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Drug injection within prison in Kyrgyzstan: elevated HIV risk and implications for scaling up opioid agonist treatments

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Abstract

Purpose: Within-prison drug injection (WPDI) is a particularly high HIV risk behavior, yet has not been examined in Central Asia. A unique opportunity in Kyrgyzstan where both methadone maintenance treatment (MMT) and needle/syringe programs (NSP) exist allowed further inquiry into this high risk environment.

Methodology: A randomly selected, nationally representative sample of prisoners within six months of release in Kyrgyzstan completed biobehavioral surveys. Inquiry about drug injection focused on three time periods (lifetime, 30 days before incarceration, and during incarceration). We performed bivariate and multivariable generalized linear modeling with quasi-binomial distribution and logit link to determine the independent correlates of current WPDI.

Findings: Of 368 prisoners (13% women), 109 (35%) had ever injected drugs, with most (86%) reporting WPDI. Among those reporting WPDI, 34.8% had initiated drug injection within prison. Despite nearly all (95%) drug injectors having initiated MMT previously, current MMT use was low with coverage only reaching 11% of drug injectors. Two factors were independently correlated with WPDI: drug injection in the 30 days before the current incarceration (AOR=12.6; 95%CI=3.3–48.9) and having HCV infection (AOR: 10.1; 95%CI=2.5–41.0).

Value: This study is the only examination of WPDI from a nationally representative survey of prisoners where both MMT and NSP are available in prisons and in a region where HIV incidence and mortality are increasing. WPDI levels were extraordinarily high in the presence of low uptake of prison-based MMT. Interventions that effectively scale-up MMT are urgently as well as an investigation of the environmental factors that contribute to the interplay between MMT and WPDI.

Keywords

within-prison drug injection; Eastern Europe & Central Asia; methadone; needle/syringe program; prison; HIV

1. Introduction

A confluence of policy, economic, and social factors result in the criminal justice system being a leading contributor to HIV transmission (Dolan et al., 2016), especially in Eastern Europe and Central Asia (EECA) (Altice FL et al., 2016). Punitive drug policies concentrate people with substance use disorders, especially people who inject drugs (PWID), in prisons (Dolan et al., 2016). Incarcerated PWID are disproportionately infected with HIV and have propensity for high-risk transmission behaviors like drug injection and syringe-sharing within prisons that contribute to ongoing HIV transmission (Vagenas et al., 2013). HIV outbreaks associated with drug injection have been documented in prisons throughout the world (Taylor et al., 1995, Dolan and Wodak, 1999, Dolan et al., 2015). Since virtually all prisoners are eventually released, the potential for onward transmission of blood-borne viruses like HIV and HCV to the wider community has significant implications for public health. For example, mathematical modeling suggests that half of all incident HIV cases among PWID in EECA are attributable to a history of incarceration; increasing methadone coverage to 50% of incarcerated PWID and retaining them on methadone after release will reduce new HIV infections in PWID overall by 20% in 15 years (Altice et al., 2016b). The extent to which within-prison risk behaviors are responsible for HIV transmission is unknown.

In the context of thriving intra-prison drug markets, some prisoners initiate or continue injecting drugs during incarceration (Culbert et al., 2015c, Jurgens et al., 2009). Global estimates of within prison-drug injection (WPDI) vary markedly by setting, ranging from 3–53% (Dolan et al., 2015, Jurgens et al., 2009, Kinner et al., 2012). Opioid agonist treatments (OAT) with either methadone or buprenorphine, and needle-syringe programs (NSP) are evidence-based HIV prevention practices recommended within prisons to reduce risky injection behavior and prevent HIV transmission (Kinner et al., 2013, Jurgens et al., 2009). Even in rare criminal justice settings with available NSPs and methadone maintenance

treatment (MMT), stigma among prisoners and staff can limit access to these vital services (Small et al., 2005).

