stratified sampling to ensure adequate numbers of women are recruited may assist in improving reliability of sex-specific prevalence statistics.

Much of the research exploring risk among these groups has to date been conducted in developed countries. These findings may not be generalizable to less developed countries, in particular findings that relate to specific subpopulations. For example, research relating to drug use and HIV among WSW originates almost exclusively from the United States,^{25,28} where the experiences of same sex attracted women may differ substantially from those of

WSW in other settings. Transgender women are not often included in studies of HIV among PWID despite high levels of risk exposure among this group. Although adolescent girls and young women are recognized as a population left behind in the global response to the HIV epidemic,¹ there is a pronounced lack of data on young women who use or inject drugs, a key subpopulation with complex needs.

CONCLUSIONS

Although women comprise a minority of those who use and inject drugs, their exposure to HIV risk may be greater than that of men who use and inject drugs. There is much that is unknown about the extent and risks of drug use and injection among women, and the HIV burden among women who use and inject drugs. It is clear that there is substantial variation in HIV prevalence among women who use and inject drugs globally, with particular subpopulations at increased risk of HIV infection, suggesting the need for local data to inform responses.

As will be documented in this special issue, women who use and inject drugs experience multiple challenges and HIV risks, including sex work, violence, and poor access to harm reduction and drug and HIV treatment services. There must be a greater focus on generation of data specifically about women and girls who use and inject drugs, including particularly vulnerable subpopulations such as sexual minority women, transgender women, young women, and racial and ethnic minority women. Such data are critical to successfully advocate for the resources and programs required for women and girls who use and inject drugs.

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Box 1**Methods for Literature Review**

The literature review focused on women and girls who use and/or inject heroin or other opioids, amphetamine/methamphetamine, or cocaine. Data on the epidemiology of drug use and injecting were obtained from the Global Burden of Diseases, Injuries, and Risk Factors Study 2010 (GBD 2010). We searched for systematic reviews on mortality among people who use and inject drugs and HIV prevalence among people who use and inject drugs. Further references were identified through literature searches on women who use and inject drugs, with specific searches designed to identify literature relating to women who have sex with women (WSW), transgender women, young women and girls, and racial and ethnic minority women. Additional data on HIV prevalence among women who inject drugs were obtained from UNAIDS.

FIGURE 1.

Rate ratio of HIV prevalence among women who inject drugs compared with men who inject drugs in countries reporting data to UNAIDS, 2011–2013. Data supplied by Keith Sabin, UNAIDS.

TABLE 1

Estimated Age-Standardized Prevalence (%) and Number of Women and Men Who Were Dependent on Amphetamines, Opioids, and Cocaine, and Injected Drugs, 2010

