REPORT
ON THE RESULTS OF INTEGRATED BIO-BEHAVIORAL STUDY ON HIV AND ESTIMATION OF THE NUMBER OF SEX WORKERS AND PEOPLE, WHO INJECT DRUGS IN THE REPUBLIC OF TAJIKISTAN

Dushanbe-2018

TEAM OF AUTHORS

Report on the results of integrated bio-behavioral study and estimation of number of people, who inject drugs and sex workers, done in Tajikistan by the team of employees of the Republican AIDS center, ICAP of Columbia University CDC, including: Karimov S.S., director of the State enterprise “Republican AIDS center” of Tajikistan (RAC), Sayburkhonov D.S., deputy director of RAC, Boymurodov K., specialist of the monitoring and evaluation department of RAC, Deryabina A.P., regional director, ICAP, Ivakin V.Yu., deputy regional director for strategic information, ICAP, Nabijonov A.K., advisor on the matters of HIV infection treatment, CDC Tajikistan, Kholov S.C, coordinator, ICAP Tajikistan, Mirzoaliyev Yu., specialist on strategic information, ICAP Tajikistan, Ali-Zade D., regional specialist on healthcare digitalization, ICAP, Tajikistan.

Implementation of the study and preparation of this report would not have been possible without participation of the employees of organizations, specified in the table below. Authors of the report express gratitude to all employees of AIDS centers, employees of NGOs, as well as representatives of sentinel groups, who have participated in the study. Using this opportunity, RAC would like to express special appreciation to CDC team, including Marissa Courey, regional specialist on healthcare studies, Aziz Nabijanov, advisor on the matters of HIV treatment, Mark Berry, epidemiologist and Perry Killam, Regional Director of the CDC Global HIV/AIDS Program in Central Asia for developing IBBS protocol. We would like to express special appreciation to Kryukova V.A., specialist on strategic information in Kazakhstan, ICAP, Kaspirova A.A., head of epidemiology department of the Aktobe regional AIDS center and Dr. Arash Alae, UNICEF consultant for providing training to the research team on data collection and for providing mentorship during the field stage of IBBS.

STUDY PARTICIPANTS BY KEY POPULATIONS (PWID and SW)

Key populations	Sentinel site	Organizations, which participated in collection of information
People, who inject drugs	Dushanbe	Republican AIDS center and “Spin Plus” NGO
	Vahdat	City AIDS center and “Spin Plus” NGO
	Rudaki	District AIDS center, “Guli Surkh” NGO and OST site
	Bokhtar	Regional AIDS center and drop-in center for PWID
	Kulyab	Regional AIDS center and drop-in center for PWID
	Khorugh	Regional AIDS center and drop-in center for PWID
	Panjakent	City AIDS center and drop-in center for PWID

	Khujand	Regional AIDS center and “Dina” NGO
Sex workers	Dushanbe	Republican AIDS center, «Marvorid» NGO and FO for SW
	Vahdat	City AIDS center and «Marvorid» NGO
	Rudaki	District AIDS center and «Marvorid» NGO
	Bokhtar	Regional AIDS center and FO for SW
	Kulyab	City AIDS center and FO for SW
	Khorugh	Regional AIDS center
	Panjakent	City AIDS center and “Buzurg” NGO
	Khujand	Regional AIDS center and FO for SW

This report presents results of integrated bio-behavioral study (IBBS) and estimation of the number of people, who inject drugs, and sex workers, done in Tajikistan by the State enterprise “Republican AIDS center” of Tajikistan. The study was conducted and the report was prepared with technical support and funding from the U.S. Centers for disease control and prevention in the framework of Cooperation agreements U2GGH001563 “Strengthening the Capacity of the Republican AIDS Center to Implement HIV Program in the Republic of Tajikistan under PEPFAR program” and 5U2GGH000994 “Technical support for HIV programs in Central Asia”. Contents of the report reflect opinions of its authors and does not necessarily reflect the official opinion of CDC or the U.S. Government.

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LIST OF ABBREVIATIONS

DEFF	Design effect
RDS-Analyst	Special computer program to process data, obtained from the respondent-driven sample
ART	Antiretroviral therapy
TLS	Time-location sampling
HBV	Hepatitis B virus
HCV	Hepatitis C virus
EECA	Eastern Europe and Central Asia
HIV	Human immunodeficiency virus
VL	Viral load
GBAR	Gorno-Badakhshan autonomous region
CI	Confidence interval
FO	Friendly office
PrEP	Pre-exposure prophylaxis
SES	Sentinel epidemiologic surveillance
IBBS	Integrated bio-behavioral study and estimation of the number of people, who inject drugs, and sex workers
IDU	Injection drug use
STI	Sexually transmitted infections
ELISA	Enzyme immunoassay
KP	Key populations
PLH	People, living with HIV
PWID	People, who inject drugs
MHSPP or RT	Ministry of healthcare and social protection of population of the Republic of Tajikistan
IQR	Interquartile range
Penit.	Penitentiary institutions
MSM	Men, who have sex with men
OST	Opioid substitution therapy
NGO	Non-government organization
Estim.	Estimation of population
OR	Odds ratio
SS	Sampling sequence
DIC	Drop-in center
PEPFAR	United States President's Emergency Plan for AIDS Relief
PSSER	Provision of sexual services in exchange for remuneration
RDS	Respondent-driven sampling
RRS	Regions of republican subordination
SW	Sex workers
RAC	Republican center for AIDS control and prevention of Tajikistan
CDC	U.S. Centers for disease control and prevention
DBS	Dry capillary blood spot sample
Media	Mass media
SOP	Standard operating procedure
AIDS	Acquired immunodeficiency syndrome
USA	United states of America
TWG	Technical working group
U-sound	Ultrasound studies
IDI	In-depth interview
UID	Unique identification code
UCID	Unique coupon identification number
FG	Focus group

CGH CDC	Center for global health CDC
ES	Electronic system for tracking HIV cases
UNAIDS	Joint United Nations Programme on HIV/AIDS

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1. HIV EPIDEMIOLOGIC SITUATION IN TAJIKISTAN

The Republic of Tajikistan (Tajikistan) is located in the south-eastern part of Central Asia. The area of the country is 142.6 thousand square km and 93% of the territory is mountainous. The length of the country west to east is 700 km, north to south –350 km. Tajikistan borders Uzbekistan (910 km) and Kyrgyzstan (630 km) in the west and north, Afghanistan in the south (1030 km) and China in the east (430 km). As of 1 January 2018, population of Tajikistan was 8. 9312 million people, of which urban population was 26.4% (2.3542 million) and rural population was 73.6% (6577.0); 34.3% of population are children of 0 to 14 years and 52.6% - people in the age group 15 to 49 years (reproductive age). As of 1 January 2018, the share of women in the total population was 49.3%.[1]

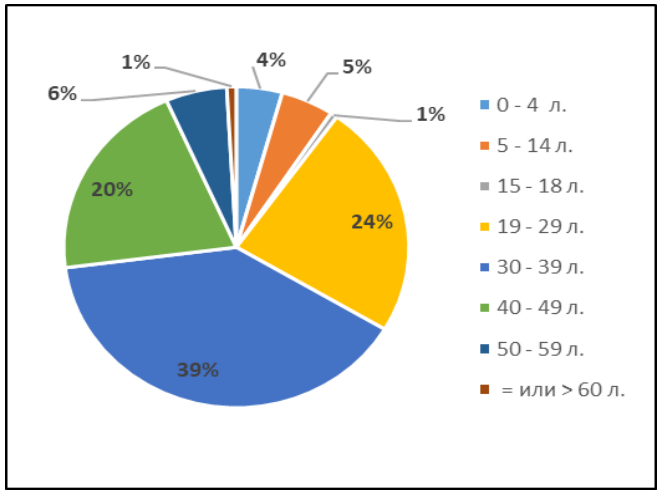


Figure 1. Distribution of cumulatively registered HIV cases by age groups, Tajikistan, 31 December 2018

Tajikistan is one of the 8 countries of Eastern Europe and Central Asia (EECA) out of 12, where there was an increase of the newly registered cases of HIV infection. According to the statistics, based on case registration data, number of cumulatively identified HIV cases in the country has increased from 1422 in 2008 to 10695 as of 1 January 2019.[2] According to the estimates of UNAIDS, in fact number of PLH can exceed 15 000.[3] In 2018, 1422 new cases of HIV were registered in Tajikistan, which exceeds the number of new cases in 2017 by 215.[2] Cumulatively registered cases of HIV infection are unevenly distributed throughout the country, with the biggest number registered in Khatlon region – 2966 cases (92.7 cases per 100 thousand people), followed by city of Dushanbe – 2467 cases (296.7 per 100 thousand people), Sughd region – 2381 cases (91.3 per 100 thousand people), regions of republican subordination (RRS) – 2238 cases (108.2 per 100 thousand people) and Gorno-Badakhshan Autonomous Region (GBAR) – 643 cases (287.6 per 100 thousand people).[2]

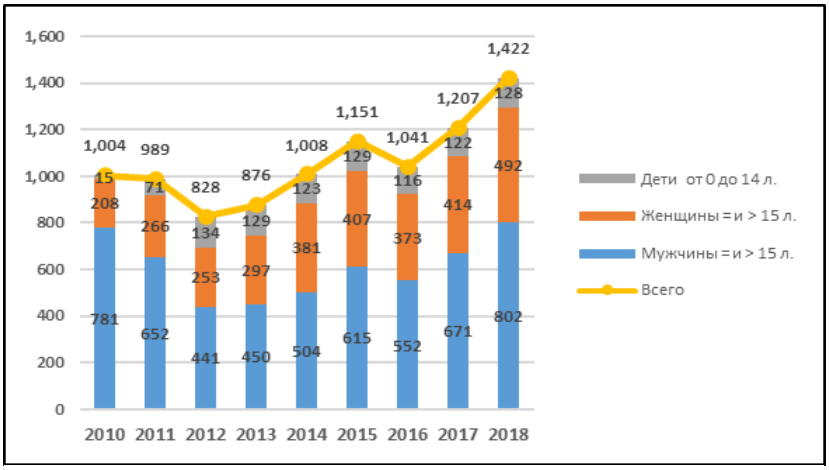


Figure 2. Total number of newly registered HIV cases and their distribution by gender, Tajikistan, 2010-2018

84% of HIV cases were registered among people of 15–49 years, including 24% in the age group 19 to 29, 39% in the age group 30 to 39, and 20% in the age group of 40 to 49. 9% of the total number of HIV cases were registered among children under 15 years (Fig. 1.).[2] 65% HIV cases were registered in men and 35% in women. Nevertheless, over the last 7 years the share of women in newly diagnosed adults (15 and older) has increased from 21% in 2010 to 38% in 2018. (Fig. 2).[2] Out of 1422 newly registered HIV cases in

2018, 1294 cases were registered in the age group 15 years and older.[2] Out of 1294 cases registered in adult population (≥ 15 years), 62% were men and 38% women.[2] The remaining 9% were identified in children under 15 years. About 70% of the newly identified HIV cases in children in 2018 were in the age group 5-14 years.[2]

Before 2011 the main HIV transmission route was parenteral, mainly due to drug injection (Fig. 3). Starting from 2012, over 50% of new HIV cases have been identified among general population and new trend in HIV spread has appeared, namely domination of sexual transmission over parenteral route. Among newly identified HIV cases in 2018, the share of people, who were possibly infected by sexual transmission has reached 72.6% (Fig. 3).

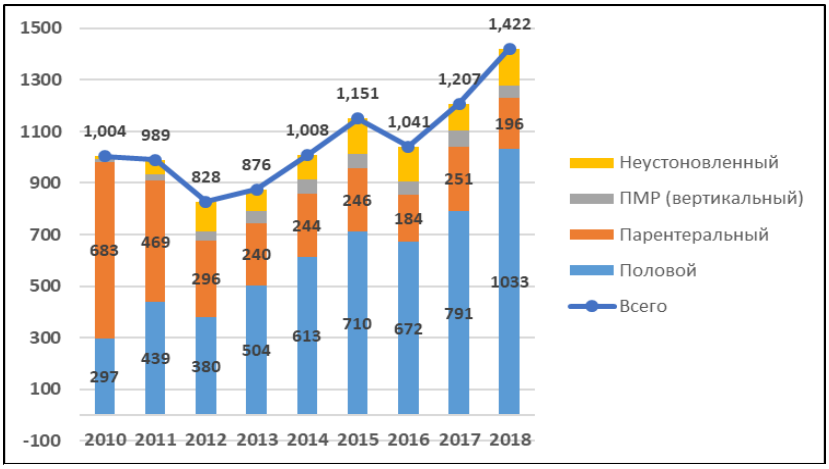


Figure 3. New HIV cases by transmission routes. Tajikistan, 2010-2018.

However, one should not underestimate the impact of key populations (KP), including people, who inject drugs (PWID), sex workers (SW) and men, who have sex with men (MSM) on development of HIV epidemics in the country, because these groups are still at the greater risk of HIV infection. Recent studied have shown that PWID are 24 times and SW are 10 more likely to be HIV infected compared to the general adult population. Many representatives of KP in Tajikistan are still not covered by HIV prevention services. In 2018, 62% and 79% of the estimated number of PWID and SW were covered by these services, respectively.[4] There exists an opinion that with this level of HIV prevention coverage, populations of PWID and SW who have the highest risk of HIV infection and who "contribute the most" to the new cases of HIV infection are not reached. PWID have the highest risk of HIV infection. In 2018, infection in 15.2% of the newly identified HIV cases among adults (≥ 15 years) was presumably transmitted parenterally during drug injection, although PWID take up only 0.26% of the total population of the country.[2] It is important to note that HIV transmission routes are defined on the basis of the data, obtained from registered HIV-positive population during epidemiologic investigation. It is widely recognized that some people, especially women, are reluctant in admitting to the past or present use of injection drugs, therefore, the real number of people, who were infected through injection of drugs, can be underestimated (Fig. 3).

Significant presence of representatives of KP is evident in Tajikistan, but many of them try not to disclose their status as member of one of the key populations. The country requires significant external support to expand the harm reduction programs and HIV care and treatment programs. Tajikistan is a country, where HIV prevalence is extremely high among PWID. According to the sentinel surveillance data, collected in 2014 (sentinel surveillance, 2014), HIV prevalence among participants of the study, who inject drugs, varied from 0.7% to 26.5% in different sentinel sites.[5] Only 36.4% participants of the same study, who inject drugs, have mentioned that they have been HIV tested in the last 12 months and know their status.[5] given high HIV prevalence among PWID, low HIV testing coverage, lack of access to the pre-exposure prophylaxis (PrEP), only 51.9% of participants of sentinel surveillance in 2014, who injection drugs, have noted use of condom during last sexual intercourse.[5] Syringe exchange program is available

in most parts of the country. In 2018, every PWID has been given 196 clean syringes, based on the estimated number of PWID.[4]

Current ARV coverage (40.5% of the estimated number of PLH as of 1 January 2018)[6] is insufficient to reach the "treatment as prevention" effect among sex workers, which could have led to reduction of incidence, and it should be complemented by the increased use of condoms. During sentinel surveillance of 2014 among SW only 62.3% of participants of the study mentioned that they have been HIV tested in the last 12 months and know their HIV status.[7] The same study has demonstrated that with the prevalence of HIV among SW of 3.5%, about 71.4% of participants, who are SW have used a condom with their last client.[7] With insufficient identification of new cases of HIV, low coverage with HIV testing, SW should use condoms in 100% of times with their clients and other sexual partners or combine the use of condoms with HIV PrEP for effective HIV transmission prevention. Currently HIV PrEP is not available in the country.

To counter HIV infection, it is important to know its drivers, trends and monitor the implementation of prevention programs. Program effectiveness in terms is one of the main conditions for international funding allocation. Sentinel surveillance has been in place from 2006 to assess the nature and trends of epidemics. This method includes both serological and behavioral surveillance among representatives of KP (PWID, SW, MSM). Studies in these groups provide information on the dynamics of behavioral changes and current HIV spread risks in these groups. At the same time, it is possible to identify the prevalence of HIV and some other infectious diseases, which characterize the dominant behavioral practices in these population groups (syphilis, HCV, HCB). Sentinel surveillance data also allow to assess the stage of HIV epidemics on the certain territory, as well as assess the effectiveness of prevention programs and their impact on the epidemics.

The last sentinel surveillance and estimation of the number of PHID and SW in Tajikistan was done in 2014. According to the sentinel surveillance of 2014, HIV prevalence among PWID across the country was 12.9% (it varied from 0.7 to 26.5% in various sentinel sites) and among SW is was 3.5% (from 0 to 11.3% in various sentinel sites).[5,7] According to the analysis, and estimates of the number of PWID and SW done in 2014, estimated number of people in these groups across the country in 2014 were 23100 and 14100, respectively.[8] In 2018, RAC has conducted an integrated bio-behavioral study and estimation of numbers in these groups (IBBS). The present report includes analysis of the IBBS.

2. RELEVANCE, GOALS AND OBJECTIVES OF THE STUDY

2.1. RELEVANCE

According to the principles of Asian model of HIV epidemics, HIV epidemics in Tajikistan is characterized by transmission of infection primarily among the KP, namely, people, who inject drugs (PWID), men, who have sex with men (MSM), and sex workers (SW). This is due to the fact that these populations are usually at a higher risk of HIV infection, and there is escalation of epidemics in these populations in many Asian countries (UNAIDS, 2013). KP are often difficult to reach, often due to the laws, which prohibit the behavior, characterizing these groups.

Routine bio-behavioral surveillance among KP is very important from the standpoint of providing evidence for planning, development, implementation and effectiveness monitoring of the programs on HIV and sexually transmitted infections (STIs). Improving understanding of HIV and STIs prevalence among KP over time helps us in learning the scale of epidemics, because it can change over time. Similarly, changes in the prevalence of risky behavior and changes over time

helps HIV programs in tracking progress, improving programs and directing resources, where they are needed the most. Furthermore, IBBS provides the factual database to identify and review the performance indicators and objectives of the programs, targeting PWID and SW.

2.2. GOAL OF THE STUDY

Main purpose of the integrated bio-behavioral surveillance in Tajikistan is continuous, systematic collection of data on HIV, which are used for planning, assessment and advocacy of activities on HIV prevention among PWID and SW in Tajikistan. Namely, the goals of IBBS were:

1. Development and monitoring of the changes of national estimates on prevalence of HIV infection among SW and PWID;
2. Assessment of response to HIV epidemics and informing HIV prevention, care and treatment programs.
3. Estimating population of PWID and SW nationally and for each region/district and cities.

2.3. OBJECTIVES OF THE STUDY

The objectives of the IBBS were:

1. Estimating prevalence of HIV and syphilis and risky behavior related to them among PWID and SW at 8 sentinel sites in Tajikistan;
2. Assessing access to and use of HIV prevention services among SW and PWID at each of 8 sentinel sites in Tajikistan;
3. Assessing the coverage with antiretroviral (ARV) treatment of HIV-infected PWID and SW in the studied sample;
4. Assessing the HIV viral suppression (<1000 copies/ml) among HIV-infected PWID and SW in the studied sample;
5. Estimating the number of PWID and SW in each of 8 sentinel sites in Tajikistan;
6. Providing final estimates for effective planning of programs on HIV prevention, care and treatment among PWID and SW;
7. Building capacity of RAC to conduct bio-studies on HIV, using the respondent-driven sampling (RDS).

3. STUDY METHODS

Type of the study: cross-sectional (cross-sectional study among PWID and SW on the territory of the districts/cities, covered by the study). Study methodology included interviews after obtaining verbal informed consent and anonymous HIV and syphilis testing linked to it with provision of pre- and post-testing counselling. Geographic boundaries for conducting the IBBS (sentinel sites) were defined during formative study. Collection of social-demographic, behavioral (survey) and serological data (HIV and syphilis rapid testing and drawing capillary blood on the filter paper with subsequent drying and analysis with EIA/dry capillary blood spot (DBS) was done in the sentinel sites (drop-in centers, friendly offices, AIDS centers, OST sites). Sentinel sites were subject to safety and convenience requirements for both study participants, and staff. Venues that were chosen for sentinel sites were located far from police stations, PWID and SW had trust in them, they had water supply and sewage system. Furthermore, those venues were chosen as sentinel sites that could ensure the proper flow under the participation algorithm and could ensure proper conditions for collection, storage and transfer of data, regular monitoring and supervision.

Documentation that was used in the process of IBBS among PWID and SW was consistent with the sampling design (RDS) and included the following:

- Logs for registering participation in IBBS, registering refusals to participate or non-compliance with selection criteria, registration of HIV and syphilis rapid test results, notes on registration as HIV-positive in the electronic HIV tracking system/registration of the HIV confirmatory test results.
- IBBS participation checklist.
- Study participant registration form.
- Coupons – recruitment for primary respondents, and recruitment and payment coupons for RDS.
- Verbal informed consent forms for participation of PWID and SW in IBBS.
- Referral forms to the local AIDS center and referrals for STIs treatment.
- Folders for storage of used or invalid coupons, and storage of IBBS participation checklists.

3.1. SELECTION OF SENTINEL SITES

Seven cities and one district of the country have been selected as sentinel sites for IBBS, including the cities of Dushanbe, Vahdat, Bokhtar (formerly Kurgan-Tube), Kulyab, Khorugh, Panjakent and Khujand, and Rudaki district. Dushanbe is the capital and the biggest city of the country. Cities of Bokhtar and Kulyab are administrative centers of the Kurgan-Tube and Kulyab zones of Khatlon region, respectively, and have the biggest populations in these zones. Khujand is administrative center and the largest city in terms of urban population in Sughd Region. Panjakent city is the second largest population center in Sughd Region. Khorugh is the only urban center in GBAR. Finally, Vahdat city and Rudaki district are number one and three among the settlements in RRS by urban population.

These locations were specifically selected because they had the highest concentration of PWID and SW according to the previous round of epidemiological surveillance and population size estimates, this also coincided with the opinion of the specialists from the Republican AIDS center and Republican narcology center. There were one or two sentinel sites in every region of the country. Although the study was done only in 14% of all cities and rural settlements of the country, these centers accounted for 27% of the total country population, 60% of all urban population, and 38% and 43% of the estimated number of PWID and SW in the country, respectively (see table 1).

Table 1. List of sentinel sites by regions with total population, urban population, estimated number of PWID and SW according to the estimates of 2014

№	Sentinel site	Region	Population		Estimated number of PWID (EN PWID 2014)	Estimated number of SW (EN SW 2014)
			Total (thsd. people)	Of them urban (thsd. people)		
1	Dushanbe	Dushanbe	831.4	831.4	2998	1638
2	Rudaki	RRS	472.2	51.5	622	457
3	Vahdat	RRS	330.1	54.5	784	394
4	Bokhtar	Khatlon	109.1	109.1	861	927
5	Kulyab	Khatlon	208.0	104.4	1465	990
6	Panjakent	Sughd	290.3	42.3	419	229
7	Khujand	Sughd	179.9	179.9	887	1302
8	Khorugh	GBAR	29.9	29.9	656	93
Total:			**2450.9**	**1403.0**	**8692**	**6030**
Share of the country			**27%**	**60%**	**38%**	**43%**

indicator				

3.2. FORMATIVE STUDY

3.2.1. PERIOD, STUDY LOCATIONS, STUDY OBJECTIVES AND QUALITATIVE METHODS USED

A formative qualitative study among PWID and SW was conducted from December 2016 to end of February 2017 to gather data, necessary to develop IBBS protocol. The study was done with joint efforts of the State enterprise "Republican AIDS center" (RAC) of the Ministry of healthcare and social protection of population of the Republic of Tajikistan (MHAPP RT), local NGOs, which work with PWID and SW, including NGOs Spin plus and Marvorid, and Centers for disease control and prevention (CDC).

Formative study was conducted in 8 cities and districts, which were then selected as sentinel sites for IBBS, namely the cities of Dushanbe, Vahdat, Bokhtar, Kulyab, Khujand, Panjakent and Khorugh, and Rudaki district. The study was done following the Protocol of the formative study with the purpose of choosing methods for bio-behavioral study and estimation of the PWID and SW populations in Tajikistan, approved by the Bioethics committee of the Academy of medical sciences of the Ministry of healthcare and social protection of the Republic of Tajikistan and Coordinator of the institutional review board for research with participation of human subjects of the Center for global health (CGH) of the CDC (CGH ref.no. – 2016-275 of October 2016).[9]

The objectives of the formative studies were:

1. Identifying peculiar social and cultural factors, which can limit or enhance access to PWID/SW when conducting bio-behavioral study, for instance, level of social media development;
2. Conducting quick ethnographic mapping of public gathering places of the subgroups of PWID/SW to obtain information on where the bio-behavioral study staff can have access to these groups; and estimation of the numbers of PWID/SW in these gathering places.
3. Identifying operational and logistics characteristics for bio-behavioral study among PWID/SW, including:
    I. Defining the feasibility of conducting bio-behavioral study among PWID/SW in each sentinel site;
    II. Identifying the possibilities for various sampling methods and best method to be used;
    III. Identifying potential primary responders ("seeds") to start the respondent driven sampling, if this method is selected as the optimal for sampling;
    IV. Defining the feasibility of using the sites, where the representatives of key populations are located, including PWID and SW for sampling purposes (cluster sampling methods – for instance, space-time cluster-based sampling);
    V. Identifying availability of the services, focused on PWID/SW for referral purposes during the planned bio-behavioral study;
    VI. Identifying potential barriers and facilitators for the study.

In the framework of the formative study, data were gathered using combination of four qualitative methods, including:

- Focus groups (FG) with representatives of the key populations, including PWID and SW;
- In-depth interviews (IDI) with service providers, facilitators, and representatives of the key populations, including PWID and SW;
- Ethnographic mapping; and
- Observation visits to the gathering places of PWID and SW.

Table 2: Number of focus-groups, in-depth interviews, ethnographic mapping and observation visits, done in each sentinel site and in the country in total

Type of qualitative study		Number done in each sentinel site		Number in the country	
		PWID	SW	PWID	SW
Focus groups		1	1	8	8
In-depth interviews with	Service providers	2	2	16	16
	Facilitators	1	1	8	8
	Representatives of key populations	2	2	16	16
Ethnographic mapping		2	2	16	16
Observation visits		2	2	16	16

3.2.2. INCLUSION AND EXCLUSION CRITERIA FOR EACH OF THE METHODS

Table 3 contains inclusion and exclusion criteria for selecting participants for each method of formative study.

Table 3. Inclusion and exclusion criteria for each method of formative study

INCLUSION CRITERIA	EXCLUSION CRITERIA
FOCUS GROUPS WITH SW	
1. Female 2. Has received monetary payments, goods or services in exchange for sex in the last 12 months 3. Age ≥18 years 4. Was residing in the study site for the last 6 months 5. Speaks Russian or Tajik 6. Is able to provide verbal informed consent	1. Under the influence of alcohol or drugs during study enrollment 2. Refuses audio-recording of the interview
FOCUS GROUPS WITH SW	
1. Has used injection drugs for non-medical purposes in the last 30 days 2. Age ≥18 years 3. Was residing in the study site for the last 6 months 4. Speaks Russian or Tajik 5. Is able to provide verbal informed consent	1. Under the influence of alcohol or drugs during study enrollment 2. Refuses audio-recording of the interview
IN-DEPTH INTERVIEWS WITH:	
SERVICE PROVIDERS	
1. Currently works in an NGO, state or other institutions of Tajikistan that provide counselling, testing, treatment services for HIV/STIs or prevention services, in particular to SW/PWID. 2. Has worked in the current position for ≥6 months 3. Age ≥18 years 4. Was residing in the study site for the last 6 months 5. Speaks Russian or Tajik 6. Is able to provide verbal informed consent	1. Under the influence of alcohol or drugs during study enrollment 2. Refuses audio-recording of the interview
FACILITATORS	
1. Owner/employee of a local business that provides services to SW/PWID or an individual, who has	1. Under the influence of alcohol or drugs during

specialized access to SW/PWID and protects their interests 2. Age ≥18 years 3. Was residing in the study site for the last 6 months 4. Speaks Russian or Tajik 5. Is able to provide verbal informed consent	study enrollment 2. Refuses audio-recording of the interview
REPRESENTATIVES OF THE KEY POPULATION OF SW	
1. Female 2. Has received monetary payments, goods or services in exchange for sex in the last 12 months 3. Age ≥18 years 4. Was residing in the study site for the last 6 months 5. Speaks Russian or Tajik 6. Is able to provide verbal informed consent	1. Under the influence of alcohol or drugs during study enrollment 2. Refuses audio-recording of the interview
REPRESENTATIVES OF THE KEY POPULATION OF PWID	
1. Has used injection drugs for non-medical purposes in the last 30 days 2. Age ≥18 years 3. Was residing in the study site for the last 6 months 4. Speaks Russian or Tajik 5. Is able to provide verbal informed consent	1. Under the influence of alcohol or drugs during study enrollment 2. Refuses audio-recording of the interview
ETHNOGRAPHIC MAPPING WITH SW	
1. Female 2. Has received monetary payments, goods or services in exchange for sex in the last 12 months 3. Age ≥18 years 4. Was residing in the study site for the last 6 months 5. Speaks Russian or Tajik 6. Is able to provide verbal informed consent	1. Under the influence of alcohol or drugs during study enrollment
ETHNOGRAPHIC MAPPING WITH PWID	
1. Has used injection drugs for non-medical purposes in the last 30 days 2. Age ≥18 years 3. Was residing in the study site for the last 6 months 4. Speaks Russian or Tajik 5. Is able to provide verbal informed consent	1. Under the influence of alcohol or drugs during study enrollment
OBSERVATION VISITS (PARTICIPANTS OF THE STUDY ACCOMPANIED THE RESEARCHERS DURING OBSERVATION VISITS)	
Same criteria as in ethnographic mapping, because they are a sub-group of the mapping participants	Same criteria as in ethnographic mapping, because they are a sub-group of the mapping participants

3.2.3. RESPONDENT SAMPLING METHODS

Enrollment of study participants was done with the assistance of the local partners from NGOs, who work with PWID and SW. Before the start of the study a training was done for the members of the research NGO on the goals and study protocol, including the topics of

importance of engaging participants to reach key populations in order to get the data from representative sample of each target group. NGOs, which were identified as partners in this study, have experience in conducting similar studies among PWID and SW.

All potential participants of FG and IDI were first asked to contact the research team lead on this sentinel site for preliminary selection. Preliminary selection was necessary in order to make sure that potential study participants satisfy the inclusion criteria and to define the time for FG and IDI.

- **Focus groups:** Sampling for participation in the focus groups was done using the snowball method. Initial seeds were chosen with assistance of the study partners, who provide community-level services to PWID/SW, namely, Spin Plus and Marvorid NGOs and their partners in locations, where they do not provide services. Employees of these organizations and other key informants, including facilitators, have informed PWID and SW through their networks about the planned study and have asked them to contact the research team leads in their respective cities/districts. These initial seeds were then asked to refer others for participation in the study, using the snowball method. Руководитель группы разрабатывал первоначальный список потенциальных участников ФГ и предоставлял им информацию об исследовании, дате, времени и месте, куда они могли обратится для участия в исследовании. Перед началом проведения ФГ, интервьюеры предоставили участникам информацию о ФГ и при проявлении заинтересованности и удовлетворении критериям включения, включали их в списки для участия в обсуждениях в тот же день.

- **In-depth interview:** Participants for the in-depth interviews were purposefully selected through research partners, who provide community level services to PWID/SW, namely Spin Plus and Marvorid NGOs, and their partners in those locations, where this NGOs do not operate. In case of in-depth interviews with PWID/SW, snowball sampling was also used in finding participants. Employees of the organizations, which participated in the study and which provide community-level services to PWID/SW, namely Spin Plus and Marvorid NGOs, and their partners in those locations, where these NGOs do not operate, have identified primary respondents (“seeds”), which then were asked to refer other people to participate.
    - Service providers: Two service providers for each target populations (PWID/SW), including employees of NGOs that provide services to these groups, and employees of official state healthcare institutions, were purposefully selected with the help of leadership of these organizations, as being the most informed people about activities of PWID/SW, and open to discuss their work and opinions. These people were asked to contact the research team lead. Research team lead drafted initial list of potential study participants out of the service providers and provided them with information on the study, date, time and location, where they could come to participate in the study. Before the start of the interview, interviewers gave the participants information about the upcoming interview, if they were interested and satisfied the inclusion criteria, they were included into participants lists on the same day.

    - **Facilitators:** with the help of Marvorid and Spin Plus, as well as other NGOs that work with target populations either locally or through referral from PWID/SW, at each sentinel site one facilitator was selected for each of two groups to participate in the in-depth interview, using the purposive sampling method. Facilitators could be owners/employees of local businesses, that provide services

to PWID/SW or any other individuals, who have specialized access to PWID/SW or protects their interests. Such people were asked to contact the research team lead. Research team lead drafted initial list of potential study participants out of all facilitators and provided them with information on the study, date, time and location, where they could come to participate in the study. Before the start of the interview, interviewers gave the participants information about the upcoming interview, if they were interested and satisfied the inclusion criteria, they were included into participants lists on the same day.

- **PWID/SW:** two representatives of each target group (PWID/SW) were selected at each site of the study for participation in in-depth interviews. Employees of organizations, which participated in the study and which provide community-level services to PWID/SW, namely Spin Plus and Marvorid NGOs, and their partners in those locations, where these NGOs do not operate, have identified primary respondents ("seeds"), which then were asked to refer other people to participate. All potential participants of in-depth interview from groups of PWID/SW were asked to contact the research team lead at this sentinel site. Research team lead drafted initial list of potential study participants and provided them with information on the study, date, time and location, where they could come to participate in the study. Before the start of the interview, interviewers gave the participants information about the upcoming interview, if they were interested and satisfied the inclusion criteria, they were included into participants lists on the same day.

- **Ethnographic mapping:** two candidates from each of the target groups were selected for participation in ethnographic mapping out of the participants of the FG, and in-depth interviews or referrals from facilitators, using the purposive sampling methods (because they have demonstrated better knowledge about the PWID/SW gathering sites).

- **Observation visits:** after ethnographic mapping, interviewers at each sentinel site have selected one informant (from each target group), using purposive sampling method, who had better understanding of the activities of SW/PWID, and who knew the mapping zone. Selected representative of the target group, if consented, has accompanied the interviewer during observation visits to the gathering places of PWID/SW. based on the results of ethnographic mapping, at least four gathering places of PWID/SW have been selected (two for each target group), including two that supposedly attracted the biggest number of PWID/SW and two that supposedly attracted the least PWID/SW.

3.2.4. RECOMMENDATIONS ISSUED AS A RESULT OF FORMATIVE STUDY

The following recommendations for conducting IBBS among PWID and SW were given on the basis of the formative study results:[10]

Sampling method

1. It is recommended to use RDS as the sampling method in both sentinel groups (PWID and SW) due to the following factors:

a. PWID

- Number of the PWID in the social network of respondents varied from 15 to 30;
- Over 90% of those PWID, whom the respondents knew, were living within the boundaries of the same sentinel site as study participants;

- The respondents saw over 70% of PWID from their social network within the last three months, and over 50% – within one month prior to participation in the study;
- The respondents knew their fellow PWIDs so well that almost all of them were in the contact list on their mobile phones;
- All of the surveyed PWID have mentioned that they do not mind giving recruitment coupons to at least three other PWID that they know;
- All surveyed PWID mentioned that among their acquaintances there were PWID of different ages with different level of education, who lived in various locations within the boundaries of the sentinel site. Therefore, we expected that after purposeful selection of two to three seeds at each sentinel site, who have well-developed social network with PWID with various characteristics (age, level of education, gender, and place of residence) in it, our recruitment network will have sufficient number of waves.

b. SW

- Maximum number of SW that the respondents knew was over 30 and minimal number was over 5.
- Over 80% of those SW, with whom the respondents were acquainted, were living within the boundaries of the same sentinel site that study participants.
- Study participants have seen majority of the SW they knew within three months before the study, and over 50% within one month before participation in the study.
- The respondents knew their fellow SW so well that almost all of them were in the contact list on their mobile phones.
- All of the surveyed PWID have mentioned that they can and do not mind giving recruitment coupons to at least three other SW that they know;
- All surveyed SW mentioned that among their acquaintances there were SW of different ages with different level of education, who lived in various locations within the boundaries of the sentinel site. Therefore, we expected that after purposeful selection of two to three seeds at each sentinel site, who have well-developed social network with SW with various characteristics (age, level of education, gender, and place of residence) in it, our recruitment network will have sufficient number of waves.
- Time-location sampling (TLS) was not possible due to limited number of gathering places of SW in the sentinel sites, limited number of SW (2-4) in each gathering place, and location of these places in private establishments, where access was limited.

Anonymity of participation and confidentiality of gathered data

2. Because many respondents have voiced concerns in relation to anonymity and confidentiality, one of the recommendations was to explicitly state in the informed consent form that anonymity and confidentiality are guaranteed.

Bio-behavioral study sites and composition of research team

3. There should be one separate site for the study (survey and testing) for each sentinel group, because SW prefer not to participate in the study in the same place that PWID.

4. Study sites for PWID can be located in NGOs and drop-in centers, which work with PWID, in OST sites, narcology clinics and AIDS centers, but far away from public spaces (markets, stadiums, official streets) or gathering places of the law enforcement officers.

5. There should be separate rooms at each study site to ensure anonymity of participation. It is better to organize study sites for SW in NGOs or drop-in centers, working with SW or in private apartments.

6. Each research team should include two interviewers. In the team that will be working with PWID, both interviewers can be men, because men are associated with better understanding of drug-related problems. The team that will be working with SW should have both male and female interviewers, so that the participants have opportunity to choose, who will interview them. The reason for this is the fact that some participants in each city/district of formative study have mentioned that they will feel more comfortable, if the survey will be done by men (including the questions related to sexual behavior).

7. Although some of the respondents do not care about the gender of an employee, who will do the testing, some of the PWID and SW have stated the preference for a woman, doing the testing, therefore, it is recommended to engage women in conducting infections tests.

