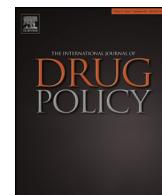




Contents lists available at ScienceDirect



# International Journal of Drug Policy

journal homepage: [www.elsevier.com/locate/drugpo](http://www.elsevier.com/locate/drugpo)

## Research paper

# HIV risks among injecting and non-injecting female partners of men who inject drugs in Almaty, Kazakhstan: Implications for HIV prevention, research, and policy

Nabila El-Bassel<sup>a,\*</sup>, Louisa Gilbert<sup>a</sup>, Assel Terlikbayeva<sup>b</sup>, Chris Beyrer<sup>c</sup>, Elwin Wu<sup>a</sup>, Stacey A. Shaw<sup>a</sup>, Xin Ma<sup>a</sup>, Mingway Chang<sup>a</sup>, Tim Hunt<sup>a</sup>, Leyla Ismayilova<sup>d</sup>, Sholpan Primbetova<sup>b</sup>, Yelena Rozental<sup>b</sup>, Baurzhan Zhussupov<sup>b</sup>

<sup>a</sup> Global Health Research Center of Central Asia, Columbia University, 1255 Amsterdam Avenue, 8th Floor, New York, NY 10027, United States

<sup>b</sup> Global Health Research Center of Central Asia, 102 Luganskogo Street, ap. 1, Medeu District, Almaty 050059, Kazakhstan

<sup>c</sup> Center for Public Health and Human Rights, Johns Hopkins Bloomberg School of Public Health, 615 North Wolfe Street, E7141, Baltimore, MD 21205, United States

<sup>d</sup> School of Social Service Administration, University of Chicago, 969 East 60th Street, Chicago, IL 60637, United States

## ARTICLE INFO

### Article history:

Received 27 August 2013

Received in revised form

11 November 2013

Accepted 13 November 2013

### Keywords:

Injection drug use

Female partners of men who inject drugs

HIV

HCV

Central Asia

## ABSTRACT

**Background:** Kazakhstan and other countries in Central Asia are experiencing a rapidly growing HIV epidemic, which has historically been driven by injection drug use, but is more recently being fueled by heterosexual transmission.

**Methods:** This paper examines HIV and HCV infection, as well as sexual and drug-related risks among female partners of men who inject drugs (MWID), comparing females who inject drugs (FWID) to non-injecting female partners on socio-demographic, relationship context, and structural characteristics.

**Results:** The prevalence rate of HIV was 30.1% among FWID and 10.4% among non-IDU female partners of MWID. The prevalence rate of HCV was 89.8% among FWID and 14.8% among female non-IDUs. Less than one-fifth of all female participants had access to HIV education and services or harm reduction programs. Although high rates of non-injection drug use and sexual risk behaviors were found among both FWID and non-injecting female partners of MWID, we found that FWID were more likely to be HIV seropositive ( $aRR = 3.03$ ; 95% CI = 1.78, 5.18) and HCV seropositive than non-IDU females ( $aRR = 6.05$ ; 95% CI = 4.05, 9.04), were more likely to have used alcohol or drugs before sex ( $aRR = 1.67$ ; 95% CI = 1.40, 2.00), and were more likely to have used sedatives, barbiturates, tranquilizers, sleeping pills, or painkillers that were not prescribed by a physician ( $aRR = 17.45$ ; 95% CI = 8.01, 38.01).

**Conclusion:** Given the spread of the HIV epidemic to heterosexual partners in Kazakhstan, more attention is needed in research, prevention, and policies regarding female partners of male injection drug users.

© 2013 Elsevier B.V. All rights reserved.

## Introduction

Injection drug use has historically driven Kazakhstan's HIV epidemic. However, in recent years there has been a steady rise in the incidence of sexual transmission of HIV, especially among heterosexual partners of men who inject drugs (MWID) (UNAIDS, 2012b). In 2011, heterosexual transmission consisted of slightly more than half (50.7%) of all newly acquired HIV cases in Kazakhstan (Boltayev, Deryabina, Kusainov, & Howard, 2012; Boltayev et al., 2013). The majority of females who inject drugs (FWID) have male sex partners who also inject, whereas the majority of MWID have non-injecting female sex partners (Roberts, Mathers, & Degenhardt, 2010). Both

FWID and non-injecting female sex partners of MWID are vulnerable to HIV, either as a result of their own risk behaviors or those of their male sex partners. However, to date, no studies have examined the risk behaviors and characteristics of female sex partners of MWID in Kazakhstan or other countries in Central Asia (CA). This paper addresses this gap in the literature by focusing on women who participated in Project Renaissance – a couple-based HIV prevention study conducted in Kazakhstan, where one or both members of the dyad reported injection drug use (El-Bassel et al., 2013). Understanding how female partners of MWID engage in sexual, injection, and non-injection drug use risk behaviors with their primary partners and others is critical for stemming the recent increase in heterosexually acquired HIV cases in the region.

Globally and in CA, the true number of women who inject drugs remains unknown (El-Bassel, Terlikbaeva, & Pinkham, 2010). Official government reports estimate there were approximately

\* Corresponding author. Tel.: +1 212 851 2391; fax: +1 212 851 2126.

E-mail address: [ne5@columbia.edu](mailto:ne5@columbia.edu) (N. El-Bassel).

122,850 people who inject drugs (PWID) in Kazakhstan in 2011, including 17,000 living in Almaty, the nation's largest city (RAC, 2011). FWID represent an estimated 20–30% of PWID in CA and Eastern Europe, where the rates of FWID are rising (UNAIDS, 2012b).

Research has identified gender disparities in HIV rates among injectors. In some countries, FWID have higher HIV rates than MWID. Studies conducted in nine European countries demonstrated higher HIV prevalence among FWID than among MWID (Wiessing, Olszewski, Klempová, Vicente, & Griffiths, 2009).

Extensive research conducted globally shows that the prevalence of HCV is high among PWID (Beyer et al., 2009; El-Bassel et al., 2013; Walsh & Maher, 2012, 2013). HIV and HCV are widespread co-occurring problems among PWID (Walsh & Maher, 2012, 2013). A recent review estimated that global, national, and regional prevalence rates of HCV among PWID in 77 countries ranged from 60 to 80%. This review estimated that approximately 10 million PWID (6.0–15.2 million) worldwide have been exposed to HCV, meaning that more PWID are living with HCV than with HIV (Aceijas, 2007). Despite these high rates, research on HCV among female sex partners of MWID is limited, especially among those female sex partners who do not inject drugs.

Reports from domestic and international NGOs demonstrate that FWID in Kazakhstan and CA face the same vulnerabilities for HIV as FWID in other countries (Thorne, Ferencic, Malyuta, Mimica, & Niemiec, 2010; UNAIDS, 2012a). FWID often have low social status, experience stigma, are victimized by their partners, family, community and the police, and are seen as deserving of abuse (El-Bassel et al., 2010; Rhodes, Singer, Bourgois, Friedman, & Strathdee, 2005; UNAIDS, 2012b). Additionally, research shows that FWID not only experience intimate partner violence (IPV) but often have a history of childhood sexual abuse and other traumatic experiences (El-Bassel, Gilbert, Witte, Wu, & Chang, 2011; El-Bassel et al., 2010). The experience of co-occurring partner violence, histories of abuse, and stigma highlight the syndemic nature of risk factors that drive HIV acquisition among women (Singer et al., 2006; Stall et al., 2003).