	Amphetamines				Opioids			
	Women		Men		Women		Men	
	N	% (95% UI)	N	% (95% UI)	N	% (95% UI)	N	% (95% UI)
Asia Pacific, high income	134,000	0.17 (0.10–0.29)	238,000	0.30 (0.18–0.47)	147,000	0.19 (0.10–0.34)	308,500	0.37 (0.19–0.66)
Asia Central	77,000	0.18 (0.13–0.24)	126,000	0.30 (0.22–0.41)	62,000	0.15 (0.10–0.21)	146,500	0.34 (0.23–0.51)
Asia East	939,000	0.13 (0.08–0.23)	1,695,000	0.22 (0.13–0.37)	746,000	0.10 (0.04–0.22)	1,434,000	0.18 (0.08–0.36)
Asia South	1,425,000	0.18 (0.10–0.31)	2,567,000	0.30 (0.18–0.54)	1,291,500	0.16 (0.13–0.20)	3,039,500	0.36 (0.28–0.44)
Asia Southeast	1,000,000	0.31 (0.23–0.42)	1,723,000	0.54 (0.40–0.75)	282,500	0.09 (0.06–0.13)	673,500	0.21 (0.14–0.31)
Australasia	36,000	0.31 (0.19–0.47)	62,000	0.51 (0.33–0.76)	30,550	0.25 (0.22–0.31)	79,500	0.66 (0.57–0.78)
Caribbean	33,000	0.15 (0.11–0.21)	55,000	0.26 (0.18–0.35)	35,500	0.17 (0.11–0.25)	74,000	0.35 (0.23–0.54)
Europe Central	134,000	0.23 (0.19–0.29)	231,000	0.39 (0.32–0.48)	66,500	0.11 (0.08–0.15)	163,500	0.27 (0.19–0.39)
Europe Eastern	112,000	0.11 (0.07–0.15)	187,000	0.18 (0.13–0.27)	192,500	0.17 (0.09–0.31)	414,500	0.38 (0.21–0.69)
Europe Western	336,000	0.19 (0.17–0.21)	602,000	0.33 (0.29–0.37)	346,000	0.18 (0.16–0.21)	972,500	0.52 (0.46–0.58)
Latin America Andean	28,000	0.10 (0.08–0.14)	48,000	0.17 (0.13–0.22)	48,000	0.18 (0.10–0.31)	105,000	0.38 (0.21–0.63)
Latin America Central	271,000	0.22 (0.16–0.32)	439,000	0.38 (0.26–0.54)	181,000	0.15 (0.09–0.25)	391,000	0.34 (0.20–0.55)
Latin America South	57,000	0.19 (0.14–0.26)	96,000	0.32 (0.23–0.43)	63,500	0.21 (0.11–0.39)	144,500	0.48 (0.26–0.84)
Latin America Tropical	265,000	0.25 (0.17–0.35)	443,000	0.42 (0.29–0.58)	161,500	0.14 (0.06–0.29)	329,500	0.31 (0.13–0.61)
North Africa Middle East	413,000	0.17 (0.14–0.22)	732,000	0.29 (0.23–0.37)	392,500	0.17 (0.12–0.23)	981,000	0.39 (0.28–0.56)
North America, high income	263,000	0.17 (0.12–0.22)	454,000	0.29 (0.21–0.38)	270,500	0.17 (0.13–0.22)	688,500	0.43 (0.34–0.54)
Oceania	9000	0.19 (0.12–0.31)	16,000	0.32 (0.20–0.53)	6000	0.13 (0.07–0.23)	12,500	0.26 (0.13–0.47)
Sub-Saharan Africa Central	79,000	0.18 (0.11–0.28)	129,000	0.30 (0.19–0.47)	39,000	0.09 (0.05–0.14)	79,000	0.20 (0.10–0.35)
Sub-Saharan Africa East	299,000	0.18 (0.13–0.23)	499,000	0.30 (0.23–0.39)	149,000	0.09 (0.07–0.13)	339,500	0.21 (0.15–0.29)
Sub-Saharan Africa South	68,000	0.18 (0.11–0.28)	120,000	0.31 (0.20–0.47)	50,500	0.14 (0.07–0.26)	106,500	0.28 (0.13–0.53)
Sub-Saharan Africa West	276,000	0.18 (0.13–0.25)	466,000	0.30 (0.21–0.44)	137,000	0.09 (0.06–0.14)	298,500	0.20 (0.13–0.31)
Global	6,256,000	0.18 (0.16–0.22)	10,928,000	0.31 (0.27–0.37)	4,698,500	0.14 (0.12–0.16)	10,781,000	0.31 (0.27–0.35)
Cocaine				Injecting drug use				