It is difficult to obtain accurate data on WPDI because reporting such information within prison can incriminate prisoners and result in criminal or disciplinary sanctions (Azbel et al., 2016). Aside from one survey study that assessed recently released prisoners in Ukraine, when they were not at risk of sanctions by the prisons department (Izenberg et al., 2014), data is not available on WPDI in countries of EECA (Azbel et al., 2013, Azbel et al., 2015b). PWID are less likely to inject and usually inject less frequently during incarceration (Darke et al., 1998) but HIV transmission risk is substantially higher in prison than in communities because of equipment sharing due to the scarcity of sterile injection equipment (Dolan et al., 2015, Darke et al., 1998, Izenberg et al., 2014).

Kyrgyzstan is one of only seven countries worldwide and the only country in Central Asia—a region with an expanding HIV epidemic concentrated in prisons and largely driven by opioid injection (El-Bassel et al., 2013)—that provides both OAT and NSP within prisons. These programs, however, remain under-scaled in Kyrgyz prisons, where HIV is 34-fold higher than in the community and drug injection is independently correlated with HIV seroprevalence (Azbel et al., 2015a). Approximately one-third of prisoners in Kyrgyzstan report lifetime WPDI (Azbel et al., 2015a), but injection and treatment-seeking practices have not been thoroughly evaluated. In the first nationally-representative bio-behavioral survey on prisoners in Central Asia, the Kyrgyz prison administration allowed a rare opportunity to inquire about within-prison drug-related risk behaviors. In this paper, we examine WPDI in Kyrgyzstan to better understand its prevalence, correlates, and health effects.

2. Methods

2.1 Aims

Among a nationally representative sample of soon-to-be released prisoners in Kyrgyzstan, we assessed the 1) prevalence of current WPDI; 2) differences in HIV risk between WPDI and pre-incarceration injection; 3) independent correlates of current WPDI; and 4) degree to which MMT and NSP were accessed within prison among those who engaged in WPDI.

2.2 Sampling and recruitment procedures

Procedures for this study have been previously described elsewhere (Azbel et al., 2015a) and are briefly summarized here. The criminal justice system in Kyrgyzstan included 9,248 individuals at the time of data collection in 2014, including 12 prisons. All facilities except for juvenile and hospital prisons were included in the study (N=8) including a women's facility, four high, and three medium security facilities. A random assignment chart was used by trained research assistants to recruit participants for a voluntary and de-identified bio-behavioral survey from a list of all prisoners 18 years old in these facilities whose scheduled release was within six months. We aimed to recruit 40% of the 938 eligible participants, to ensure acceptable power and ecological validity. A disproportionate

sampling frame was used, whereby the number of participants sampled from each facility was not proportional to the size of the potential study population housed in that facility.

2.3 Study measures

Consented participants were assigned a study ID that was linked to de-identified serologic testing for HIV (HIV 1/2 Ab by ELISA with confirmatory HIV Ag/Ab by ELISA or rapid HIV Oraquick if unable to draw blood), Hepatitis C (HCV; HVC antibody test by ELISA), Hepatitis B (HBV; by Anti-HBs enzyme immunoassay), syphilis (RPR with confirmatory MHA-TP), and CD4 lymphocyte quantification. All consent procedures and self-administered surveys using Computer-Assisted Self-Survey Instruments (CASI) on laptop computers were conducted in a private room in the prison medical facility without prison personnel present. Surveys were originally written in English, translated into Russian and Kyrgyz, back-translated into English to check for consistency (Brislin, 1970), and piloted to ensure quality and comprehension.