In dyadic contexts globally, research shows that FWID often rely on their male partners to procure the drugs that they both share, and FWID often inject drugs after their partners have injected. Using the same syringes and drug equipment after their partners raises the female partner's risk for HIV and HCV infection (Lazuardi et al., 2012; Wagner, Jackson Bloom, Hathazi, Sanders, & Lankenau, 2013). However, by refusing to share syringes or drug equipment FWID may increase their risk of physical and sexual IPV (El-Bassel et al., 2011, 2010). Intimidation and threats of IPV often put pressure on the female partner to engage in both drug-use and high-risk sexual behaviors (El-Bassel et al., 2010), thus heightening risks for acquiring HIV.

Research also shows that the likelihood of engaging in risky behaviors increases as individuals become more heavily addicted (El-Bassel et al., 2011, 2010). Non-IDU female sex partners of MWID are not only at high risk for HIV and HCV due to their partners' risk behaviors, but also due to the difficulties of negotiating condom use while under the influence of non-injection drugs or alcohol. In addition, non-IDU female sex partners of MWID are at high risk for experiencing sexual and physical IPV (El-Bassel et al., 2011; Lau, Tsui, Ho, Wong, & Yang, 2010).

Research demonstrates that 30–70% of female partners of MWID experience IPV (El-Bassel et al., 2011, 2013). Non-IDU female sex partners may use drugs such cannabis and alcohol to cope with IPV and other traumatic events as a result of being with MWID (Gilbert et al., 2013). Binge drinking and the use of non-injection drugs have been associated with failure to use condoms, having multiple sex partners, and increased rates of HIV and STI acquisition among women (Baliunas, Rehm, Irving, & Shuper, 2010; Chersich & Rees, 2010; Meade et al., 2012).

FWID in Kazakhstan and other countries face a number of co-occurring social and structural risks that increase vulnerabilities to HIV. These include homelessness, stigma, poverty, lack of access to employment, harsh drug laws and policies, incarceration, criminalization of drug use, gender-based violence, human rights violations (Aceijas, 2007; Latypov, Otashvili, Aizberg, & Boltaev, 2010; Mathers et al., 2013; Rhodes, Wagner, Strathdee, Davidson, & Bourgois, 2012; Strathdee et al., 2011; Thorne et al., 2010), barriers to accessing HIV care and services, and barriers to accessing drug treatment (Wolfe, Carrieri, & Shepard, 2010). Other barriers FWID face include a lack of gender-specific services in harm-reduction programs, especially in needle exchange programs (Pinkham & Malinowska-Sempruch, 2008). Research has also found that sex trading increases the risk of both transmission and acquisition of HIV (Strathdee et al., 2010, 2011). FWID who engage in sex trading experience even more serious police harassment, harsh treatment in prison, discrimination, and sexual and physical abuse from their intimate partners, clients, and the police than female non-IDUs who trade sex (Strathdee et al., 2011).

In sum, research suggests that female sex partners of MWID, whether they inject drugs or not, are at risk for acquiring HIV, HCV, and STIs. However, little is known about how these elevated risks may operate among female partners of MWID who inject versus non-injecting female partners. This paper examines and compares FWID and females who do not inject drugs according to socio-demographic characteristics (age, ethnicity, level of education), relationship context (marital status, living arrangements, IPV, childhood sexual abuse), and structural risk environments (employment, homelessness, food security, incarceration). We examine associations between a history of injection drug use (those who have a history of injection versus no history of injection) and HIV and HCV prevalence, current drug use, and current sexual risk behaviors, controlling for socio-demographic characteristics.

## Methods

### Data source

Project Renaissance was a randomized controlled trial conducted between 2009 and 2012 in Almaty, Kazakhstan. Project Renaissance's goal was to test the efficacy of a couple-based HIV prevention intervention for couples where one or both partners report injecting drugs in the past 90 days ( $N=728$  individuals, or 364 couples). Couples were randomized into one of two arms: (1) a 5-session HIV/STI prevention intervention or (2) a 5-session Wellness Promotion intervention. Participants completed a baseline pre-intervention assessment and repeated assessments at 3, 6, and 12 months post-intervention. The Columbia University Institutional Review Board and the Kazakhstan School of Public Health Institutional Review Board both approved the study.

### Eligibility criteria

Trained research assistants recruited potential study participants from neighborhoods where IDUs gather as well as HIV clinics and needle exchange programs (for more detail see El-Bassel et al., 2013). Couples were eligible to participate if they met the following criteria: (1) both partners were aged 18 or older, (2) both partners identified each other as their main partner of the opposite sex and someone whom the participant considered a boy/girlfriend, spouse, lover and/or parent of his/her child, (3) the relationship had existed for at least 6 months, (4) both partners reported intending to remain together for at least 12 months, (5) at least one partner reported having had unprotected vaginal or anal intercourse with the other

partner in the previous 90 days, and (6) at least one partner reported injecting drugs in the past 90 days.

Couples were excluded if they met any of the following criteria: (1) either partner showed evidence of psychiatric, physical, or neurological impairment that would limit effective participation in the study; (2) either partner reported severe physical or sexual violence perpetrated by the other partner in the past year, as determined on a Revised Conflict Tactics Scale (Straus, 1979); (3) either partner reported that the couple was planning a pregnancy within the next 18 months; or (4) either partner was not fluent in Russian as determined during the informed consent process. Couples trying to get pregnant were excluded because the intervention was designed to increase condom use and couples trying to become pregnant in the next 18 months would not be using condoms.

In total, 971 individuals completed the screening interview. Of these, 728 people agreed to participate (364 females), met the study eligibility criteria, and completed the baseline interview. Because this paper focuses on female partners of male injection drug users, 13 couples that included female injection drug users and non-IDU male partners were excluded from the analysis. Baseline data on the 351 female partners of MWID are used in this paper.

#### Data collection

Data collection included both self-reported responses and biological assays. During the baseline visit, participants completed a 1.5-h Audio Computer Assisted Self-Interview (ACASI) conducted in Russian in a private room. After the interview was completed, a Clinical Research Coordinator (CRC) conducted individual pre-test counseling related to HIV, HCV, and other STIs, with each participant in a gender-specific testing room. Within two weeks of the baseline interview, the CRC notified each participant privately of his or her HIV, HCV, and STI test results, conducted post-test counseling, and provided referrals and navigation to STI treatment when applicable.

#### Measures

##### Socio-demographic characteristics

Self-reported information was collected about each participant's socio-demographic characteristics including gender, age, ethnicity (Kazakh, Russian, or other), and years of education.