8. Each research team should include at least one representative of key population (PWID or SW), which is the focus of this team.

Dates and times of bio-behavioral study

9. Study sites should be open Monday to Friday, at least from 10:00 to 16:00 for PWID and from 12:00 to 17:00 for SW.

Amount and type of primary (participation) and secondary (recruitment) compensations

10. For PWID, primary compensation should be given in the form of food package, and secondary compensation should be in the form of personal hygiene products. The cost of food package (primary compensation) should be at least 56.00 Somoni (7.00$), it should include such items as sugar cubes, instant coffee, dried tea, rice, vegetable oil, and condensed milk. Cost of hygiene package (secondary compensation) should be at least 24.00 Somoni (3.00$) for every PWID recruited for the study, it should include such goods, as personal hygiene products, toothpaste, soap and shampoo.

11. For SW, primary compensation should be given in the form of personal hygiene products, its cost should be at least 64.00 Somoni (8.00$), and it should include such items as good liquid soap, shampoo, moisturizing crème, wet wipes etc. Secondary compensation should be in the form of food package, its cost should be at least 32.00 Somoni (4.00$) for every SW recruited for the study, it should include such items, as pasta, dried tea, vegetable oil and condensed milk.

Additional services at the time of participation in the bio-behavioral study

12. Organization of referrals to get additional free medical services can be an incentive for participation in the study. Such services for PWID include the services of dermatologist-STI specialist, surgeon and lawyer, for SW these include gynecologist, ultrasound specialist and dermatologist-STI specialist.

Design of the recruitment coupon and information it should contain

PWID

13. For PWID you should use full-color coupons, printed on thicker, glossy paper. The following factors should be taken into account when designing the recruitment coupon for PWID:

- Nothing on the coupon should indicate that the study is done among PWID;
- The coupon should contain the following information in Russian and Tajik languages: detailed address of the study site with information on how to find the place (significant landmarks); phone number to obtain additional information about participation in the study or location of sentinel site; dates and time of the sentinel site working hours; period (dates) of the study; brief information about compensation for participation in the study;
- Size of the coupon is not important.
- A map with location of the study site is not mandatory, because over 70% of respondents mentioned that based on their past experience it will be difficult for them and their acquaintances to read the map.

SW

14. None of SW, who participated in the formative study, have mentioned any preferences for the size or color of the recruitment coupons. The following factors should be taken into account when developing recruitment coupon for SW:

- Nothing on the coupon should indicate that the study is done among SW;
- The coupon should contain the following information in Russian and Tajik languages: detailed address of the study site with information on how to find the place (significant landmarks); phone number to obtain additional information about participation in the study or location of sentinel site; dates and time of the sentinel site working hours; period (dates) of the study; brief information about compensation for participation in the study.

Language of the study

15. All questionnaires and forms for the study should be in Tajik and Russian languages. Depending on the preference of the study participant (PWID or SW), the survey should be done either in Russian or Tajik language. Therefore, all employees, participating in the study, should be fluent in both Tajik and Russian.

Recommendations for training of the research team

16. All employees, who will participate in the study, should be trained on prevention of stigma and non-discrimination of PWID and SW, human subject research ethics and data confidentiality.

3.3. RESPONDENT-DRIVEN SAMPLING (RDS)

Respondent-driven sampling was used for IBBS at each sentinel site, to do the sampling of PWID and SW, that is the method of building recruitment chain through peer referrals, which is used to recruit representatives of hidden populations in the studies. RDS is based on the tight links between members of studied population, which allows for peer recruitment in the study. Therefore, this method is not suitable for populations with weak social networks, where the members have no strong links. Selection of RDS at the sampling method was fully based on the

results of the formative qualitative study, done earlier among PWID and SW with the purpose of choosing IBBS methods and estimating the size of PWID and SW population in Tajikistan. The formative study has demonstrated that each PWID had from 15 to 30 PWID with different demographic characteristics in their network and 90% of them lived within the boundaries of the same sentinel site as the study participants. Respondents have also noted that within 30 days prior to their participation in the formative study they have seen about 50% of PWID from their social networks. PWID are well linked with each other, because almost all study participants have noted that they had contact details of PWID from their social networks on their mobile phones.[10]

As for SW, during formative study they have noted that number of SW in their social network with various demographic characteristics can vary from 10 to 30 people ant that 80% of SW from their social network live within the boundaries of the same sentinel site, as study participants. Participants of the formative study have also noted that they have seen more than 50% of their SW acquaintances within 30 days, prior to their participation in the formative study. Similarly to PWID, it seems that SW closely interact with each other, because almost all participants of the formative study have noted that they have contact details of the SW from their social networks on their cell phones.[10]

Based on the results of the formative study, the researchers have drawn a conclusion, that respondent-driven sampling (RDS) is the proper sampling method for both key populations in all sentinel sites. With proper implementation and analysis of collected information, this method can yield data, representative for the population, from which the respondents were selected.[11,12]

Sampling started with purposeful identification of certain number of representatives of the target population, the so called "seeds" at each sentinel site for each sentinel group. Decision on the required number of seeds was made individually for each sentinel site and group. RAC together with technical agencies, including CDC and ICAP were continuously monitoring the recruitment process. If the recruitment process slowed down or the chain from some seeds stopped early, decision on engaging additional seeds was made. The "seeds" were selected in line with certain criteria, which for SW included the size of social network, level of education, method for finding clients, duration of engagement in providing sexual services, age, drug use and HIV status, and for PWID they included size of social network, length of injection drugs use, gender, level of education, age and HIV status. Table 4 contains information about the number of "seeds", engaged in the study among sentinel groups in various sentinel sites. To participate in the study as "seeds" individuals in both groups had to be willing to participate in the recruitment process.

Table 4. Number of "seeds"

Site	Number of seeds	
	PWID	SW
Bokhtar	4	4
Vahdat	3	3
Dushanbe	5	6
Kulyab	3	2
Panjakent	3	2
Rudaki	3	3
Khorugh	3	3
Khujand	3	3
All sites	**27**	**26**

After completion of all stages of the study, as defined by the protocol, the "seeds" were trained in recruiting members of the same sentinel group into the study. During the training process emphasis was put on the fact that coupons can be given only to individuals, who satisfy the study inclusion criteria and who are part of the recruiter's social network. Then each "seed" got three recruitment coupons with unique coupon identification numbers (UCID) to engage members of the same population into the study (PWID or SW). All representatives of

PWID and SW groups, who participated in the study, using coupons they have received from "seeds", were the first wave in the recruitment chain, originating from individual "seeds". In turn, representatives of PWID and SW groups, attracted to the study by the "seeds", were also invited to participate in the recruitment process. If they agreed, they were also trained in recruitment process and were given certain number of recruitment coupons (maximum three). Representatives of PWID and SW, who have participated in the study, using coupons, received from the participants in the first wave of recruitment chain, were considered the second wave of recruitment chain, originating from certain "seed". Number of waves was increasing, ideally building a long recruitment chain until the planned sample size was reached.

Recruitment process, namely, who was recruiting whom, could be tracked through UCID, which was specified on each recruitment coupon. This number also ensured respondent anonymity, linking each respondent to their questionnaire and biological testing results, therefore there was no need to collect personally identifying information, such as names, addresses etc.

3.4. SAMPLE SIZE CALCULATION

Researchers estimated that to ensure significant capacity to asses HIV prevalence among PWID and SW population, average sample size for each sentinel site was 290 for PWID and 275 for SW. Total calculated sample size for PWID at all eight sites was 2350, while sample size per site varied from 200 to 500. Total calculated sample size for SW at all eight sentinel sites was 2200, while sample size per site varied from 200 to 500. Differences in the sample sizes at different sites can be explained by the following: 1) expected prevalence of HIV among key populations at each site. Data from the study of these key populations in 2014 were chosen as the basis; and 2) relative width of confidence intervals, which was different depending on the expected prevalence. Namely, the lower the expected prevalence, the narrower was the confidence interval.

When calculating sample size for this study, estimated HIV prevalence among PWID and SW at each sentinel site was taken as the basis: sample size calculation was based on the main study objective: i.e. calculation of the percentage of HIV-positive PWID and SW at each sentinel site. To calculate sample size the following formula was used:

$$n = \frac{\left\{ DEFF \times \frac{Z_{1-\alpha/2}{}^2 pq}{d^2} \right\}}{1 - NR}$$

Where:
n = is sample size, necessary for the chosen research design;
DEFF = is the design effect of the sample, which explains the increase in estimate variation in the respondent-driven sample. When calculating sample size, design effect of 2.0 was used based on the literature on RDS (MJ, 2006);
Z1-α/2 = z-value, corresponding to the desired level of statistical significance and 90% confidence interval;
p = prevalence for the studied feature in the sample. Previous IBBS round for SW and PWID was done in 2014. Participants were selected in each sentinel site and sample sizes varied from 80 to 400. Some sample sizes were so small that were not taken into account during analysis.

Estimated prevalence, used in calculation of sample sizes in this study, was similar to prevalence identified during the last IBBS round, rounded to comply with the prevalence range, specified in table 5.
q = (1-p);
d = half of the width of confidence interval, i.e. margin of error. Margin of error is a deviation in any direction from the percentage of population (for instance, ± 5%), which is a function of standard deviation;
NR = percentage of refusals to participate, i.e. percentage of cases, where the data is absent due refusal to participate, was set at zero, because sample size was defined as the number of respondents, who agree to get HIV-tested. We have expected that percentage of refusals to participate in the study will be equal 0%, because consent for HIV test and obtaining the results was part of the inclusion criteria.

Table 5. Planned sample size broken down by sentinel sites and groups

Sentinel site	Expected HIV prevalence among PWID (%)	½ of the CI width (%)	Sample size of PWID	Expected HIV prevalence among SW (%)	½ of the CI width (%)	Sample size of SW
Panjakent *	20.0	±7.84	200	5.0	±4.27	200
Khujand *	7.5	±5.16	200	5.0	±4.27	200
Kulob	7.5	±3.90	350	7.5	±3.90	350
Kurgan-Tube	5.0	±3.23	350	1.0	±1.47	350
Rudaki	7.5	±5.16	200	10.0	±5.88	200
Vahdat	15.0	±7.0	200	12.5	±6.48	200
Dushanbe	25.0	±5.37	500	3.0	±2.11	500
Khorugh	22.5	±6.19	350	10.0	±5.88	200
Total			**2,350**			**2,200**

*because of the absence of data at sentinel site, HIV prevalence used for SW was similar to the prevalence at another sentinel site in the same region.
*for all sentinel sites and both sentinel populations, confidence interval was set at 90%.

We have identified these sample sizes based on the number of participants we wanted to attract to the study, and then we have defined, whether half of confidence interval will be narrow enough to provide information, necessary to achieve the main objective, given various indicators of HIV prevalence and sample design effect value. Table 6 below demonstrates halves of confidence intervals for various levels of HIV prevalence and design effects for three sample sizes: 500, 350 and 200.

Table 6: Half of CI with sample size of 500, 350 and 200

RDS sample size (n) for large settlements	500	DEFF		
		1	1.5	2
HIV prevalence (p)	**1.0%**	±0.87%	±1.07%	±1.23%
	2.0%	±1.23%	±1.50%	±1.74%
	3.0%	±1.50%	±1.83%	±2.11%
	5.0%	±1.91%	±2.34%	±2.70%
	7.5%	±2.31%	±2.83%	±3.26%
	10.0%	±2.63%	±3.22%	±3.72%
	12.5%	±2.90%	±3.55%	±4.10%
	15.0%	±3.13%	±3.83%	±4.43%

	20.0%	±3.51%	±4.29%	±4.96%
	22.5%	±3.66%	±4.48%	±5.18%
	25.0%	±3.80%	±4.65%	±5.37%
RDS sample size (n) for medium size settlements	**350**	**DEFF**		
		1	**1.5**	**2**
HIV prevalence (p)	**1.0%**	±1.04%	±1.28%	±1.47%
	2.0%	±1.47%	±1.80%	±2.07%
	3.0%	±1.79%	±2.19%	±2.53%
	5.0%	±2.28%	±2.80%	±3.23%
	7.5%	±2.76%	±3.38%	±3.90%
	10.0%	±3.14%	±3.85%	±4.44%
	12.5%	±3.46%	±4.24%	±4.90%
	15.0%	±3.74%	±4.58%	±5.29%
	20.0%	±4.19%	±5.13%	±5.93%
	22.5%	±4.37%	±5.36%	±6.19%
	25.0%	±4.54%	±5.56%	±6.42%
RDS sample size (n) for small settlements	**200**	**DEFF**		
		1	**1.5**	**2**
HIV prevalence (p)	**1.0%**	±1.38%	±1.69%	±1.95%
	2.0%	±1.94%	±2.38%	±2.74%
	3.0%	±2.36%	±2.90%	±3.34%
	5.0%	±3.02%	±3.70%	±4.27%
	7.5%	±3.65%	±4.47%	±5.16%
	10.0%	±4.16%	±5.09%	±5.88%
	12.5%	±4.58%	±5.61%	±6.48%
	15.0%	±4.95%	±6.06%	±7.00%
	20.0%	±5.54%	±6.79%	±7.84%
	22.5%	±5.79%	±7.09%	±8.18%
	25.0%	±6.00%	±7.35%	±8.49%

3.5. INCLUSION AND EXCLUSION CRITERIA

Table 7 specifies inclusion criteria for the study. Some people might have satisfied inclusion criteria for more than one sentinel group (for instance, a woman, who satisfies inclusion criteria for SW, could have also satisfied the criteria for PWID), in this case they had a right to participate in the study for both groups, if they had coupons, received from representatives of both groups.

Table 7. Inclusion criteria for participation in IBBS

Sentinel group	Inclusion criteria
SW	• Biological woman • Provided sexual services (vaginal or anal sexual intercourse) in exchange

	for money or goods and services in the last 6 months • Age 18 and older • Has been living within the boundaries of the sentinel site (city/district) in the last three months • Speaks Tajik and/or Russian language • Is able to provide verbal informed consent for participation in all study procedures • Has a valid recruitment coupon
PWID	• Has used injection drugs for non-medical purposes in the last 6 months • Age 18 and older • Has been living within the boundaries of the sentinel site (city/district) in the last three months • Speaks Tajik and/or Russian language • Is able to provide verbal informed consent for participation in all study procedures • Has a valid recruitment coupon

People, who did not satisfy the inclusion criteria, were not allowed to participate in the study. People, who satisfied the inclusion criteria, but also met any one of the following exclusion criteria, were also not allowed to participate:

- Could not provide informed consent;
- At the time of potential participation were aggressive, were under the influence of drugs or alcohol, or the interviewer thought the survey to be unsafe;
- Individual has already participated in similar survey of the same population group.

3.6. STUDY PARTICIPATION PROCESS

Based on the results of the formative qualitative study, analysis of the sentinel sites sizes, planned sample size, and expected three-months period of data collection, the decision was made to organize one sentinel point at each sentinel site for each sentinel group (a place, where both interviews and HIV and syphilis rapid tests will be done). Results of the formative study have demonstrated that PWID were ready to participate in the study in the points, organized by the Narcology centers, OST sites and AIDS centers. As for SW, majority of them have noted that they would prefer for the sentinel point to be located in the offices of NGOs, drop-in centers, which work with SW or in private apartments. However, about 60% of formative study participants out of the SW group in Dushanbe, Kulyab, Bokhtar and Rudaki have noted that they do not mind participating in the points, organized in local AIDS centers. SW have also noted that they would prefer not to participate in the study in the same sentinel point that PWID.[10]

Table 8 lists organizations, which were selected as sentinel points based on the analysis of the formative study results, availability of NGOs that work with PWID and SW, office sizes (private rooms) in various organizations (NGOs, AIDS centers, Narcology centers, drop-in

centers, friendly offices and OST points) and location of local AIDS centers (to simplify confirmatory testing process for those participants, whose first HIV rapid test was positive).

Table 8: Location of the sentinel points

#	Sentinel site	Sentinel point	
		PWID	SW
1	Dushanbe	NGO* Spin PLUS	FO** for SW in clinic №4
2	Rudaki	OST site	District AIDS center
3	Vahdat	NGO* Spin PLUS	NGO* Marvorid
4	Bokhtar	Regional AIDS center	City AIDS center
5	Kulob	Zonal AIDS center	City AIDS center
6	Khorugh	Drop-in center *** for PWID	Regional AIDS center
7	Panjakent	City AIDS center	Buzurg NGO
8	Khujand	Regional AIDS center	Regional AIDS center

* - Non-government organization; ** - Friendly office; *** - drop-in center

Figures 4 and 5 below demonstrate study participation algorithm that was used at each sentinel point.

Figure 4. Algorithm of study participation (RDS, first visit)

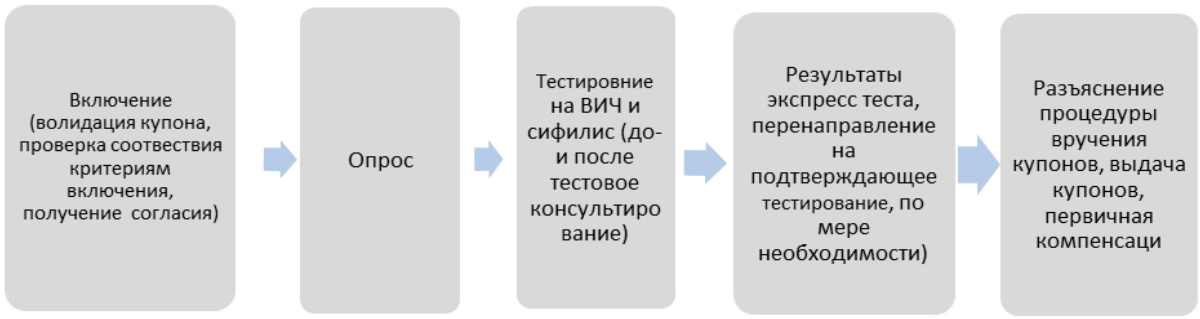
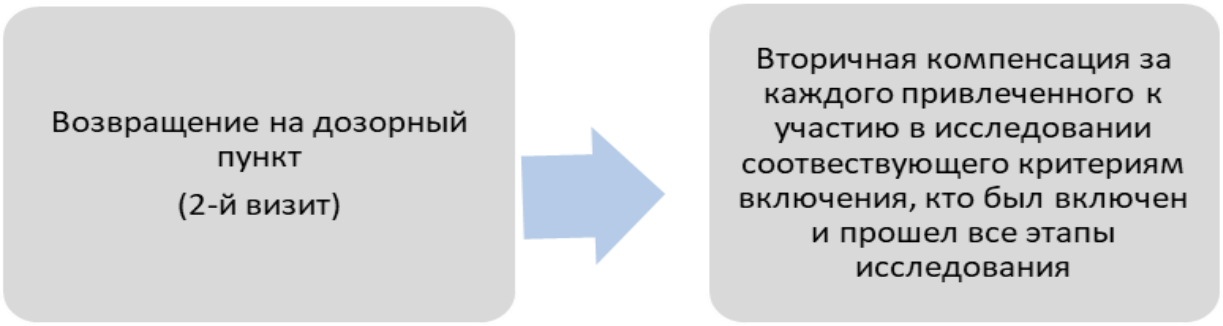


Figure 5. Algorithm of study participation (RDS, second visit)



First visit to the sentinel point (Figure 4)

As it was mentioned in section 3.3, the study began by identifying certain number of "seeds" at each sentinel point (see table 4 for information on the number of seeds, engaged in the study at each sentinel point). After completion of their participation in the study, the seeds received recruitment coupons, which they used for the purpose or recruiting other representatives of target population from their social network for participation in the study.

After a representative of a sentinel group arrived to the sentinel point with the coupon, coupon manager conducted coupon validation, following the algorithm, specified in stage 1 of the IBBS participation checklist (Annexes A and B of the IBBS protocol).[13] if the validity of the coupon was confirmed, coupon manager gave the checklist and accompanied the respondent to the screener. Screeners were representatives of target populations. They have assessed, whether the respondent satisfied the study inclusion criteria. Screening process included standard survey and was required for RDS, because this method uses peer recruitment. During screening process, SW and PWID were asked to describe certain details of providing sexual services in exchange for something (for SW) and use of injection drugs (for PWID). Screeners were also responsible for getting verbal informed consent from the participants, following the algorithm, described in stage 3 of the checklist (Annexes A and B of IBBS protocol).[13] if the respondent satisfied all inclusion criteria and gave verbal informed consent to participate in the study, the screener transferred this responder's checklist to the trained interviewer and personally accompanied the participant to him/her (interviewer).

Before the start of the survey, interviewer asked questions, aimed at defining the size of respondent's social network, following the algorithm, described in stage 4.1 of the checklist (Annexes A and B of the IBBS)[13] and then he proceeded to survey, recording respondent's answers on the tablets with uploaded structured questionnaires (Annex C – questionnaire for PWID and Annex D – questionnaire for SW in the IBBS protocol)[13] following the steps, specified in section 4.2 of the checklist. During the survey the following information was gathered: social-demographic characteristics, sexual behavior and drug use, knowledge of HIV and testing, access to HIV prevention and treatment services, as well as other medical services. Questionnaires for both groups were developed in Russian and English languages, subsequently they have been translated into Tajik. Translation was done contextually, where questions and phrases were translated not literary, but with translation of the meaning. After translation, they questionnaires were tested in two stages. During the first stage, questionnaires, and in particular their content, accuracy and relevance of questions and translation were reviewed by the Technical working group (TWG). During the second stage, questionnaires were tested with representatives of the relevant target populations, participants could provide their comments in relation to any aspect of the questionnaires and what worked well or not during the

survey process. These comments were documented and used for subsequent improvements of the questionnaire. Survey at the sentinel points was done in a private room and usually took no more than 40 minutes. If the size of respondent's network was defined and he/she has successfully passed the survey, the interviewer gave the participant checklist to the laboratory specialist and personally accompanied to him/her.

Laboratory specialist provided pre- and post-test counselling, conducted needs assessment, processed referrals for services and conducted HIV and syphilis rapid tests and did blood draw for DBS, following the algorithm, described in stages 5 and 6 of the checklist (Annexes A and B of the IBBS protocol).[13] When needed, laboratory specialists have also distributed goods for HIV prevention, including syringes and condoms. After successful completion of all procedures, laboratory specialist gave the respondent checklist back to coupon manager and accompanied the respondent to him/her. If the participant's HIV test result was positive, laboratory specialist accompanied the respondent to the screener for accompanying to the local AIDS center to confirm/check the diagnosis. After visit to the AIDS center the respondent went back to the sentinel point to the coupon manager.

Coupon manager checked, whether the respondent passed all previous procedures (stages 1-6 of the checklist). If all required procedures were successfully passed, participation was considered completed and coupon manager gave such respondent primary compensation (stage 7 of the checklist). Then the coupon manager asked the respondent, whether he/she would like to attract other PWID/SW from their social network to participate in the project. If the respondent agreed, he/she was trained in recruiting process and given recruitment coupons. Number of issued recruitment coupons varied from one to three and depended on multiple factors, including time left until the end of information collection period, number of previously issued coupons and achievement of the sampling size. If little time was left until the end of the survey period and the planned sample size was almost achieved, or if there was sufficient number of coupons already issued to the participants, which would ensure achievement of the sample size, decision was made to limit or stop issuing recruitment coupons.

At no stage of participation, respondents were asked to provide personally identifying information. To ensure confidentiality, unique IDs were assigned to the questionnaires and blood samples.

After participation in all required procedures to compensate for time spent on participation in the study and transport costs to get to the sentinel site, the respondents got food packages (PWID) and hygiene packages (SW), the cost of which was 79 Somoni (about 9.00 USD) and 70 Somoni (about 8 USD), respectively. During consent process participants were explained that they will not be able to receive any compensation or recruitment coupons, if they interrupt their participation at any stage.

After providing recruitment coupons, coupon manager informed respondent about the approximate date, when he/she could come to the sentinel point to get compensation for attracting other PWID/SW to the study. Participants were told, that if no one participates in the study, using the coupons, issued to them, or if the participation of the person, who was recruited through their coupon will be incomplete, they will not be able to get any compensation for attracting other members of the target population to the study.

Second visit to the sentinel point (Figure 5)

During the second visit, based on the records from IBBS participation log (Annex G, columns 8 and 9 of the IBBS protocol)[13], coupon manager identified, whether certain respondent had a right to get secondary compensation for recruiting peers to participate in the study. This respondent had to provide payment parts of the recruitment coupons, which he/she received for peer recruitment. Using the registration number for participation in the study on these coupons, coupon manager located the record of this respondent in the IBBS participation log (Annex G of the IBBS protocol).[13] If there was a coupon identification number and date of participation in the study of those people, who received the coupons from this respondent in columns 8 and 9, he/she received secondary compensation for attracting other members of the target population to the study. As secondary compensation respondents got hygiene (PWID) and food (SW) packages, the cost of each of them was 49 (about 5.00 USD) and 41 Somoni (about 4 USD), respectively.

3.7. CONSENT OR REFUSAL TO PARTICIPATE IN THE STUDY

On the recruitment coupon validation stage potential participants received informed consent form (Annexes E & F of the IBBS protocol).[13] This form informed the participants about the objectives of the study, their role, potential risks, benefits and their rights in the study, and provided detailed information on the relevant study procedures and on whom they could contact in the Bioethics committee and RAC to submit any complaints on violation of their rights during participation in the survey. Participants were also informed that small amount of their blood, collected on the DBS test card will be stored and used for other analyses, related to this study. Respondents were informed that participation is voluntary and confidential and that they could stop participation at any stage without explaining the reasons, or they could refuse to answer any questions during an interview. Because survey and HIV and syphilis testing process did not require collection of personally identifying information, the researchers have requested a waiver from obtaining written informed consent in line with 45CFR46.117 (c) 2.

The formative study done earlier has demonstrated that all representatives of the target populations (PWID and SW) can speak Tajik or Russian, and in some cases even both languages. Therefore, copies of informed consent forms were printed in Russian and Tajik languages. Respondents could read the form themselves, or due to various reasons, including problems with eyesight or illiteracy, they could opt for the employees to read the form aloud. In the latter case, the form was read aloud with a witness present.

After the respondent got answers to all questions he/she had related to his/her participation in the study, the screener asked him/her for verbal informed consent for participation in the study, which included interview and submission of capillary blood sample for HIV and syphilis testing, and depending on the decision of the participant, storage and subsequent testing. If the potential participant decided not to participate in the survey and/or biological testing, after receiving detailed information on the study, his/her participation was considered invalid and screener gave the IBBS participation checklist (Annex A and B of the IBBS protocol)[13] to the coupon manager, who then recorded refusal in the Log of refusals and incompliance with inclusion criteria (Annex L of the IBBS protocol).[13] Participants also had to provide consent for obtaining their HIV test results. If they refused to receive their HIV test results, they were not allowed to participate in the study. To receive recruitment coupons the participant had to complete all mandatory study stages. Participants could interrupt their participation in the study at any stage, even after all mandatory procedures. During the process of obtaining informed consent, the participants were informed that if they decide to stop their participation in the study before completing all stages, they will not have the right to receive compensation.

3.8. RESEARCH TEAM

To ensure successful study completion, personnel in each sentinel point, which was involved in data collection, included qualified specialists and representatives of studied populations with the relevant research skills. All research personnel received comprehensive training on research procedures, ethical matters, stigma and discrimination, as well as other topics, related to the study and their roles in the study (see Annex 1 Agenda of the training on conducting an integrated bio-behavioral study).

The team at each sentinel site included 7 employees, including the sentinel point manager, coupon manager, two screeners, two interviewers and one laboratory specialist.

- **Sentinel point manager:** coordinated the work of sentinel point employees, provided answers to the questions of respondents, which other employees of the sentinel point were unable to answer, was responsible for resolving conflicts, arising during the study, daily checked the quality of completion of forms and logs, oversaw data collection, ensured availability of all materials, necessary to conduct the study in the sentinel point (paper forms, logs, HIV and syphilis rapid tests, compensation packages, office supplies), coordinated transfer of completed questionnaires from tablets to the server, provided weekly written progress reports to the study coordinator.
- **Coupon manager:** when a person with a recruitment coupon came to the site, coupon manager created the study participant checklist, conducted validation of the coupons, which the participants brought with them, issued the study participant registration form, was responsible for storing recruitment and payment coupons, that were deemed valid or invalid, and for storing all participant checklists, documented information in the study participation log and log for refusals or incompliance with inclusion criteria, was tracking recruitment process, issued primary and secondary compensation to study participants, identified unique IDs of recruitment coupons, completed and issued recruitment coupons.
- **Screener:** conducted the screening to check the compliance with inclusion criteria, provided informed consent form and was responsible for obtaining informed consent, was responsible for completing the relevant section of the participant checklist.
- **Interviewer:** identified the size of the respondent's social network and conducted the survey of study participants, documented information obtained on the tablet and transferred completed electronic questionnaire forms for the server, was responsible for completing the relevant section of the participant checklist.
- **Laboratory specialist:** was responsible for storing and ensured availability at the sentinel point of the HIV and syphilis rapid tests, Whatman 903 cards for preparing dried blood spot samples (DBS) and other materials, necessary to conduct laboratory procedures, specified in the study protocol, provided pre-testing counselling on HIV and syphilis, conducted brief survey on the matters of HIV tests done in the past, conducted HIV and syphilis rapid tests and prepared DBS, provided HIV and syphilis test results, conducted post-testing counselling, referred respondents with positive syphilis test results to the STI specialist for treatment, issued referral to the local AIDS center to the respondents with positive HIV rapid test results, documented information in the HIV and syphilis rapid test log, was responsible for completing the relevant section of the participant checklist. Laboratory specialist was also responsible for proper labeling, storage and timely transfer of the DBS samples to the local AIDS centers.

4. SEROLOGICAL TESTING PROCEDURES

4.1. HIV AND SYPHILIS RAPID TESTING IN SENTINEL POINT

Testing procedures were developed on the basis of national testing algorithm and were conducted in line with the current standard operating procedures (SOPs) for serological tests. HIV and syphilis rapid testing, and preparation of DBS sample was done at the sentinel point after the respondents went through the interview and pre-testing counselling process. Capillary blood sample, drawn from the finger, was used for rapid testing and preparation of DBS sample. Determine HIV 1/2 ® rapid test was used for HIV testing. CHEMBIO DPP® syphilis screen & confirm rapid test was used for syphilis screening and confirmation. After conducting HIV and syphilis rapid test and preparing DBS sample, laboratory specialist registered results of rapid tests in the participant checklist and in the IBBS rapid tests log (Annex P of the IBBS protocol)[13], using participant registration number and unique ID as identifiers.

Interpretation and codification of syphilis rapid test results was done in line with the Guidelines for laboratory specialists of the sentinel points on codification of the syphilis rapid test results (Annex 2). According to these guidelines, all tests negative for antibodies to Treponema pallidum, and antibodies to non-treponema component were considered negative (code 01 was assigned) for syphilis. Respondents with tests 1) positive to both antibodies to Treponema pallidum, and antibodies to non-treponema component (code 02), 2) positive only for antibodies for Treponema pallidum (code 03), 3) positive only for antibodies to non-treponema component (04) were given referral to STI specialist.

All respondents with negative HIV test results were considered HIV-negative. Study participants, whose tests at the sentinel sites were positive, were accompanied by the screener to the local AIDS center either for confirmatory testing or early registration of HIV case in the electronic HIV monitoring system (ES). Participation of those respondents, whose HIV tests were positive and who refused to visit AIDS center for necessary procedures, was deemed incomplete, such respondents lost their right to primary compensation and recruitment coupons.

4.2. COLLECTION, STORAGE AND TRANSFER OF DRIED BLOOD SPOT SPECIMEN TO THE AIDS CENTER

From the samples taken after HIV and syphilis rapid tests, five blood spots were drawn from all participants onto the five dotted circles of DBS test cards (Whatman 903 filtration cards). Study participant's registration numbers, their unique IDs and coupon identification numbers were labelled on the test cards. Then the samples were dried at room temperature during the day. If there was less than 3 hours of work day left when blood was drawn from respondents, such DBS were dried overnight in a locked room. When dried, each DBS sample was put in a separate zipped plastic bag to eliminate contamination. Desiccant was also included in the bags. The prepared DBS samples were transferred by the laboratory specialists daily to the local AIDS center and were stored in the refrigerator at the temperature from +2 to + 8 °C. Every two weeks DBS samples were transported at ambient temperature from local AIDS center to the RAC laboratory in Dushanbe. In the RAC laboratory samples were stored at the temperature of -80 °C to do the HCV and HBV tests after approval of an addendum to the protocol by the Research office of the CDC.

4.3. STUDY PROCEDURES AT A LOCAL AIDS CENTER

As it was mentioned before, study participants, whose HIV tests were positive at the sentinel point, were accompanied by the screener to the local AIDS center. Three-component referral form was used for referrals to the AIDS center, three parts of which were divided by the detachment line. All three parts were completed by the laboratory specialist at the sentinel point. Second and third parts of the referral form were given to the study participants to use during their visit to the local AIDS center. Laboratory specialist kept the first part and was used to track, whether all individuals, referred to the laboratory of AIDS center have returned to the sentinel point. When respondent provided two parts of the referral form that were received from the laboratory specialist at the sentinel point, to the employee of the local AIDS center, he checked, whether this person referred from the sentinel point was registered as the HIV patient earlier in the electronic HIV monitoring system (ES). Those, who were not registered in the ES were offered a confirmatory HIV testing in line with national HIV diagnostics algorithm. Rapid test HIV ½ STAT-PAK® DIPSTICK was used as first confirmatory test, and Murex HIV Ag/Ab Combination ELISA test was used as final confirmatory tests. Results of confirmatory HIV tests were registered in the log of Previous registration as HIV + in the ES or results of confirmatory tests (Annex K of the IBBS protocol).[13]

Data on viral load (VL) was also collected for all respondents, who came to the local AIDS center. If the respondent was previously registered in the ES and had documented viral suppression (<1000 copies/ml) in the last three months prior to his/her participation in the study, the following data were recorded in the log: Previous registration as HIV+ in the ES or confirmatory test results (Annex K of the IBBS protocol).[13] Those respondents, who were registered in the ES, but had no documented VL test results in the last three months, or whose results indicated elevated VL (>1000 copies/ml), as well as respondents with supposedly newly identified HIV were offered to take VL test in the local AIDS centers, following current HIV care provision standards. VL test was desirable, but not mandatory, if the respondent refused it their participation was still deemed completed.

After respondent consented to VL test, phlebotomist of the AIDS center drew whole venous blood into 5 ml plastic plasma preparation tubes (PPT) with Hemogard cap and K_2EDTA anticoagulant, sprayed on the walls, and inert polyether gel. Within the first hour after collection, PPTs were centrifuged with the speed of 1100 x g for 10 minutes. Viral load analysis was done using ready samples within 72 hours after blood collection. For samples, collected at three sentinel sites, including Dushanbe, Rudaki, and Vahdat RotorGene platform and QIAGEN artus HI Virus-1 QS-RGQ Kit (24) CE test were used. For samples, collected at other five sentinel sites, GeneXpert platform and Cepheid Xpert HIV-1 VL tests were used. VL tests were done, following manufacturer's instructions. Quantitative data for all respondents, who have done VL tests, were included in the log: Previous registration as HIV+ in the ES or confirmatory test results (Annex K of the IBBS protocol).[13] For the respondents, who were registered in the ES, the results were also included in the ES so that the patients can be informed about the test results during their next medical visit.

After the respondent completed all procedures, specified in the study protocol, in the local AIDS center, responsible employee took the second part of the referral, and put a "tested" stamp on the third part, which he gave back to the respondent. With this part of the referral form the respondent went back to the sentinel point. Once he submitted the part of referral form with "tested" stamp, the participation of this respondent was deemed completed and he/she received primary compensation.

4.4. ENSURING EUALITY OF TESTING AND HIV RAPID TEST QUALITY CONTROL

Quality was ensured during all pre-analytical, analytical and post-analytical stages of testing. All tests were used following manufacturer's instructions, testing was done by trained laboratory personnel with regular on-site monitoring. For the purpose of HIV rapid tests quality control, results of DBS HIV tests were compared to HIV rapid tests, performed at the sentinel point. For this purpose, laboratory of the Republican AIDS center in Dushanbe performed DBS testing for all participants with positive HIV rapid test results and 10% randomly selected negative HIV rapid test results using Murex HIV Ag/Ab Combination ELISA test. Results of HIV rapid tests and DBS tests have agreed in 98.6% for positive results (it varied between 90.3 and 100% at different sites) or 347 out of 352, and for negative test results in 98.8% (it varied between 93.3 and 100% at different sites) or 406 out of 411, as specified in Table 9.

Table 9: Confirmation of the results, received by the rapid method with laboratory testing of DBS among PWID and SW, 2018.

Sentinel site	Group	Result of HIV test	Number of people tested with rapid method (abs.)	Number of confirmations with EIA using DBS (abs.)	Share of rapid tests confirmed with EIA using DBS (%)
Dushanbe	PWID	Positive	48	48	100%
		Negative	45	43	95.6%
	SW	Positive	8	8	100%
		Negative	49	49	100%
Vahdat	PWID	Positive	21	21	100%
		Negative	18	18	100%
	SW	Positive	8	8	100%
		Negative	19	19	100%
Rudaki	PWID	Positive	36	36	100%
		Negative	20	20	100%
	SW	Positive	6	6	100%
		Negative	19	19	100%
Bokhtar	PWID	Positive	14	14	100%
		Negative	34	34	100%
	SW	Positive	12	12	100%
		Negative	24	24	100%
Kulyab	PWID	Positive	55	55	100%
		Negative	30	28	93.3%
	SW	Positive	5	5	100%
		Negative	35	35	100%
Khorugh	PWID	Positive	46	46	100%
		Negative	30	30	100%
	SW	Positive	4	4	100%
		Negative	16	16	100%
Panjakent	PWID	Positive	31	28	90.3%
		Negative	17	17	100%
	SW	Positive	5	5	100%
		Negative	21	21	100%
Khujand	PWID	Positive	37	35	94.6%

		Negative	16	15	93.8%
	SW	Positive	16	16	100%
		Negative	18	18	100%
Total:		Positive	352	347	98.6%
		Negative	411	406	98.8%
Total:			763	753	98.7%

5. DATA ANALYSIS

IBBS data was downloaded from e-Sentinel surveillance online system in MS Excel format, checked and cleaned, after which it was imported into RDS Analyst version 0.64 (www.hpmrg.org). Descriptive analysis was done in RDS Analyst software by means of applying weights following Gile'SS algorithm, which is based on the sample inclusion probability based on the information on the numbers in personal social network of the respondent, it allows to get population data. All results, presented in this report, are weighted data (as opposed to share in the sample), unless otherwise specified. Two-dimensional data analysis was done using Stata SE13, using weights obtained from RDS Analyst (Gile'SS). Furthermore, to identify the most significant factors, affecting the presence of HIV infection, multiple regression analysis was done in Stata SE13.