Survey items inquired about drug injection at three points in time: 1) lifetime; 2) the 30-days preceding the arrest that led to the current incarceration; and 3) during the current incarceration. For each setting and time period, participants were asked about use of non-sterile injection equipment and number of sharing partners. Substance use was defined as having used one or more (and polysubstance use, as two or more) of the following substances through any route of administration: illegal opioids, barbiturates, sedatives, cocaine, hallucinogens, or amphetamines. PWID was defined as those who reported at least one episode of drug injection during any time frame; WPDI was defined as having injected drugs during any incarceration; past WPDI was defined as having injected drugs during a prior incarceration; and current WPDI was defined as having injected drugs during the current incarceration. Survey items also addressed participants' lifetime use of MMT and NSP, both in the community and during any incarceration. PWID were asked if MMT should be available in prisons. They were also asked, "How many days, in the 30 days prior to your arrest and incarceration, did you experience drug problems?" and "How troubled or bothered were you by drug problems in the 30 days prior to your arrest and incarceration?" on a scale where 5 was most troubled and 1 was least troubled. All PWID were asked how much they currently crave opioids with 1 defined as "not at all" and 10 as "I think about it all the time."

Additional survey items included: 1) socio-demographic characteristics; 2) criminal justice history with recidivism defined as having served at least one previous sentence in prison; 3) major depressive symptoms, defined as scores ≥ 11 on the 10-item Clinical Epidemiological Survey of Depression CES-D 10 (Garrison et al., 1991); 4) anxiety was defined dichotomously as scores ≥ 45 on the Zung anxiety scale (Zung, 1971); 5) health-related quality of life (HRQoL) was measured continuously using the Medical Outcomes Survey SF-36 (Ware and Sherbourne, 1992); 6) an alcohol use disorder was defined by scores ≥ 8 (men) or ≥ 4 (women) on the WHO's Alcohol Use Disorders Inventory Test (AUDIT) (Saunders et al., 1993); 7) self-reported history of chronic illnesses; 8) social support measured continuously using the social support survey (Sherbourne and Stewart, 1991); and 9) detention, defined as being detained by the police in the year before the current

incarceration either with (official) or without (unofficial) formal charges (Izenberg et al., 2013).

2.4 Analysis

R (version 3.2.3) with the Survey package (Lumley, 2004) was used for statistical analyses. To adjust for the disproportionate sampling frame, we weighed each observation according to every prison's share of the total study population. Because fewer than 5% of variables were missing, we used complete-case analysis. For continuous variables, we removed outlier values and log-transformed skewed variables to address non-normal distributions (Van den Broeck et al., 2005). We calculated estimates of prevalence and means or medians for key variables, including 95% confidence intervals. We used chi-square for categorical variables and Kruskal-Wallis H test for continuous variables to compare key characteristics among three groups: non-WPDI, current WPDI, and past WPDI. We performed bivariate and multivariable generalized linear modeling with quasi-binomial distribution and logit link to determine the independent correlates of current WPDI. Variables that were significantly associated with the outcome at the bivariate level ($p < 0.05$) were included in the full multivariable model, except when determined to be collinear using the variation inflation factor (VIF > 5). To evaluate goodness-of-fit, we performed Pearson and deviance residual analysis, the Hosmer and Lemeshow test, and Stukel's test.

2.5 Ethical considerations

Participants received no disincentive for declining to participate in the study, but those who completed the entire study were given a small package of hygiene products for their time. Deidentification insured the confidentiality of the data. The Prisons Department provided written assurances that we were not required to report any within-prison risk behaviors nor would any disclosures result any disciplinary action. Prison staff were not present in the room during survey procedures. The Institutional Review Boards at Yale University and the Kyrgyzstan Ministry of Health approved the study. Further ethical assurances for research with prisoners were provided by the U.S. Office for Human Research Protections (OHRP).

3. Results

3.1 Socio-demographics

Among 938 eligible prisoners, 368 (of whom 13% were women) were randomly selected and enrolled in the study (over 95% of those randomly selected consented to participate). Table 1 compares the characteristics of current PWID in prison, past PWID in prison, and the remainder of the sample (non-PWID in prison), and presents the Kruskal-Wallis H test results with corresponding p -values for each comparison among these three groups. There was no difference in mean age between the three groups (mean 37.4 years). A greater proportion of PWID in prison were male as compared to female and Russian as compared to the non-PWID in prison who were more likely to identify as Kyrgyz.