##### Relationship context

Participants were asked to describe relationship context characteristics, including marital status (legally married and common-law marriage as "married," and divorced, separated, widowed, or never married as "unmarried"), whether or not she currently lived with her main partner, child-rearing status (have children under 18 or not), sexual IPV, and childhood sexual abuse. Sexual IPV was measured by asking if any partner ever used force (like hitting, holding down, or using a weapon) or used a threat of force to make the participant have vaginal, anal, or oral sex; ever insisted on having vaginal, anal, or oral sex; or made the participant have vaginal, anal, or oral sex without a condom. Childhood sexual abuse was measured by asking whether the participants, at 16 years old or younger, had experienced the following: (1) an adult or someone at least 5 years older had touched or fondled the participant in a sexual way, (2) an adult or someone at least 5 years older had the participant touch their body in a sexual way, (3) an adult or someone at least 5 years older had attempted oral, anal, or vaginal intercourse with the participant, (4) an adult or someone at least 5 years older had actually had oral, anal, or vaginal intercourse with the participant, (5) a relative touched or fondled the participant in a sexual way, (6) a relative had the participant touch their body in a sexual way, (7) a relative attempted oral, anal, or vaginal

intercourse with the participant, or (8) a relative actually had oral, anal, or vaginal intercourse with the participant.

##### Structural risk environment

The structural variables included unemployment, homelessness (having no place to sleep in the past 90 days), and food insecurity (having insufficient money for food in the past 90 days). Measures of legal history included a history of incarceration and arrest.

##### Biological testing

Biological assays were used to test for HIV, HCV, syphilis, gonorrhea, and Chlamydia. Urine specimens were collected from participants and shipped to the Almaty Oblast Skin and Venereal Disease Dispensary to be tested for Chlamydia trachomatis and Neisseria gonorrhoea using molecular/DNA amplification assay (BD ProbeTec ET System) with a sensitivity >99.9% and specificity >99.9%. For HIV, HCV, and syphilis testing, a dried blood spot (DBS) technique was applied. A whole blood spot was obtained by a finger prick, applied to five printed circles on DBS filter paper cards, and sent to the reference laboratory at the Republican AIDS Center (RAC). For the serologic surveillance of HIV, HCV, and syphilis, a standard enzyme-linked immunosorbent assay (ELISA) was used (Kamal, 2008). Tests for all three biomarkers were conducted using a serial two-test strategy, as recommended by the World Health Organization and routinely used at the Kazakhstan RAC. U.S.-manufactured Abbott Murex Biotech tests were used for the second test. According to the RAC Guidelines for Serological Surveillance, the Murex anti-HIV ABBOTT, Murex anti-HCV ABBOTT, and the ICE Syphilis Murex ABBOTT each have a reported sensitivity of >99.9% and specificity of 99%. We also examined whether a participant had any STI by combining syphilis, gonorrhea, and Chlamydia.

##### HIV characteristics and treatment

Participants were asked whether or not they had ever received an HIV test, and if so, what the results of their HIV test were. If participants knew that they were HIV positive, they were asked whether or not they had ever received medical care for HIV. They were also asked about their CD4 count and whether or not they were currently taking antiretroviral medications.

##### Sexual behaviors

Self-reported data on sexual behaviors with the study partner and with other partners in the prior 90 days were collected using a modified Risk Behavior Assessment (RBA) (Schoeneberger, Logan, & Leukefeld, 2001), including asking whether or not participants had unprotected anal or vaginal sex, had more than one sexual partner, had used alcohol or drugs before having sex with the main partner, and had exchanged sex for money or drugs.

##### Substance use

The RBA was also used to assess past drug use. Participants were asked to report usage of types of drugs and alcohol, where they injected drugs, and whether or not they had attended a drug treatment or syringe exchange program. The interview also assessed unsafe injection behaviors in the past 90 days which included using unclean syringes or needles, sharing paraphernalia (cookers, cotton, rinse water), splitting drug solutions with other injectors through front-loading, back-loading, or use of the same cooker/spoon, or adding their own or someone's else blood into an injected drug. If participants reported engaging in one or more of these unsafe injection behaviors in the past 90 days, their responses were coded as 1 = Yes for "any unsafe injection act in the past 90 days."

## Data analysis

To assess the differences between FWID and non-injecting female sex partners of MWID, we compared frequencies and percentages of socio-demographic data, relationship data, structural characteristics, bio-testing results of HIV, HCV, and STIs, sexual risk behaviors, and drug use behaviors. We compared these characteristics using Pearson's Chi-square tests for dichotomous variables (the Fisher's exact test was applied when one or more expected cell counts were less than 5) and the Student's *t*-test for continuous variables. To test the association between IDU status and HIV serostatus, HCV serostatus, sexual risk factors, and drug use behaviors, we employed Poisson regression with robust error variance to obtain relative risks (RR) and their associated 95% confidence intervals (CI). The regression models were also adjusted for age, ethnicity, education, marital status, unemployment, and food insecurity. All analyses were performed in SAS 9.2.

## Results

Of the 351 female partners of men who inject drugs, 216 (61.5%) reported a history of injection drug use and 135 (38.5%) reported no history of injection drug use.

### Socio-demographic characteristics of participants (*N* = 364)

The average age of female participants was 34.8 years (SD = 7.7 years). Approximately two thirds (63.0%) were Russian, 11.1% were Kazakh, and 25.9% were from other ethnic groups (e.g. Ukrainian, German, Tatar, Uighur, Uzbek, Roma, Dunghan, Korean, and others). The average years of education completed was 11.6 (SD = 3 years).

### Relationship context

The majority of female participants (88.0%) were married or in a common law marriage and 79.2% were currently living with their male partners. About 60% of the participants had children under the age of 18. More than a third (37.6%) had ever experienced sexual IPV and 10.8% had experienced sexual IPV within the past six months. One-third (32.5%) of the women had experienced childhood sexual abuse (CSA). Participants with history of injection drug use had a significantly higher proportion of CSA compared to non-IDUs (38.9% vs. 22.2%).

### Structural risk environment

Of the total female sample, 73.5% were unemployed, with this proportion higher among FWID than among non-injecting female partners of MWID (77.3% vs. 67.4%). One in ten participants (10.8%) reported being homeless in the past 90 days and almost half of the women (46.4%) did not have enough money for food within the past 90 days. FWID reported higher rates of food insecurity than non-injecting female partners (50.9% vs. 39.3%). FWID were also much more likely to report a history of incarceration when compared to non-injecting female partners (72.2% vs. 10.4%) (Table 1).

### HIV, HCV, and STIs

FWID had a higher prevalence of HIV, HCV, and syphilis when compared to women who did not inject drugs. The prevalence rate of HIV was 30.1% among FWID and 10.4% among non-injectors. Among those who were seropositive at baseline, 22.8% of the women were newly detected as positive. FWID were more likely to be newly diagnosed or not previously aware of their positive status compared to non-IDU female sex partners (24.6% vs. 14.3%), although this difference was not statistically significant. The HCV

prevalence rates were 89.8% and 14.8% respectively for FWID and non-IDU participants. Additionally, more FWID sex partners tested positive for the syphilis antibody than non-IDU female sex partners (20.8% vs. 10.4%). Among the male sex partners who were injection drug users, 28.8% were HIV positive and 90.6% tested positive for HCV.