6. KEY STUDY RESULTS IN PWID GROUP

6.1. DESCRIPTION OF THE RESPONDENT RECRUITMENT PROCESS AND SAMPLE DESCRIPTION

To start the recruitment process, three primary respondents (seeds) from the group of people, who inject drugs (PWID) were selected at each site with exception of Bokhtar and Dushanbe, based on the sample size and variety of their social network, as well as ability to recruit peers with various characteristics. 4 seeds were selected in Bokhtar and 5 in Dushanbe. Seed characteristics are specified in Table 1.

Table 10. Characteristics of primary respondents (seeds), PWID

Site	Number of seeds	Number of seeds, whose social network included 10 or more people	Gender		Age 25 and above	Duration of injection drug use ≤5 years	HIV+
			M	F			
Bokhtar	4	4	4		4	1	1
Vahdat	3	3	2	1	2	2	2
Dushanbe	5	4	3	2	5	1	2
Kulyab	3	3	3		2	1	1
Panjakent	3	3	3		3	1	1
Rudaki	3		3		3	1	1
Khorugh	3	3	3		3		2
Khujand	3	3	2	1	3		2
All sites	27	23	23	4	25	7	12

Number of waves was from 6 in Bokhtar to 16 in Dushanbe. In 6 out of 8 sites, more than half of the respondents were recruited from one most productive seed (Table 2).

Table 11. Number of waves, PWID

Site	Maximum number of waves	Share of respondents, recruited from one most productive seed
Bokhtar	6	35%
Vahdat	10	42%
Dushanbe	16	64%
Kulyab	10	63%
Panjakent	8	72%
Rudaki	10	56%
Khorugh	11	60%
Khujand	11	64%
All sites	**16**	

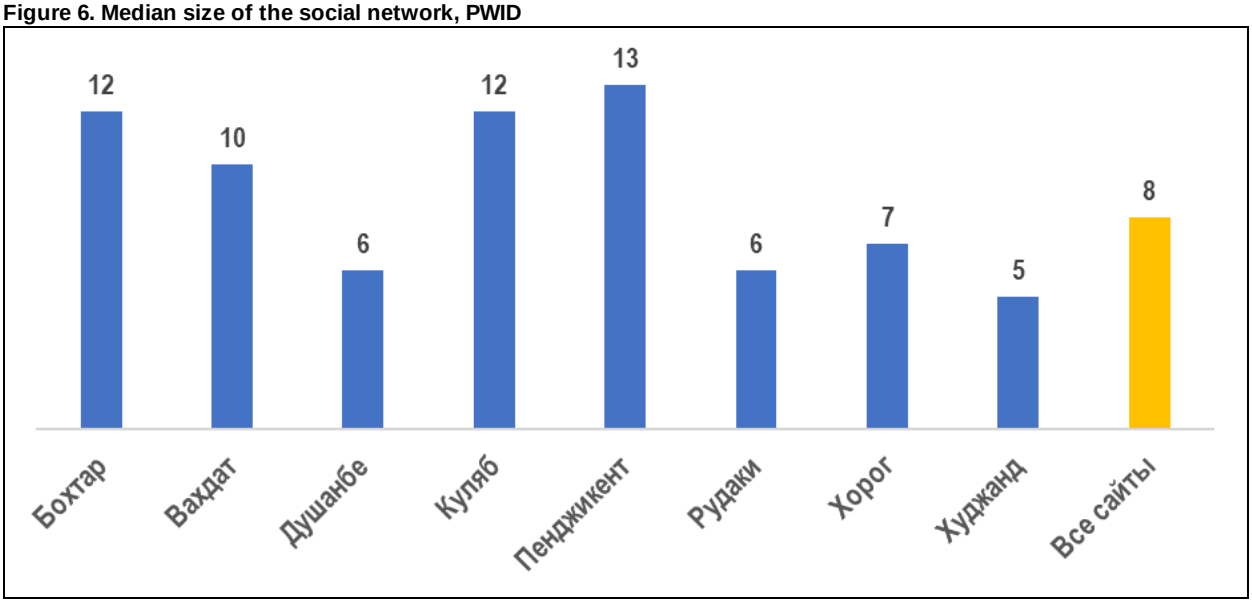
There were 2390 respondents in the study, including 2274 men (94%) and 116 women (6%). Of 33 participants, who came with coupons, but were not included in the study, 22 did not satisfy the inclusion criteria, and 11 refused to participate. Sample size was achieved in all sites.

Table 12. Characteristics of the PWID sample

Site	Total number of coupons issued	Number of coupons returned	Number of respondents, who did not satisfy the inclusion criteria or who refused to participate	Number of participants, who have completed the study	Gender		Sample size	% of sample achievement
					M	F		
Bokhtar	744	350	0	350	335	15	350	100%
Vahdat	334	200	0	200	196	4	200	100%
Dushanbe	1126	517	17	500	441	59	500	100%
Kulyab	538	351	1	350	343	7	350	100%
Panjakent	264	200	0	200	189	11	200	100%
Rudaki	562	254	14	240	239	1	200	120%
Khorugh	673	350	0	350	349	1	350	100%
Khujand	255	201	1	200	182	18	200	100%
All sites	**4496**	**2423**	**33**	**2390**	**2274**	**116**	**2350**	**102%**

Median size of social network by sentinel sites varied from 5 in Khujand to 13 PWID in Panjakent, and on average was 8 across the sites (interquartile range (IQR) 5-14).

Figure 6. Median size of the social network, PWID

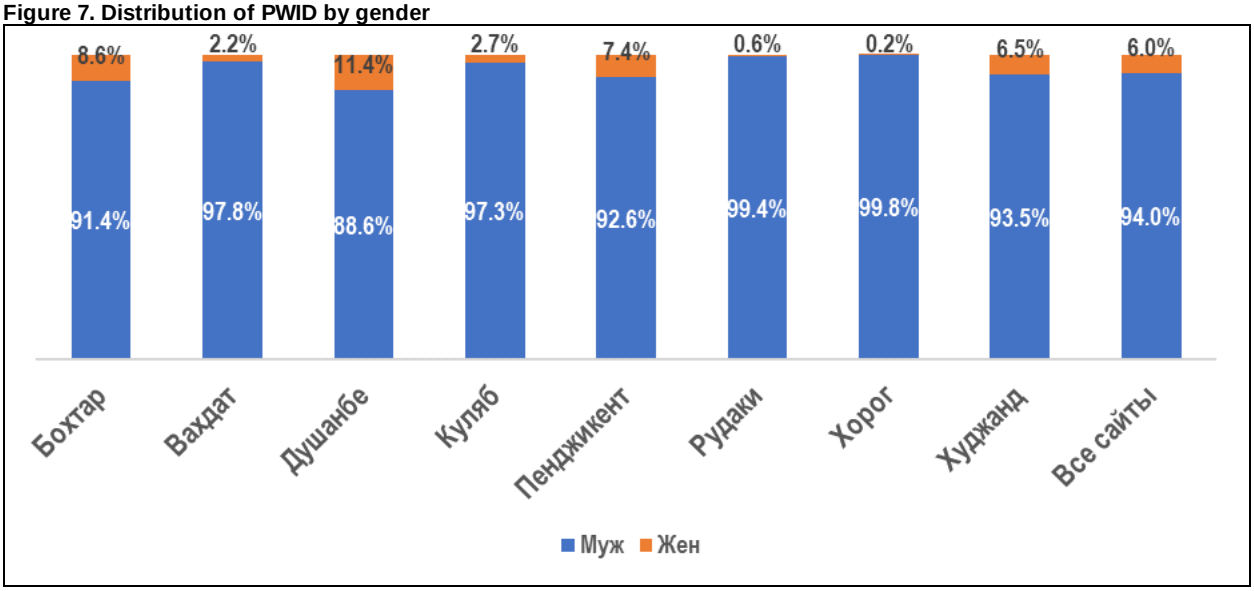


6.2. SOCIAL AND DEMOGRAPHIC CHARACTERISTICS

6.2.1. GENDER

Share of men in the sample was from 88.6% in Dushanbe to 99.8% in Khorugh, across the sites it was 94.0%.

Figure 7. Distribution of PWID by gender



6.2.2. AGE

Median age varied from 36 years in Rudaki to 47 years in Panjakent, across the sites it was 41 years (IQR 33-48, range 18-76). Share of young PWID below 25 years was in total 3.2% (from 0.2% in Vahdat to 8.3% in Rudaki). Compared to IBBS of 2014, the share of PWID below

25 years has significantly decreased in the following sites: Bokhtar – from 16.2% to 6%, Kulyab – from 10.3% to 2.8%.

Figure 8. Median age of PWID (full years)

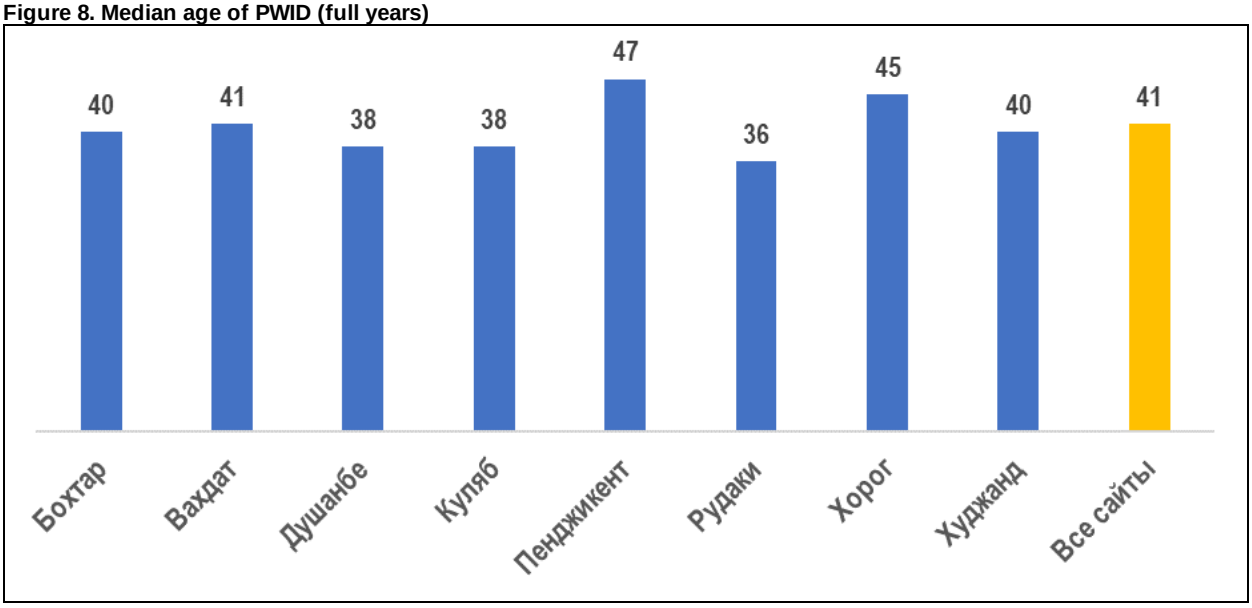
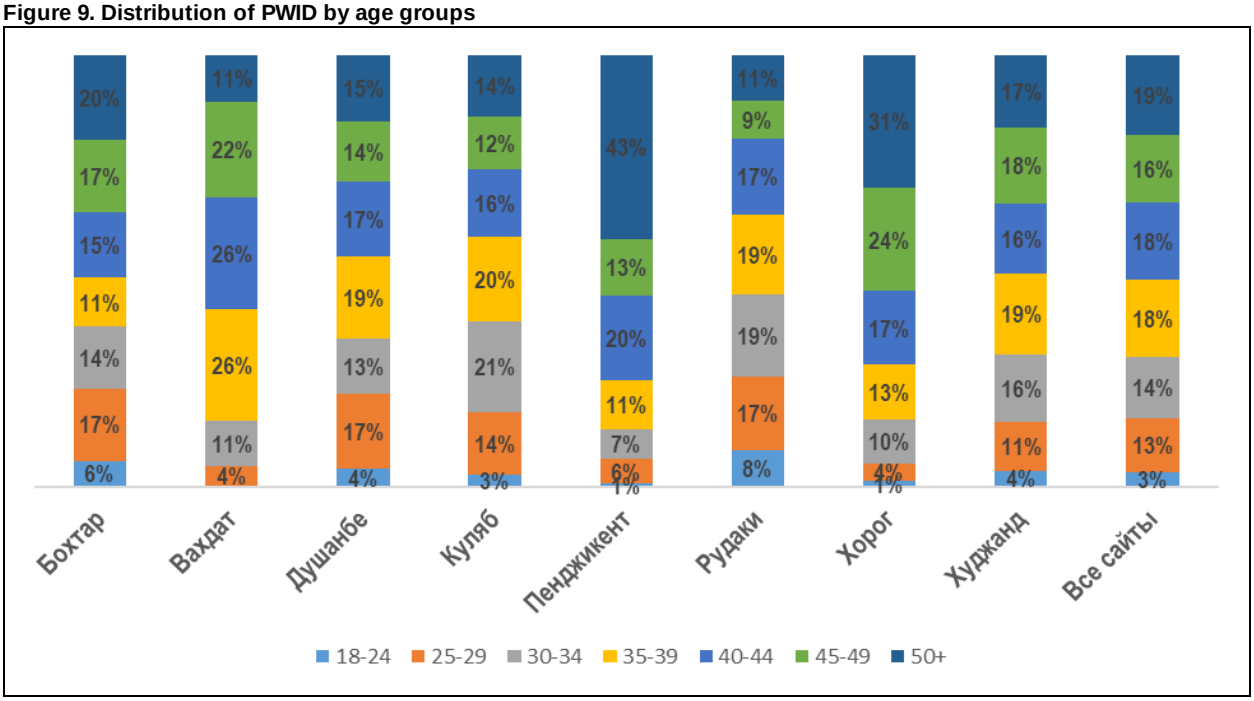


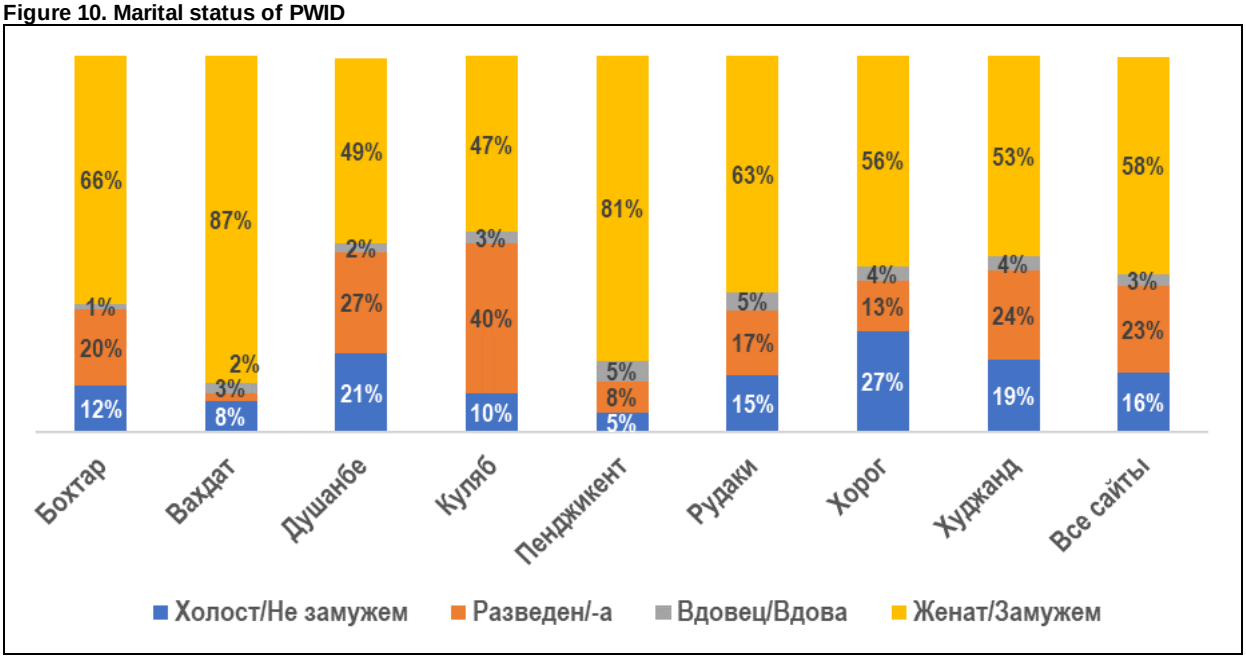
Figure 9. Distribution of PWID by age groups



6.2.3. MARITAL STATUS

Majority of PWID (57.9%) were married at the time of the study (from 46.6% in Kulyab to 87.0% in Vahdat). Almost quarter of PWID were divorced (23%) (from 8% in Panjakent to 40% in Kulyab).

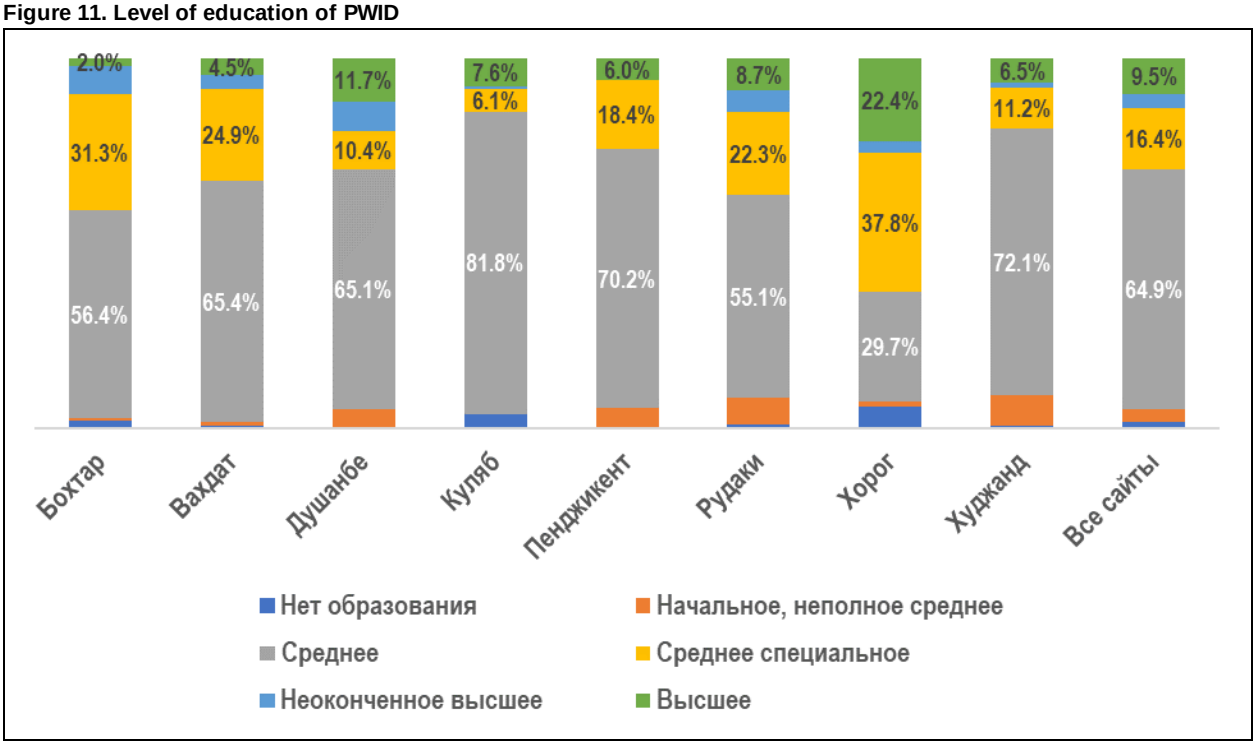
Figure 10. Marital status of PWID



6.2.3.1. EDUCATION

Majority of study participants had secondary education (64.9%) or vocational training (16.4%). The highest percentage of PWID with higher education was seen in Khorugh (22.4%), the lowest – in Bokhtar (2%).

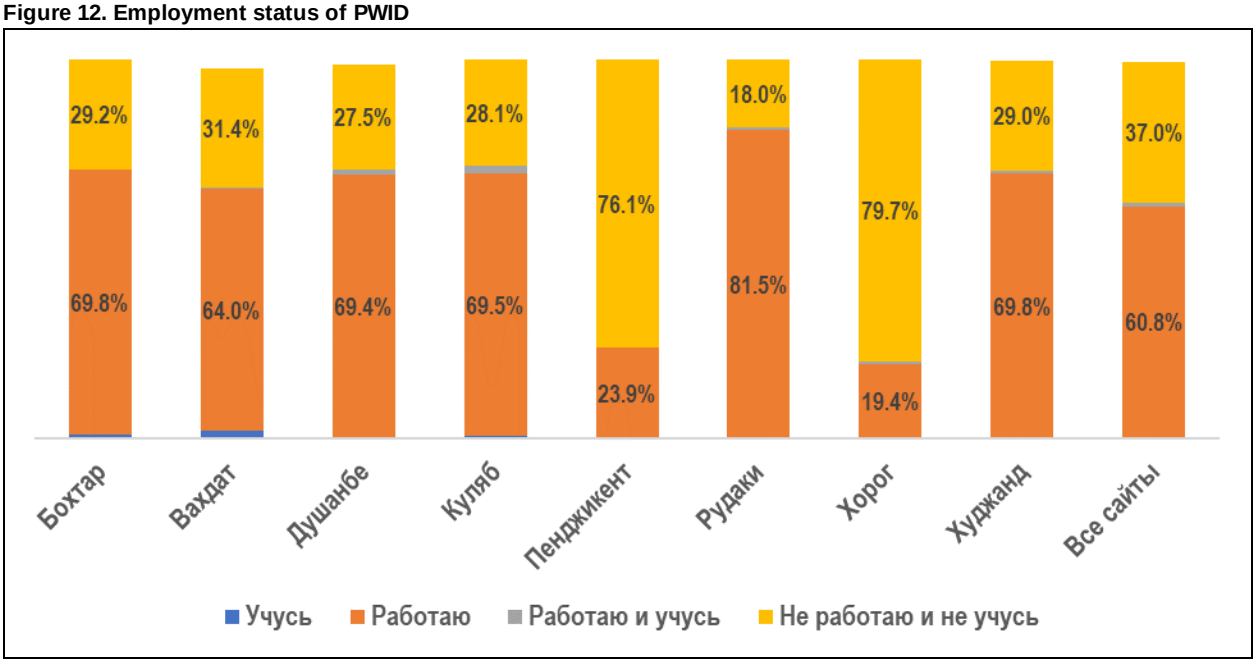
Figure 11. Level of education of PWID



6.2.4. EMPLOYMENT STATUS

Share of employed PWID varied between the sites: from 19.4% in Khorugh to 69.8% in Bokhtar and Khujand, and was 60.8% across all sites. Share of those PWID, who were neither employed, nor studied was from 18% in Rudaki to 79.7% in Khorughe and was equal to 37.0% across all sites.

Figure 12. Employment status of PWID



Median income/wages among PWID over the last 30 days on average at all sites was 600 Somoni (IQR 300-950). The highest monthly income was registered in Vahdat and Rudaki (1000 Somoni) and the lowest – in Kulyab (350 Somoni).

Table 13. Income/wages in the last 30 days (in Somoni), PWID

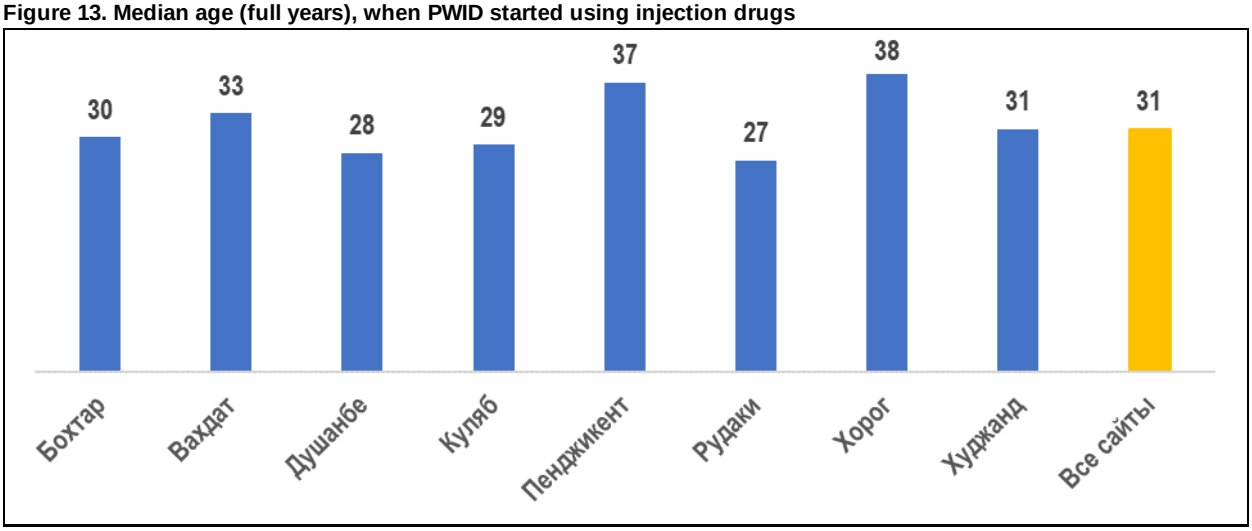
Site	Share of PWID. who indicated income/earnings in the last 30 days	Average income/wages in the last 30 days (Somoni)	Median income/wages in the last 30 days (IQR) (Somoni)	%<=500 (Somoni)	95% CI	
Bokhtar	95.5%	582.6	500 (350-770)	52.2%	47.8%	56.9%
Vahdat	76.0%	1124.8	1000 (600-1500)	21.9%	15.6%	28.2%
Dushanbe	74.6%	955.5	800 (600-1200)	21.9%	16.7%	27.1%
Kulyab	99.5%	353.4	350 (250-450)	91.6%	88.6%	94.5%
Panjakent	93.4%	742.0	600 (300-900)	45.2%	38.2%	52.3%
Rudaki	99.7%	1403.5	1000 (850-1600)	6.0%	2.9%	9.2%
Khorugh	100.0%	592.9	500 (200-800)	62.1%	56.6%	67.6%
Khujand	88.4%	718.5	600 (300-875)	46.4%	36.7%	56.2%
All sites	**88.0%**	**755.3**	**600 (300-950)**	**47.6%**	**44.9%**	**50.4%**

6.3. DRUG USE

6.3.1. LENGTH OF INJECTION DRUG USE

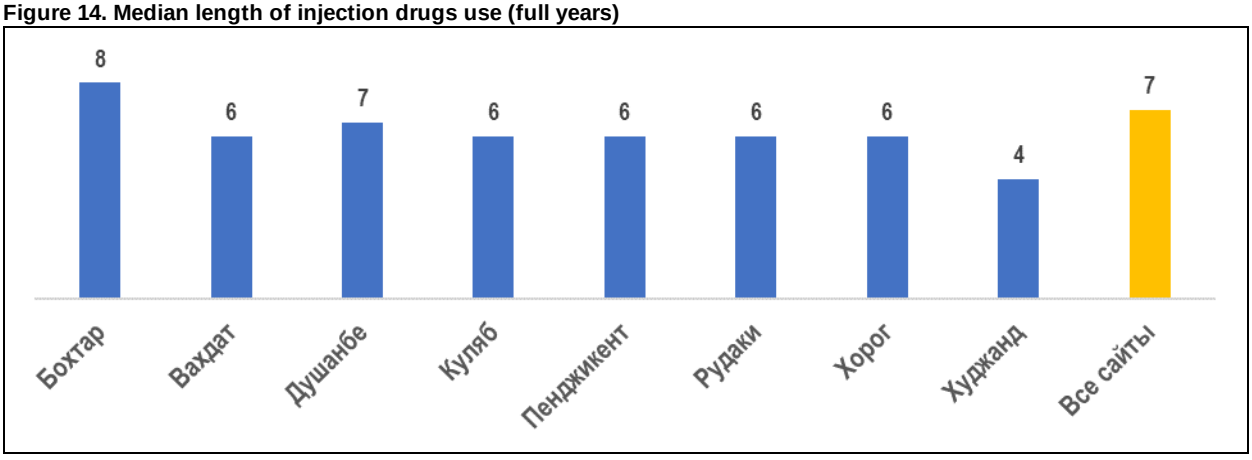
Median age, when the PWID have first used injection drugs varied from 27 years in Rudaki to 38 in Khorugh and was on average 31 (IQR 25-38) years across the sites.

Figure 13. Median age (full years), when PWID started using injection drugs



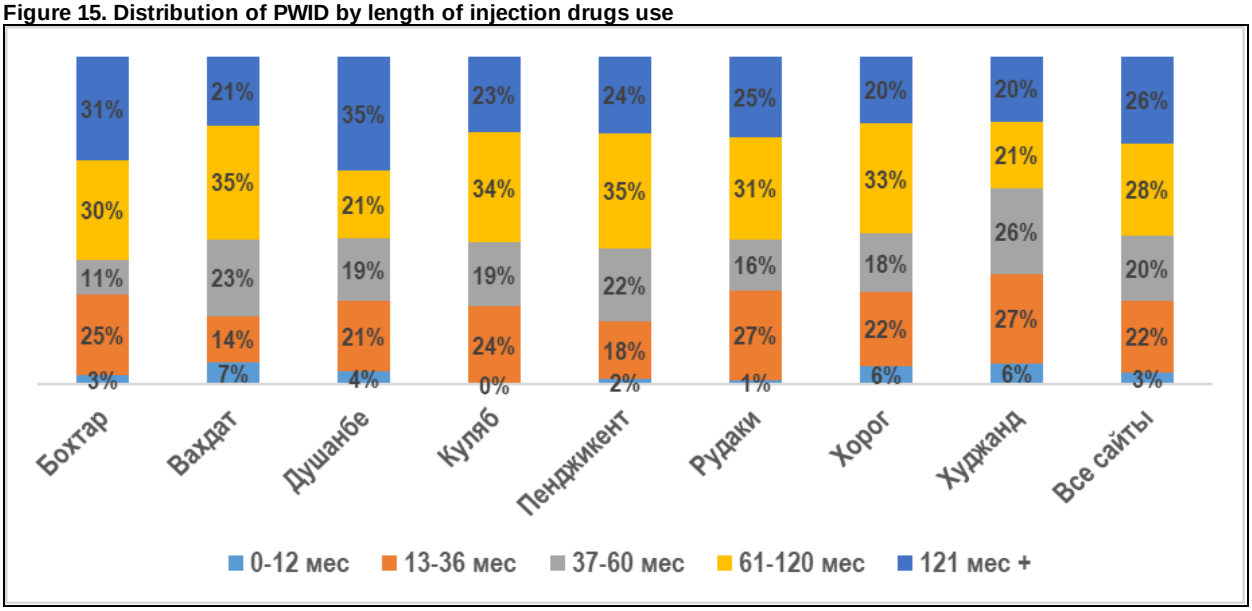
Median length of injection drugs use (through syringe) was 7 (IQR 4-12) years across the sites: minimal length in Khujand – 4.4 years, maximum length in Bokhtar – 8 years.

Figure 14. Median length of injection drugs use (full years)



Share of PWID with less than 12 months of injection drugs use was only 3.5% (from 0.0% in Kulyab to 6.7% in Vahdat). More than half of all respondents (54.6%) used drugs for more than 5 years.

Figure 15. Distribution of PWID by length of injection drugs use



6.3.2. TYPES OF DRUGS USED

Main drug used through syringe was heroin: 99% of PWID have used heroin (through syringe) in the last 6 months. At the same time 17% of respondents have noted that in addition to heroin they have used dimedrol (diphenhydramine), 9%–poppy/seeds[1], 9% – raw opium[2]. None of the surveyed PWID has noted use of "crocodile" (Desomorphine) or "salts". Majority (97%) of PWID have noted that most often they used heroin in the last 6 months (from 82% in Rudaki to 100% in Vahdat). In Rudaki 13% of PWID noted the use of poppy/seeds.

Figure 14. Types of injection drugs, used by PWID most often in the last 6 months

Sentinel site	N sample size	Poppy/ seeds	Heroin	Raw opium	Dimedrol	Other
Bokhtar	350	0%	99%	0%	0%	1%
Vahdat	200	0%	100%	0%	0%	0%
Dushanbe	500	0%	98%	1%	1%	0%
Kulyab	350	0%	98%	0%	2%	0%
Panjakent	200	0%	99%	0%	0%	1%
Rudaki	240	13%	82%	5%	0%	0%
Khorugh	350	0%	100%	0%	0%	0%
Khujand	200	0%	97%	3%	0%	0%
All sites	**2390**	**1%**	**97%**	**1%**	**1%**	**0%**

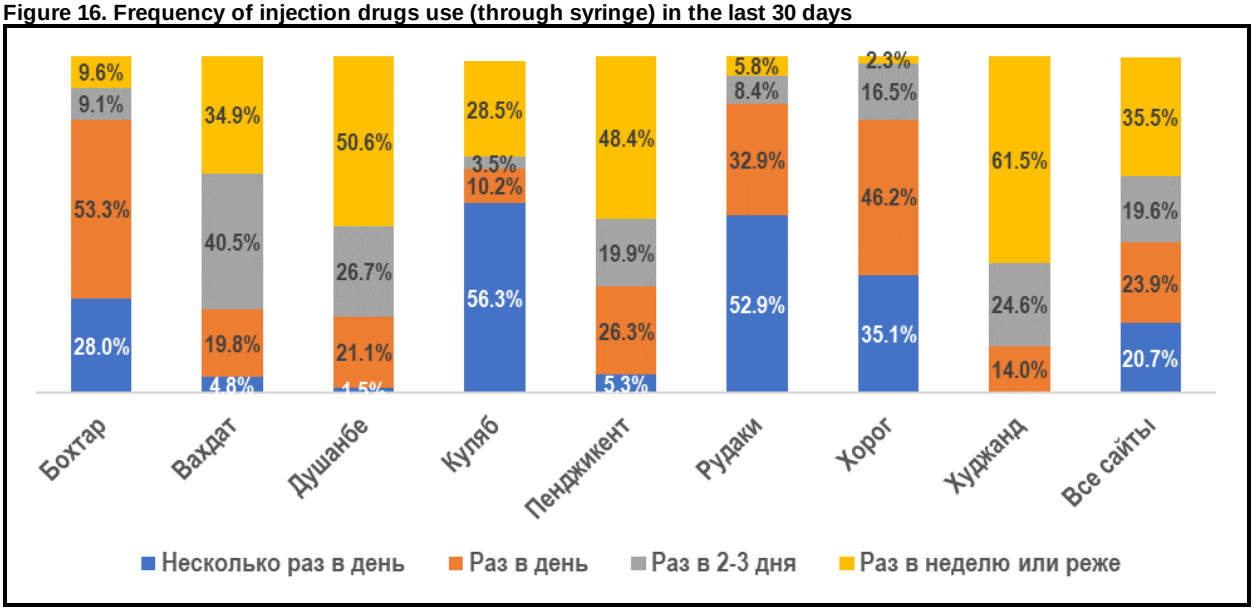
[1] Poppy\seeds – poppy (poppy seeds), are seeds of some plants of Papaveraceae family, which look like small dark spheres, which are used to extract drug mix with certain manipulations and processing in improvised manner.

[2] Raw opium – milky fluid from poppy heads

6.3.3. FREQUENCY OF INJECTION DRUG USE

Majority of PWID (88.2%) have indicated use of injection drugs in the last 30 days. Frequency of use varied significantly between the sites. For instance, percentage of PWID, who indicated use of injection drugs several times a day was from 0% in Khujand to 56.3% in Kulyab, on average across sites it was 20.7%. 23.9% of respondents used injection drugs once a day, and 19.6% of PWID used once in 2-3 days. A third of PWID used drugs once a week.