The comparison of criminal justice history between the three groups shows that PWID in prison have more criminal justice involvement: current-PWID in prison have spent more total time in prison, had more previous incarcerations, were more likely to be recidivists, and

were first incarcerated at a younger age than non-PWID in prison. There were no significant differences between past and current PWID in prison in terms of criminal justice-involvement.

There were no statistically significant differences in socioeconomic factors between the three groups. Mental and physical health, however, did differ. Past PWID in prison had elevated anxiety levels compared to current PWID in prison (16% vs. 8%, respectively; $p=0.01$). PWID in prison reported significantly higher levels of current social support but lower physical HRQoL indices than non-PWID in prison.

3.2 Infectious diseases

Among current and past PWID in prison, the prevalence of HIV (25% and 22%, respectively) and HCV (96% and 93%, respectively) was significantly higher than among non-WPDI ($p<0.001$ for both). Notably, HIV and HCV prevalence in non-PWID in prison was still 5% and 30%, respectively, and prevalence of syphilis or HBV did not differ between all groups.

3.3 Substance use

In the 30 days before the current incarceration, 36.1% of participants reported using at least one illegal substance, with 8.5% reporting polysubstance use. Heroin was the most commonly used substance and men were significantly more likely than women to have injected drugs of any kind ($p=0.001$). Lifetime addiction severity was significantly higher among PWID in prison compared to non-PWID in prison, and even higher among current PWID in prison than past PWID in prison. Before incarceration, current PWID in prison experienced drug problems for more days on average than past PWID in prison (4.7 vs. 1.4 days; $p<0.001$) and more current PWID in prison had shared non-sterile injection equipment (10% vs. 5%; $p=0.02$) in the 30 days before the current incarceration.

Figure 1 depicts the prevalence of injection in a number of scenarios. Overall, 35.4% of participants reported injecting drugs at least once in their lifetime, with nearly all (86.2%) doing so in prison, representing 30.8% of the entire sample. Over one-third (34.8%) of all lifetime WPDI had injected for the first time in prison. Among the PWID ever in prison, 70.9% had injected during the current incarceration. The proportions of participants injecting inside versus outside of prison are not statistically different. However, significantly more PWID shared equipment within prison than outside of prison. Of those respondents who reported ever injecting drugs outside of prison ($N = 79$), 15.4% reported sharing non-sterile injection equipment (a syringe, container, or needle) in the 30 days prior to incarceration with an average of 0.34 people. In prison, however, 70 participants had shared non-sterile injection equipment (74.0% of PWID in prison) with an average of 1.9 other people.

3.4 Access to HIV prevention services

Lifetime use of HIV prevention services (NSP and MMT) was high. Nearly all of the 109 PWID (95.2%) had been enrolled in MMT, primarily in prison (82.0%) and/or pre-trial detention (8.0%), but a minority used MMT in the community (14.9%). Despite high uptake,

more than half (57.4%) of PWID thought OAT should not be available in prison. Overall, 78.1% of PWID reported ever receiving a sterile needle or syringe from NSP, most commonly in prison (82.0% of all PWID) and to a lesser extent, in the community (51.2% of all PWID). Current PWID in prison had accessed NSP more than past PWID in prison (80% vs. 67%, respectively). Concurrent relationship between WPDI and use of OAT or NSP services, however, was not assessed.

3.5 Correlates of current within-prison drug injection

Table 2 presents multivariable correlates of current PWID drugs in prison (at least one injection during the current incarceration). Drug injection in the 30 days prior to the current incarceration was associated with a 12-fold increased odds of current WPDI. Similarly, having HCV infection was also associated with more than a 10-fold (AOR: 10.1; $p=0.001$) increased odds of current WPDI. Goodness-of-fit tests confirmed the model was not misspecified [Hosmer and Lemeshow ($p=0.82$) and Stukel's test ($p=0.29$)] and the ROC showed high predictive accuracy of the model.