Of the total female sample, 25.9% had never been tested for HIV at baseline. This rate was lower among FWID when compared to non-IDU females (18.5% vs. 37.8%). Of those who knew their HIV positive status before baseline (*n* = 61), eight women (13.1%) were currently on antiretroviral (ARV) treatment and 20 (32.8%) knew of their specific CD4 count. Among the 7 women who knew their CD4 count to be less than 250, 4 were currently receiving ARV treatment.

### HIV counseling/education within past six months

Among all female participants, 20.2% had received HIV counseling and education in the past six months. More FWID reported receiving HIV counseling/education more frequently than non-IDU women (24.1% vs. 14.1%). Out of the 79 HIV seropositive female participants, 35 (44.3%) had received HIV counseling/education in the past six months, and 32 (72.7% out of 44) reported that they needed HIV services, but did not receive them. More FWID participants, when compared to their counterparts, reported that they needed HIV services but did not receive them (83.3% vs. 25.0%) (Table 2).

### Sexual risks

The majority of female participants (85.2%) reported having unprotected vaginal sex and a small proportion (8.0%) reported unprotected anal sex within the past 90 days. Also, 13.1% had more than one sexual partner within the past 90 days. The majority reported using alcohol or drugs before having sex with their study partner (70.1%). This behavior was reported among more FWID than among non-IDUs (83.3% vs. 48.9%). Only a small number of women (5.1%) reported trading sex for money or drugs within the past 90 days. FWID had a slightly higher proportion of sex trading compared to non-IDUs (6.9% vs. 2.2%, *p* = .05).

### Substance use

Almost two-thirds (65.2%) of the sample reported binge drinking within the past 90 days. Compared to non-IDU female sex partners, FWID reported more use of different types of non-injection drugs. Of the total sample, 29.9% of the women smoked hashish within the past 90 days, while FWID had a higher proportion compared to non-IDUs (43.1% vs. 8.9%). Almost half of the women (48.4%) used non-prescribed sedatives, barbiturates, tranquilizers, sleeping pills or painkillers within the past 90 days; more FWID used these drugs than non-IDUs (75.9% of FWID and 4.4% of non-IDUs). Non-IDU women were also less likely to report the use of opium, cocaine, and methamphetamines, when compared to FWID (Table 3).

### Injection behaviors among FWID

Among women who had ever injected drugs (*n* = 216), 86.6% had injected heroin in the past 90 days. Over the previous 90-day period, 72.7% had experienced unsafe injections. Almost half (45.4%) of the women had injecting partners within the past 90 days, with 29.6% reporting more than one injecting partner. Over two thirds (69.4%) of FWID had injected with their main male partner in the past 90 days, and the prevalence of unsafe injections with the regular male partner was 43.1%. The most common injecting place was non-public (at home, a friend's place, or a shooting gallery), where 75.5% of FWID reported injecting. Additionally, 27.3% had injected

**Table 1**

Socio-demographic characteristics, relationship context and structural risk environment.

	Total females (N=351)	FWID (N=216)	Non-IDUs (N=135)
Socio-demographic characteristics			
Age in years (mean, SD)	34.8, 7.7	35.4, 7.0	33.8, 8.7
Ethnicity			
Kazakh	39 (11.1%)	22 (10.2%)	17 (12.6%)
Russian	221 (63.0%)	142 (65.7%)	79 (58.5%)
Other	91 (25.9%)	52 (24.1%)	39 (28.9%)
Years of education (mean, SD)	11.6, 3.0	11.5, 3.1	11.8, 2.8
Relationship context			
Marital status			
Married	309 (88.0%)	195 (90.3%)	114 (84.4%)
Unmarried	42 (12.0%)	21 (9.7%)	21 (15.6%)
Currently living with main partner	278 (79.2%)	170 (78.7%)	108 (80.0%)
Have children under 18	210 (59.8%)	124 (57.4%)	86 (63.7%)
Ever experienced sexual IPV	132 (37.6%)	83 (38.4%)	49 (36.3%)
Experienced sexual IPV within past six months	38 (10.8%)	21 (9.7%)	17 (12.6%)
Experienced childhood sexual abuse	114 (32.5%)	84 (38.9%) <sup>**</sup>	30 (22.2%)
Structural risk environment			
Unemployed	258 (73.5%)	167 (77.3%) <sup>*</sup>	91 (67.4%)
Homelessness within 90 days	38 (10.8%)	24 (11.1%)	14 (10.4%)
Food insecurity within 90 days	163 (46.4%)	110 (50.9%) <sup>*</sup>	53 (39.3%)
Ever incarcerated	170 (48.4%)	156 (72.2%) <sup>**</sup>	14 (10.4%)

<sup>\*</sup> p < 0.05.<sup>\*\*</sup> p < 0.01.**Table 2**

HIV, HCV, STIs bio-testing.

	Total females (N=351)	FWID (N=216)	Non-IDUs (N=135)
Woman's bio-testing results			
HIV positive	79 (22.5%)	65 (30.1%) <sup>**</sup>	14 (10.4%)
New detection of HIV positive (out of HIV seropositive, N=79)	18 (22.8%)	16 (24.6%)	2 (14.3%)
HCV positive	214 (61.0%)	194 (89.8%) <sup>**</sup>	20 (14.8%)
New detection of HCV positive (out of HCV seropositive, N=214)	110 (51.4%)	95 (49.0%)	15 (75.0%) <sup>*</sup>
Both HIV and HCV positive	58 (16.5%)	55 (25.5%) <sup>**</sup>	3 (2.2%)
Syphilis antibody test positive	59 (16.8%)	45 (20.8%) <sup>*</sup>	14 (10.4%)
Any STIs (current syphilis, gonorrhea, chlamydia)	27 (7.7%)	15 (6.9%)	12 (8.9%)
Woman's HIV characteristics			
Never tested for HIV prior to baseline	91 (25.9%)	40 (18.5%)	51 (37.8) <sup>**</sup>
Currently on ARV treatment (out of those who previously known to be HIV positive, N=61)	8 (13.1%)	7 (14.3%)	1 (8.3%)
HIV counseling/education in the past six months			
Received HIV counseling/education	71 (20.2%)	52 (24.1%) <sup>*</sup>	19 (14.1%)
Didn't receive, but needed (N=280)	212 (75.7%)	128 (78.1%)	84 (72.4%)
Received HIV counseling/education among HIV positive (N=79)	35 (44.3%)	29 (44.6%)	6 (42.9%)
Didn't receive, but needed among HIV positive (N=44)	32 (72.7%)	30 (83.3%) <sup>**</sup>	2 (25.0%)

<sup>\*</sup> p < 0.05.<sup>\*\*</sup> p < 0.01.**Table 3**

Sexual and drug use risk behaviors.