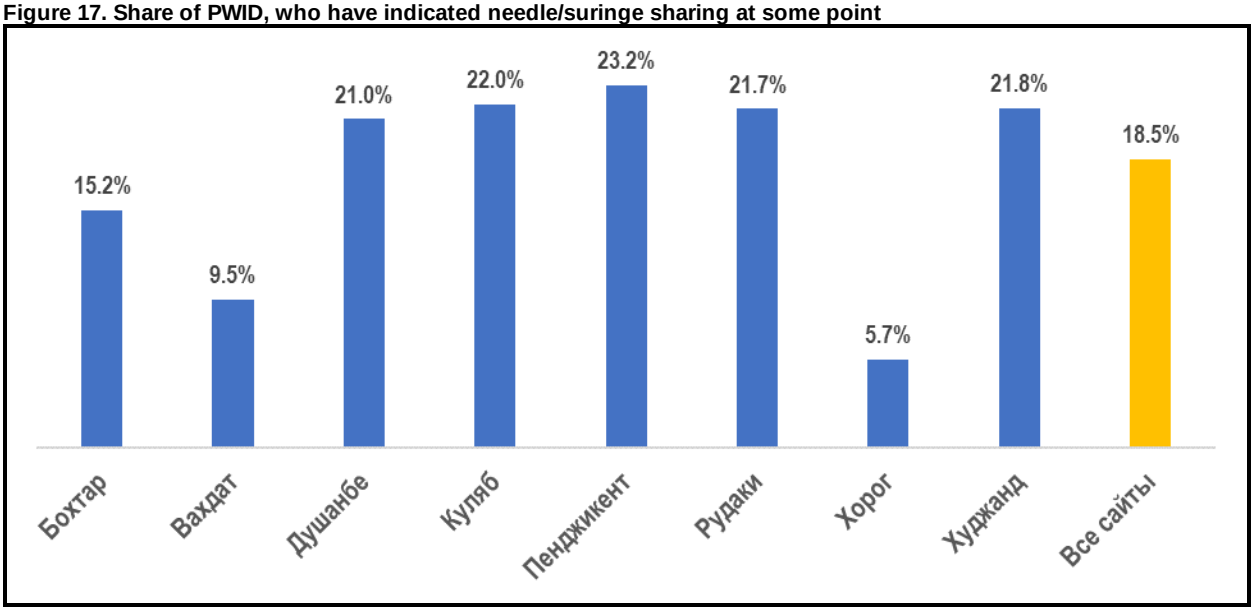
Figure 16. Frequency of injection drugs use (through syringe) in the last 30 days



6.3.4. INJECTION PRACTICES

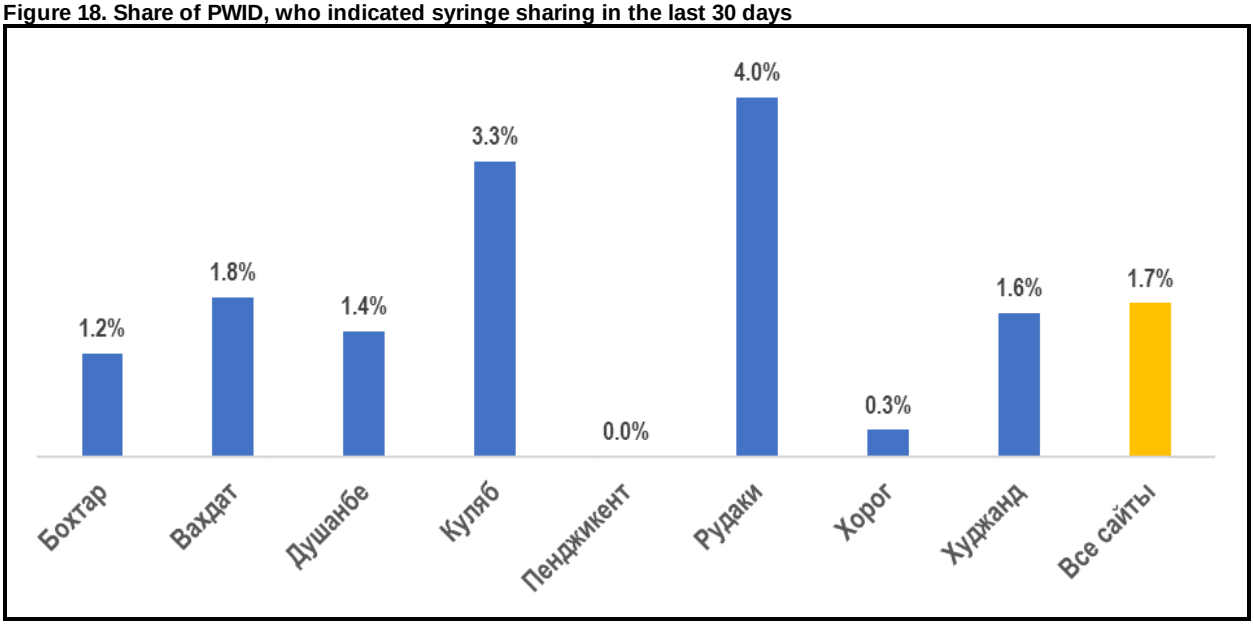
Significant part of PWID (18.5%) has reported that they had experience in sharing needles/syringes. In Panjakent, Kulyab, Khujand, Rudaki and Dushanbe percentage of PWID, who had experience of needle/syringe sharing was over 21%. The lowest percentage of needle/syringe sharing was registered in Khorugh – 5.7%.

Figure 17. Share of PWID, who have indicated needle/suringe sharing at some point



At the same time share of PWID, who have shared needle/syringe during the last injection in the last 30 days was only 1.7% across all sites. The highest percentage was registered in Rudaki (4.0%) and Kulyab (3.3%); the lowest indicator– in Panjakent (0%) and Khorugh (0.3%).

Figure 18. Share of PWID, who indicated syringe sharing in the last 30 days



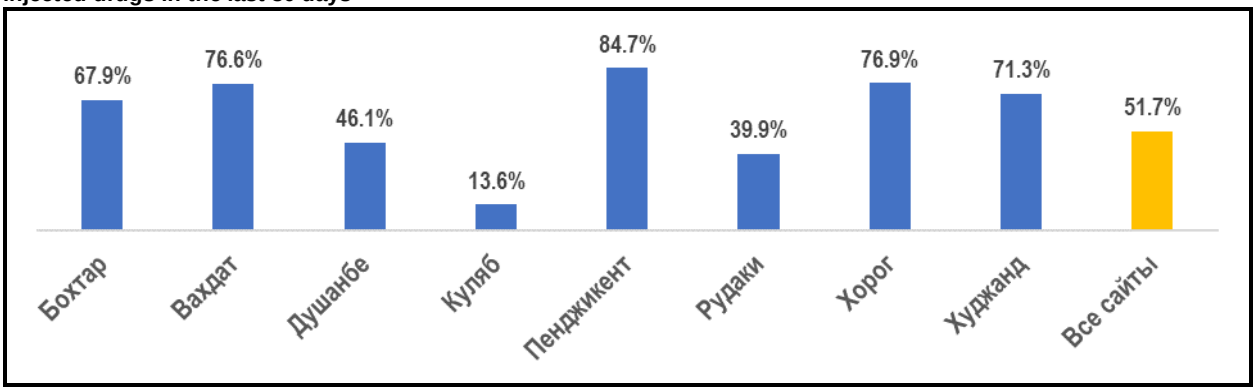
In addition to sharing needles/syringes at the time of the last injection in the last 30 days, PWID have also indicated other potentially dangerous drug use practices for HIV transmission. For instance, 41.6% of PWID had experience in drawing drugs from a common container; 9.8% have shared water to wash used needles and syringes; 4.9% have transferred drug to their syringe from a syringe that was already used. Most often dangerous injection practices were noted by PWID in Kulyab.

Table 15. Injection practice during last drug injection among PWID in the last 30 days

Site	Share of PWID. who have indicated use of the injection practices mentioned below						
	Used needle and syringe sharing	Drawing drug solution from a common container	Transferring drug from one syringe that was already used into another	Sharing water to wash used syringes and needles	Adding blood (own or someone else' s) into the solution	Buying drug that is already dispensed in a syringe	Providing own used syringe to another drug user for drug injection
Bokhtar	0.3%	29.0%	0.4%	9.7%	0.2%	1.3%	1.5%
Vahdat	2.4%	16.9%	1.8%	3.7%	1.2%	2.2%	3.3%
Dushanbe	1.0%	50.6%	1.2%	5.5%	0.3%	2.3%	0.9%
Kulyab	13.5%	73.1%	19.9%	22.0%	2.3%	3.3%	26.8%
Panjakent	0.0%	3.7%	0.8%	3.0%	1.7%	6.9%	1.1%
Rudaki	2.8%	54.5%	0.0%	5.1%	0.6%	1.4%	8.9%
Khorugh	0.0%	19.7%	0.2%	15.4%	0.0%	0.5%	2.1%
Khujand	0.0%	21.2%	2.9%	4.8%	1.2%	2.1%	5.6%
All sites	**3.4%**	**41.6%**	**4.9%**	**9.8%**	**0.9%**	**2.5%**	**7.3%**

Share of PWID, who used none of the dangerous practices, specified in Table 5, during last injection in the last 30 days was only 51.7%. This indicator varied from 13.6% in Kulyab to 77% in Vahdat and Khorugh.

Figure 19. Share of PWID, who practiced less dangerous injection behavior during the last injection, among those, who injected drugs in the last 30 days*

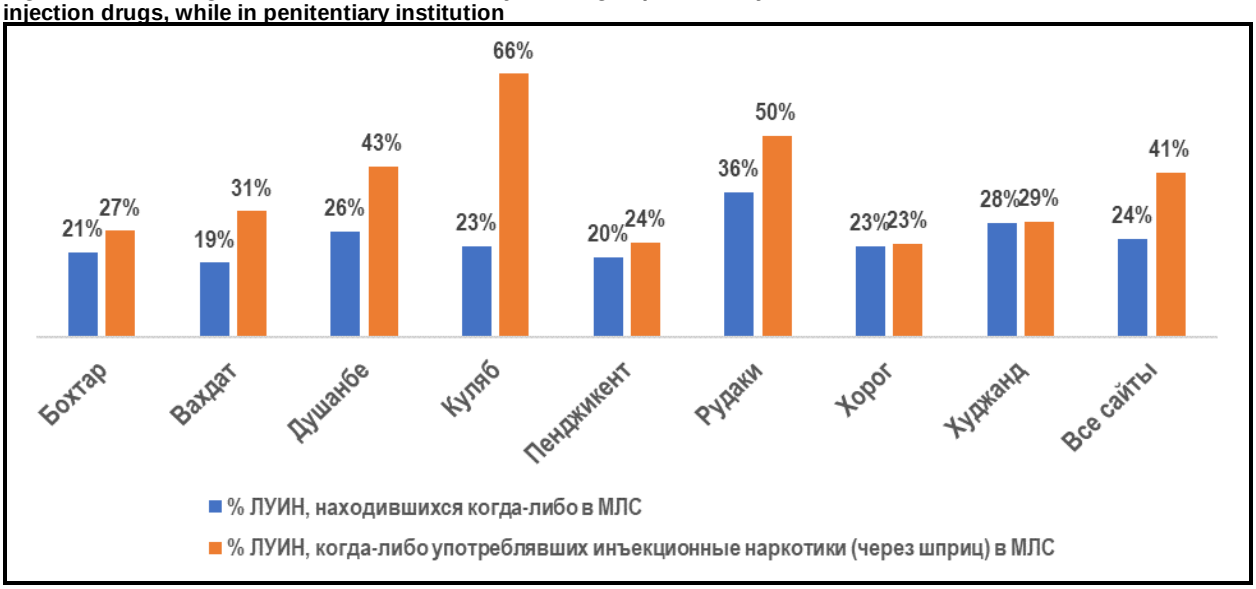


**Note: those who answered "no" to all questions, related to practices of drug injection*

6.3.5. HISTORY OF INSTITUTIONALIZATION IN PENITENTIARY INSTITUTIONS AND USE OF INJECTION DRUGS IN PRISONS

One quarter of PWID (24.5%) indicated history of institutionalization in penitentiary institutions, of them 41.1% used injection drugs in penitentiary institutions.

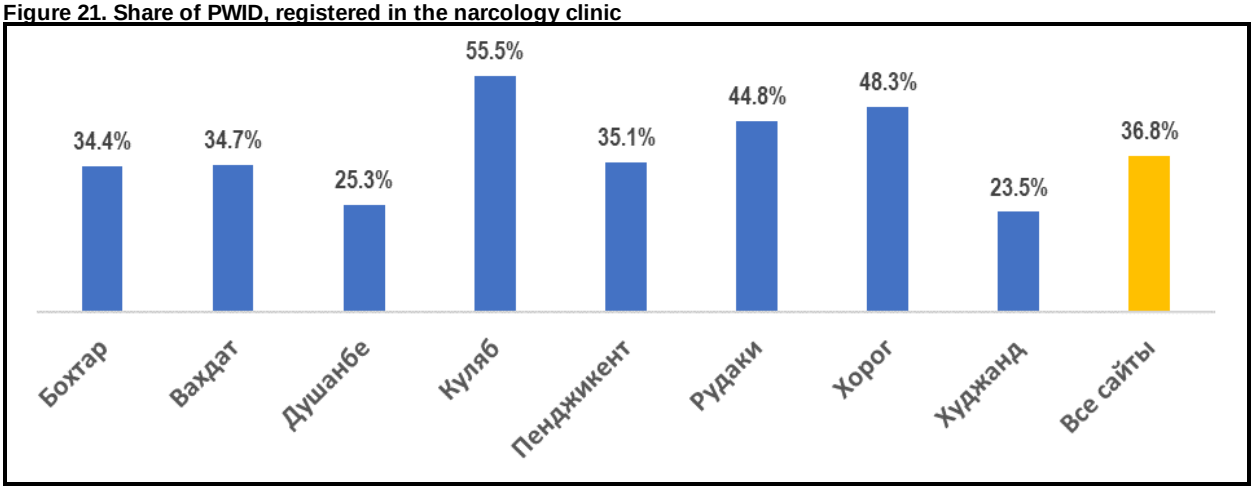
Figure 20. Percentage of PWID, who have history of being in penitentiary institutions, and share of those, who used injection drugs, while in penitentiary institution



6.3.6. DRUG ADDICTION TREATMENT

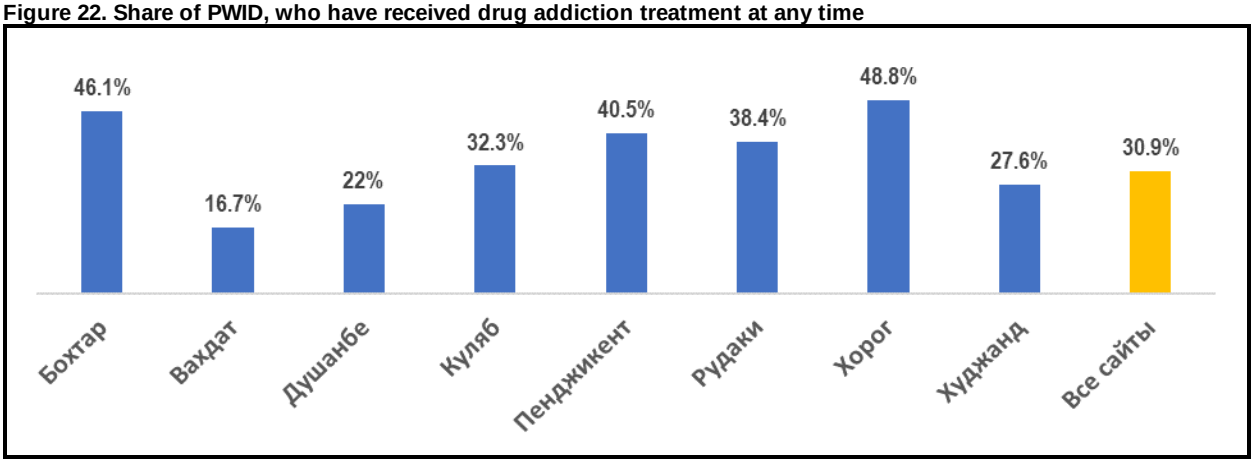
At the time of the study, one third of PWID (36.8%) was registered in the narcology clinic (from 48.3% in Khorugh to 55.5% in Kulyab). Median length of registration as addict (in years) across all sites was 6 (IQR 3-11) years (minimal length in Vahdat (2 years), and maximum – in Dushanbe (10 years).

Figure 21. Share of PWID, registered in the narcology clinic



Furthermore, during the study PWID were asked about any treatment of drug addiction received at any time, including current treatment, aimed at changing, reducing or discontinuing the use of injection drugs. About one third of PWID have had experience of addiction treatment. The highest percentage was seen in Khorugh (48.8%), Bokhtar (46.1%) and Panjakent (40.5%), whereas the lowest 16.7% was seen in Vahdat and 22% in Dushanbe.

Figure 22. Share of PWID, who have received drug addiction treatment at any time



Percentage of PWID, who were receiving any treatment, aimed at changing, reducing or discontinuing use of injection drugs at the time of the study was 28.3%, the highest percentage was seen in Bokhtar – 77.5%, and the lowest was in Panjakent – 10.7%. Most frequent type of treatment among PWID was methadone substitution therapy (70%); 18% also received outpatient care[3] (18%).

Table 16. Drug addiction treatment

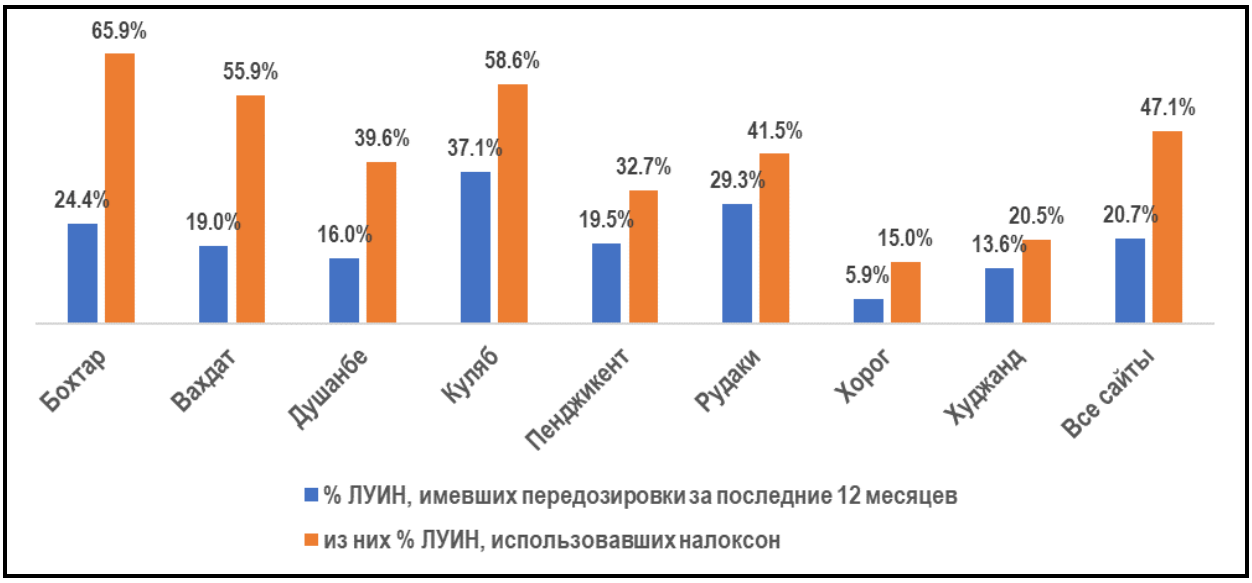
Site	%PWID, who receive any type of drug addiction treatment currently	%PWID, who receive any type of drug addiction treatment currently	Type of treatment			
			In-patient detoxication without use of dugs	Outpatient care	Methadone substitution therapy	Detoxication with use of other drugs
Bokhtar	77.5%	135	32.6%	33.2%	41.8%	1.2%
Vahdat	54.2%	18	0.0%	1.0%	90.1%	0.0%
Dushanbe	15.2%	23	0.0%	0.0%	93.4%	0.0%
Kulyab	25.6%	43	15.4%	26.5%	74.3%	2.6%
Panjakent	10.7%	10	0.0%	0.0%	100.0%	0.0%
Rudaki	17.9%	21	0.0%	33.3%	65.6%	0.0%
Khorugh	38.6%	87	5.9%	4.0%	90.1%	2.3%
Khujand	15.5%	13	5.5%	41.5%	62.4%	0.0%
All sites	**28.3%**	**350**	**12.3%**	**18.5%**	**70.0%**	**1.3%**

[3] Outpatient care – provision of treatment, diagnostic and prevention activities to the drug addiction patients in outpatient settings. Functions of outpatient care are: 1) identification and registration of patients with drug addiction, chronic alcoholism, and people with other substance abuse issues; 2) dynamic monitoring of registered population; 3) conducting treatment and prevention activities

6.3.7. OVERDOSE AND USE OF NALOXONE

Percentage of PWID, who had instances of overdose when using drugs in the last 12 months was 21% across all sites and varied from 5.9% in Khorugh to 37% in Kulyab. 47.1% of PWID used naloxone to reverse overdose (from 15.0% in Khorugh to 65.9% in Bokhtar).

Figure 23. Percentage of PWID, who had instances of overdose in the last 12 months and share of PWID, who used naloxone



6.4. SEXUAL BEHAVIOR

Majority of PWID (55.5%) have noted that they had sexual intercourse in the last 30 days. In Bokhtar, 82.3% of PWID had sexual intercourse in the last 30 days, and in Kulyab only 20.7%. At the same time, only 37.6% of PWID indicated that they used a condom during the last sexual intercourse in the last 30 days (from 23.3% in Kulyab to 52.9% in Khujand).

Figure 24. Percentage of PWID, who had sexual intercourse in the last 30 days and who used a condom during the last sexual intercourse

When asking PWID questions about the reasons for not using a condom during their latest sexual intercourse, overwhelming majority (82%) of the respondents said they did not think the use of condom was necessary (from 66.4% in Rudaki to 97.5% in Khujand), and 9% noted that their partner did not want to use a condom (from 0.6% in Vahdat to 38.5% in Khorugh).

Table 17. Reasons for not using a condom during the last sexual intercourse

Site	% of PWID, who used condom during the last sexual intercourse in the last 30 days	Reasons for not using a condom during the last sexual intercourse					
		Partner did not want	No money to buy it	Did not have it with me	Do not think it is necessary	Was nowhere to buy	Other
Bokhtar	29.0%	21.6%	0.0%	9.0%	68.9%	0.0%	0.5%
Vahdat	27.4%	0.6%	0.0%	0.0%	85.1%	0.0%	0.0%
Dushanbe	40.1%	7.0%	0.0%	3.2%	86.2%	0.0%	1.1%
Kulyab	23.3%	6.2%	0.0%	0.0%	85.1%	0.0%	0.0%
Panjakent	32.6%	10.1%	0.0%	11.6%	76.6%	0.0%	1.7%
Rudaki	39.9%	8.6%	0.6%	3.1%	66.4%	0.0%	21.3%
Khorugh	51.7%	38.5%	0.0%	3.2%	58.3%	0.0%	0.0%
Khujand	52.9%	0.8%	0.0%	0.7%	97.5%	1.1%	0.0%
All sites	**37.6%**	**9%**	**0%**	**4%**	**82%**	**0%**	**2%**

To assess risky sexual behavior among PWID, questions were asked during the study about the sexual intercourse and use of condoms with casual, commercial and regular sexual partners.

6.4.1. CASUAL SEXUAL PARTNERS AND USE OF CONDOMS

Among PWID 11% have noted that they had sexual intercourse with casual sexual partners in the last 30 days (from 2.1% in Kulyab to 24.9% in Rudaki). Median number of sexual intercourses with casual sexual partners was 3 (IQR 2-6). Only 62% of PWID responded that they have always used a condom during sexual intercourse with casual sexual partners (from 0% in Panjakent and Khujand to 19% in Kulyab).

Figure 25. Percentage of PWID, who had sexual contacts with casual sexual partners in the last 30 days

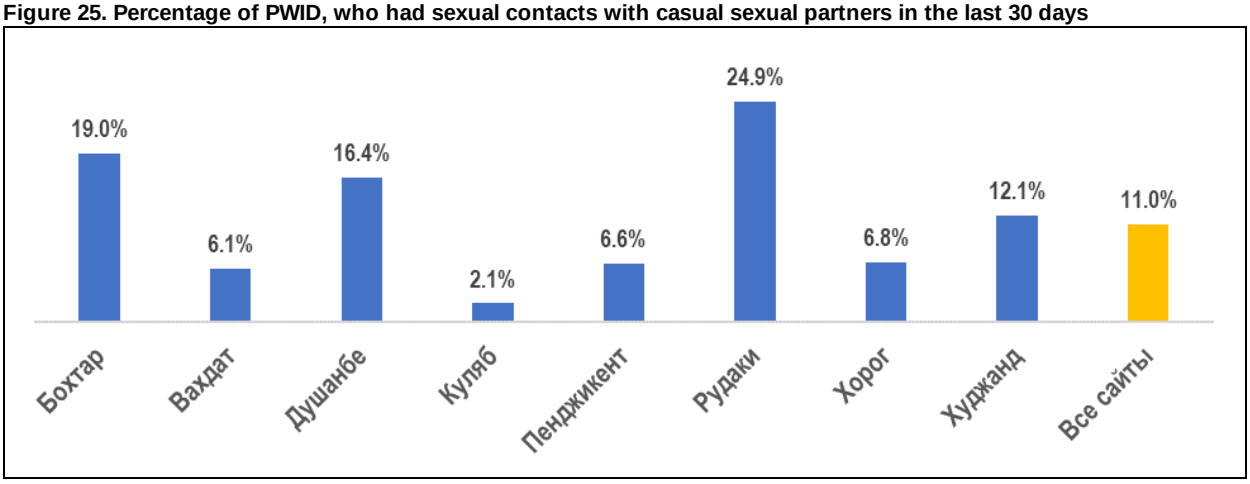


Table 18. Use of condoms with casual sexual partners in the last 30 days

Site	Share of sexual intercourses, when a condom was used with casual sexual partners				
	All	Almost all	Half	Less than half	None
Bokhtar	65%	11%	1%	1%	21%
Vahdat	70%	17%	0%	0%	13%
Dushanbe	54%	18%	0%	1%	27%
Kulyab	61%	19%	0%	0%	20%
Panjakent	63%	0%	5%	0%	32%
Rudaki	51%	4%	6%	0%	39%
Khorugh	72%	10%	0%	0%	18%
Khujand	88%	0%	4%	3%	5%
All sites	62%	12%	2%	1%	24%

6.4.2. COMMERCIAL SEXUAL PARTNERS AND USE OF CONDOMS

6.8% of PWID (from 0.7% in Kulyab to 16.3% in Vahdat) had sexual intercourse with commercial sexual partners in the last 30 days. Median number of sexual intercourses with commercial sexual partners was 3 (IQR 1-5). At the same time the share of PWID, who have indicated always using a condom with commercial sexual partners was 81.2% (from 50% in Bokhtar to 94.5% in Khujand).

Figure 26. Share of PWID, who had sexual intercourse with commercial sexual partners in the last 30 days

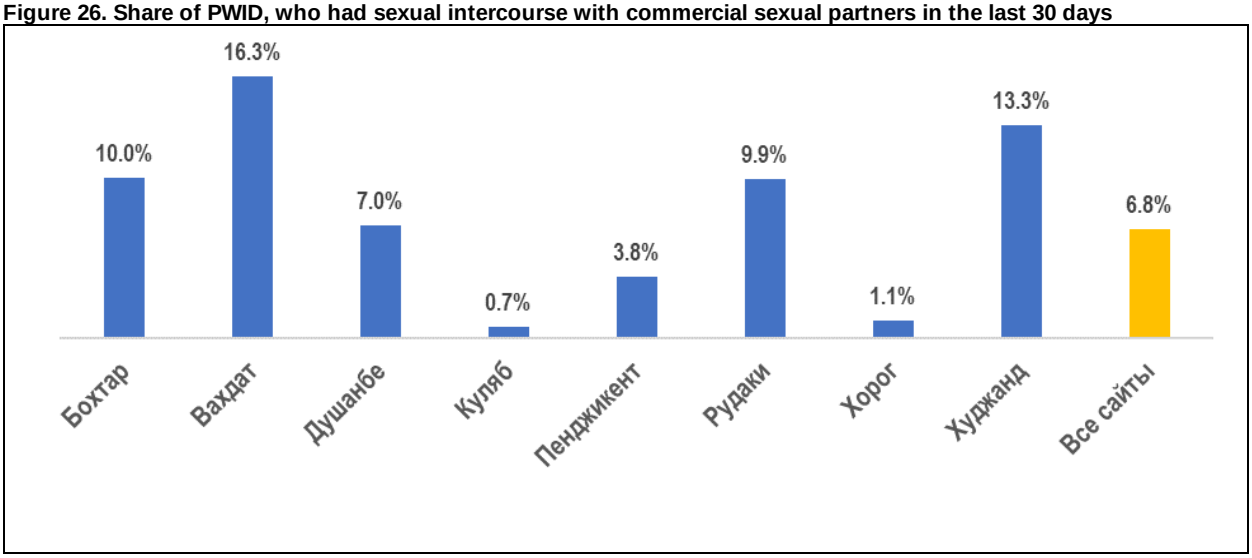


Table 19. Use of condoms with commercial sexual partners in the last 30 days

Site	Share of sexual intercourses, when a condom was used with commercial sexual partners				
	All	Almost all	Half	Less than half	None
Bokhtar	49.6%	2.8%	0.0%	0.0%	28.2%
Vahdat	83.6%	2.0%	0.0%	0.0%	14.5%
Dushanbe	70.4%	13.2%	0.0%	0.0%	16.5%
Kulyab	100.0%	0.0%	0.0%	0.0%	0.0%

Panjakent	89.4%	0.0%	10.6%	0.0%	0.0%
Rudaki	86.5%	0.0%	0.0%	6.3%	7.2%
Khorugh	83.9%	0.0%	0.0%	0.0%	16.1%
Khujand	94.5%	1.5%	4.0%	0.0%	0.0%
All sites	**81.2%**	**5.0%**	**1.3%**	**0.5%**	**11.7%**

6.4.3. REGULAR SEXUAL PARTNERS AND USE OF CONDOMS

Among all PWID 42.7% have noted that they had sexual intercourse with regular sexual partners in the last 30 days (from 12.8% in Kulyab to 76.7% in Bokhtar). Median number of sexual intercourses with regular partners was 4 (IQR 2-8). Share of PWID, who indicated use of condom during all sexual intercourses was 23% (from 12% in Kulyab to 36% in Khorugh and Khujand).

Figure 27. Share of PWID, who have indicated sexual intercourse with regular sexual partners in the last 30 days

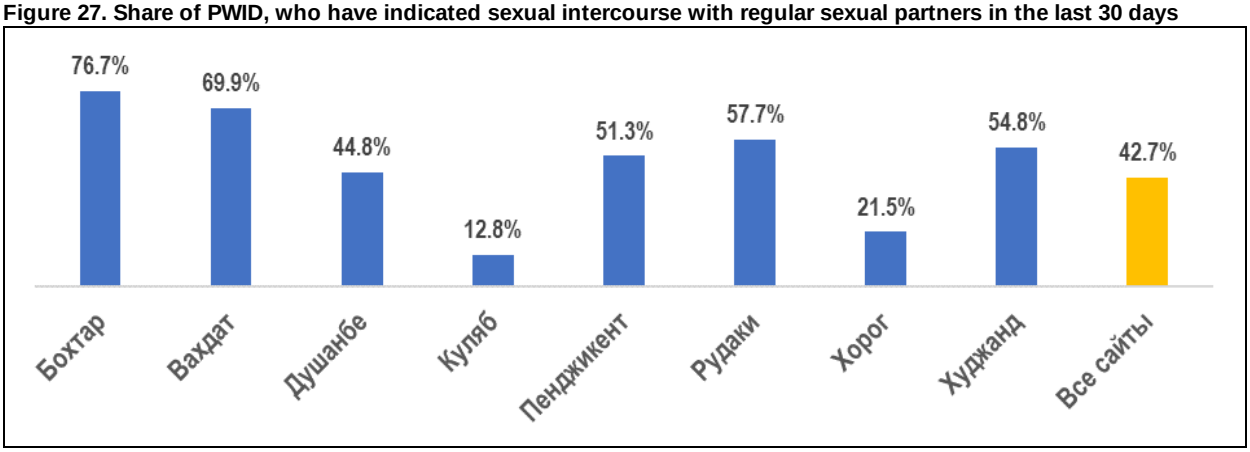
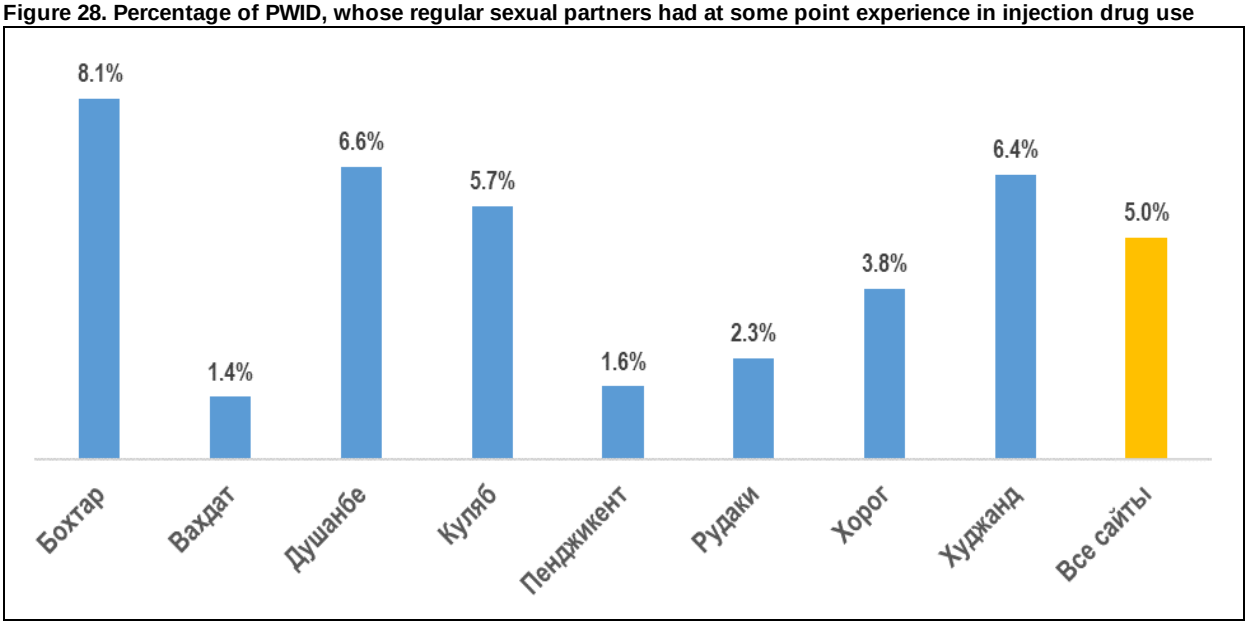


Table 20. Use of condoms with regular sexual partners

Site	Share of sexual intercourses, when a condom was used with regular sexual partners				
	All	Almost all	Half	Less than half	None
Bokhtar	23%	2%	2%	0%	73%
Vahdat	16%	0%	0%	0%	83%
Dushanbe	19%	1%	2%	4%	74%
Kulyab	12%	4%	2%	6%	74%
Panjakent	26%	7%	0%	2%	66%
Rudaki	20%	2%	3%	1%	73%
Khorugh	36%	3%	0%	0%	61%
Khujand	36%	0%	5%	1%	58%
All sites	**23%**	**2%**	**2%**	**2%**	**71%**

5% of PWID have indicated that their regular sexual partners had experience of injection drug use (from 1.4% in Vahdat to 8.1% in Bokhtar). In general, across all sites 46.1% of female PWID have indicated that their sexual partners had experience of injection drug use, whereas the same indicator among male PWID was only 3.2%.

Figure 28. Percentage of PWID, whose regular sexual partners had at some point experience in injection drug use



In terms of awareness of PWID about HIV test results of their latest regular partner, 3.1% of PWID knew about HIV-positive status of their partners, 56.7% of PWID know about HIV-negative status and one third of PWID (33.9%) do not know the HIV status of their regular sexual partner.

Table 21. Awareness of PWID about the HIV test results of the latest regular sexual partner

Site	Positive result	Negative result	Partners do not now their HIV status	Don't know	No answer
Bokhtar	0.0%	58.5%	9.9%	31.4%	0.2%
Vahdat	5.6%	88.3%	0.0%	4.3%	1.9%
Dushanbe	2.6%	58.5%	0.2%	32.4%	6.3%
Kulyab	3.0%	23.1%	0.0%	73.9%	0.0%
Panjakent	4.3%	22.1%	7.8%	65.7%	0.0%
Rudaki	3.1%	58.8%	14.0%	14.3%	9.7%
Khorugh	2.9%	74.3%	10.1%	12.7%	0.0%
Khujand	2.6%	70.7%	0.0%	24.4%	2.3%
All sites	**3.1%**	**56.7%**	**3.1%**	**33.9%**	**3.2%**

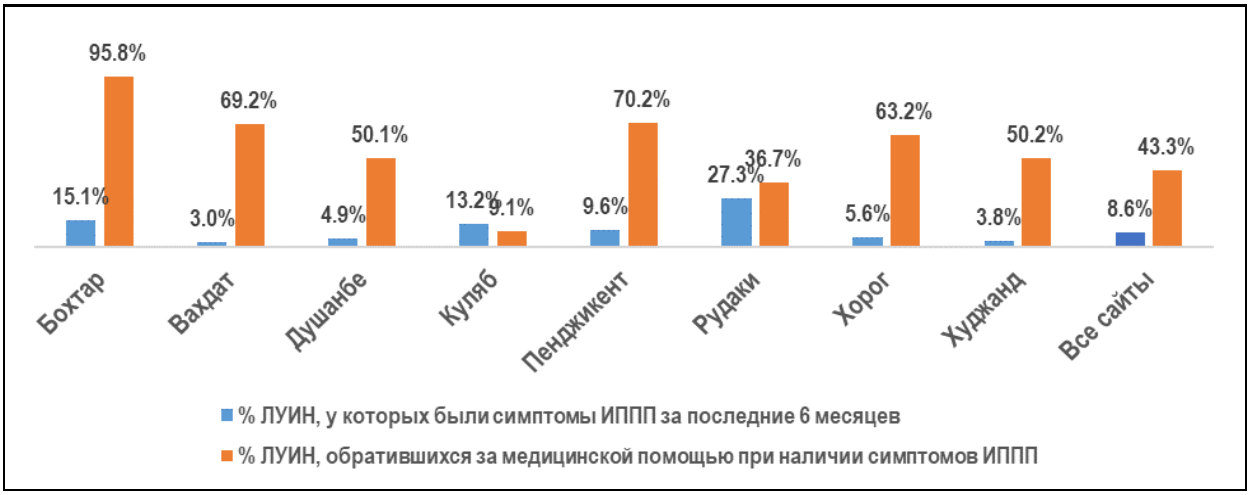
6.4.4. SEXUAL INTERCOURSE WITH MEN (FOR MEN)

Percentage of men/PWID, who have had sexual intercourse with men across all sites was 2.4%. Men/PWID only at four sites have indicated that they had sex with men: Kulyab – 10.4% and Khujand – 1.9%, Bokhtar and Vahdat, each 0.2%.