4. Discussion

Though a number of studies document WPDI and related HIV risk, this paper adds to the extant literature an assessment of WPDI in the EECA, the only region globally where HIV incidence and mortality is increasing (UNAIDS, 2016). We focused on WPDI in Kyrgyzstan where both MMT and NSP are available in prison, one of 7 prison systems globally, yet underutilized. A growing body of research attests to the contribution of incarceration to HIV transmission (Altice et al., 2016a, Werb et al., 2008). This is especially salient in EECA, where HIV incidence increased 57% from 2010 to 2015 (UNAIDS, 2016), driven primarily by injection drug use. To our knowledge, this is the first study to examine WPDI—a behavior associated with high risk for transmission of blood-borne infections—among a nationally representative sample of prisoners in a setting where both MMT and NSP are available. We document extremely high levels of WPDI, including initiation of injecting in prison, sharing of injection equipment, and associated blood-borne infection risk, despite the existence of HIV prevention programs (MMT and NSP) that have been proven effective at reducing risky injection behavior in the prison context (Jurgens et al., 2009). Importantly here, and like studies of WPDI in other settings, those reporting WPDI in Kyrgyzstan showed markedly higher instances of sharing injection equipment within prison than in the community, even while MMT and NSP were available, pointing to an urgent need to encourage consistent use of risk reduction services throughout the course of incarceration and through the transition to communities.

Although WPDI has been studied in a wide range of contexts (Izenberg et al., 2014, Culbert et al., 2015c, Darke et al., 1998, Kinner et al., 2012, Gore et al., 1995), most were retrospective; few studies have assessed currently incarcerated individuals (Culbert et al., 2015c, Treloar et al., 2015), and none, except this one, in Central Asia (Azbel et al., 2015a, Polonsky et al., 2016a). Elsewhere, it might have been unethical to conduct assessments of HIV risk-taking within prison because these behaviors were illegal and researchers would be obligated to report them. Moreover, prison authorities often want to conceal within-prison

risk behaviors as it may imply that they were not adequately controlling the prison environment. Fortunately, the prison authorities in Kyrgyzstan have taken a public health stance to better understand HIV risk by using study results to inform and improve programs (Azbel et al., 2016). Emblematic of Kyrgyzstan's commitment to public health is that it is among the only seven countries worldwide that provides both NSP and MMT in prisons, presenting a rare opportunity to document and prevent HIV risk in an environment where WPDI is acknowledged and addressed on a government level. The finding that fewer prisoners reported injection than were diagnosed with HCV suggests that there was under-reporting of lifetime injection risk. Such discrepancies have been observed within prisoners in this region, and, similar to this study, were not accounted for by sex, tattooing or blood transfusions (Azbel et al., 2015b, Azbel et al., 2013, Azbel et al., 2015a). Even if injection was under-reported, which is often the case for highly stigmatized behaviors (Azbel et al., 2016), an astonishing 30% of all prisoners transitioning to the community in Kyrgyzstan have ever injected within prison, with 86% of all PWID doing so. Furthermore, the proportion of HIV-infected prisoners reporting lifetime WPDI (66%) is higher than reported in previous studies. This is alarming given that over half of the prisoners (53.5%) in Kyrgyzstan do not know their HIV status and are thus not in care or receiving antiretroviral therapy (Azbel et al., 2015a), increasing the chances of transmitting HIV to others.