	Total females (N=351)	FWID (N=216)	Non-IDUs (N=135)
Sexual risk behaviors			
Unprotected vaginal sex with any partner within 90 days	299 (85.2%)	186 (86.1%)	113 (83.7%)
Unprotected anal sex with any partner within 90 days	28 (8.0%)	16 (7.4%)	12 (8.9%)
More than one sexual partner within 90 days	46 (13.1%)	34 (15.7%)	12 (8.9%)
Alcohol/drugs before sex with main partner within 90 days	246 (70.1%)	180 (83.3%) <sup>**</sup>	66 (48.9%)
Exchanged sex for money or drugs within 90 days	18 (5.1%)	15 (6.9%)	3 (2.2%)
Drug use risk behaviors			
Binge drinking within 90 days	229 (65.2%)	136 (63.0%)	93 (68.9%)
Smoked hashish within 90 days	105 (29.9%)	93 (43.1%) <sup>**</sup>	12 (8.9%)
Used sedatives, barbiturates, tranquilizers, sleeping pills or painkillers that were not prescribed by a physician within 90 days	170 (48.4%)	164 (75.9%) <sup>**</sup>	6 (4.4%)
Used opium within 90 days	119 (33.9%)	118 (54.6%) <sup>**</sup>	1 (0.7%)
Smoked heroin within 90 days	13 (3.7%)	11 (5.1%)	2 (1.5%)
Used cocaine within 90 days	7 (2.0%)	7 (3.2%) <sup>*</sup>	0 (0.0%)
Used methamphetamines within 90 days	7 (2.0%)	7 (3.2%) <sup>*</sup>	0 (0.0%)

<sup>\*</sup> p < 0.05.<sup>\*\*</sup> p < 0.01.

in public places such as a car, a stairwell, on the street, or in a park and 4.6% had injected at other locations.

More than a third (40.3%) of FWID had ever attended drug treatment or received help for their drug use, but only 2.3% were currently receiving drug treatment. Most FWID (90.7%) reported they could obtain new, unused needles and syringes when they needed them. Needles and syringes were usually obtained from pharmacies (93.4%) and health workers (12.8%). Of the FWID sample, 14.8% had ever visited a syringe exchange program and 6.0% had attended a syringe exchange program within 90 days (Table 4).

#### *Associations between IDU status and serostatus, sexual, and drug risks*

After adjusting for age, ethnicity, education, marital status, unemployment, and food insecurity, FWID were more likely to have been HIV seropositive compared to non-IDU female sex partners of MWID ( $aRR = 3.03$ ; 95% CI = 1.78, 5.18). FWID were also more likely to have been HCV seropositive than non-IDUs ( $aRR = 6.05$ ; 95% CI = 4.05, 9.04). In terms of their risk behaviors, FWID were more likely to have used drugs or alcohol before sex when compared to non-IDU females ( $aRR = 1.67$ ; 95% CI = 1.40, 2.00) when adjusted for covariates. FWID were more likely to have smoked hashish when compared to non-IDUs ( $aRR = 4.98$ ; 95% CI = 2.88, 8.62). They were also more likely to have used sedatives, barbiturates, tranquilizers, sleeping pills, or painkillers that were not prescribed by a physician in past 90 days ( $aRR = 17.45$ ; 95% CI = 8.01, 38.01) (Table 5).

#### Conclusion

This study demonstrates that the two types of female sex partners (FWID and non-IDU) do not significantly differ on socio-demographic characteristics such age, race/ethnicity, level of education, and the relationship context, except for childhood sexual abuse, where FWID were more likely to have experienced CSA. The majority of female participants reported that they were married or in a common-law relationship. Approximately a third reported experiencing sexual IPV. This finding supports previous research that shows perpetration of IPV by drug-involved male sex partners is pervasive (El-Bassel et al., 2011, 2010; Gilbert et al., 2013; Gilchrist, Blázquez, & Torrens, 2012; Mattson, O'Farrell, Lofgreen, Cunningham, & Murphy, 2012; Zaha, Helm, Baker, & Hayes, 2013). The finding that FWID reported a higher prevalence of childhood sexual abuse (CSA) than non-IDU women is consistent with other studies conducted in different countries showing that CSA is more widespread in women who inject or use drugs when compared to the general population of women (El-Bassel et al., 2011, 2010; Meade et al., 2012). Moreover, these findings highlight the importance of a syndemic perspective that recognizes how partner violence and CSA are linked and affected by common risks and outcomes (Singer et al., 2006). Sexual and other forms of IPV and CSA must be addressed in HIV prevention strategies for FWID (Singer et al., 2006).

Unemployment was widespread among both FWID and non-injecting women. A greater number of FWID faced structural risks that increased their vulnerabilities to HIV, when compared to non-IDU females. FWID were more likely than non-IDU women to report not having enough money for food in the past 90 days, and a higher number of FWID reported a history of incarceration. Incarceration of FWID is common in Kazakhstan, which increases their vulnerability to HIV and reduces their access to harm reduction programs and HIV education, treatment, and care (Thorne et al., 2010; Wolfe et al., 2010). Additional barriers to HIV prevention and treatment services for FWID include requirements to register as a drug user, as well as the pervasive stigma, discrimination, harsh treatment

by police, and fear of imprisonment (Kirtadze et al., 2013; Krüsi, Wood, Montaner, & Kerr, 2010; Pinkham, Stoicescu, & Myers, 2012; Simmons & McMahon, 2012; Wolfe et al., 2010).

The prevalence of HIV among FWID was much higher than official statistics have found in Almaty (30.1% versus a reported 2.35%) (RAC, 2011). In this study we also found that the rate of HIV among non-IDU female sex partners was 10%, which strongly indicates that HIV is bridging to non-injecting female partners of PWID.

We witnessed a high prevalence of HCV among FWID, as has been found in research among other populations of IDUs (Beyer et al., 2009; Walsh & Maher, 2012). In a third of the sample, HCV was detected for the first time, with significantly more FWID than non-FWID having new HCV detections.

We were concerned to discover a 14.8% prevalence of HCV among non-FWID, which may indicate sexual transmission of HCV. Although this link has not been well-established in the literature, research has found associations between HCV and unprotected sex with individuals who are HCV positive (Hagan, 2005; Kamal, 2008), having anal sex, failing to use condoms, having a higher number of sexual partners, having a history of STIs, and engaging in sex work. Sexual transmission of HCV has been well documented among HIV positive men who have sex with men (Urbanus et al., 2009; van de Laar et al., 2009), but to much less an extent among heterosexuals (Terrault et al., 2013). None of these studies specifically focused on female sex partners of MWID. The relationship between HCV and sexual transmission needs to be further investigated among non-FWID.

The majority of both FWID and non-IDU female sex partners of MWID reported practicing unprotected sex, with condom use extremely low among both groups of women. Unexpectedly, the prevalence of sex trading was low in both groups of women. This low rate may be explained by the fact that the majority of the women reported being married or living with a primary male partner.