6.4.5. SEXUALLY TRANSMITTED INFECTIONS (STIs)

Share of PWID, who have mentioned presence of at least one of the mentioned STI symptoms varied significantly across sentinel sites and was from 3.0% in Vahdat to 27.3% in Rudaki (across all sites – 8.6%). Of the PWID with STI symptoms a little less than half (43.3%) have sought medical attention to treat STIs.

Figure 29. Percentage of PWID, who had at least one of STI symptoms in the last 6 months and share of those, who seeked medical attention



In case of presence of STI symptoms, most PWID sought medical attention in STI clinics (32%), urologist (23%), medical professional they know (22%) and private doctor (13%).

Table 22. Seeking medical attention for STIs

Site	N	STI clinic	Drop-in center/FO	Private doctor	Medical professional they know	Urologist/ gynecologist	Other
Bokhtar	56	60.4%	0.0%	22.1%	17.6%	0.0%	0.0%
Vahdat	4	90.8%	0.0%	9.2%	0.0%	0.0%	0.0%
Dushanbe	12	21.3%	11.7%	20.7%	13.5%	12.0%	20.7%
Kulyab	8	29%	25%	0%	18%	28%	0%
Panjakent	10	22.1%	0.0%	15.9%	10.2%	51.8%	0.0%
Rudaki	25	22.4%	6.3%	7.7%	61.3%	0.0%	2.2%
Khorugh	16	0.0%	0.0%	0.0%	33.2%	66.8%	0.0%
Khujand	7	12.5%	0.0%	0.0%	0.0%	87.5%	0.0%
All sites	**138**	**32%**	**5%**	**13%**	**22%**	**23%**	**4%**

*-Drop-in center/Friendly office

6.5. LEVEL OF KNOWLEDGE ABOUT HIV AND COVERAGE WITH PREVENTION PROGRAMS

6.5.1. AWARENESS ABOUT HIV AND AIDS

In general, awareness on HIV transmission routs across the sites was rather high in relation to all questions, for instance, share of PWID, who correctly answered the following questions on whether it was possible to get HIV infected through: “any types of sexual intercourse (oral, vaginal, anal) without a condom” was (98%), “when shaking hands” (92%), “mother-to-child transmission during pregnancy, birth and breastfeeding” (91%) and “when using injection drugs, using common syringe or needle” (93%).

Table 23. Awareness on HIV infection routes

Site	With any sexual intercourse (oral, vaginal, anal) without a condom	During handshake	When taking food together with HIV positive individual	A child from the mother during pregnancy, birth and breastfeeding	When swimming in a pool	Through mosquito bite	When using same needle or syringe for drug injection
Bokhtar	100%	94%	80%	95%	92%	70%	92%
Vahdat	98%	96%	89%	95%	92%	89%	97%
Dushanbe	99%	92%	81%	89%	92%	69%	99%
Kulyab	96%	89%	74%	85%	78%	49%	76%
Panjakent	98%	89%	76%	93%	80%	44%	98%
Rudaki	100%	91%	72%	93%	77%	53%	100%
Khorugh	97%	95%	92%	90%	95%	87%	95%
Khujand	97%	96%	91%	97%	89%	61%	95%
All sites	**98%**	**92%**	**82%**	**91%**	**87%**	**65%**	**93%**

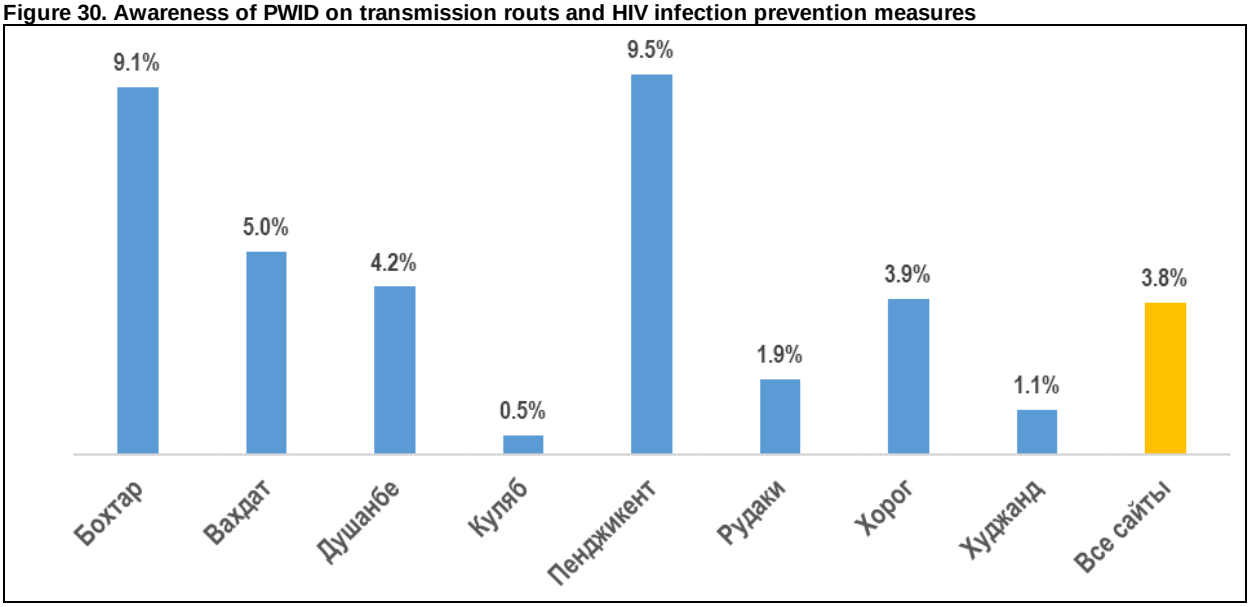
Correct responses to the questions “Is it possible to reduce the risk of HIV infection, if…” varied from 50.5% to 97.0%. For instance, majority (97%) of respondents have correctly answered the question of reducing HIV transmission risk by using condoms for all intercourses. However, only 50.5% of PWID have correctly answered the question on reducing HIV transmission risk, if they take drug from a common container, using their own clean syringe or needle, and the lowest indicator for this question was seen among PWID in Khujand (11.2%).

Table 24. Awareness about reducing risk of HIV transmission

Site	Switching to using non-injection drugs (smoke or inhale)	Use someone else' s syringe or needle, which were washed using running water	Use someone else' s syringe or needle, which were boiled for 15 minutes	Inject drug dose taking turns using same syringe, but different needles	Take drug dose from common container, but using own syringe or needle	Buy drug, which is already dispensed in the syringe	Prepare drug solution in a separate container and use own syringe or needle for injection	Always use condoms	Have sexual intercourses only with one faithful partner, who is HIV negative	Can a person, who looks healthy, have HIV infection?
Bokhtar	97.3%	94.9%	74.1%	88.7%	60.0%	97.5%	54.9%	96.9%	97.8%	90.9%
Vahdat	99.3%	90.0%	75.3%	65.1%	35.8%	38.7%	99.6%	99.7%	100.0%	93.7%
Dushanbe	83.9%	69.6%	35.5%	91.6%	62.1%	95.3%	82.6%	97.6%	93.4%	38.8%
Kulyab	90.0%	68.0%	87.5%	64.5%	62.4%	73.6%	61.4%	93.9%	91.5%	90.3%
Panjakent	95.1%	60.5%	62.9%	75.8%	67.1%	87.4%	94.2%	97.4%	91.6%	82.1%
Rudaki	97.2%	93.3%	42.0%	79.5%	44.4%	69.9%	94.6%	97.4%	99.5%	50.3%
Khorugh	76.3%	59.0%	62.0%	58.4%	33.2%	58.5%	90.7%	96.1%	94.9%	71.1%
Khujand	97.6%	79.5%	72.2%	76.7%	11.2%	96.3%	96.1%	98.6%	99.3%	94.6%
All sites	**89.8%**	**73.3%**	**61.1%**	**76.6%**	**50.5%**	**80.0%**	**73.3%**	**97.0%**	**94.9%**	**70.8%**

Only 3.8% of PWID have correctly answered all questions about HIV transmission routes. The lowest awareness level among PWID on HIV transmission routes and reduction of infection risk was seen in Kulyab (0.5%) and the highest was in Bokhtar (9.1%).

Figure 30. Awareness of PWID on transmission routs and HIV infection prevention measures



*-Note: PWID, who have correctly answered questions N66-N68 are included

6.5.2. SOURCES OF INFORMATION ON HIV

Majority of respondents have mentioned the following main sources of information on reducing HIV infection risks: volunteers and outreach workers (82.6%), trust offices (69.3%). More than half of PWID have mentioned that in 3 months prior to the study they have received information from healthcare workers (59%), and their friends (55.8%).

Table 25. Sources of information in the last 3 months

Site	Mass media, (newspapers, journals, TV, radio)	Internet	Healthcare workers	Friendly offices	Drop-in centers	Volunteers/ Outreach workers	Friends	Educational institutions
Bokhtar	70.2%	55.8%	93.5%	59.7%	98.7%	73.4%	34.2%	16.7%
Vahdat	10.9%	36.9%	89.1%	25.6%	46.4%	96.7%	57.7%	2.0%
Dushanbe	49.1%	33.3%	85.6%	40.1%	89.8%	96.4%	73.6%	12.9%
Kulyab	6.7%	1.1%	34.9%	13.8%	74.2%	93.2%	57.5%	4.1%
Panjakent	76.2%	17.3%	49.7%	14.0%	53.3%	66.2%	34.3%	3.8%
Rudaki	46.9%	19.0%	89.8%	24.1%	45.7%	43.8%	58.5%	10.1%
Khorugh	92.6%	37.4%	50.4%	10.8%	61.3%	60.6%	59.6%	0.5%
Khujand	32.4%	26.7%	55.8%	12.1%	48.7%	80.8%	43.6%	1.2%
All sites	**38.4%**	**22.5%**	**59.0%**	**22.2%**	**69.3%**	**82.6%**	**55.8%**	**5.6%**

6.5.3. COVERAGE WITH PREVENTION PROGRAMS

PWID were included, who have received at least two of the mentioned services:

- syringes

- condoms
- verbal information on reducing HIV infection risks OR counselling on the use of condoms and safe sex (through outreach services, in Drop-in centers/friendly offices etc.).

Coverage of PWID with prevention programs across all sites was 55.7% and varied from 31.7% in Dushanbe to 95.9% in Kulyab.

Figure 31. Coverage with prevention programs

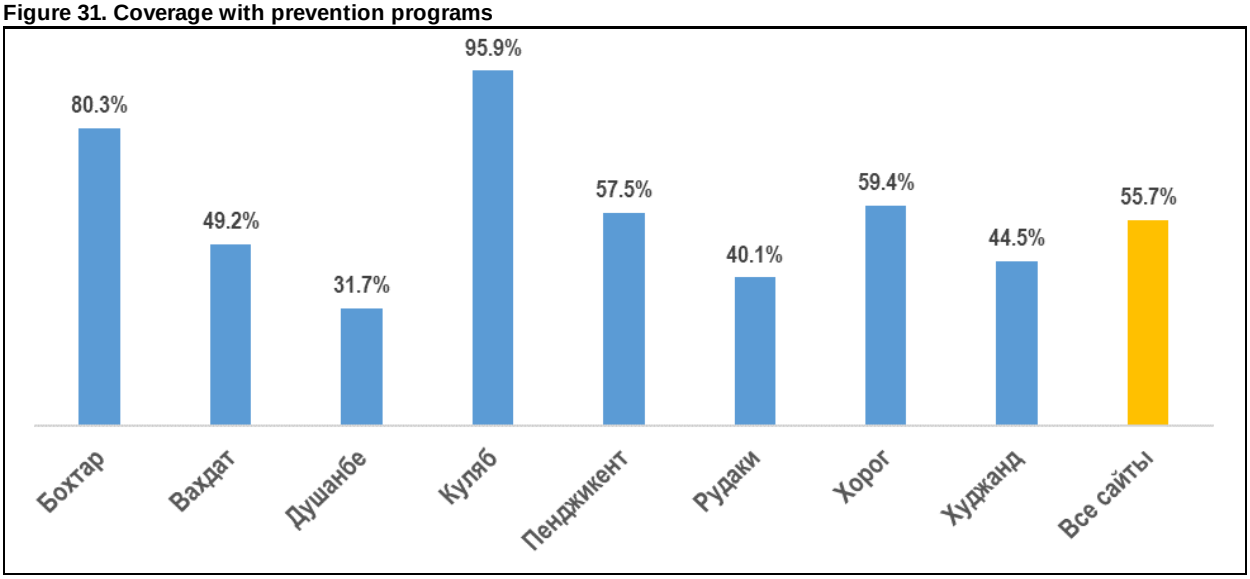


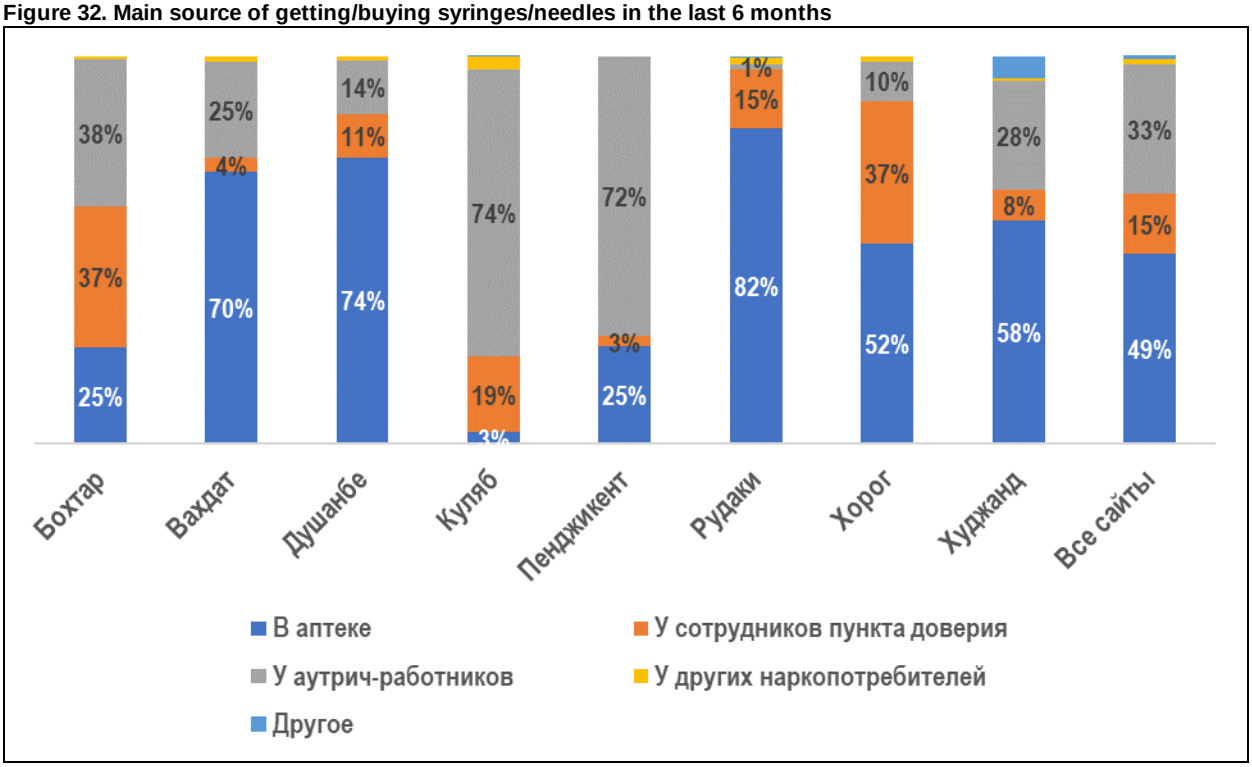
Table 26. Provision of prevention services to PWID

Site	In the last 3 months, have you received the following free of charge				
	N	Any printed materials on HIV prevention (leaflets, booklets, handouts)	Syringes, needles	Condoms	Verbal information on reduction of HIV infection risk Counselling on use of condoms and safe sex (through outreach services, drop-in centers/FO etc.).
Bokhtar	350	71%	83%	77%	77%
Vahdat	200	51%	48%	48%	58%
Dushanbe	500	23%	33%	31%	30%
Kulyab	350	89%	98%	79%	95%
Panjakent	200	34%	73%	49%	47%
Rudaki	240	52%	26%	37%	57%
Khorugh	350	73%	62%	27%	79%
Khujand	200	37%	44%	43%	42%
All sites	**2390**	**51%**	**57%**	**47%**	**56%**

6.5.4. LOCATIONS FOR GETTING OR BUYING SYRINGES AND NEEDLES

One of the most frequent sources for getting/buying clean syringes/needles were pharmacies. For instance, 49% have said that in the last 6 months they have most often bought syringes in pharmacies (from 3% in Kulyab to 82% in Rudaki). The other half of PWID (49%) received syringes/needles from outreach workers and employees of drop-in centers. Low indicator of getting syringes from outreach workers was seen in Rudaki (1%), from employees of the drop-in centers in Panjakent (3%) and Vahdat (4%).

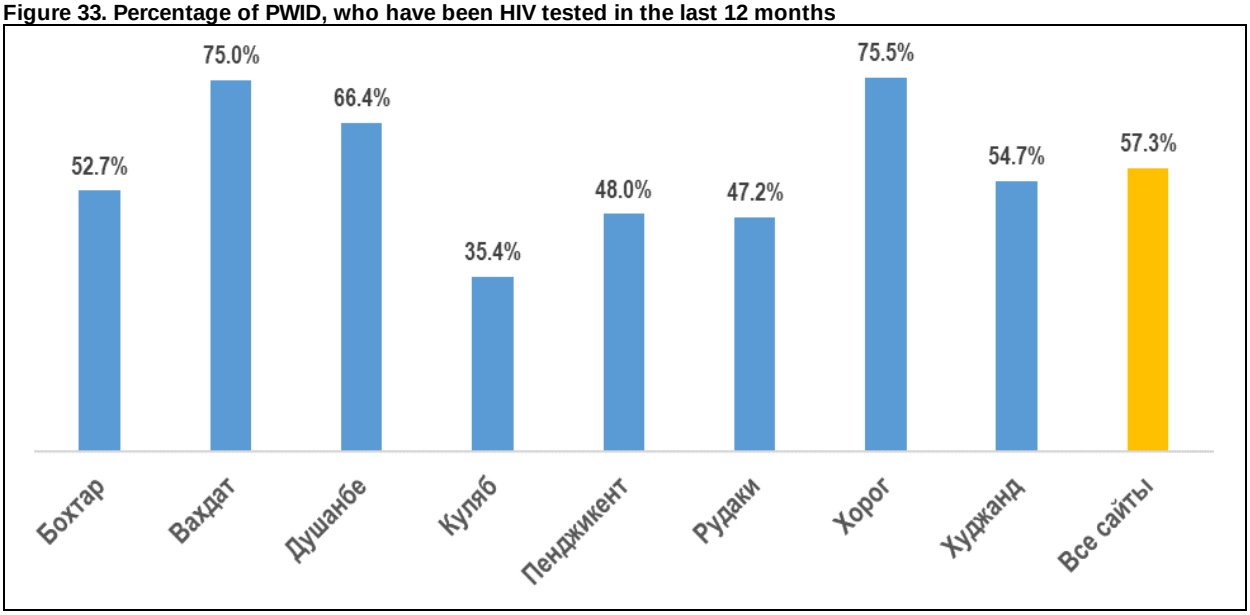
Figure 32. Main source of getting/buying syringes/needles in the last 6 months



6.6. HIV TESTING

Majority of PWID (57.3%) have been tested for HIV in the last 12 months. The share of PWID, who have been HIV tested in the last 12 months was the lowest in Kulyab and Rudaki among all sentinel sites (35.4% and 47.2%, respectively), whereas in Khorugh, Vahdat and Dushanbe the level of HIV testing among PWID was the highest (75.5%, 75.0 and 66.4%, respectively).

Figure 33. Percentage of PWID, who have been HIV tested in the last 12 months



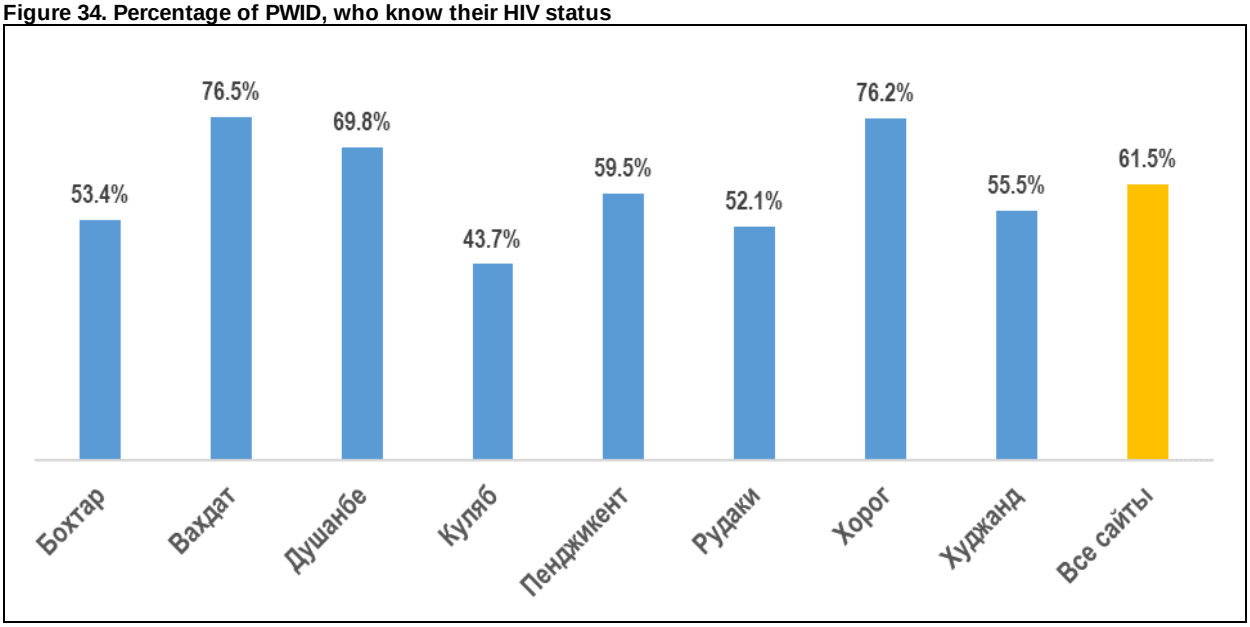
The most frequently used location for HIV testing in the last 12 months was AIDS center (67.2%), 8.0% of respondents got tested in an NGO.

Table 27. Location for HIV testing in the last 12 months.

Site	Drug clinic	NGO	AIDS center	Drop-in office	FO	Other healthcare organizations	Penitentiary	Other
Bokhtar	6.5%	3.8%	82.7%	39.9%	3.2%	9.2%	0.0%	0.3%
Vahdat	0.3%	16.8%	83.5%	4.6%	0.0%	0.0%	0.0%	0.0%
Dushanbe	2.9%	10.8%	43.6%	8.9%	0.0%	37.5%	1.8%	1.3%
Kulyab	2.3%	9.8%	95.1%	1.2%	0.3%	1.2%	1.1%	1.1%
Panjakent	3.2%	10.4%	56.1%	36.0%	0.6%	0.0%	0.0%	0.0%
Rudaki	11.1%	0.0%	62.8%	15.8%	9.2%	24.8%	1.0%	6.6%
Khorugh	16.3%	0.9%	78.9%	0.8%	0.0%	14.8%	0.0%	0.0%
Khujand	7.4%	0.0%	80.4%	8.0%	0.0%	6.1%	0.0%	9.2%
All sites	**5.4%**	**8.0%**	**67.2%**	**10.1%**	**0.7%**	**17.4%**	**0.8%**	**1.9%**

61.5% of PWID have indicated that they know their HIV status. Percentage of those, who knew their HIV status varied from 43.7% in Rudaki to 76.5% in Vahdat.

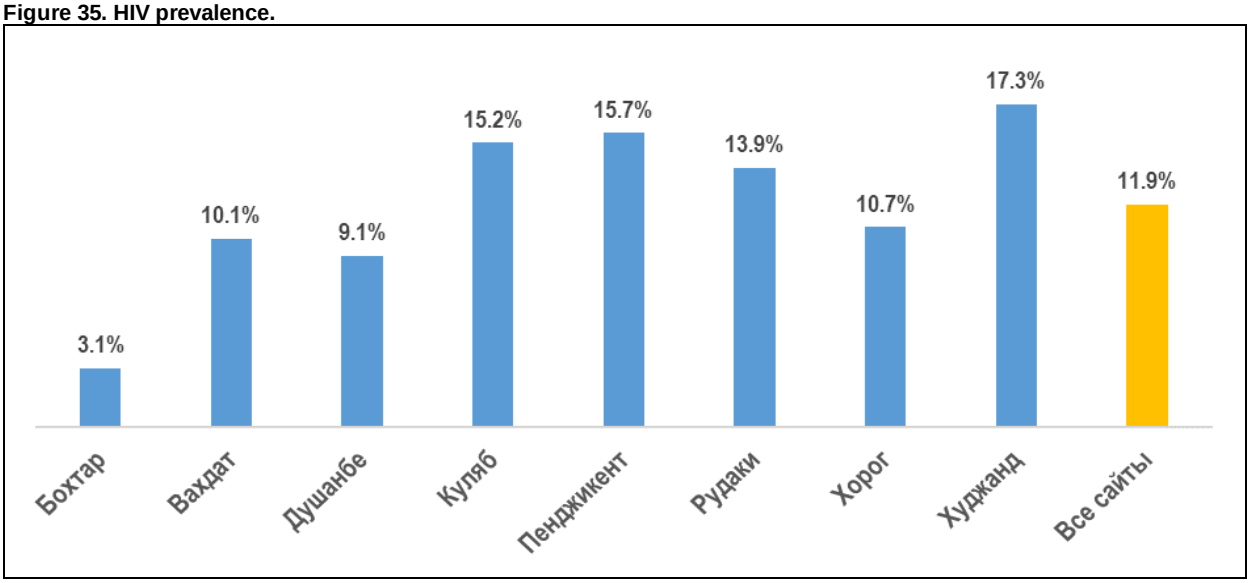
Figure 34. Percentage of PWID, who know their HIV status



6.7. PREVALENCE OF HIV INFECTION

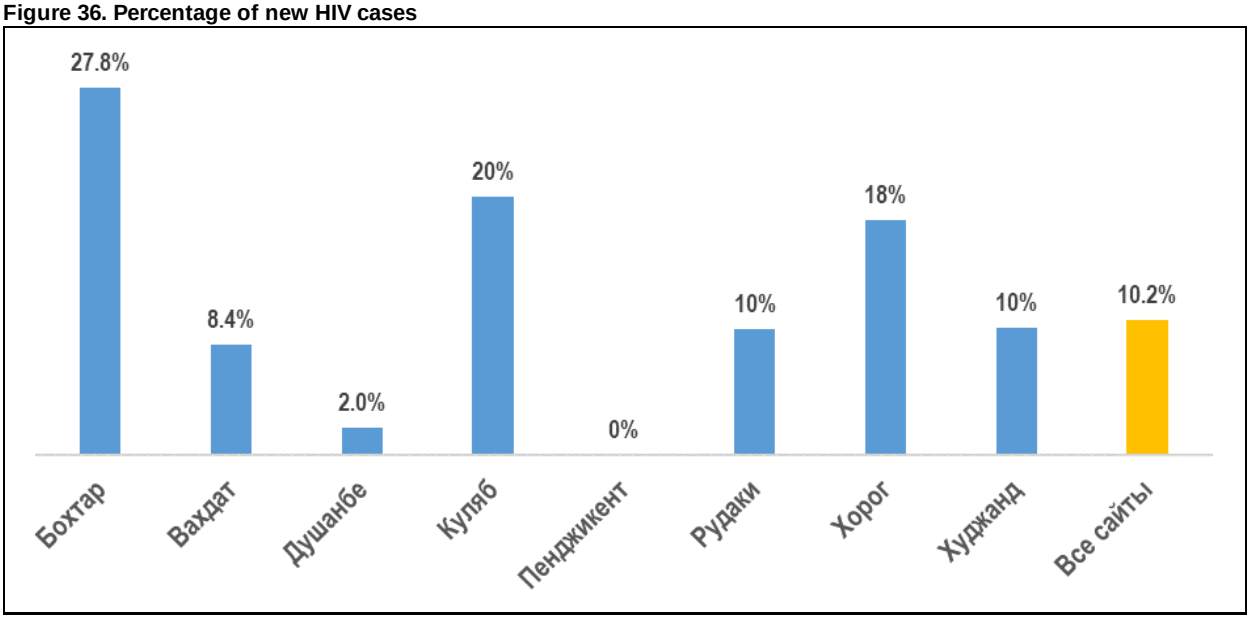
HIV prevalence among PWID was 11.9% and varied from 3.1% in Bokhtar (3.1%) to 17.3 in Khujand (27.8%). HIV prevalence in total sample was 24.1% among women and 11.4% among men.

Figure 35. HIV prevalence.



Share of new HIV cases among PWID across all sites was 10.2% (from 0% in Panjakent to 27.8% in Bokhtar).

Figure 36. Percentage of new HIV cases



Multiple regression analysis of the data has shown that factors that associated with significantly higher risk of HIV infection were HIV-positive sexual partner, length of drug use of over 5 years, no permanent employment, history of being in a penitentiary institution and female gender. (Table 18).

Table 28. Factors, causing elevated risk of HIV infection among PWID, based on the results of logistic regression with adjustment (N=1229)

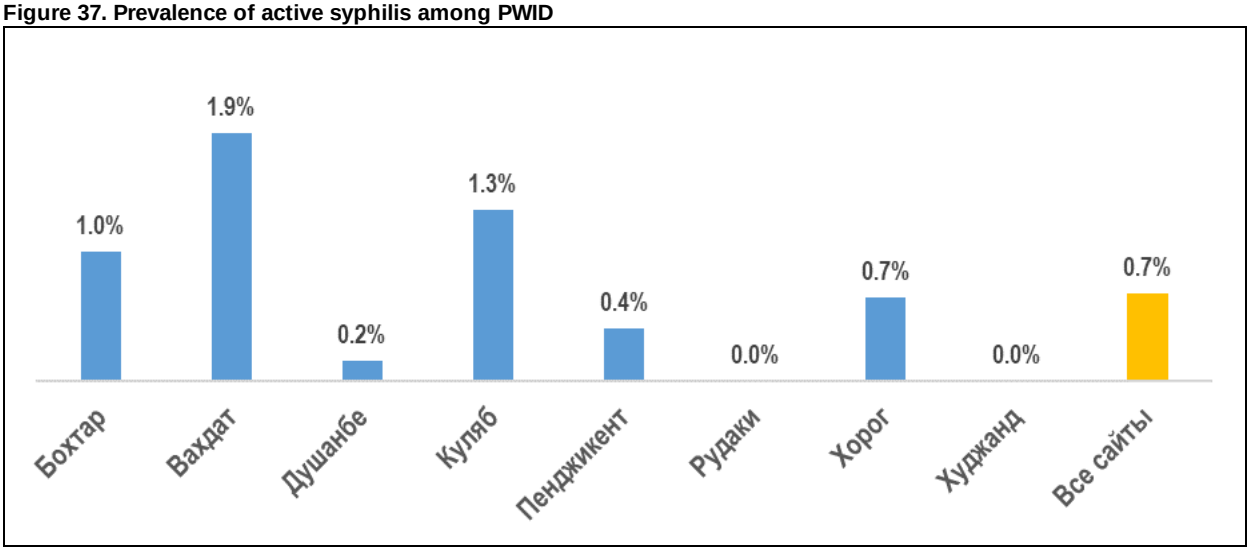
Factor	OR	[95% CI]	p
Male gender	0.19	0.08 – 0.47	0.000
HIV positive sexual partner	5.26	1.96 – 14.11	0.001
Length of drug use over 5 years	3.66	1.54-8.73	0.003
Does not work or study	1.93	1.10-3.39	0.022
History of incarceration in a penitentiary institution	2.14	1.18-3.90	0.012

6.8. SYPHILIS PREVALENCE

Prevalence of active syphilis[4] among PWID was equal to 0.78% with the highest indicator in Vahdat (1.9%) and Kulyab (1.3%).

[4] Reactive screening and confirmatory syphilis test Chembio DPP, indicating antibodies to Treponema pallidum

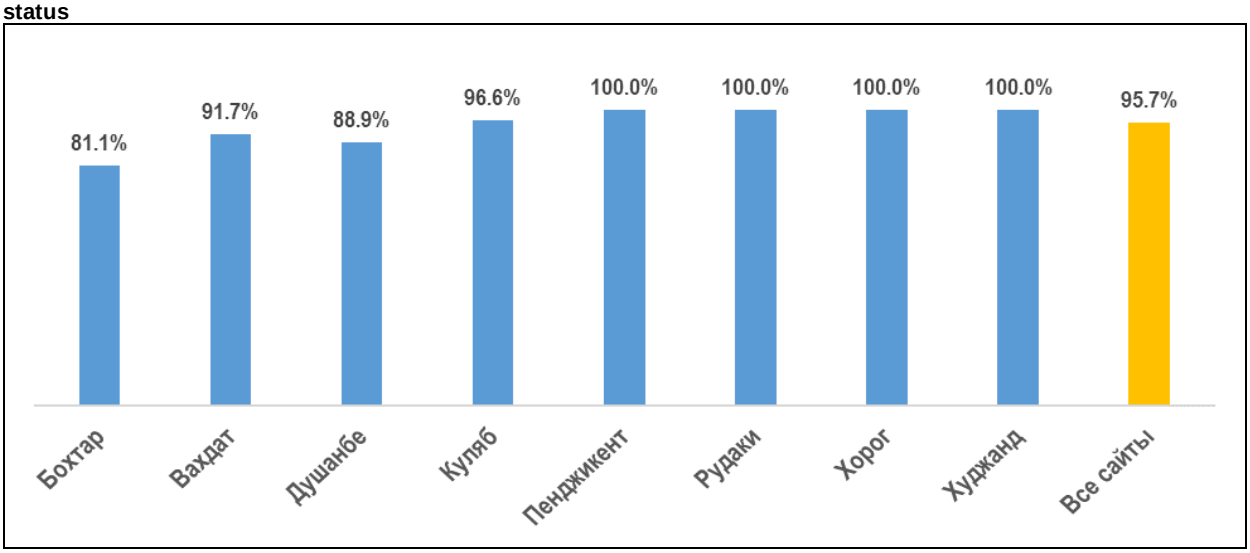
Figure 37. Prevalence of active syphilis among PWID



6.9. HIV CARE AND TREATMENT

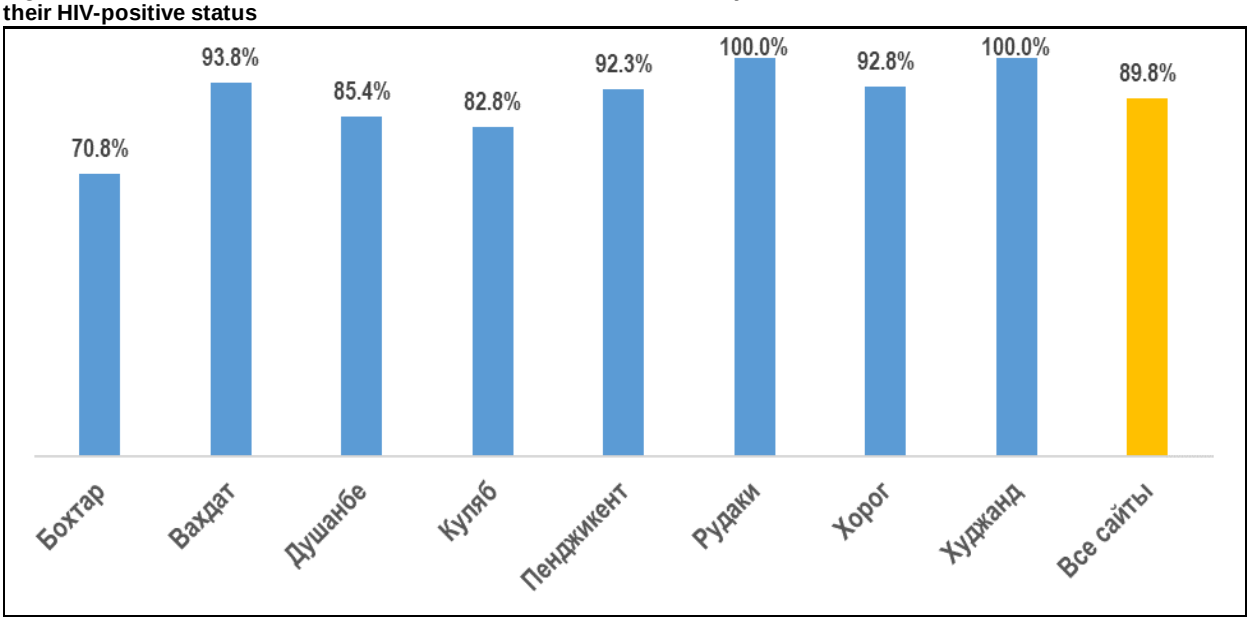
Out of the number of those, who know their HIV-positive status, 95.7% PLH/PWID were registered in AIDS center with HIV infection. This percentage varied from 81.1% in Bokhtar to 100% in Panjakent, Rudaki, Khorugh and Khujand.

Figure 38. Percentage of PLH/PWID, who are registered in AIDS center, out of the PLH/PWID, who know their HIV-positive status



Based on the survey results, coverage with antiretroviral therapy (ART) among PLH/PWID was 89.8% of the number of PLH/PWID, who know about their HIV-positive status. The lowest ART coverage was seen in Bokhtar (70.8%), maximum in Rudaki and Khujand (100%).