Injecting during the current incarceration was associated with higher pre-incarceration addiction severity, evidenced by their reporting more drug problems and using drugs, especially heroin, in the 30 days prior to incarceration. This is in line with previous findings where PWID in the 30 days before arrest (Izenberg et al., 2014), in the past year before incarceration (Calzavara et al., 2003, Culbert et al., 2015c) and people who have higher addiction severity before arrest (Polonsky et al., 2016a) are more likely to engage in WPDI. The consistency of this finding suggests that, where MMT is provided, all prisoners entering prison should be screened for opioid use disorders, then intervene using either informed or shared decision-making strategies to improve acceptability (Elwyn et al., 2014). MMT dose should be rapidly escalated and optimized to promote MMT retention when prisoners complete their prison sentence and transition to the community (Wickersham et al., 2013b). Such strategies are likely to have the greatest influence on reducing transmission of HIV and other blood-borne infections both within prison and post-release. Uptake of OAT and NSP services is particularly important in light of our finding that current WPDI is associated with ten-fold increased odds of Hepatitis C exposure.

PWID do so less frequently in prisons than in the community, but HIV and Hepatitis C transmission risk is markedly elevated because scarce injection equipment leads to increased high-risk sharing (Jurgens et al., 2009). Consistent with prior studies (Jurgens et al., 2009), a larger proportion of PWID in our sample shared injection equipment in prison (75%) than in the community (15%). Prison-based MMT and NSP reduce injection and equipment sharing within prisons (Dolan et al., 2003, Dolan et al., 1996, Jurgens et al., 2009). In Kyrgyzstan, however, where NSP and MMT services have been available for close to a decade, we found that injection and instances of equipment sharing were frequent despite high exposure to these services. While this may seem paradoxical, a closer look points to an intermittent utilization of these services. Only 377 prisoners were receiving MMT nationally during the time of this survey, meeting only 11.6% of the estimated need. Although our cross-sectional

data precludes investigation into whether utilization of these services was contemporaneous with risky injection practices—a limitation of this study. But, considering that 95% of WPDI have at some point received prison-based MMT, we can deduce considerable turnover among MMT patients. Continuation on MMT after release must be low given that only 16% had ever received it in the community. Incarceration represents an opportunity for initiating MMT, but also requires effective linkage to community MMT post-release to effectively reduce new HIV infections in PWID (Altice FL et al., 2016). The reasons behind this low uptake and high turnover are not well understood, especially given that MMT is available in all prison facilities and anyone reporting opioid dependence in Kyrgyzstan's prisons can enter treatment.

One explanation is a strong within-prison drug economy fomenting negative attitudes toward OAT. Studies of PWID in Moldova (Polonsky et al., 2016b) and Indonesia (Culbert et al., 2015c, Culbert et al., 2015b, Culbert et al., 2015a) suggest that OAT can be seen as competition to a within-prison drug trade which incurs financial losses from reduced drug use by PWID. In Ukraine, prisoners do not equate OAT with recovery (Polonsky et al., 2016c) and prison staff harbor negative attitudes toward OAT (Polonsky et al., 2015), which challenges implementation and uptake. In the current study, over half of PWID stated that MMT should not be available in prisons. The extent to which this is a reflection of the within-prison drug economy's impact on entry and retention on MMT in Kyrgyzstan remains to be documented, but may be a hurdle if OAT were rolled out throughout the region. While Kyrgyzstan has been a pioneer of HIV prevention for PWID in the region (Ancker and Rechel, 2015), implementation issues persist, and qualitative research on how MMT is embedded within the prison context is necessary to more fully grasp why enthusiasm for the program is low even when a majority of PWID have accessed it.

5. Conclusions

Our findings are consistent with others showing that the prison environment amplifies risk for blood-borne infections like HIV and HCV, and that incarceration is associated with higher HIV risk behavior with potential HIV transmission after release (Altice FL et al., 2016). In our study, drug use before incarceration correlated with WPDI, and nearly one-third of all PWID initiated drug injection while they were incarcerated. Thus, WPDI has important implications for transmission of blood-borne infections both within and outside of the prison risk environment. Although data is lacking on the local context, findings from the U.S. suggest that mortality is high following prison-release, and disproportionately due to overdose from opioids, with which WPDI is likely associated (Milloy et al., 2011, Patterson, 2013). While prisons amplify HIV risk with increase probability of onward community transmission (Morenoff and Harding, 2014, Milloy et al., 2013), they can also serve as sentinel sites for HIV prevention and treatment (Fazel and Baillargeon, 2011, Flanigan et al., 2010). Prisons can expand HIV prevention efforts by scaling up MMT in PWID (Lucas et al., 2010, Uhlmann et al., 2010, Altice et al., 2011, Palepu et al., 2006, Kinlock et al., 2009, Wickersham et al., 2013a, Haddad et al., 2013) with concomitant health and social benefits for the individual and community post-release (Jurgens et al., 2009, Kinlock et al., 2009, Altice et al., 2016a). Although expanding MMT within the EECA context is the most cost-effective HIV prevention strategy, combining it with ART scale-up is the most cost effective