Binge drinking and the use of alcohol or drugs before having sex with the main partner were common among both FWID and non-injecting female partners, but the use of hashish, sedatives, barbiturates, tranquilizers, sleeping pills, or painkillers was more common among FWID than non-injecting female partners. The prevalence of non-injection drug use among females support research that suggests a change in the drug scene of Kazakhstan is emerging, where non-injection drug use is becoming more widespread (Grund, Latypov, & Harris, 2013). Sharing needles was common among FWID despite high numbers of FWID reporting they could obtain new syringes. Women may share needles in intimate relationships to maintain closeness with their main sex partner who injects drugs. Research has shown that sharing needles in intimate relationships is a sign of emotional closeness, intimacy, and love, which may deter concerns about risks (Bryant, Brener, Hull, & Treloar, 2010; Seear et al., 2012; Simmons, Rajan, & McMahon, 2012). Moreover, a refusal to share needles may be perceived by the male partner as rejection or a lack of closeness (Bryant, Brener, Hull, & Treloar, 2010; Seear et al., 2012; Wagner et al., 2013), which may heighten risks for IPV (El-Bassel, Wechsberg, & Shaw, 2012).

The low numbers of women receiving drug treatment points to the need for increases in drug treatment services in Almaty, Kazakhstan, where methadone and buprenorphine are not available (Boltaev et al., 2012). Access to services for FWID may also be impeded by structural barriers including discrimination, drug policies, police exploitation, and stigma (Odinokova, Rusakova, Urada, Silverman, & Raj, 2012; UNODC, 2013).

The dual risks of drug use and unprotected sex found in this study increase the vulnerabilities of FWID and non-IDU female partners to HIV, STIs, and HCV. The majority of FWID inject with their main partners and engage in unsafe injection behaviors with

**Table 4**Injection Behaviors among FWID ( $N=216$ ).

	<i>N (%)</i>
Injected heroin within 90 days	187 (86.6%)
Unsafe injections within 90 days	157 (72.7%)
Injected using works used by someone else	74 (34.3%)
Injected using a syringe after someone else squirted drugs into it from his/her syringe	70 (32.4%)
Used a cooker/cotton/rinse water used by another injector	77 (35.7%)
Fixed drugs with another person, then split solution	134 (62.0%)
Drew up drug solution from a common container shared by others	139 (64.4%)
Added own or someone's blood into a drug injected	16 (7.4%)
Had injecting partners within 90 days	98 (45.4%)
More than one injecting partner within 90 days	64 (29.6%)
Injected with main partner within 90 days	150 (69.4%)
Unsafe injections with main partner within 90 days	93 (43.1%)
Used needles or syringes used by main partner	62 (28.7%)
Used cookers, cotton or rinse water used by main partner	85 (39.4%)
Main partner used needles or syringes used by the woman	59 (27.3%)
Main partner used cookers, cotton or rinse water used by the woman	75 (34.7%)
Injecting place within 90 days	
Non-public place (at home, a friend's place, a shooting gallery)	163 (75.5%)
Public place (in a car, a stairwell, street or park)	59 (27.3%)
Other place	10 (4.6%)
Ever been in drug treatment	87 (40.3%)
Currently under drug treatment	5 (2.3%)
Can obtain new, unused needles and syringes when need them	196 (90.7%)
If can obtain, where ( $N=196$ )	
Pharmacy/street-based pharmacy	183 (93.4%)
Health worker/hospital, needle exchange program, drug worker/NGO	25 (12.8%)
Friends, sexual partner	13 (6.6%)
Other drug users	5 (2.6%)
Other	4 (2.0%)
Ever visited a syringe exchange program	32 (14.8%)
Attended a syringe exchange program in the past 90 days	13 (6.0%)

their partners. This supports other literature on injection drug use in intimate relationships which has found that FWID share drug equipment and engage in risky injections with their male partners (El-Bassel et al., 2013; Lazuardi et al., 2012; Seear et al., 2012; Simmons et al., 2012; Wagner et al., 2013). The most common unsafe behaviors were (1) drawing a drug solution from a vessel shared with others and (2) preparing drugs with another person and then splitting the solution.

In the multivariate analysis, after controlling for socio-demographic and risk environment characteristics, we found that FWID, compared to their non-FWID counterparts, were more likely to be HIV seropositive, HCV seropositive, report having sex while under the influence of drugs, and report using non-injection drugs.

The study has a number of strengths including the use biological assays for HIV, HCV, and syphilis. We enrolled a sample of female intimate partners of MWID and the study clearly reached a population that has had limited access to drug treatment and HIV services

in this region of the world. This study also has a number of limitations, including that data used in this paper was cross-sectional, which precludes us from determining the temporal relationships between risk behaviors and HIV infection, STIs, HCV, and other factors. The sample is non-random; therefore, the study findings may not be representative of other female partners of MWID in Kazakhstan. Nevertheless, the study clearly reached a population of female partners of MWID that have not been studied before, who comprise one of the most at-risk populations for HIV in the world.

These findings have important HIV prevention and drug policy implications. Given that one-quarter of the total sample of women were not tested for HIV prior to the study, greater efforts are needed to improve access to HIV testing for both FWID and non-IDU female partners of MWID. The limited access to harm reduction services and HIV counseling and education among FWID in this study underscores the need for female-specific services such as:

**Table 5**

Estimates of relative risks of HIV, HCV, sexual and drug risks on IDU status.

	Unadjusted RR [95% CI]	Adjusted RR <sup>a</sup> [95% CI]
Bio-testing		
HIV seropositive	2.90** [1.70, 4.96]	3.03** [1.78, 5.18]
HCV seropositive	6.06** [4.04, 9.11]	6.05** [4.05, 9.04]
Sexual risks		
Unprotected vaginal sex with any partner within 90 days	1.03 [0.94, 1.13]	1.01 [0.92, 1.11]
Unprotected anal sex with any partner within 90 days	0.83 [0.41, 1.71]	0.85 [0.40, 1.80]
More than one sexual partner within 90 days	1.77 [0.95, 3.30]	1.77 [0.98, 3.20]
Alcohol/drugs before sex with main partner within 90 days	1.70** [1.42, 2.05]	1.67** [1.40, 2.00]
Drug use		
Binge drinking within 90 days	0.91 [0.78, 1.06]	0.89 [0.77, 1.04]
Smoked hashish within 90 days	4.84** [2.76, 8.49]	4.98** [2.88, 8.62]
Used sedatives, barbiturates, tranquilizers, sleeping pills or painkillers that were not prescribed by a physician within 90 days	17.08** [7.79, 37.48]	17.45** [8.01, 38.01]

<sup>a</sup> Adjusted covariates include age, ethnicity, education (years), marital status, unemployment and food insecurity.\*  $p < 0.05$ .\*\*  $p < 0.01$ .

- (a) Providing services in harm reduction and HIV care that meet the specific needs of women involved with MWID and women who use drugs. Gender-specific needs should be addressed such as antenatal care, childcare, and prevention of IPV and trauma.
- (b) Scaling up HIV evidence-based interventions that address the dual sexual and drug use HIV risks for all drug-involved women and non-injecting female partners of MWID as well as sex workers.
- (c) Ensuring the protection of human rights of women who use drugs by creating public policies to fight discrimination and sex-based violence, so as to stop police mistreatment, arrest, and registration of female drug users.