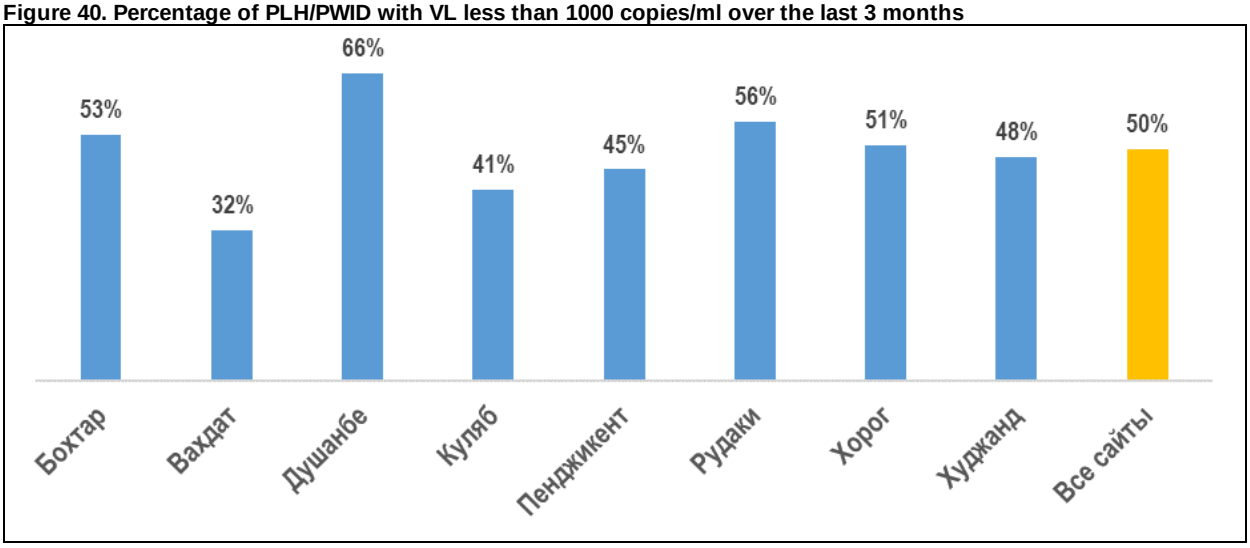
Figure 39. Share of PLH/PWID, who received ART at the time of the study out of the number of PLH/PWID, who know about their HIV-positive status



Share of PLH/PWID, who have previously received ART, but have discontinued ART in the last 12 months was only 2.7% across all sites. Compared to other sites, this indicator was rather high in Panjakent (8%), in Rudaki (7%), and in Kulyab (5%). Percentage of PLH/PWID, who have previously received ART, but discontinued the ART over a year ago was equal 1.7%. High values were seen in Bokhtar (10%), in Kulyab (4%) and in Dushanbe (2.7%).

In general, percentage of PLH/PWID with the viral load (VL) less than 1000 copies/ml over the last 3 months across all sites was 50% of the number of HIV-positive PWID (from 32% in Vahdat to 66% in Dushanbe).

Figure 40. Percentage of PLH/PWID with VL less than 1000 copies/ml over the last 3 months



6.9.1. HIV TREATMENT CASCADE

To assess progress in achieving 90-90-90 targets among PWID – knowing their HIV status, receiving antiretroviral therapy and achieving viral suppression – PLH/PWID were

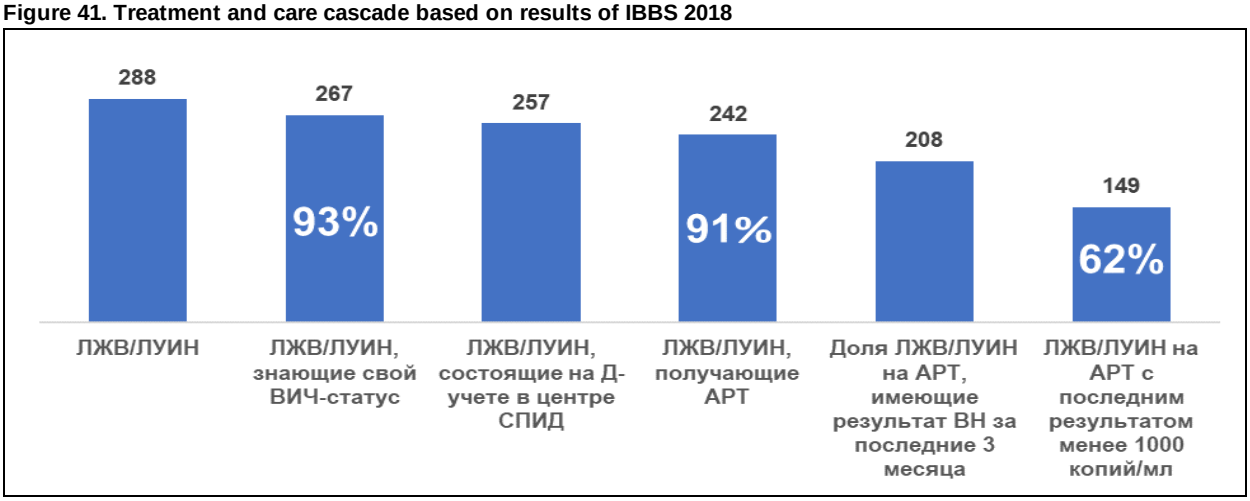
accompanied to AIDS centers, where they checked information on registration of the patient in the electronic monitoring system, provision of ART and identification of viral load.

As it was specified above, 93% of PLH/PWID knew about their HIV status (from 81% in Bokhtar to 100% in Panjakent). Out of number of PLH/PWID, who knew their HIV status, 94% were registered in AIDS centers (from 81% in Bokhtar to 100% in Panjakent, Rudaki and Khorugh). Out of the number of PLH/PWID, who know their HIV status, 88% received ART (from 71% in Bokhtar to 100% in Rudaki) and 87% PLH/PWID, who receive ART, were tested for viral load (VL) in the last 3 months (from 61% in Vahdat to 100% in Bokhtar). At the same time, 58% of those, who receive ART, had viral suppression (VL below 1000 copies/ml) (from 31% in Vahdat to 79% in Bokhtar).

Table 29. HIV treatment cascade among PWID.

Site	Share of PLH/PWID, who know their HIV-status	Share of PLH/PWID, registered in AIDS center	Share of PLH/PWID, who receive ART	Share of PLH/PWID on ART, who have VL test results in the last 3 months	Share of PLH/PWID on ART with last result of less than 1000 copies/ml
Bokhtar	81%	81%	71%	100%	79%
Vahdat	92%	92%	89%	61%	31%
Dushanbe	96%	84%	81%	91%	76%
Kulyab	93%	97%	83%	98%	53%
Panjakent	100%	100%	92%	97%	49%
Rudaki	88%	100%	100%	84%	63%
Khorugh	85%	100%	93%	75%	64%
Khujand	92%	98%	98%	78%	53%
All sites	**93%**	**94%**	**88%**	**87%**	**58%**

Figure 41. Treatment and care cascade based on results of IBBS 2018



6.10. CONCLUSION

Duration of the field stage varied from 30 to 44 working days, median duration across the country was 36 days. Number of respondents, who have participated in the study per day varied from 1 to 24 and median number was 9. Duration of the field stage mostly depended on the intensiveness of recruiting process, sample size, and other features of the sentinel sites. For instance, in the city of Vahdat, to achieve the planned sample size (200) 44 days were needed, whereas in the same period of time, 500 respondents were surveyed in Dushanbe (see Table 29a). The main reason was difference in the number of respondents, who have participated in the study per day.

Maximum number of waves by sites varied from 6 to 16, median number was 10. Minimal size of the social network across all sentinel sites was from 1 to 3, maximum – from 20 to 70, median number was 9. Agreement between DBS test results and HIV rapid tests: 1) for positive tests at different sentinel sites varied from 90.3 to 100% and on average was 98% and 2) for negative test results at different sentinel sites varied from 93.3 to 100% and on average was 97.8%.

Table 29a. Information on the dates and duration of the study, number of respondents, who have participated in the study per day

№	Sentinel site	Sample size	Study period		Duration of field stage (in days)	Number of respondents, who have participated in the study per day		
			Start date	End date		Min	Max	Median
1	Bokhtar	350	09.04.2018	28.05.2018	35	3	20	10
2	Vahdat	200	10.04.2018	13.06.2018	44	2	9	4
3	Dushanbe	500	10.04.2018	08.06.2018	43	3	24	11
4	Kulyab	350	09.04.2018	25.05.2018	34	2	20	11
5	Panjakent	200	09.04.2018	28.05.2018	33	2	12	6
6	Rudaki	240	09.04.2018	06.06.2018	37	1	14	7
7	Khorugh	350	11.04.2018	12.06.2018	44	1	23	8
8	Khujand	200	09.04.2018	23.05.2018	30	2	12	7

When comparing respondents between the studies of 2014 and 2018, it can be seen, that shares of different age groups and gender composition have changed. For instance, in 2018, in almost all sites there is a significant increase in the share of PWID from the age group ≥ 35 years due to reduction of the share of PWID from age groups of below 25 and 25-34. In 2018, compared to 2014, there is a reduction in share of female respondents (see Table 29b). in 2018, compared to 2014, prevalence of HIV among PWID has reduced from 12.9 to 11.9. However, HIV prevalence indicator has increased in Kulyab, Rudaki and Khujand in 2018 compared to 2014. In terms of syphilis testing, as it was mentioned above, rapid test in IBBS of 2018 was done using CHEMBIO DPP® syphilis screen & confirm rapid test, which was able to detect both treponema and non-treponema antibodies. Presence of treponema and non-treponema antibodies indicated prevalence of active syphilis (column C of the table 29b). Because during sentinel surveillance of 2014 syphilis testing was done using ICE* Syphilis Murex® ELISA test system, which was able to detect total treponema antibodies, we have compared prevalence of presence of treponema antibodies in studies of 2014 and 2018. (columns A and B of table 29b). According to the study results of 2014 and 2018, prevalence of

treponema antibodies among respondents has increased in 2018 at five out of eight sentinel sites, including Bokhtar, Vahdat, Kulyab, Panjakent and Khorugh.

Table 29b. Comparative analysis of gender and age composition of respondents, HIV and syphilis prevalence based on the results of studies in 2014 and 2018.

№	Sentinel site	Gender of study participants				Age of participants						HIV prevalence		Syphilis prevalence (%)		
		2014		2018		2014			2018					A	B	C
		M	F	M	F	Below 25	25-34	≥35	Below 25	25-34	≥35	2014	2018	2014	2018	2018
1	Bokhtar	90.0	10.0	91.4	8.6	16	60	24	6	31	63	4.6	3.1	0.3	6.6	1.0
2	Vahdat	93.9	6.1	97.8	2.2	5	31	65	0	15	85	16.4	10.1	3.2	4.5	1.9
3	Dushanbe	82.4	17.6	88.6	11.4	7	39	54	4	30	66	26.5	9.1	10.1	4.0	0.2
4	Kulyab	100	0	97.3	2.7	10	56	34	3	35	62	6.4	15.2	4.2	6.3	1.3
5	Panjakent	91.4	8.6	92.6	7.4	1	16	83	1	13	86	21.4	15.7	4.8	5.0	0.4
6	Rudaki	95.1	4.9	99.4	0.6	5	55	40	8	36	56	5.9	13.9	2.5	2.0	0
7	Khorugh	99.5	0.5	99.8	0.2	2	19	79	1	14	85	21.8	10.7	1.5	4.6	0.7
8	Khujand	84.4	15.6	93.5	6.5	4	30	66	4	27	69	7.0	17.3	5.3	1.0	0

A - total treponema antibodies; B – total treponema antibodies; C – treponema and non-treponema antibodies.

When comparing respondents from studies in 2014 and 2018, it can be seen that in 2018 there is a significant increase of the share of respondents, who have used injection drugs for ≥ 3 years (Table 29c). Compared to the respondents in 2014, in 2018 there was an increase in share of people, who used injection drugs ≥1 time per day in the last month at three sentinel sites (Table 29c). In comparison with 2014, according to the 2018 study results, there was a reduction of using someone else's syringe in the last 30 days at all sentinel sites (Table 29c).

Table 29c. Comparative analysis of injection practice in the studies of 2014 and 2018.

№	Sentinel site	Length of injection drug use (%)				Use of injection drugs ≥1 time a day in the last 30 days (%)		Use of someone else's syringe in the last month (%)	
		2014		2018		2014	2018	2014	2018
		<3 years	≥3 years	<3 years	≥3 years				
1	Bokhtar	91	9	28	72	56	81.3	19	1.2
2	Vahdat	44	56	21	79	45	24.6	37	1.8
3	Dushanbe	37	63	25	75	58	22.6	9	1.4
4	Kulyab	85	15	24	76	66	66.5	34	3.3
5	Panjakent	39	61	20	80	66	31.6	23	0
6	Rudaki	72	28	28	72	34	85.8	28	4
7	Khorugh	13	87	28	72	67	81.3	4	0.3
8	Khujand	36	64	33	67	57	14	7	1.6

Main characteristics of PWID based on the IBBS 2018 results:

- In the last 3 months, 55.7% PWID (indicator varied from 31.7% in Dushanbe to 95.9% in Kulyab), have received at least two out of three prevention services, specified below:
    - Sterile syringes

    - Condoms
    - Verbal information on reduction of HIV infection risk OR counselling on use of condoms and safe sex (through outreach services, in drop-in centers/friendly offices etc.);
- The following number of people have indicated that they have received the following free items in the last 3 months: 57% PWID of (indicator varied from 26% in Rudaki to 98% in Kulyab) received free syringes, 47% (from 27% in Khorugh to 77% in Bokhtar) received condoms, 51% (from 23 in Dushanbe to 89% in Kulyab) received printed materials on HIV prevention, 56% (from 30% in Dushanbe to 95% in Kulyab) have received verbal information on reducing HIV infection risk, including counselling on use of condoms and safe sex.
- Most frequently referenced sources of information about HIV/AIDS were outreach workers (82.6%) and drop-in centers (69.3%).
- In the last 6 months, 49% of PWID (indicator varied from 3% in Kulyab to 82% in Rudaki) have most often purchased syringed in pharmacies. 33% of PWID (indicator varied from 1% in Rudaki to 74% in Kulyab) have most often received sterile syringes from outreach workers. 15% of PWID (indicator varied from 3% in Panjakent to 37% in Khorugh and Bokhtar) have most often received sterile syringes in drop-in centers.
- Share of PWID, who are registered in narcology clinics across the country was 36.8% (indicator varied from 23.5% in Khujand to 55.5% in Kulyab), median duration of being registered as an addict across all sites was 6 years.
- Share of PWID, who have never used a condom in sexual intercourse with regular partners in the last 30 days across all sites was 71% (indicator varied from 58% in Khujand to 83% in Rudaki), with casual partners – 24% (from 5% in Khujand to 39% in Rudaki) and with commercial partners – 11.7% (from 0% in Khujand to 28.2% in Bokhtar).
- Share of PWID, who have indicated that they had at least one STI symptom in the last 6 months across all sites was 8.6% (indicator varied from 3.0% in Vahdat to 27.3% in Rudaki).
- 43.3% of PWID, of those who had STI symptoms in the last 6 months, have sought medical attention in various organizations and majority of those have visited STI clinics (32%). Significant number of PWID, who had STI symptoms have sought help of urologist (23%) and healthcare professional they know (22%).
- Share of PWID, who have correctly answered all questions about HIV transmission routes and prevention measures across all sites was 3.8% with the highest indicator – 9.5% in Panjakent, and the lowest indicator – 0.5% in Kulyab.
- Weighted indicator of HIV testing done in the last 12 months was 57.3%.
- Share of PWID, who know the result of their last HIV test done in the last 12 months was 61.5%, which, according to many specialists, is insufficient, and can be a reason for underestimating behavioral risks and can create conditions for spread of infection.
- Weighted indicator of HIV prevalence across all sites was 11.9% and varied from 3.1% in Bokhtar to 17.3% in Khujand.
- Prevalence of active syphilis in the sample across all sites was 0.7% and varied from 0% in Khujand and Rudaki to 1.9% in Vahdat.
- Out of PLH/PWID, who knew their HIV status, 88% received ART (from 71% in Bokhtar to 100% in Rudaki) and 87% of PLH/PWID on ART, were tested for viral load (VL) in the last 3 months (from 61% in Vahdat to 100% in Bokhtar). At the same time, 58% of patients on ART had viral suppression (VL below 1000 copies/ml) (from 31% in Vahdat to 79% in Bokhtar).

7. KEY STUDY RESULTS AMONG SW

7.1. DESCRIPTION OF RESPONDENT RECRUITMENT AND SAMPLING PROCESS

To start the recruitment process, primary respondents (seeds) were selected at each sentinel site from the group of sex workers (SW) based on the size and diversity of their social networks and ability to recruit peers with different characteristics. Number of seeds varied from 2 in Kulyab and Panjakent to 6 in Dushanbe. Seed characteristics and specified in Table 1.

Table 30. Characteristics of primary respondents (seeds), SW

Site	Number of seeds	Number of seeds, whose social network included 5 or less people	Age 25 years and above	Experience in providing sexual services of over 5 years	HIV+
Bokhtar	4	0	4	2	1
Vahdat	3	0	3	1	1
Dushanbe	6	0	5	2	1
Kulyab	2	1	2	2	0
Panjakent	2	1	2	2	1
Rudaki	3	2	3	1	1
Khorugh	3	2	3	1	1
Khujand	3	0	3	2	1
All sites	**26**	**6**	**25**	**13**	**7**

Minimum number of waves was 5 in Panjakent, maximum was 15 in Kulyab.

Table 31. Number of waves, SW

Site	Maximum number of waves	Share of respondents, recruited from one most productive seed
Bokhtar	12	62%
Vahdat	13	43%
Dushanbe	7	About ¼ of respondents were recruited by 3 seeds
Kulyab	15	64%
Panjakent	5	59%
Rudaki	10	43%
Khorugh	11	45% from 1 seed and 44% from another seed
Khujand	6	About 1/3 of respondents recruited by each seed

There were 2174 respondents in the study. Of 34 participants, who came with coupons, but were not included in the study, 29 did not satisfy the inclusion criteria and 5 refused to participate. Necessary sample size was reached in all sites with exception of Khorugh (80%o of the planned amount).

Table 32. Sample characteristics, SW

Site	Total number of coupons issued	Number of coupons returned	Number of respondents, who did not satisfy the inclusion criteria or refused to participate	Number of participants, who have completed the study	Age below 25 years	Age 25 and above	Sample size	% of sample achievement
Bokhtar	819	350	0	350	79	271	350	100%

Vahdat	451	203	3	200	32	168	200	100%
Dushanbe	780	504	4	500	102	398	500	100%
Kulyab	540	354	4	350	51	299	350	100%
Panjakent	317	216	2	214	24	190	200	107%
Rudaki	491	221	21	200	39	161	200	100%
Khorugh	194	160	0	160	19	141	200	80%
Khujand	220	200	0	200	17	183	200	100%
All sites	**3812**	**2208**	**34**	**2174**	**363**	**1811**	**2200**	**99%**

Median size of the social network by sentinel sites varied from 1 SW in Khorugh to 18 SW in Dushanbe and on average across the sites was 9 (interquartile range (IQR): 4-15).

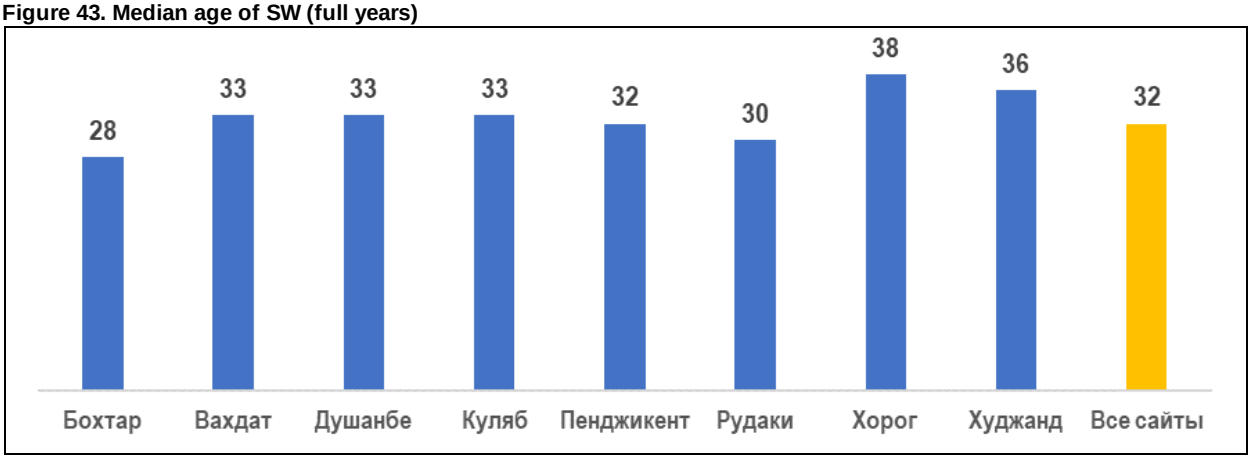
Figure 42. Median size of social network SW

7.2. SOCIAL AND DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

7.2.1. AGE

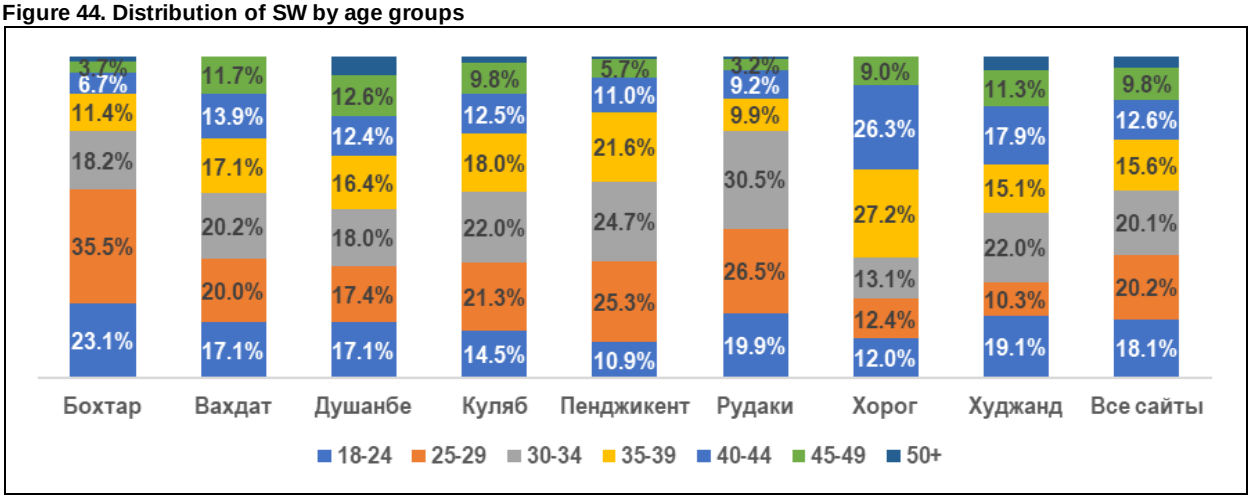
Median age of SW varied from 28 years in Bokhtar to 38 years in Khorugh and across all sites was 32 years (IQR: 26-39, range: 18 - 59).

Figure 43. Median age of SW (full years)



Share of SW below 25 years was 18.1% (from 10,9% in Panjakent to 23.1% in Bokhtar).

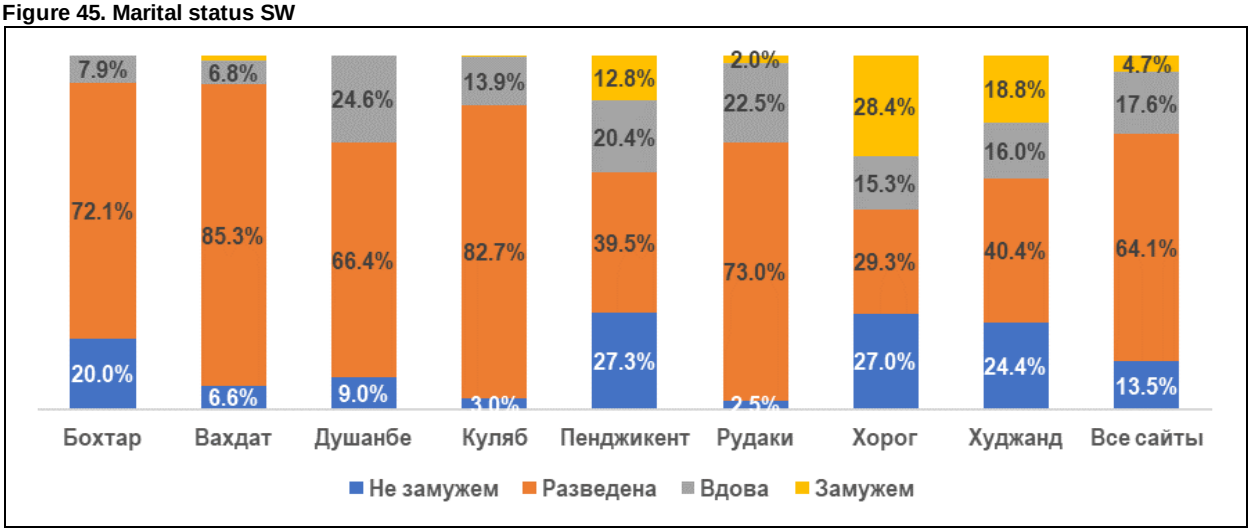
Figure 44. Distribution of SW by age groups



7.2.2. MARITAL STATUS

Majority of SW (64.1%) at the time of the study were divorced (from 29.3% in Khorugh to 85.3% in Vahdat); 17.6% SW were widows and 13.5% SW have never been married.

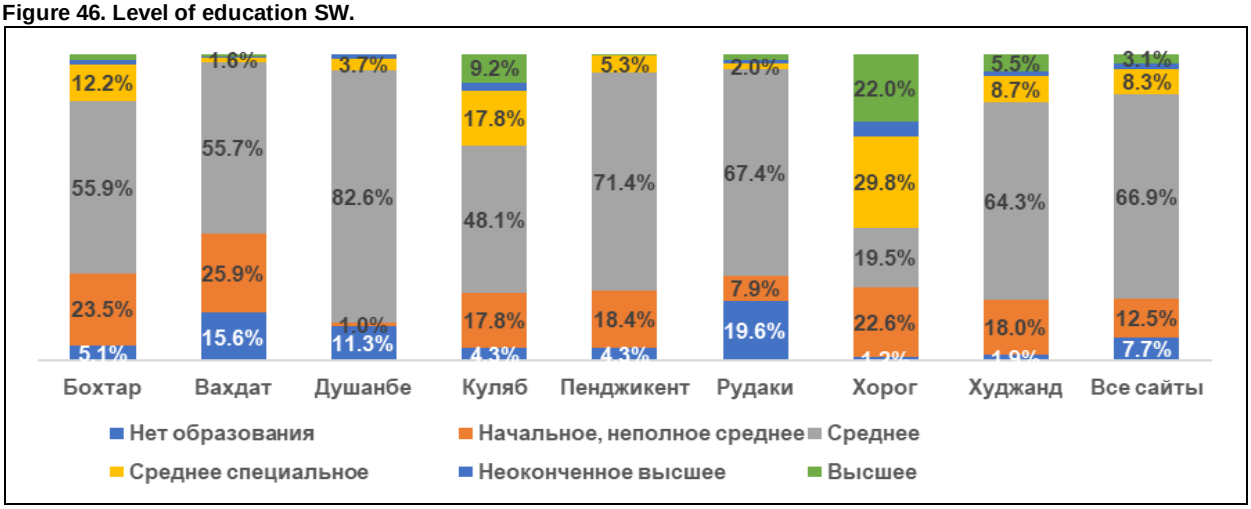
Figure 45. Marital status SW



7.2.3. EDUCATION

Majority of study participants had secondary education (66.9%). Share of SW with higher education across all sites was only 3.1%: the highest percentage was in Khorugh (22.0%), the lowest – in Dushanbe (0%).

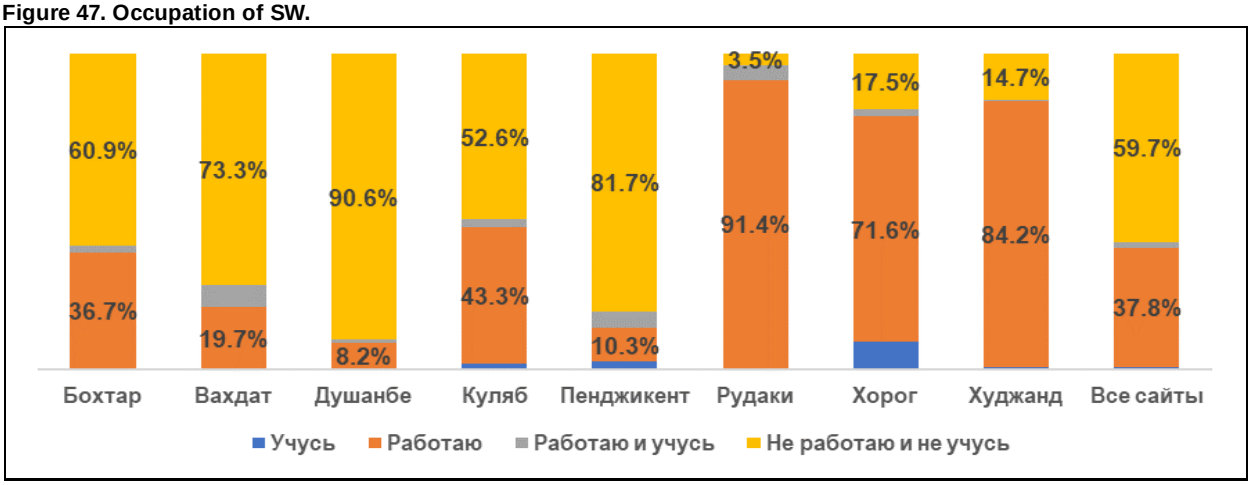
Figure 46. Level of education SW.



7.2.4. EMPLOYMENT STATUS

Share of employed SW varied significantly between the sites: from 8.2% in Dushanbe to 91.4% in Rudaki and was 37.8% across all sites. Percentage of SW, who neither worked nor studied varied from 3.5% in Rudaki to 90.6% in Dushanbe and across all sites was equal to 59.7%.

Figure 47. Occupation of SW.



Majority of SW (90.3%) have specified provision of sexual services as the main source of income in the last 12 months: from 54.9% in Khorugh to 100% in Vahdat. Median income in the last 30 days across all sites was 1200 Somoni (IQR: 900-1800). The highest level of monthly income was seen in Vahdat, Dushanbe and Khujand (median: 1500 Somoni), and the lowest was in Kulyab (median: 700 Somoni).

Median income from provision of sexual services in the last 30 days on average across all sites was 1000 Somoni (IQR: 650-1500): the highest average income was registered in Vahdat and Dushanbe (1500 Somoni), and the lowest – in Kulyab (500 Somoni).

Table 33. Income/earnings in the last 30 days (in Somoni), SW

Site	Total income/earnings in the last 30 days (Somoni)	Income/earnings due to provision of sexual services in the last 30 days (Somoni)

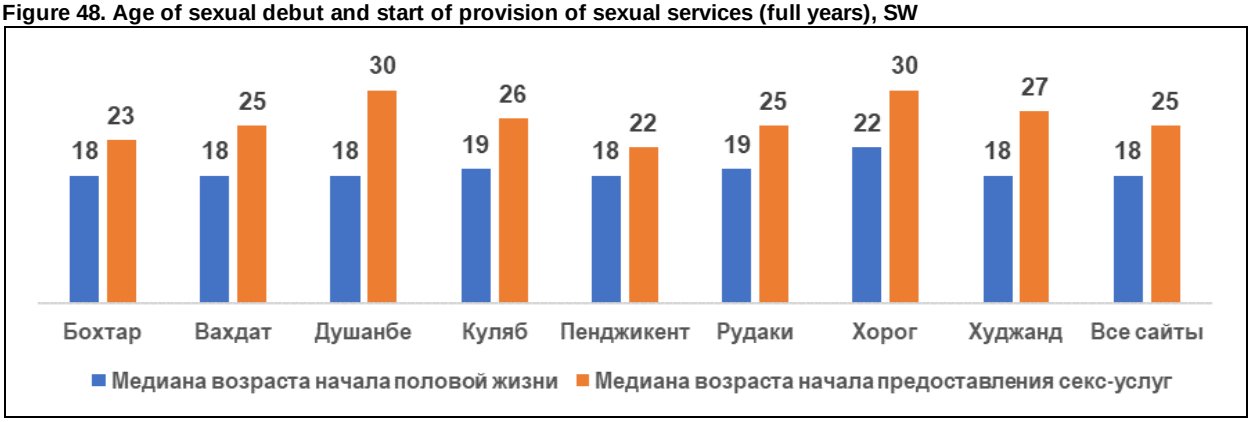
	Average	Median (IQR)	Average	Median (IQR)
Bokhtar	1206.2	1000 (900-1500)	991.3	1000 (800 – 1100)
Vahdat	1615.3	1500 (1000 - 2000)	1490.1	1500 (1000 – 2000)
Dushanbe	1571.8	1500 (1000 - 2000)	1453.0	1500 (1000-2000)
Kulyab	861.8	700 (500 - 1000)	618.8	500 (400-800)
Panjakent	1409.1	1400 (1000 - 1600)	1196.4	1050 (1000-1500)
Rudaki	1365.6	1300 (1100 - 1725)	863.9	800 (600 – 1000)
Khorugh	1324.8	1200 (1000 - 1600)	665.4	600 (400 – 862.5)
Khujand	1650.5	1500 (1000 - 2500)	1399.7	1400 (800 – 2000)
All sites	**1418.8**	**1200 (900 - 1800)**	**1213.1**	**1000 (650 – 1500)**

7.3. CHARACTERISTICS OF PROVISION OF SEXUAL SERVICES

7.3.1. SEXUAL DEBUT AGE AND START OF PROVISION OF SEXUAL SERVICES

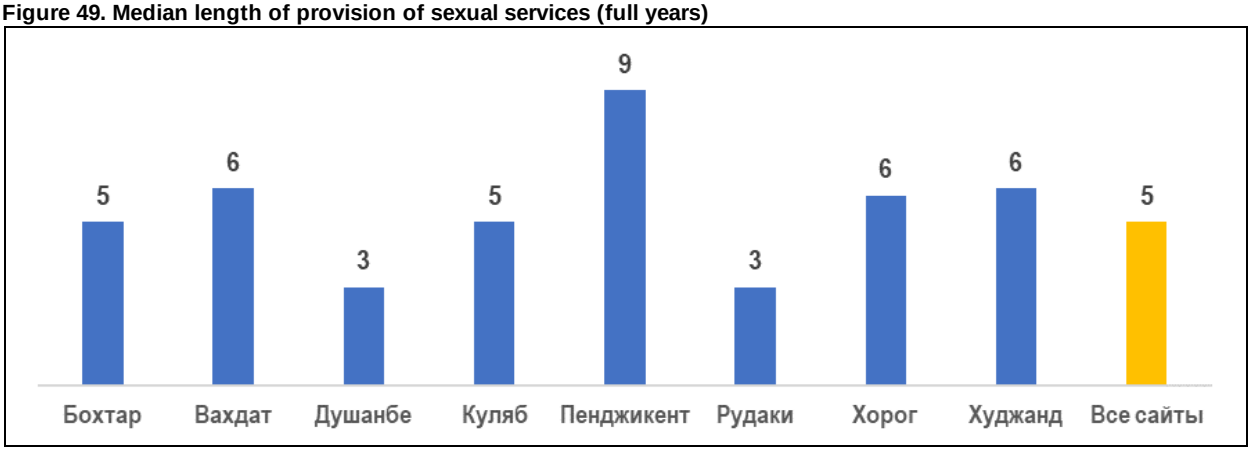
Median age, when the respondents had first sexual experience with a man was 18 years (IQR: 17-20). Almost one quarter of SW (23.6%) have had sexual debut before the age of 18 years. Median age, when they started providing sexual services in exchange for money, goods or other services across all sites was 25 years (IQR: 21-30) and varied from 22 years in Panjakent to 30 years in Dushanbe and Khorugh. 1.4% of SW started providing sexual services before the age of 18.

Figure 48. Age of sexual debut and start of provision of sexual services (full years), SW



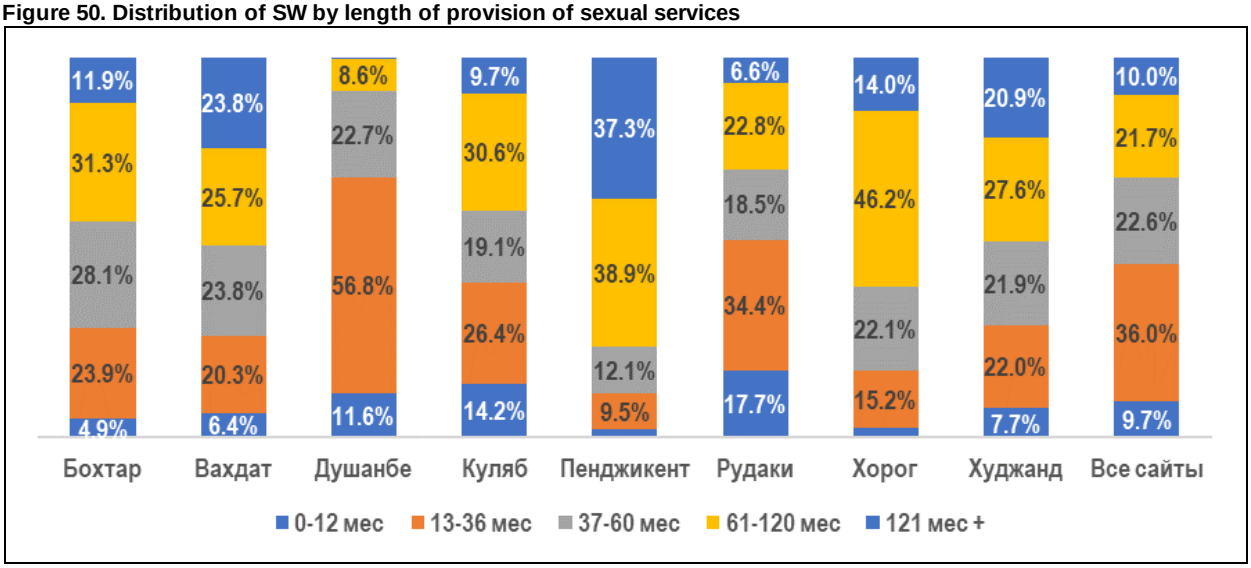
On average across all sites, median length of provision of sexual services was 5 years (IQR: 2-8 years): the shortest average length (3 years) was seen in Dushanbe and Rudaki, and the longest (9 years) – in Panjakent.