(Vickerman et al., 2014, Alistar et al., 2011). Although Kyrgyzstan is a small country within EECA, it holds great promise for serving as a regional leader to more effectively implement and scale-up prison-based MMT. Our findings here offer a rare glimpse into within prison risk behaviors, but also offer opportunities for further investigation and program improvement. Based on international standards and national targets, however, MMT expansion efforts for HIV prevention and treatment in Kyrgyzstan generally, and within the prison, remain suboptimal to curb the growing HIV epidemic in PWID (Wolfe et al., 2010, Strathdee et al., 2010, Degenhardt et al., 2010, Mathers et al., 2010, United Nations Office on Drugs and Crime, 2010). Furthermore, prisoners continue to inject opioids and share injection equipment within prison. While MMT programs in prisons provide an important opportunity for introducing, expanding and continuing MMT post-release, it is vital to understand the social-environmental context of prisons where MMT is available (Roman et al., 2011) to improve MMT uptake, reduce simultaneous opioid injection, prevent opioid relapse post-release, and to enable organizational change within prison to maximize future MMT delivery. Strategies that provide consistent utilization of HIV prevention services over the course of incarceration are likely to be crucial.

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Figure 1.
Within-prison drug injection practices among soon-to-be released people who injected drugs in Kyrgyzstan (N=109)

Table 1.
Weighted participant characteristics for prisoners who have never, previously, and currently injected within prison (N=368)

WPDI (within prison drug injection); NSP (needle-syringe program); MMT (methadone maintenance treatment); ART (antiretroviral therapy); STI (sexually transmitted infection)

Variable	Never WPDI N=274	Past WPDI N=26	Current WPDI N=68	p-value
Demographics				
Mean Age, years	37.4	38.2	36.6	0.440
Female, %	16 _a	5 _{ab}	6 _b	0.004*
<u>Ethnicity, %</u>				
Kyrgyz, %	48 _a	29 _{ab}	17 _b	<0.001*
Russian, %	27	35	55	
Uzbek, %	15	15	8	
Other, %	10	21	20	
Criminal justice history				
Recidivist, %	60 _a	95 _b	95 _b	<0.001*
Lifetime years incarcerated, mean	2.33 _a	3.52 _b	3.33 _b	<0.001*
Number previous incarcerations for recidivists, mean	2.90 _a	3.95 _b	3.88 _b	<0.001*
Years currently incarcerated, mean	1.44 _a	1.03 _b	1.42 _a	<0.001*
Age at first incarceration	26.7 _a	20.3 _b	19.9 _b	<0.001*
<u>Offense</u>				
Homicide, %	14 _a	0 _b	6 _b	0.030*
Violent crime, %	9	10	2	0.130
Property-related crime, %	27 _a	42 _{ab}	43 _b	0.038*
Drug-related crime, %	20	26	30	0.170
Sex-related crime, %	3	0	2	0.580
Fraud, %	4	5	0	0.250
Socioeconomic factors & mental health				
In a sexual relationship, %	43	45	28	0.80
Completed high school, %	59	62	51	0.480
Below poverty line, %	32	17	32	0.290
Has been employed abroad, %	29	39	33	0.550
Major depression, %	29	48	36	0.110
Mild to severe anxiety, %	3 _a	16 _{ab}	8 _b	0.010*
Social support scale score, mean	22.62 _a	29.92 _b	25.57 _b	0.020*
Health				
Physical composite score, mean	47.22 _a	44.49 _b	45.50 _b	0.005*
Mental composite score, mean	36.81	37.13	36.86	1.00
Told by a doctor had STI, %	7 _a	9 _{ab}	20 _b	0.020*
HIV, %	5 _a	25 _b	22 _b	<0.001*
CD4 count among HIV-infected, cells/mL, median	381	243	248	0.300