Given that the steady increase in heterosexual transmission in CA may be occurring among non-injecting female partners of MWID, there is also a need for harm reduction and HIV services to target these women by providing services individually or with their partners. Currently, non-IDU female sex partners of PWID are rarely included in HIV prevention services or welcomed to services with their partners. Including and engaging non-IDU female sex partners in harm reduction or HIV services with their partners will require a cultural shift in service delivery philosophy, with policy changes and staff trainings on how to deliver services.

A couple-based HIV prevention modality is one important approach that can play a pivotal role in the fight against HIV. Given that sexual and drug use behaviors occur in dyadic contexts, FWID and non-IDU female partners may gain from being jointly involved in couple-based treatment to reduce HIV transmission risk, which is paramount to fighting an epidemic where no vaccine is available. The findings of this study underscore the urgent need for scaling up coverage of HIV testing, harm reduction, HIV services for female partners of MWID, and greater engagement of these female partners in treatment and prevention services. Given the spread of the HIV epidemic to heterosexual partners, social, behavioral, and HIV prevention research must direct more attention to FWID and non-IDU female sex partners of MWID in Kazakhstan.

### Conflict of interest statement

None declared.

### References

- Aceijas, C. (2007). Global estimates of prevalence of HCV infection among injecting drug users. *The International Journal of Drug Policy*, 18(5), 352–358.
- Baliunas, D., Rehm, J., Irving, H., & Shuper, P. (2010). Alcohol consumption and risk of incident human immunodeficiency virus infection: A meta-analysis. *International Journal of Public Health*, 55(3), 159–166.
- Beyrer, C., Patel, Z., Stachowiak, J. A., Tishkova, F. K., Stibich, M. A., Eyzaguirre, L. M., et al. (2009). Characterization of the emerging HIV Type 1 and HCV epidemics among injecting drug users in Dushanbe, Tajikistan. *AIDS Research and Human Retroviruses*, 25(9), 853–860.
- Boltayev, A., Deryabina, A., Kusainov, A., & Howard, A. (2012). Evaluation of a PilotMedication-assisted therapy program in Kazakhstan: Successes, challenges, and opportunities for scaleup. *Advances in Preventive Medicine*, 13.
- Boltayev, A., El-Bassel, N., Deryabina, A., Terlikbaeva, A., Gilbert, L., Hunt, T., et al. (2013). Scaling up HIV prevention efforts targeting people who inject drugs in Central Asia: A review of key challenges and ways forward. *Drug and Alcohol Dependence*, 132, 1–7.
- Bryant, J., Brener, L., Hull, P., & Treloar, C. (2010). Needle sharing in regular sexual relationships: An examination of serodiscordance, drug using practices, and the gendered character of injecting. *Drug and Alcohol Dependence*, 107(2–3), 182–187.
- Chersich, M. F., & Rees, H. V. (2010). Causal links between binge drinking patterns, unsafe sex and HIV in South Africa: Its time to intervene. *International Journal of STD & AIDS*, 21(1), 2–7.
- El-Bassel, N., Gilbert, L., Witte, S., Wu, E., & Chang, M. (2011). Intimate partner violence and HIV among drug-involved women: Contexts linking these two epidemics—challenges and implications for prevention and treatment. *Substance Use & Misuse*, 46(2–3), 295–306.
- El-Bassel, N., Gilbert, L., Terlikbayeva, A., Wu, E., Beyrer, C., Shaw, S., & Rozental, Y. (2013). HIV among injection drug users and their intimate partners in Almaty, Kazakhstan. *AIDS and Behavior*, 17(7), 2490–2500.
- El-Bassel, N., Terlikbaeva, A., & Pinkham, S. (2010). HIV and women who use drugs: Double neglect, double risk. *The Lancet*, 376(9738), 312.
- El-Bassel, N., Wechsberg, W. M., & Shaw, S. A. (2012). Dual HIV risk and vulnerabilities among women who use or inject drugs: No single prevention strategy is the answer. *Current opinion in HIV and AIDS*, 7(4), 326–331.
- Gilchrist, G., Blázquez, A., & Torrens, M. (2012). Exploring the relationship between intimate partner violence, childhood abuse and psychiatric disorders among female drug users in Barcelona. *Advances in Dual Diagnosis*, 5(2), 46–58.
- Grund, J. P., Latypov, A., & Harris, M. (2013). Breaking worse: The emergence of krokodil and excessive injuries among people who inject drugs in Eurasia. *International Journal of Drug Policy*, 24(4), 265–274.
- Hagan, H. (2005). HIV/hepatitis C virus co-infection in drug users: Risk behavior and prevention. *AIDS*, 19, S199.
- Kamal, S. M. (2008). Acute Hepatitis C: A systematic review. CME. *The American Journal of Gastroenterology*, 103(5), 1283–1297.
- Kirtadze, I., Otiashvili, D., O'Grady, K. E., Zule, W., Krupitsky, E., Wendee, M., & Jones, H. E. (2013). Twice stigmatized: Provider's perspectives on drug-using women in the Republic of Georgia. *Journal of Psychoactive Drugs*, 45(1), 1–9.
- Krüsi, A., Wood, E., Montaner, J., & Kerr, T. (2010). Social and structural determinants of HAART access and adherence among injection drug users. *International Journal of Drug Policy*, 21(1), 4–9.
- Latypov, A., Otiashvili, D., Aizberg, O., & Boltaev, A. (2010). Opioid substitution therapy in Central Asia: Towards diverse and effective treatment options for drug dependence. *EHRN*.
- Lau, J. T. F., Tsui, H. Y., Ho, S. P. Y., Wong, E., & Yang, X. (2010). Prevalence of psychological problems and relationships with condom use and HIV prevention behaviors among Chinese female sex workers in Hong Kong. *AIDS Care*, 22(6), 659–668.
- Lazuardi, E., Worth, H., Saktiawati, A. M. I., Spooner, C., Padmawati, R., & Subronto, Y. (2012). Boyfriends and injecting: The role of intimate male partners in the life of women who inject drugs in Central Java. *Culture, Health & Sexuality*, 14(5), 491–503.
- Mathers, B. M., Degenhardt, L., Bucello, C., Lemon, J., Wiessing, L., & Hickman, M. (2013). Mortality among people who inject drugs: A systematic review and meta-analysis. *Bull World Health Organ*, 91, 102–123.
- Mattson, R. E., O'Farrell, T. J., Lofgreen, A. M., Cunningham, K., & Murphy, C. M. (2012). The role of illicit substance use in a conceptual model of intimate partner violence in men undergoing treatment for alcoholism. *Psychology of Addictive Behaviors*, 26(2), 255–264.
- Meade, C. S., Watt, M. H., Sikkema, K. J., Deng, L. X., Ranby, K. W., Skinner, D., & Kalichmann, S. C. (2012). Methamphetamine use is associated with childhood sexual abuse and HIV sexual risk behaviors among patrons of alcohol-serving venues in Cape Town, South Africa. *Drug Alcohol Depend*, 126, 232–239.
- Odinokova, V., Rusakova, M., Urada, L., Silverman, J., & Raj, A. (2012). Police sexual coercion and its association with injection drug use and binge alcohol use among female sex workers in Russia. In *Paper presented at the International AIDS Conference, Washington, DC, USA*.
- Pinkham, S., & Malinowska-Sempruch, K. (2008). Women, harm reduction and HIV. *Reproductive Health Matters*, 16(31), 168–181.
- Pinkham, S., Stoicescu, C., & Myers, B. (2012). Developing effective health interventions for women who inject drugs: Key areas and recommendations for program development and policy. *Advances in Preventive Medicine*, 2012, 1–10.
- RAC. (2011). *HIV Surveillance Update for Kazakhstan by Oblast and Risk Group*. Unpublished Ministry of Health Statistics. Almaty, Kazakhstan: Republican AIDS Center (RAC), Ministry of Health.
- Rhodes, T., Singer, M., Bourgois, P., Friedman, S. R., & Strathdee, S. A. (2005). The social structural production of HIV risk among injecting drug users. *Social Science & Medicine*, 61(5), 1026–1044.
- Rhodes, T., Wagner, K., Strathdee, S., Davidson, P., & Bourgois, P. (2012). Structural violence and structural vulnerability within the risk environment: Theoretical and methodological perspectives for a social epidemiology of HIV risk among injection drug users and sex workers. In P. O'Campo, & J. Dunn (Eds.), *Rethinking social epidemiology: Towards a science of change* (pp. 205–230). Netherlands: Springer.
- Roberts, A., Mathers, B., & Degenhardt, L. (2010). *Women who inject drugs: A review of their risks, experiences and needs* (Vol. 12) Sydney, Australia: University of New South Wales, Secretariat of the Reference Group to the UN on HIV and Injecting Drug Use. National Drug and Alcohol Research Centre (NDARC).
- Schoeneberger, M. L., Logan, T. K., & Leukefeld, C. G. (2001). Age differences in HIV risk behaviors and drug treatment utilization among drug users in Kentucky. *Substance Use & Misuse*, 36(6–7), 867–886.
- Seear, K., Gray, R., Fraser, S., Treloar, C., Bryant, J., & Brener, L. (2012). Rethinking safety and fidelity: The role of love and intimacy in hepatitis C transmission and prevention. *Health Sociology Review*, 12(3), 272–286.
- Simmons, J., & McMahon, J. M. (2012). Barriers to drug treatment for IDU couples: The need for couple-based approaches. *Journal of Addictive Diseases*, 31(3), 242–257.
- Simmons, J., Rajan, S., & McMahon, J. M. (2012). Retrospective accounts of injection initiation in intimate partnerships. *International Journal of Drug Policy*, 23(4), 303–311.
- Singer, M. C., Erickson, P. I., Badiane, L., Diaz, R., Ortiz, D., Abraham, T., & Nicolaysen, A. M. (2006). *Syndemics, sex and the city: Understanding sexually transmitted*