Figure 49. Median length of provision of sexual services (full years)



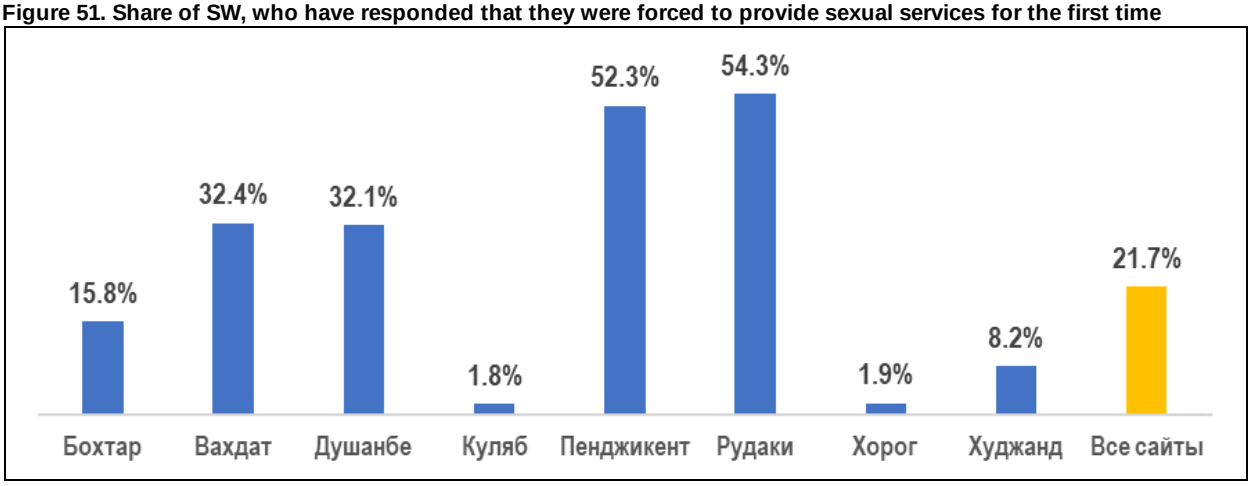
Share of SW with the length of work in sex business of 12 months or less was only 9.7% across all sites and varied from 2.3% in Panjakent to 17.7% in Rudaki.

Figure 50. Distribution of SW by length of provision of sexual services



Share of SW, who have indicated forced (someone has forced them) provision of sexual services for the first time varied from 1.8% in Kulyab to 54,3% in Rudaki, and across all sites this indicator was 21.7%.

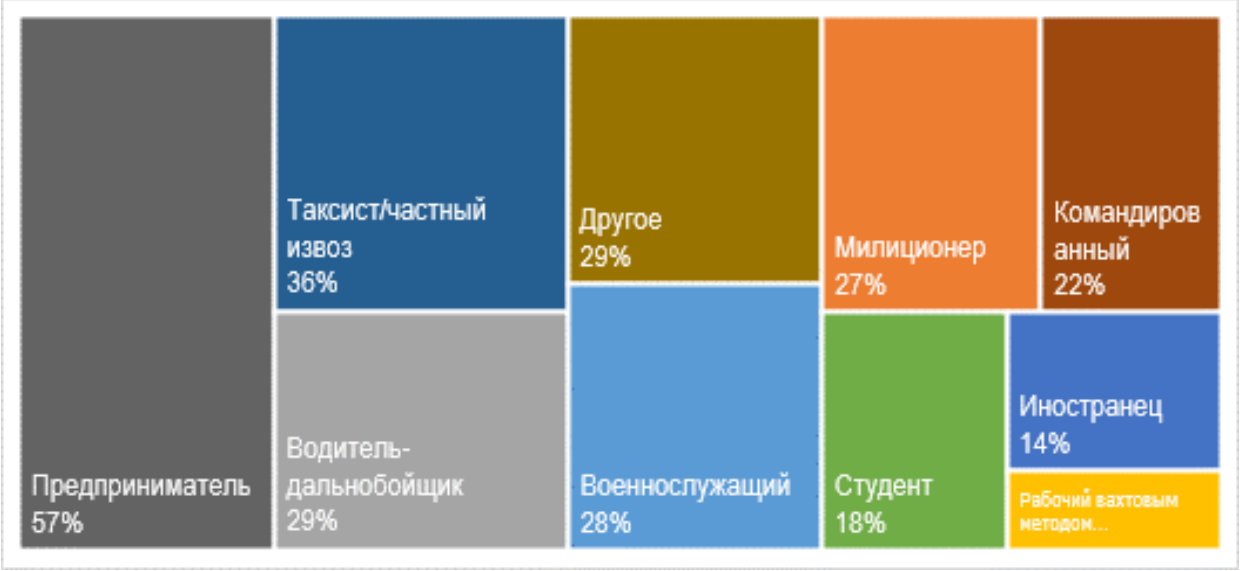
Figure 51. Share of SW, who have responded that they were forced to provide sexual services for the first time



7.3.2. OCCUPATION OF CLIENTS

Over half of SW (57.1%) have said that most frequently their clients were businessmen, 36.3% of SW said these were taxi drivers/ private drivers, 29% - long-distance drivers.

Figure 52. Occupation of the clients of SW



7.3.3. PROVISION OF SEXUAL SERVICES IN OTHER DISTRICTS/CITIES IN THE LAST 12 MONTHS

One quarter of SW (25.2%) have indicated provision of sexual services in other districts/cities (from 5.7% in Dushanbe to 78.7% in Vahdat). Most frequently visited city for provision of sexual services was Dushanbe, on average 75.7% of SW of those, who have left in the last 12 months to work in other cities/regions, went there (from 42.6% in Khujand to 95.6% in Vahdat).

Table 34. Provision of sexual services in other districts/cities

Site	Share of SW, who have indicated provision of sexual	Другие области/города, в которых SW оказывали услуги					
		Dushanbe	RRS	Khatlon	GBAR	Sughd	Outside RT

	services in other districts/cities						
Bokhtar	56.0%	87.9%	40.3%	63.0%	0.0%	7.9%	0.9%
Vahdat	78.7%	95.6%	22.8%	33.5%	2.6%	26.2%	2.6%
Dushanbe	5.7%	0.0%	3.6%	60.2%	5.7%	22.2%	6.7%
Kulyab	36.2%	93.4%	2.3%	43.3%	1.4%	17.6%	2.9%
Panjakent	52.1%	49.7%	0.0%	0.9%	0.0%	88.6%	11.5%
Rudaki	39.1%	82.1%	0.0%	10.0%	0.0%	0.0%	2.4%
Khorugh	45.1%	42.7%	0.0%	0.0%	54.1%	6.9%	18.3%
Khujand	8.9%	42.6%	0.0%	9.8%	0.0%	63.8%	8.3%
All sites	**25.2%**	**75.7%**	**19.1%**	**42.8%**	**2.7%**	**20.7%**	**3.7%**

7.3.4. WAYS OF FINDING CLIENTS

Majority of SW (86.8%) had stated the use of telephone as the main way of finding new clients (from 49.2% in Rudaki to 92.5% in Kulyab). Over half of SW (55.7%) found their clients on the street (from 26.8% in Khujand to 83.7% in Bokhtar) and 38.3% - through their clients (3.3% in Khujand to 61.4% in Dushanbe).

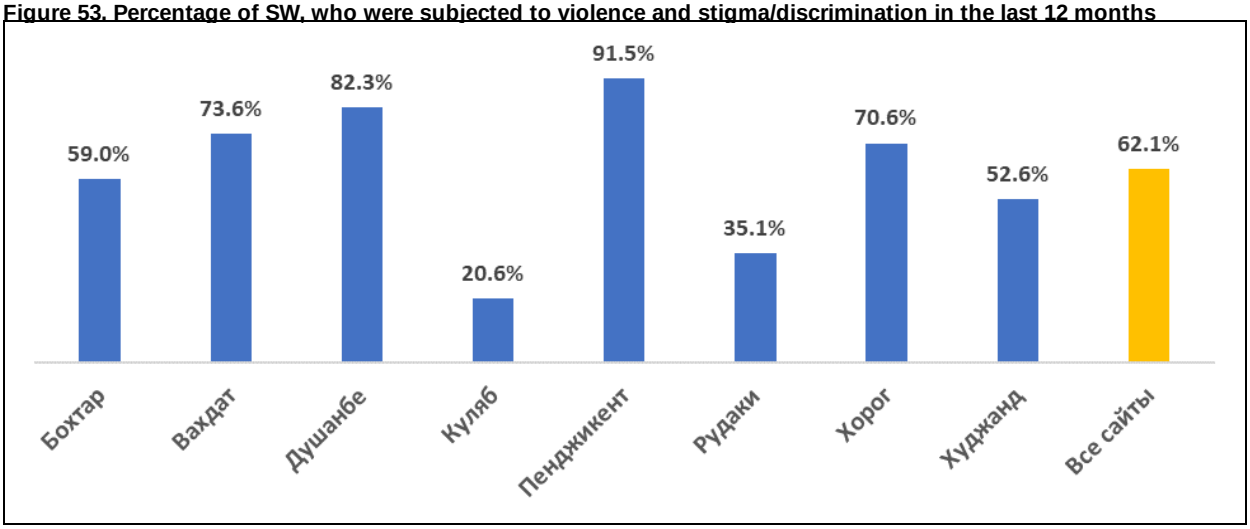
Table 35. Ways of finding new clients in the last 12 months

Site	In a sauna	On the street	By phone	Through a pimp/madam	Through other clients	Internet	Other
Bokhtar	20.1%	83.7%	90.5%	4.9%	35.4%	5.2%	13.4%
Vahdat	4.9%	79.3%	84.3%	0.0%	61.0%	13.1%	15.8%
Dushanbe	6.9%	64.9%	89.7%	3.7%	61.4%	6.3%	0.0%
Kulyab	0.3%	35.4%	92.5%	13.0%	21.0%	1.2%	20.3%
Panjakent	3.1%	63.7%	86.3%	8.6%	73.8%	1.3%	9.7%
Rudaki	15.3%	36.4%	49.2%	1.3%	14.0%	33.1%	5.4%
Khorugh	0.0%	37.3%	87.5%	0.0%	47.7%	30.9%	27.7%
Khujand	0.2%	26.8%	83.5%	0.1%	3.3%	5.9%	26.5%
All sites	**7.0%**	**55.7%**	**86.8%**	**4.2%**	**38.3%**	**7.2%**	**11.7%**

7.3.5. VIOLENCE AND STIGMA/DISCRIMINATION

Over half of respondents (62.1%) during survey indicated that they were subject to violence, stigma or discrimination, related to provision of sexual services, in the last 12 months. The lowest indicator (20.6%) was seen in Kulyab, and the highest (91.5%) – in Panjakent.

Figure 53. Percentage of SW, who were subjected to violence and stigma/discrimination in the last 12 months

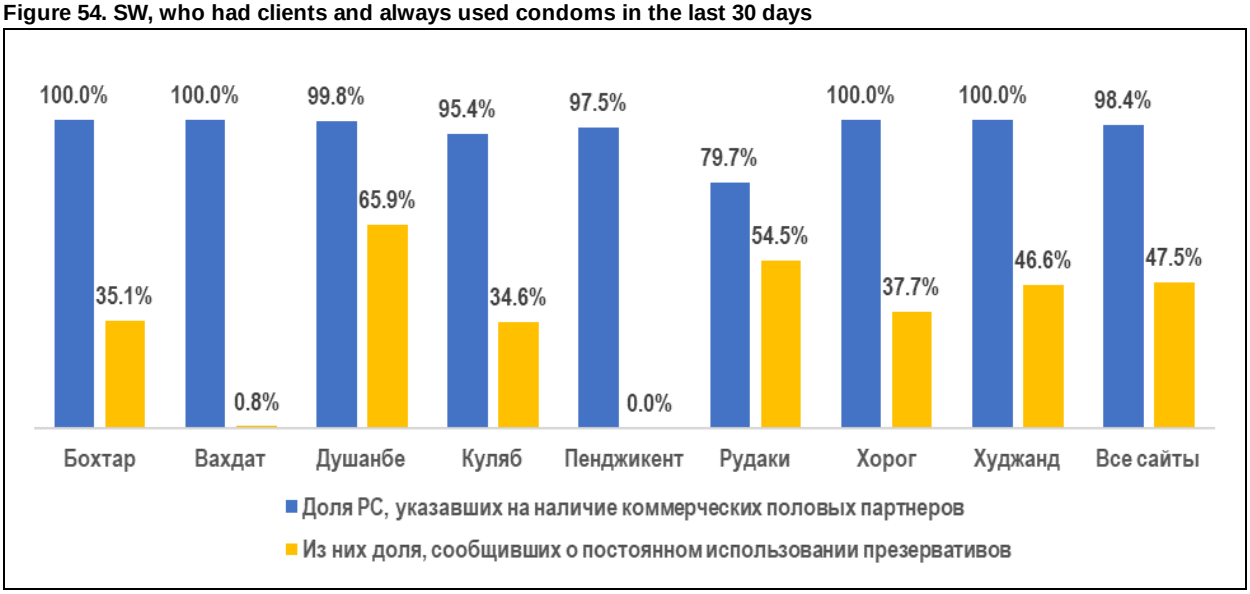


7.4. SEXUAL BEHAVIOR WITH CLIENTS AND OTHER PARTNERS

7.4.1. COMMERCIAL SEXUAL PARTNERS (CLIENTS) AND USE OF CONDOMS

98.4% of SW have noted that they had sexual intercourse with at least one client in the last 30 days (median number of clients: 9, IQR 4-14). At the same time, the share of SW, who indicated that they always use a condom with their clients in the last 30 days was only 47.5% and varied significantly across sites from 0% in Panjakent to 65.9% in Dushanbe.

Figure 54. SW, who had clients and always used condoms in the last 30 days



70.1% of SW have responded that they have always used a condom for vaginal sexual intercourse with clients in the last 30 days: the lowest share (1.1%) was in Vahdat, and the highest (86.7%) – in Dushanbe.

Table 36. Use of condoms for vaginal sexual intercourse with clients in the last 30 days

Vaginal sexual intercourse					
Site	**Always**	**Almost always**	**In half of the cases**	**Sometimes**	**Never**
Bokhtar	39.5%	5.9%	7.7%	39.4%	7.1%
Vahdat	1.1%	15.9%	22.4%	60.3%	0.3%
Dushanbe	86.7%	0.3%	8.3%	3.7%	0.7%
Kulyab	68.7%	4.5%	10.5%	10.8%	5.2%
Panjakent	2.9%	10.8%	36.9%	45.7%	3.3%
Rudaki	82.1%	0.0%	0.5%	11.1%	6.0%
Khorugh	59.7%	16.1%	8.7%	14.3%	1.2%
Khujand	87.5%	10.7%	1.4%	0.3%	0.2%
All sites	**70.1%**	**5.1%**	**8.1%**	**14.0%**	**2.5%**

Share of SW, who have said that they had oral sexual intercourse with clients, was 39.5% across all sites (from 33.1% in Khorugh to 93.2% in Vahdat), whereas only 15.8% SW (from 0% in Khorugh to 40,3% in Rudaki) have always used a condom during such intercourse.

Table 37. Use of condoms with clients for oral sexual intercourse in the last 30 days

Oral sexual intercourse						
Site	**Percentage of SW, who had oral sexual intercourse**	**Always**	**Almost always**	**In half of the cases**	**Sometimes**	**Never**
Bokhtar	11.8%	4.5%	2.1%	8.0%	45.1%	40.3%
Vahdat	93.2%	2.7%	4.6%	18.4%	68.3%	6.0%
Dushanbe	32.0%	35.6%	0.3%	6.2%	33.8%	13.9%
Kulyab	50.0%	2.4%	0.0%	0.3%	1.4%	95.9%
Panjakent	88.3%	0.0%	2.1%	5.8%	18.9%	71.2%
Rudaki	59.6%	40.3%	0.0%	1.6%	23.8%	33.8%
Khorugh	33.1%	0.0%	1.7%	2.0%	68.9%	27.4%
Khujand	50.3%	6.6%	5.7%	9.8%	35.0%	41.1%
All sites	**39.5%**	**15.8%**	**2.3%**	**7.2%**	**32.3%**	**38.7%**

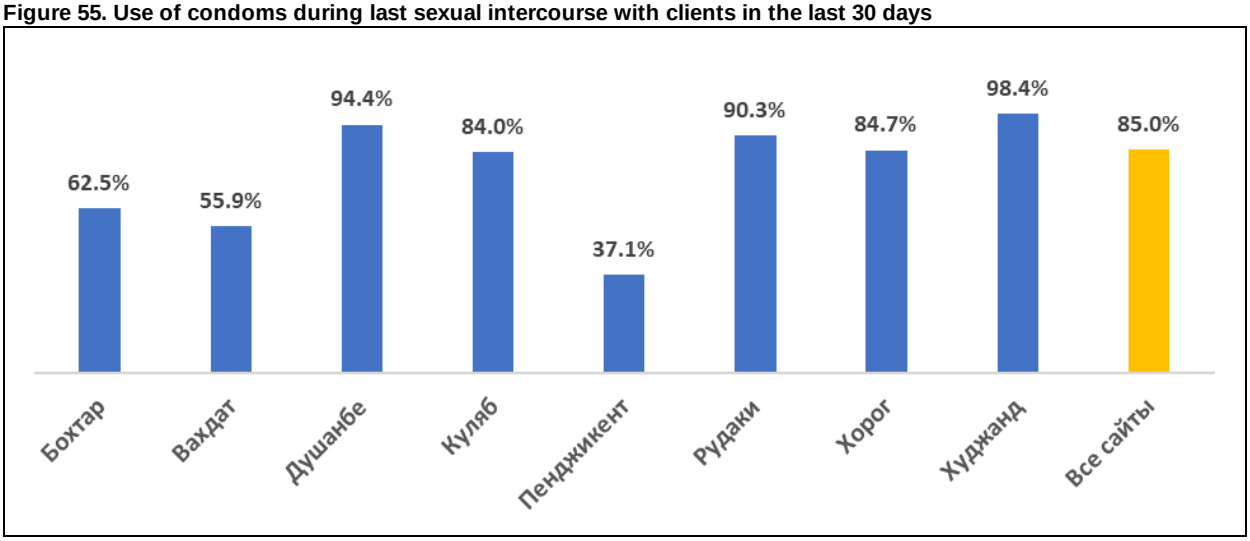
When asking SW about the reasons for not always using condoms with clients for any type of sexual intercourse in the last 30 days, majority of respondents (65.5%) have indicated that the partner did not want to use a condom (from 30.8% in Dushanbe to 82.2% in Bokhtar), 14.3% have indicated that they did not have a condom on them (from 1.4% in Khujand to 44.8% in Panjakent).

Table 38. Reasons for not using a condom with clients in the last 30 days for any type of sexual intercourse

Site	**Partner did not want**	**No money to buy**	**Did not have it with me**	**Do not think it necessary**	**Nowhere to buy**	**Was sure about health of the client**	**Do not think this type of sex dangerous**
Bokhtar	82.2%	0.0%	8.9%	7.0%	0.0%	1.8%	0.0%
Vahdat	81.9%	0.8%	10.3%	1.5%	0.0%	5.5%	0.0%
Dushanbe	30.8%	4.8%	23.5%	20.9%	0.0%	17.2%	2.8%
Kulyab	65.2%	0.0%	11.9%	7.7%	1.2%	5.5%	1.2%
Panjakent	40.8%	0.5%	44.8%	4.7%	1.9%	5.3%	0.0%
Rudaki	50.0%	0.0%	7.2%	31.8%	3.1%	0.0%	3.7%
Khorugh	56.6%	0.0%	22.0%	10.5%	3.4%	4.5%	0.0%
Khujand	61.8%	0.0%	1.4%	5.1%	0.0%	31.7%	0.0%
All sites	**65.5%**	**0.9%**	**14.3%**	**8.7%**	**0.4%**	**8.2%**	**0.7%**

85.0% of SW have answered that they have used a condom during their last sexual intercourse with a client in the last 30 days. This indicator varied significantly from 37.1% in Panjakent to 98.4% in Khujand. Majority of SW (84.4%) have indicated that they have made their own decision on using a condom.

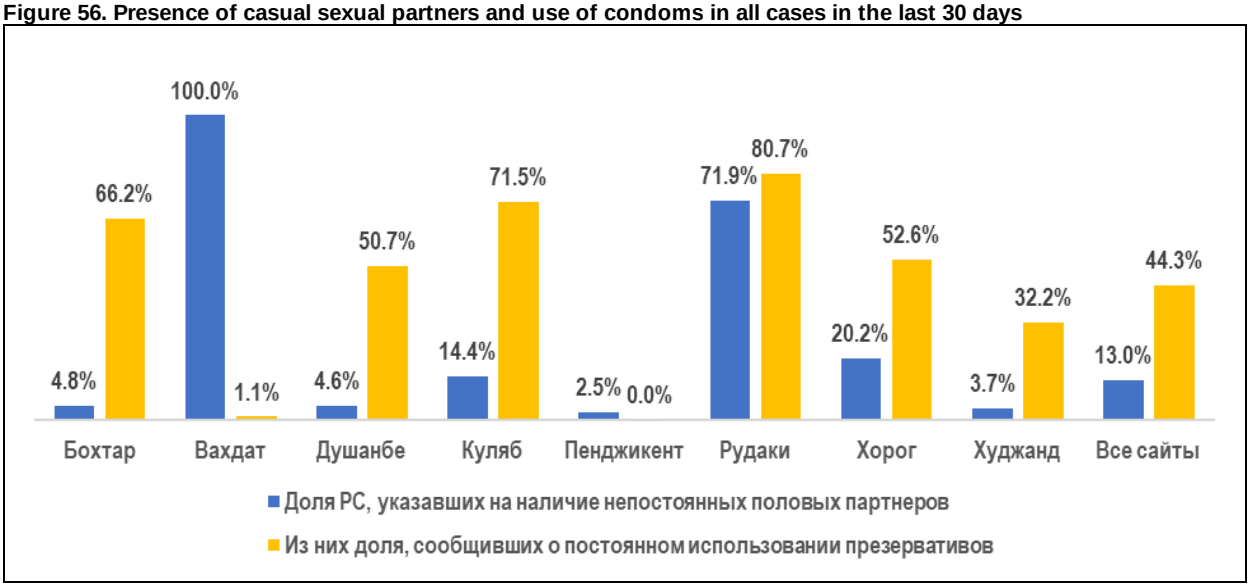
Figure 55. Use of condoms during last sexual intercourse with clients in the last 30 days



7.4.2. CASUAL SEXUAL PARTNERS, WHO ARE NOT COMMERCIAL PARTNERS, AND USE OF CONDOMS

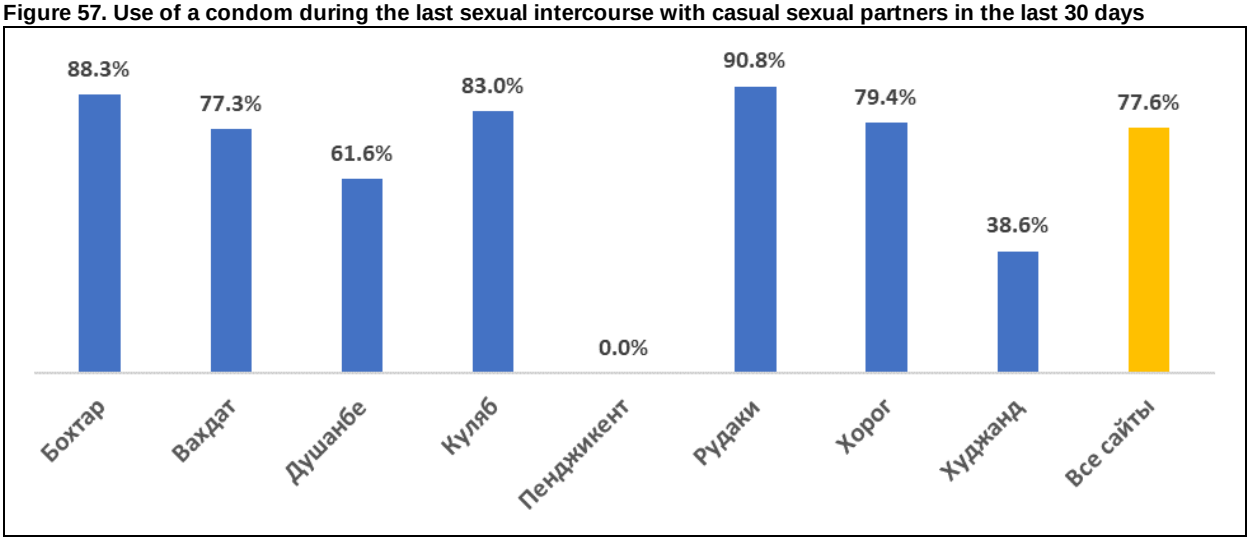
Out of all SW, 13.0% have indicated that they had sexual intercourse with at least one casual sexual partners in the last 30 days (median number of partners: 2, IQR: 1-3): from 2.5% in Panjakent to 100.0% in Vahdat; at the same time less than half of SW (44.3%) have indicated that they always used a condom (from 1.1% in Vahdat to 80.7% in Rudaki).

Figure 56. Presence of casual sexual partners and use of condoms in all cases in the last 30 days



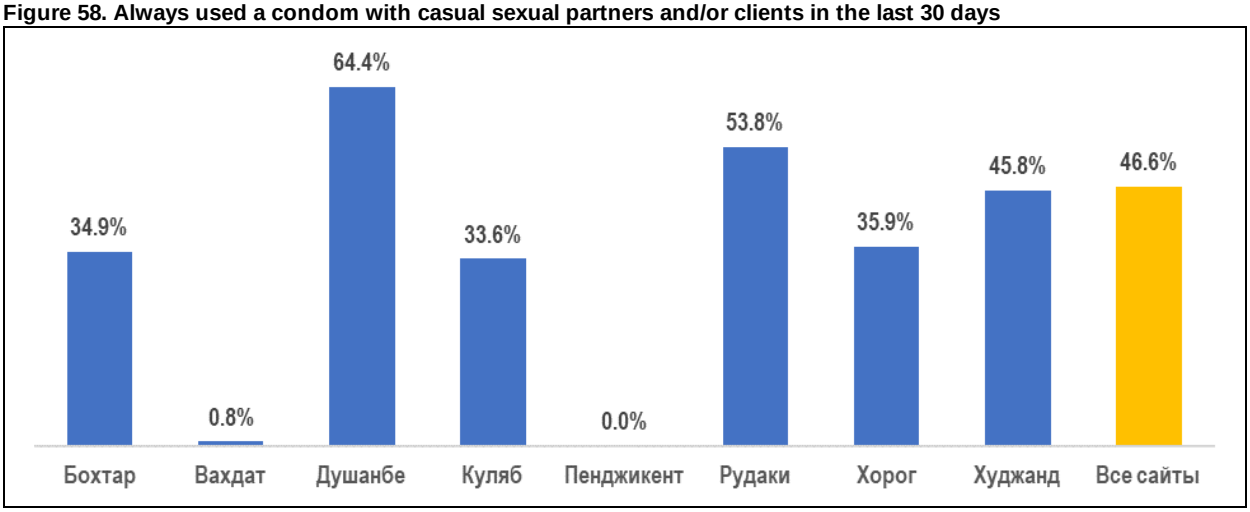
77.6% of SW used a condom during the last sexual intercourse with a casual sexual partner in the last 30 days, this indicator varied significantly from 0% in Panjakent to 90.8% in Rudaki. Majority of SW (84%) have made their own decision about the use of a condom.

Figure 57. Use of a condom during the last sexual intercourse with casual sexual partners in the last 30 days



Less than half of the respondents (46.6%) have indicated that they have always used a condom with a casual and/or commercial partner: from 0% in Panjakent to 64.4% in Dushanbe.

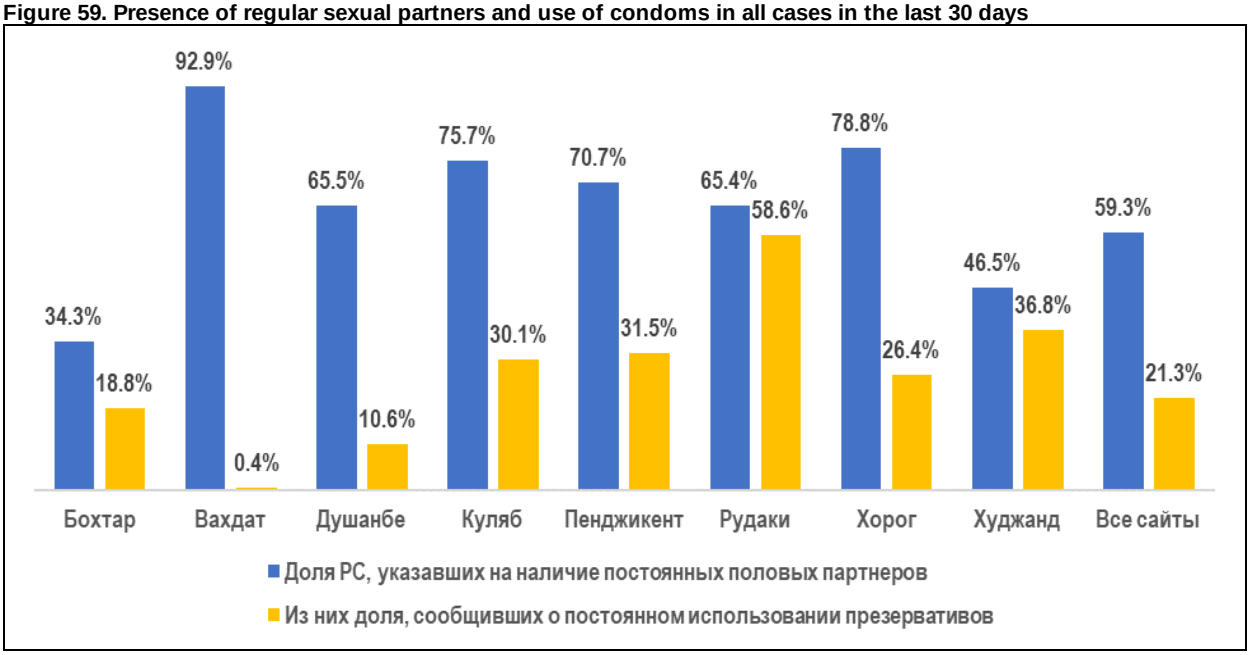
Figure 58. Always used a condom with casual sexual partners and/or clients in the last 30 days



7.4.3. REGULAR SEXUAL PARTNERS AND USE OF CONDOMS

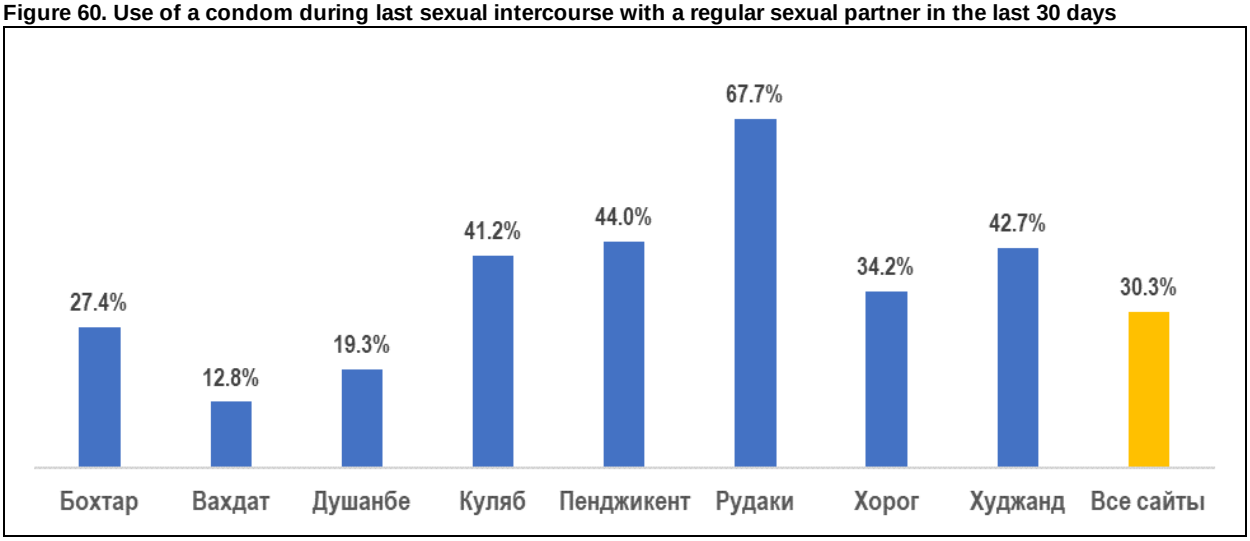
Over half of SW (59.3%) have indicated that they had sexual intercourse with at least one regular partner in the last 30 days (median number of partners: 1, IQR: 1-1). This indicator was from 34.3% in Bokhtar to 92.9% in Vahdat. Share of SW, who have always used a condom varied from 0.4% in Vahdat to 62.3% in Rudaki, and across all sites was 22.9%.

Figure 59. Presence of regular sexual partners and use of condoms in all cases in the last 30 days



Less than one third (30.3%) have used a condom during sexual intercourse with a regular sexual partner in the last 30 days, this indicator varied from 12.8% in Vahdat to 67.7% in Rudaki. At the same time, 75.8% of SW have noted that they have made their own decision on the use of a condom (from 3.9% in Panjakent to 100% in Bokhtar).

Figure 60. Use of a condom during last sexual intercourse with a regular sexual partner in the last 30 days



Awareness of SW about the HIV test results of their latest regular sexual partner indicated, that 1.1% of SW knew about HIV-positive status of their partner. However, majority of SW (59.2%) did not know the HIV status of their regular sexual partner.

Table 39. Awareness of SW about HIV test results of their latest regular sexual partner

Site	He says he is HIV-negative	He says he is HIV-positive	We have not discussed this matter/I don't know	No response

Bokhtar	10.8%	0.0%	89.2%	0.0%
Vahdat	26.2%	0.6%	73.2%	0.0%
Dushanbe	39.6%	0.2%	59.2%	1.0%
Kulyab	52.1%	0.8%	46.7%	0.4%
Panjakent	28.7%	1.2%	68.3%	1.9%
Rudaki	43.8%	1.4%	53.0%	1.7%
Khorugh	60.0%	3.6%	36.4%	0.0%
Khujand	43.1%	4.6%	51.5%	0.8%
All sites	**39.0%**	**1.1%**	59.2%	**0.7%**

7.4.4. ANAL SEX

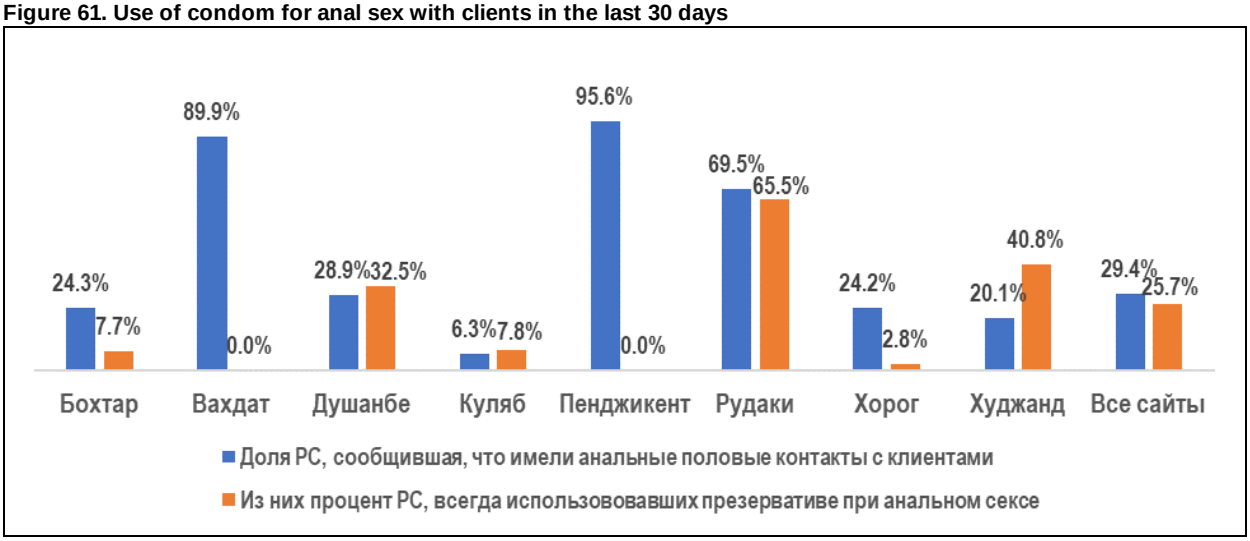
Almost one third of all study participants (29.4%) have reported practicing anal sex in the last 30 days: from 6.3% in Kulyab to 95.6% in Panjakent. Less than half of SW (46.1%) have used lubricants during their last anal sexual intercourse (from 14.2% in Kulyab to 68.4% in Khorugh).