	Women		Men		Women		Men	
	N	% (95% UI)	N	% (95% UI)	N	% (95% UI)	N	% (95% UI)
Asia Pacific, high income	77,600	0.10 (0.06–0.16)	179,700	0.22 (0.13–0.35)	137,000	0.17 (0.12–0.28)	384,000	0.46 (0.31–0.74)
Asia Central	16,300	0.04 (0.03–0.05)	35,500	0.08 (0.06–0.11)	65,000	0.15 (0.11–0.22)	191,000	0.47 (0.33–0.70)
Asia East	69,600	0.01 (0.01–0.02)	164,000	0.02 (0.01–0.04)	781,000	0.12 (0.09–0.13)	2,326,000	0.30 (0.26–0.35)
Asia South	316,500	0.04 (0.02–0.06)	769,500	0.09 (0.05–0.15)	476,000	0.06 (0.05–0.08)	1,482,000	0.18 (0.13–0.24)
Asia Southeast	34,900	0.01 (0.01–0.02)	79,200	0.02 (0.02–0.04)	241,000	0.08 (0.06–0.09)	733,000	0.23 (0.19–0.28)
Australasia	9800	0.08 (0.05–0.15)	22,300	0.19 (0.11–0.32)	33,000	0.25 (0.08–0.73)	94,000	0.77 (0.21–2.06)
Caribbean	43,700	0.20 (0.15–0.28)	99,800	0.46 (0.34–0.62)	27,000	0.14 (0.07–0.26)	81,000	0.43 (0.22–0.79)
Europe Central	18,500	0.03 (0.02–0.04)	44,200	0.07 (0.06–0.09)	73,000	0.12 (0.07–0.21)	221,000	0.36 (0.22–0.64)
Europe Eastern	35,700	0.03 (0.02–0.05)	81,300	0.08 (0.05–0.11)	251,000	0.20 (0.11–0.50)	761,000	0.70 (0.35–1.47)
Europe Western	194,400	0.11 (0.10–0.12)	446,300	0.24 (0.21–0.28)	274,000	0.15 (0.12–0.17)	835,000	0.43 (0.36–0.50)
Latin America Andean	43,500	0.16 (0.11–0.21)	101,600	0.36 (0.26–0.50)	42,000	0.16 (0.06–0.36)	118,000	0.45 (0.18–1.01)
Latin America Central	85,500	0.07 (0.05–0.09)	188,900	0.16 (0.12–0.22)	166,000	0.14 (0.07–0.29)	464,000	0.40 (0.19–0.81)
Latin America South	56,200	0.19 (0.11–0.29)	127,700	0.42 (0.27–0.65)	42,000	0.14 (0.11–0.18)	124,000	0.41 (0.32–0.53)
Latin America Tropical	285,000	0.26 (0.17–0.39)	634,900	0.59 (0.37–0.91)	158,000	0.13 (0.13–0.17)	398,000	0.38 (0.32–0.44)
North Africa Middle East	205,000	0.08 (0.06–0.11)	486,300	0.19 (0.14–0.24)	296,000	0.12 (0.08–0.21)	932,000	0.36 (0.23–0.59)
North America, high income	494,800	0.33 (0.22–0.49)	1,109,100	0.72 (0.48–1)	363,000	0.22 (0.06–0.66)	1,083,000	0.68 (0.19–1.78)
Oceania	900	0.02 (0.01–0.03)	2200	0.04 (0.03–0.07)	5000	0.11 (0.05–0.31)	15,000	0.34 (0.13–0.81)
Sub-Saharan Africa Central	12,600	0.03 (0.02–0.05)	27,700	0.07 (0.04–0.11)	37,000	0.09 (0.04–0.21)	108,000	0.28 (0.11–0.66)
Sub-Saharan Africa East	32,800	0.02 (0.02–0.03)	72,200	0.04 (0.03–0.06)	140,000	0.09 (0.06–0.15)	406,000	0.27 (0.16–0.43)
Sub-Saharan Africa South	11,100	0.03 (0.02–0.05)	25,500	0.07 (0.03–0.11)	35,000	0.10 (0.04–0.25)	109,000	0.30 (0.10–0.75)
Sub-Saharan Africa West	45,500	0.03 (0.02–0.04)	103,100	0.07 (0.05–0.10)	129,000	0.09 (0.05–0.18)	375,000	0.26 (0.14–0.49)
Global	2,089,900	0.06 (0.05–0.07)	4,800,800	0.14 (0.12–0.16)	3,771,000	0.11 (0.10–0.13)	11,240,000	0.32 (0.28–0.39)

UI, uncertainty interval.

Sources of amphetamine and cocaine data from Ref. 4; opioid data from Ref. 5; and injecting drug use data from Refs. 3 and 6.