- diseases in social and cultural context. *Social Science & Medicine*, 63(8), 2010–2021.
- Stall, R., Mills, T. C., Williamson, J., Hart, T., Greenwood, G., Paul, J., & Catania, J. A. (2003). Association of co-occurring psychosocial health problems and increased vulnerability to HIV/AIDS among urban men who have sex with men. *American Journal of Public Health*, 93(6), 939–942.
- Strathdee, S. A., Hallett, T. B., Bobrova, N., Rhodes, T., Booth, R., Abdool, R., & Hankins, C. A. (2010). HIV and risk environment for injecting drug users: The past, present, and future. *The Lancet*, 376(9737), 268.
- Strathdee, S. A., Lozada, R., Martinez, G., Vera, A., Rusch, M., Nguyen, L., & Patterson, T. L. (2011). Social and structural factors associated with HIV infection among female sex workers who inject drugs in the Mexico-U.S. border region. *PLoS ONE*, 6(4), e19048.
- Straus, M. A. (1979). Measuring intrafamily conflict and violence: The conflict tactics (CT) scales. *Journal of Marriage and the Family*, 41(1), 75–88.
- Terrault, N. A., Dodge, J. L., Murphy, E. L., Tavis, J. E., Kiss, A., Levin, T. R., & Alter, M. J. (2013). Sexual transmission of hepatitis C virus among monogamous heterosexual couples: The HCV partners study. *Hepatology*, 57(3), 881–889.
- Thorne, C., Ferencic, N., Malyuta, R., Mimica, J., & Niemiec, T. (2010). Central Asia: Hotspot in the worldwide HIV epidemic. *The Lancet Infectious Diseases*, 10(7), 479–488.
- UNAIDS. (2012a). *Country report on progress in implementation of the global response to HIV infection, Kazakhstan 2012*. Geneva, Switzerland: Joint United Nations Programme on HIV/AIDS.
- UNAIDS. (2012b). *Global report UNAIDS report on the global AIDS epidemic 2012*. Switzerland: Joint United Nations Programme on HIV/AIDS (UNAIDS).
- UNODC. (2013). *World Drug Report: 2013*. Vienna: United Nations Office on Drugs and Crime.
- Urbanus, A. T., van de Laar, T. J., Stolte, I. G., Schinkel, J., Heijman, T., Coutinho, R. A., & Prins, M. (2009). Hepatitis C virus infections among HIV-infected men who have sex with men: An expanding epidemic. *AIDS*, 23(12), F1–F7.
- van de Laar, T., Pybus, O., Bruisten, S., Brown, D., Nelson, M., Bhagani, S., & Danta, M. (2009). Evidence of a large, international network of HCV transmission in HIV-positive men who have sex with men. *Gastroenterology*, 136(5), 1609–1617.
- Wagner, K. D., Jackson Bloom, J., Hathazi, S. D., Sanders, B., & Lankenau, S. E. (2013). Control over drug acquisition, preparation, and injection: Implications for HIV and HCV risk among young female injection drug users. *ISRN Addiction*, 2013, 1–9.
- Walsh, N., & Maher, L. (2012). HIV and viral hepatitis C coinfection in people who inject drugs implications of new direct acting antivirals for hepatitis C virus treatment. *Current Opinion in HIV & AIDS*, 7(4), 339–344.
- Walsh, N., & Maher, L. (2013). HIV and HCV among people who inject drugs in Central Asia. *Drug and Alcohol Dependence*, 132, S37–S40.
- Wiessing, L., Olszewski, D., Klempová, D., Vicente, J., & Griffiths, P. (2009). EMCDDA annual report 2009: Cocaine and heroin maintain firm hold on Europe's drug scene. *Euro Surveillance*, 14, 46.
- Wolfe, D., Carrieri, M. P., & Shepard, D. (2010). Treatment and care for injecting drug users with HIV infection: A review of barriers and ways forward. *The Lancet*, 376(9738), 355–366.
- Zaha, R., Helm, S., Baker, C., & Hayes, D. (2013). Intimate partner violence and substance use among Hawai'i youth: An analysis of recent data from the Hawai'i Youth Risk Behavior Survey. *Subst Use Misuse*, 48, 11–20.