Variable	Never WPDI N=274	Past WPDI N=26	Current WPDI N=68	p-value
CD4>350, %	65	34	24	0.150
CD4<=350, %	35	66	76	
On ART, %	52	67	68	0.890
HCV, %	30 _a	96 _b	93 _b	<0.001*
HBV, %	6	8	5	0.890
Syphilis, %	16	23	25	0.250
Substance use				
<i>30 days prior to this incarceration</i>				
Opioid use, %	10 _a	91 _b	90 _b	<0.001*
Number of days injecting drugs, mean	61 _a	5.30 _b	7.32 _b	<0.001*
Used sedatives, %	1 _a	6 _b	9 _b	0.002*
Number of days experienced drug problems, mean	0.27 _a	1.36 _{ab}	4.65 _b	0.001*
How troubled by drug problems, mean	1.05 _a	1.37 _b	1.80 _b	<0.001*
Used non-sterile injection equipment, %	2 _a	5 _{ab}	10 _b	0.020*
<i>Within prison</i>				
Used non-sterile injection equipment, %	<1 _a	72 _b	75 _b	<0.001*
Access to MMT and NSP				
Has used NSP in the community, %	2 _a	63 _b	53 _b	<0.001*
Has used NSP in prison, %	36 _a	67 _{ab}	80 _b	0.001*
Has received MMT in prison or SIZO, %	4 _a	86 _b	87 _b	<0.001*
Ever enrolled in MMT in the community, %	2 _a	11 _b	12 _b	0.001*

Notes:

All values are means weighed according to the number of soon-to-be released prisoners in each facility, unless otherwise noted. Significance denotes $p<0.05$; marked with asterisk (*). Means that do not share subscripts differ at $p<0.05$.

Table 2.

Adjusted correlates of current within-prison drug injection (N=68) among soon-to-be released prisoners in Kyrgyzstan (N=368)

	Adjusted Odds Ratio	95% C.I.	p-value
Gender	2.0	0.4 – 11.1	NS
Kyrgyz ethnicity	0.5	0.2 – 1.5	NS
Lifetime years in prison	1.0	0.9 – 1.0	NS
Number of times in prison	1.0	0.8 – 1.3	NS
Age at first incarceration	0.9	0.9 – 1.0	NS
Has a partner	0.4	0.2 – 1.0	NS
Was officially detained in year before incarceration	2.4	0.9 – 6.2	NS
Was unofficially detained in year before incarceration	1.2	0.4 – 3.5	NS
Was told by a doctor they had a sexually transmitted infection	1.7	0.5 – 5.6	NS
HIV infection	1.4	0.4 – 5.0	NS
HCV infection	10.1	2.5 – 41.0	0.001 *
Ever injected drugs before this incarceration	0.9	0.3 – 2.9	NS
Currently craving opioids	1.0	0.8 – 1.1	NS
<i>Substance use in 30 days before this incarceration</i>			
Number of injections	1.0	0.9 – 1.1	NS
How many days experienced drug problems	1.0	1.0 – 1.1	NS
How troubled by drug problems?	2.0	0.9 – 4.4	NS
Substance use	12.6	3.3 – 48.9	<0.001 *
Polysubstance use	0.3	0.1 – 1.1	NS
Used non-sterile injection equipment	2.2	0.4 – 13.1	NS

* Denotes a significant difference, defined as $p < 0.05$.

NS = not significant