TABLE 2

Sex-Specific Non-AIDS Mortality Among People Who Inject Drugs

	Women			Men			CMR Ratio (Women/men); (95% CI)	Studies (N)	I ² (P)
	Studies (N)	Pooled CMR per 100 PY (95% CI)	I ² (P)	Studies (N)	Pooled CMR per 100 PY (95% CI)	I ² (P)			I ² (P)
Overall	19	0.91 (0.68 to 1.14)	88% (<0.001)	21	1.35 (1.19 to 1.52)	85% (<0.001)	1.34 (1.14 to 1.57)	19	44% (0.022)
High-income countries	17	0.92 (0.68 to 1.15)	88% (<0.001)	17	1.22 (1.09 to 1.36)	81% (<0.001)	1.33 (1.13 to 1.57)	17	49% (0.012)
Low- and middle- income countries	2	0.59 (−0.67 to 1.85)	0% (0.698)	4	3.25 (2.30 to 4.19)	55% (<0.1)	3.16 (0.43 to 23.35)	2	0% (0.869)

CMR, crude mortality rate; PY, person-years.
Source from Ref. 10.

TABLE 3

HIV Prevalence Among Women Who Inject Drugs, as Reported to UNAIDS Under Global AIDS Response Progress Reporting Guidelines, 2011–2013

Country	Tested (N)	HIV Positive (N)	% HIV Positive (95% CI)
Afghanistan	2	0	0 (0 to 68.7)
Armenia	4	1	25.0 (0 to 78.7)
Australia	717	9	1.3 (0.6 to 2.2)
Azerbaijan	23	0	0 (0 to 7.4)
Bangladesh	354	4	1.1 (0.2 to 2.6)
Belarus	534	90	16.9 (13.8 to 20.2)
Benin	3	0	0 (0 to 50.0)
Bulgaria	79	8	10.1 (4.3 to 17.9)
Canada	823	85	10.3 (8.3 to 12.5)
China	7034	450	6.4 (5.8 to 7.0)
Cyprus	18	0	0 (0 to 9.4)
Estonia	76	42	55.3 (43.9 to 66.3)
France	NR	NR	7.0 (unable to calculate)
Georgia	22	0	0 (0 to 7.7)
Germany	101	8	7.9 (3.3 to 14.1)
Greece	NR	NR	9.6 (unable to calculate)
Hungary	63	0	0 (0 to 2.7)
India	422	55	13.0 (10.0 to 16.4)
IR Iran	62	6	9.7 (3.4 to 18.5)
Italy	NR	NR	12.2 (unable to calculate)
Kazakhstan	776	52	6.7 (5.0 to 8.6)
Kenya	56	0	0 (0 to 3.1)
Kosovo	21	0	0 (0 to 8.1)
Kyrgyzstan	94	12	12.8 (6.7 to 20.4)
Latvia	253	25	9.9 (6.5 to 13.9)
Malaysia	36	10	27.8 (14.2 to 43.7)
Malta	27	1	3.7 (0 to 15.2)
Mauritius	60	39	65.0 (52.4 to 76.6)
Mexico	193	15	7.8 (4.4 to 12.0)
Moldova	42	5	11.9 (3.6 to 23.7)
Morocco	12	4	33.3 (9.1 to 62.8)
Nigeria	81	17	21.0 (12.7 to 30.6)
Pakistan	39	7	17.9 (7.3 to 31.8)
Philippines	102	31	30.4 (21.8 to 39.7)
Portugal	1181	227	19.2 (17.0 to 21.5)
Romania	87	40	46.0 (35.6 to 56.6)
Senegal	14	4	28.6 (7.5 to 55.4)
Serbia	76	2	2.6 (0 to 7.8)

Country	Tested (N)	HIV Positive (N)	% HIV Positive (95% CI)
Seychelles	346	2	0.6 (0 to 1.7)
Spain	31	4	12.9 (3.0 to 27.4)
Sweden	2	0	0 (0 to 68.7)
Switzerland	113	14	12.4 (6.9 to 19.2)
Tajikistan	185	28	15.1 (10.3 to 20.7)
Tanzania	37	10	27.0 (13.8 to 42.6)
Thailand	NR	NR	29.7 (unable to calculate)
Ukraine	2266	508	22.4 (20.7 to 24.2)
United Kingdom	851	10	1.2 (0.5 to 2.0)
Uzbekistan	565	83	14.7 (11.9 to 17.7)

NR, Not reported.

Data supplied by Keith Sabin, UNAIDS. Data for each country are from the most recent year available, 2011–2013.