Table 40. Share of SW, who have reported anal sex practices in the last 30 days

Site	Share of SW, who practiced anal sex in the last 30 days	Use of lubricants during the last anal sex	Anal sex practices by type of partners		
			With regular sexual partners	With casual sexual partners	With clients
Bokhtar	24.3%	47.4%	15.2%	8.9%	23.9%
Vahdat	89.9%	43.7%	87.9%	80.4%	82.3%
Dushanbe	28.9%	51.5%	24.4%	0.0%	25.6%
Kulyab	6.3%	14.2%	6.6%	1.0%	3.0%
Panjakent	95.6%	63.1%	86.1%	100.0%	96.2%
Rudaki	69.5%	20.4%	72.6%	82.3%	66.5%
Khorugh	24.2%	68.4%	21.5%	2.8%	19.9%
Khujand	20.1%	46.4%	12.3%	6.7%	16.4%
All sites	**29.4%**	**46.1%**	**27.1%**	**48.2%**	**26.5%**

One quarter of SW (26.5%) has reported that they had anal sexual intercourse with clients in the last 30 days (from 3.0% in Kulyab to 96.2% in Panjakente). Of them, only 25.7% of SW have indicated that they always used a condom for this type of intercourse (from 0% in Panjakent to 65.5% in Rudaki).

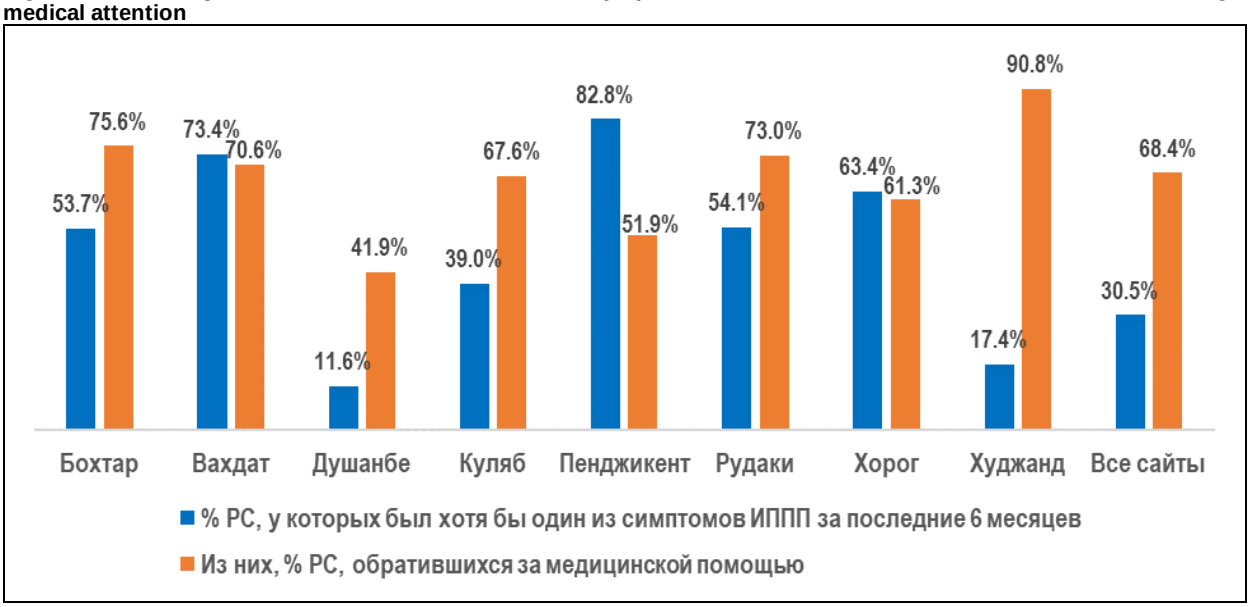
Figure 61. Use of condom for anal sex with clients in the last 30 days



7.4.5. SEXUALLY TRANSMITTED INFECTIONS (STI)

Share of SW, who have noted presence of at least one of the suggested STI symptoms, varied significantly between sentinel sites and was from 11.6% in Dushanbe to 82.8% in Panjakent (across all sites – 30.5%). Of the SW with STI symptoms almost two thirds (68.4%) sought medical attention to treat STI.

Figure 62. Percentage of SW, who had at least one of STI symptoms in the last 6 months and share of them who sought medical attention



In case of STI symptoms most SW sought medical attention of gynecologists (59.2%), STI clinics (20.1%), healthcare professionals they know (12.0%).

Table 41. Seeking medical attention for STI

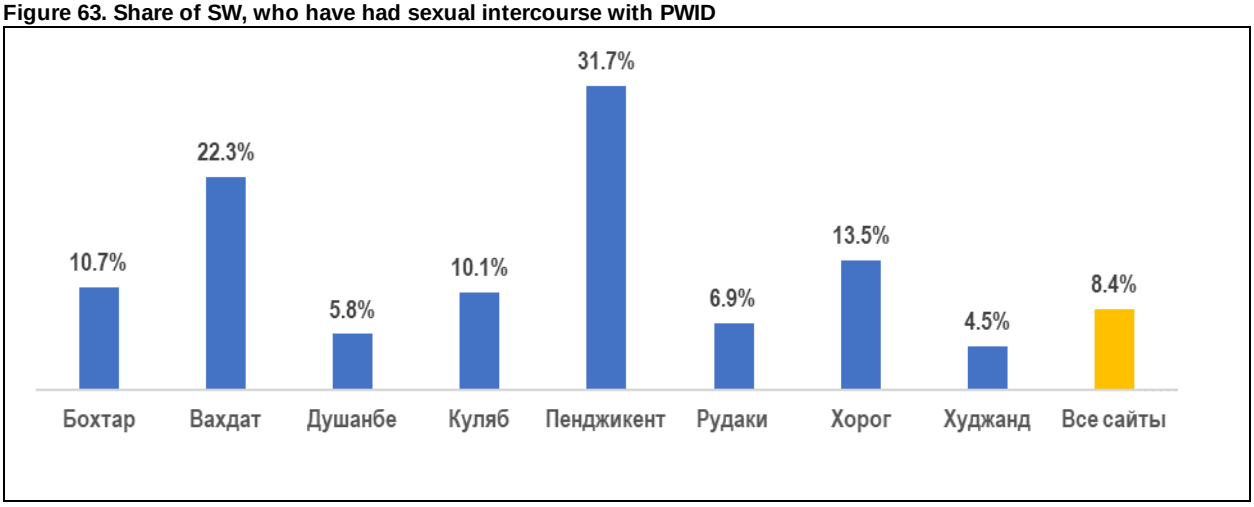
Site	STI clinic	Friendly office	Private doctor	Healthcare professional they know	Gynecologist	Other
Bokhtar	29.3%	0.4%	2.9%	20.6%	46.8%	0.0%

Vahdat	3.2%	0.9%	1.1%	10.5%	84.2%	0.0%
Dushanbe	24.7%	19.1%	14.8%	4.8%	36.5%	0.0%
Kulyab	36.9%	0.8%	0.0%	3.3%	57.7%	1.4%
Panjakent	17.2%	0.0%	24.8%	26.9%	23.4%	7.7%
Rudaki	0.0%	0.0%	19.0%	10.6%	70.5%	0.0%
Khorugh	9.5%	0.0%	0.0%	19.0%	70.0%	1.5%
Khujand	5.5%	2.2%	3.8%	1.9%	86.7%	0.0%
All sites	**20.1%**	**2.4%**	**5.7%**	**12.0%**	**59.2%**	**0.6%**

7.4.6. SEXUAL INTERCOURSE WITH PEOPLE, WHO INJECT DRUGS (THROUGH SYRINGE)

Share of SW, who have indicated that they had sexual intercourse with people, who inject drugs through syringe (PWID), was 8.4% across all sites and varied significantly from 4.5% in Khujand to 31.7% in Panjakent.

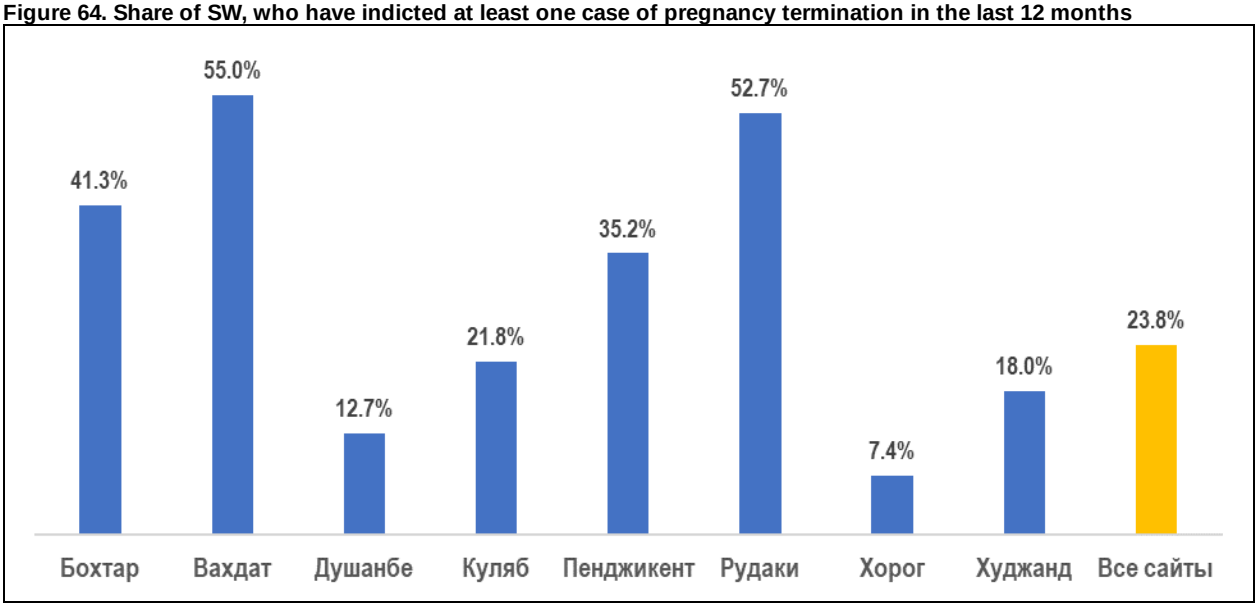
Figure 63. Share of SW, who have had sexual intercourse with PWID



7.4.7. TERMINATION OF PREGNANCY IN THE LAST 12 MONTHS

Almost one quarter of respondents (23.8%) have said that they had at least one termination of pregnancy in the last 12 months; share of SW varied significantly between the sites from 7.4% in Khorugh to 55.0% in Vahdat.

Figure 64. Share of SW, who have indicted at least one case of pregnancy termination in the last 12 months



7.5. LEVEL OF KNOWLEDGE ABOUT HIV AND COVERAGE WITH PREVENTION PROGRAMS

7.5.1. AWARENESS ABOUT HIV AND AIDS

In general, level of awareness in percentage about HIV transmission routes across all sites and almost all questions were rather low. For instance, share of SW, who have correctly answered the questions on whether it was possible get HIV infected: "through any types of sexual intercourse (oral, vaginal, anal) without a condom" was (80.5%), "during handshake" (68.9%), "from mother to child during pregnancy, birth and breastfeeding" (75.9%) and "when injecting drugs using common syringe and needle" (73,2%).

Table 42. Awareness about HIV infection transmission

Site	With any sexual intercourse (oral, vaginal, anal) without a condom	During handshake	When taking food together with HIV positive individual	A child from the mother during pregnancy, birth and breastfeeding	When swimming in a pool	Through mosquito bite	When using same needle or syringe for drug injection
Bokhtar	95.7%	67.0%	33.5%	88.3%	55.2%	22.7%	86.3%
Vahdat	92.2%	57.0%	55.9%	81.5%	41.6%	26.6%	68.0%
Dushanbe	69.2%	69.1%	68.4%	66.6%	66.4%	65.8%	66.2%
Kulyab	87.4%	63.4%	60.3%	79.6%	55.7%	39.4%	78.5%
Panjakent	89.5%	44.8%	46.1%	94.7%	53.8%	83.3%	64.6%
Rudaki	91.4%	86.1%	97.7%	95.6%	93.4%	87.5%	88.5%
Khorugh	97.1%	90.2%	83.8%	93.9%	84.6%	51.8%	95.4%
Khujand	76.8%	73.5%	67.7%	71.0%	64.2%	58.6%	68.8%
All sites	**80.5%**	**68.9%**	**61.7%**	**75.9%**	**62.8%**	**53.1%**	**73.2%**

From 28.1% to 78.6% of respondents have given correct answers to the questions on whether "it was possible to reduce risk of HIV transmission, by…". For instance, 78.6% of

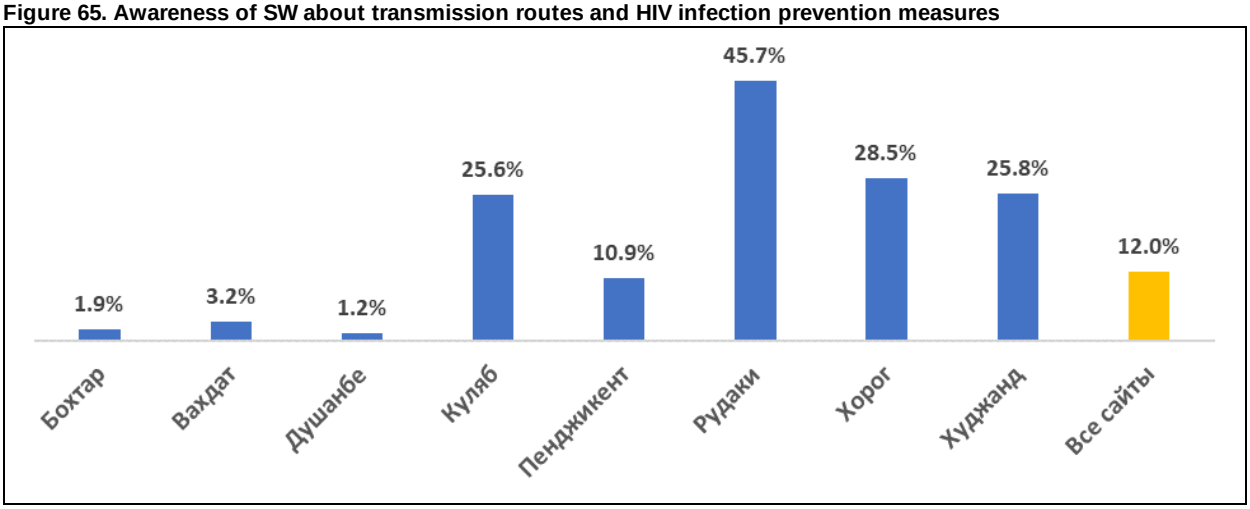
respondents have correctly answered the question about reducing HIV infection risk through regular testing and STI treatment, 78.2% - by using a condom.

Table 43. Awareness about reducing HIV transmission risks

Site	Is it possible to reduce risk of HIV transmission, if …					
	Always use a condom (responded «yes»)	Refuse sex with a man, who has explicit signs of sexually transmitted diseases (responded «yes»)	Avoid anal sex (responded «yes»)	Get tested regularly and get timely treatment of sexually transmitted diseases (responded «yes»)	Have sexual intercourses only with one faithful partner, who is not HIV-infected (responded «yes»)	Switch to non-injection drugs (smoke or inhale) (responded «yes»)
Bokhtar	85.8%	77.0%	58.9%	81.9%	76.8%	34.7%
Vahdat	91.5%	86.3%	89.2%	94.8%	96.4%	19.9%
Dushanbe	72.7%	78.1%	67.7%	77.8%	75.4%	5.3%
Kulyab	85.8%	77.1%	71.7%	85.6%	79.1%	72.6%
Panjakent	84.7%	81.8%	54.1%	81.1%	47.5%	48.9%
Rudaki	80.0%	90.5%	74.3%	71.8%	73.5%	65.0%
Khorugh	96.5%	97.1%	49.6%	97.7%	95.3%	93.6%
Khujand	71.8%	62.0%	70.8%	68.5%	73.2%	53.1%
All sites	**78.2%**	**75.9%**	**67.9%**	**78.6%**	**76.2%**	**34.2%**

Only 12.0% of SW have correctly answered all questions about HIV transmission routes and ways to reduce HIV transmission risks. The lowest level of awareness of SW about HIV transmission routes and HIV infection risk reduction was seen in Dushanbe, Bokhtar and Vahdat (1.2%, 1.9% and 3.2%, respectively) and the highest was in Rudaki (45.7%). SW, who have answered correctly all questions on transmission routes and HIV infection risk reduction have more often reported that they always used condoms with any partners in the last 30 days, compared to those SW, who did not have sufficient knowledge of HIV (30.6% compared to 17.6:, p<0,0001).

Figure 65. Awareness of SW about transmission routes and HIV infection prevention measures



* - Note: includes SW, who have correctly answered all questions in N59-N61

7.5.2. SOURCES OF INFORMATION ABOUT HIV INFECTION

Majority of respondents named volunteers and outreach workers (75.6%), and friendly offices (59.4%) as the main source of information on reducing the risk of HIV infection.

Table 44. Sources of information in the last 3 months

Site	Mass media (newspapers, magazines, TV, radio)	Internet	Healthcare workers	Friendly offices	Drop-in centers	Volunteers/outreach workers	Friends	Educational institutions	NGOs
Bokhtar	29.6%	13.7%	58.7%	57.5%	1.9%	60.2%	17.6%	1.3%	12.8%
Vahdat	34.5%	21.7%	55.5%	4.4%	9.2%	75.8%	73.3%	0.0%	45.2%
Dushanbe	4.3%	17.7%	21.0%	59.0%	64.3%	75.8%	32.4%	7.0%	87.2%
Kulyab	78.4%	18.1%	82.3%	73.2%	19.2%	75.8%	50.5%	16.9%	8.4%
Panjakent	1.0%	0.0%	6.8%	2.5%	6.1%	81.3%	36.0%	0.9%	86.4%
Rudaki	93.3%	90.6%	75.6%	38.7%	35.7%	34.6%	80.5%	36.5%	58.5%
Khorugh	90.1%	57.0%	56.9%	3.7%	10.6%	10.3%	62.7%	29.4%	4.5%
Khujand	6.2%	8.0%	7.9%	78.8%	14.9%	99.5%	13.1%	2.1%	10.2%
All sites	**33.8%**	**21.7%**	**40.5%**	**59.4%**	**28.4%**	**75.6%**	**37.0%**	**9.9%**	**37.1%**

7.5.3. COVERAGE WITH PREVENTION PROGRAMS

The coverage indicator included SW, who have received at least two of the below mentioned services:

- condoms
- STI testing
- verbal information on reduction of HIV infection risk OR counselling on use of condoms and safe sex (through outreach services, in the drop-in centers/friendly offices etc.).

Coverage of SW with prevention programs across all sites was 41.0% and varied in a big range from 4.9% in Panjakent to 62.9% in Kulyab.

Figure 66. Coverage with prevention programs

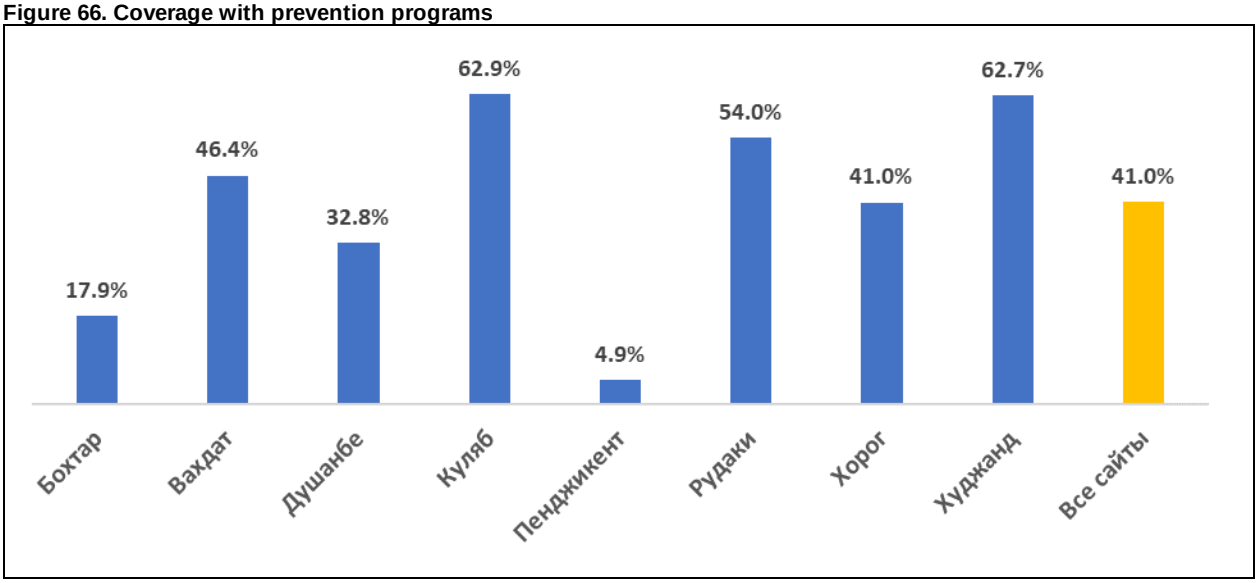


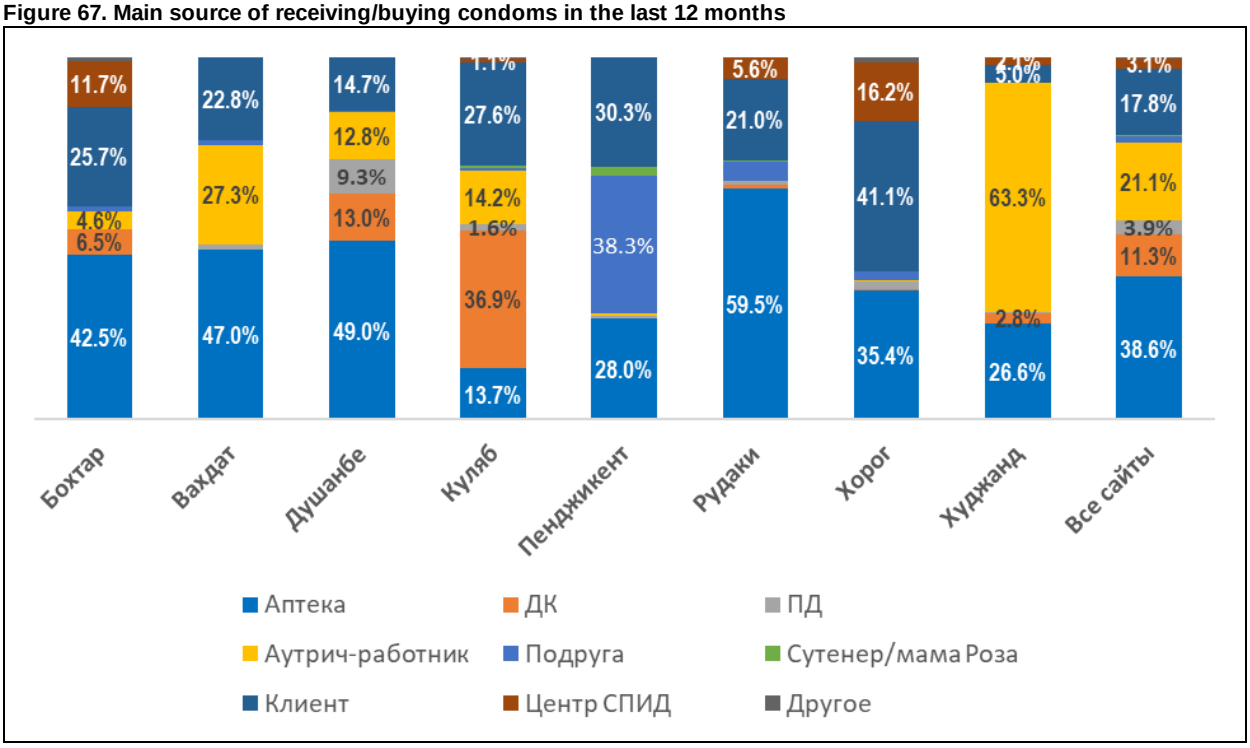
Table 45. Provision of prevention servcies to SW

Site	Any type of printed materials on prevention of HIV infection (booklets, leaflets, handouts)	Condoms	Syringes, needles	Verbal information on HIV infection risk reduction **Counselling on the use of condoms and safe sex** (through outreach services, in drop-in centers/friendly offices etc.)
Bokhtar	18.8%	25.8%	1.0%	17.6%
Vahdat	29.0%	45.6%	1.1%	77.5%
Dushanbe	11.9%	37.7%	4.1%	34.7%
Kulyab	58.5%	67.8%	34.5%	70.4%
Panjakent	37.6%	5.8%	0.9%	31.6%
Rudaki	71.4%	54.7%	26.5%	73.3%
Khorugh	73.6%	37.4%	7.2%	38.6%
Khujand	53.1%	73.0%	4.5%	59.9%
All sites	**32.2%**	**46.8%**	**8.4%**	**44.9%**

7.5.4. RECEIVING AND BUYING CONDOMS

Majority of SW bought condoms in pharmacies (38.6%). Over one third of SW (36.3%) have received condoms from outreach workers, employees of drop-in centers and friendly offices. Low indicator of getting condoms from outreach workers was seen in Rudaki (0%) and Khorugh (0.6%), from employees of friendly office – 0% in Vahdat, Panjakent, Khorugh and Rudaki.

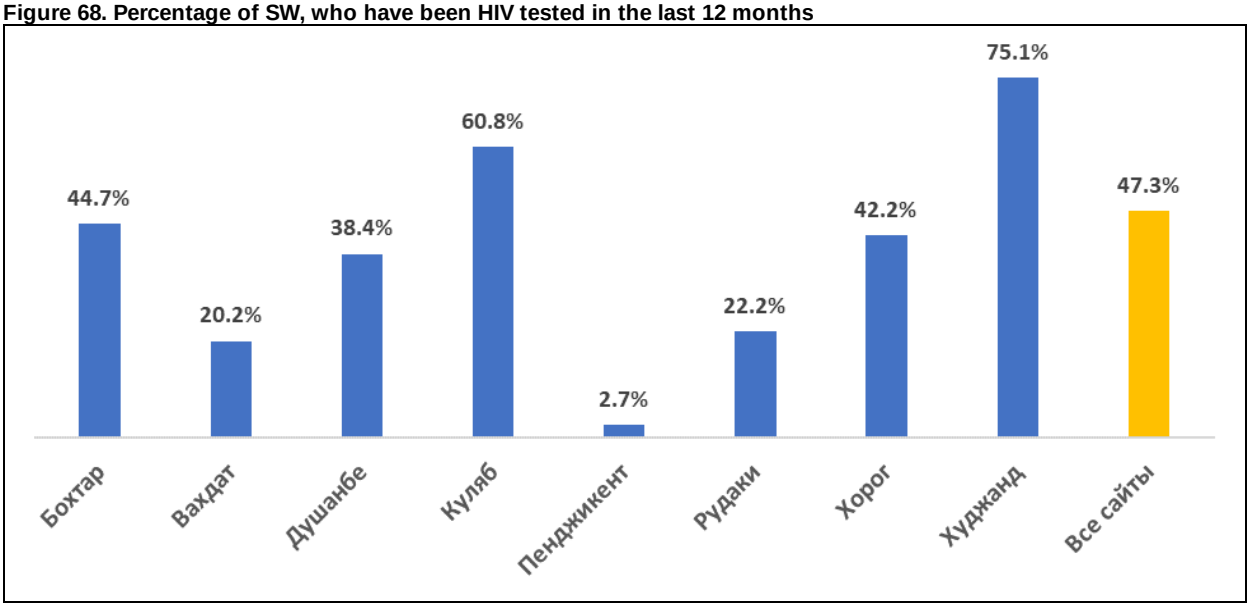
Figure 67. Main source of receiving/buying condoms in the last 12 months



7.6. HIV TESTING

A little less than half of SW (47.3%) have been HIV tested in the last 12 months. Share of SW, who have been HIV tested in the last 12 months in Panjakent was the lowest among all sentinel sites (2.7%), whereas in Khujand and Kulyab rate of HIV testing among SW was the highest (75.1% and 60.8, respectively).

Figure 68. Percentage of SW, who have been HIV tested in the last 12 months



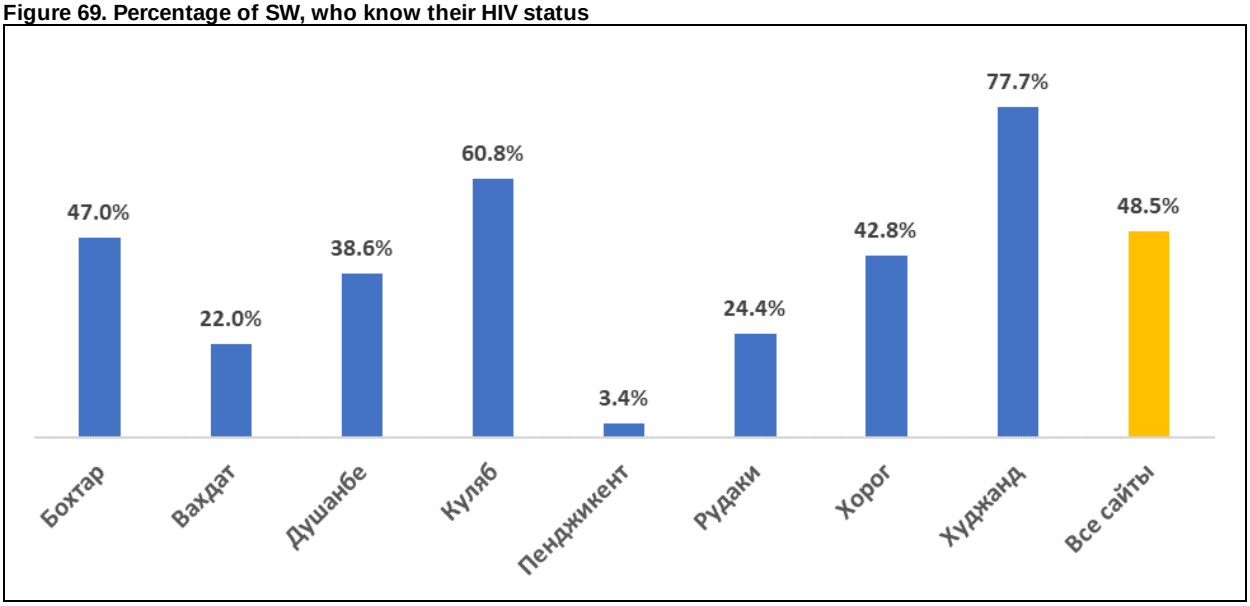
AIDS center was indicated as the most frequent location for HIV test (78.9%) in the last 12 months, 13.2% of respondents have been tested in friendly offices and 8.1% in an NGO.

Table 46. Location for HIV testing in the last 12 months

Site	Drug clinic	NGO	AIDS center	Drop-in center	FO	Other healthcare organizations	Penitentiary	Other
Bokhtar	1.4%	0.0%	98.2%	0.0%	0.0%	0.0%	0.0%	1.1%
Vahdat	0.0%	0.0%	89.3%	0.0%	10.7%	0.0%	0.0%	0.0%
Dushanbe	13.6%	24.4%	64.7%	0.6%	23.6%	0.2%	0.0%	0.0%
Kulyab	1.1%	0.7%	94.1%	0.0%	5.2%	0.0%	0.0%	2.7%
Panjakent	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	16.2%	0.0%
Rudaki	7.7%	6.6%	78.0%	0.0%	18.5%	0.0%	0.0%	2.6%
Khorugh	0.0%	1.3%	95.8%	0.0%	0.0%	0.0%	0.0%	2.9%
Khujand	5.6%	1.3%	73.2%	0.0%	14.4%	0.0%	0.1%	5.6%
All sites	**6.5%**	**8.1%**	**78.9%**	**0.2%**	**13.2%**	**0.1%**	**0.1%**	**2.5%**

48.5% of SW have reported that they knew their HIV status before participation in the study. Percentage of those who knew their HIV status varied from 3.4% in Panjakent to 77.7% in Khujand.

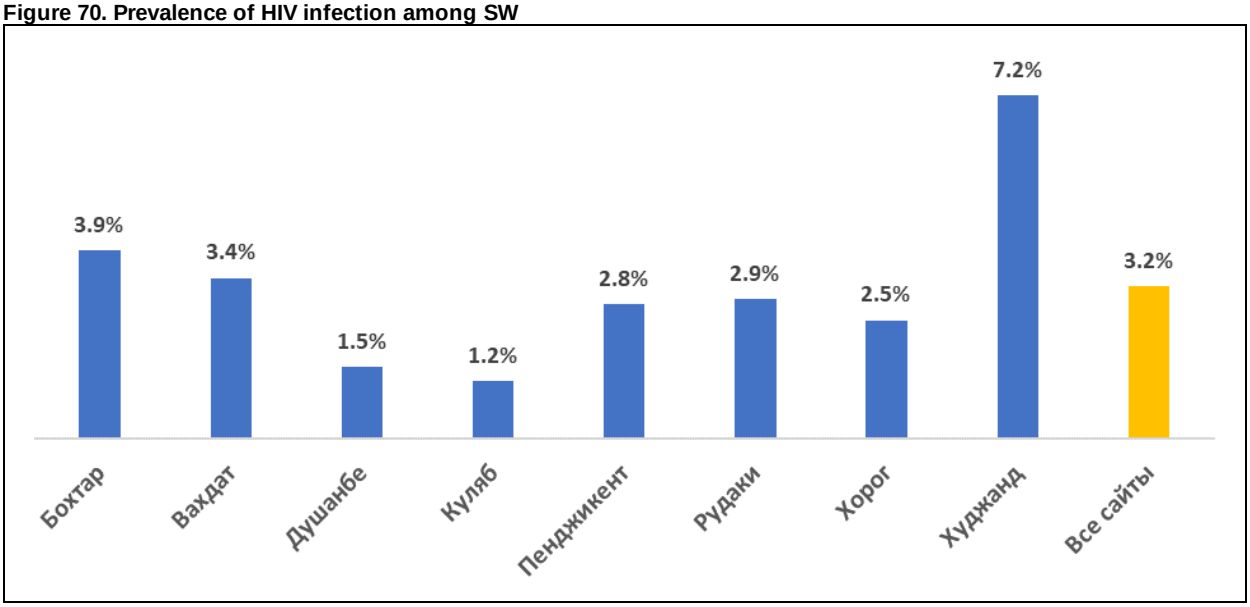
Figure 69. Percentage of SW, who know their HIV status



7.7. PREVALENCE OF HIV INFECTION

Based on results of this study HIV prevalence among all SW was 3.2% and varied from 1.2% in Kulyab to 7.2% in Khujand. HIV prevalence among those SW, who did not know about their HIV status before the study, was only 0.4% (from 0% in Bokhtar and Vahdat to 1.0% in Khorugh).

Figure 70. Prevalence of HIV infection among SW



Prevalence of HIV infection in the age group below 25 years across all sites was 2.1% and varied from 0% in Khorugh and Khujand to 5.4% in Bokhtar; in the age group above 25 years across all sites it was 3.4% and varied from 1.1% in Kulyab to 8.9% in Khujand.

Figure 71. Prevalence of HIV infection among SW in the age group below 25 years and 25 years and older (p=0.57)

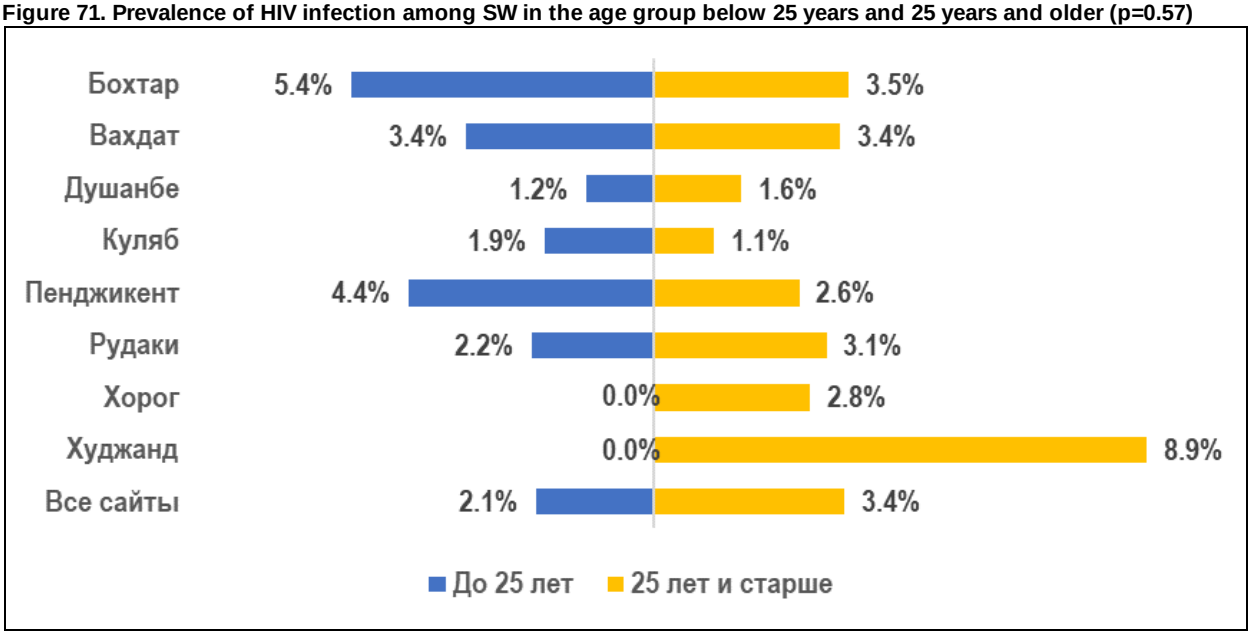
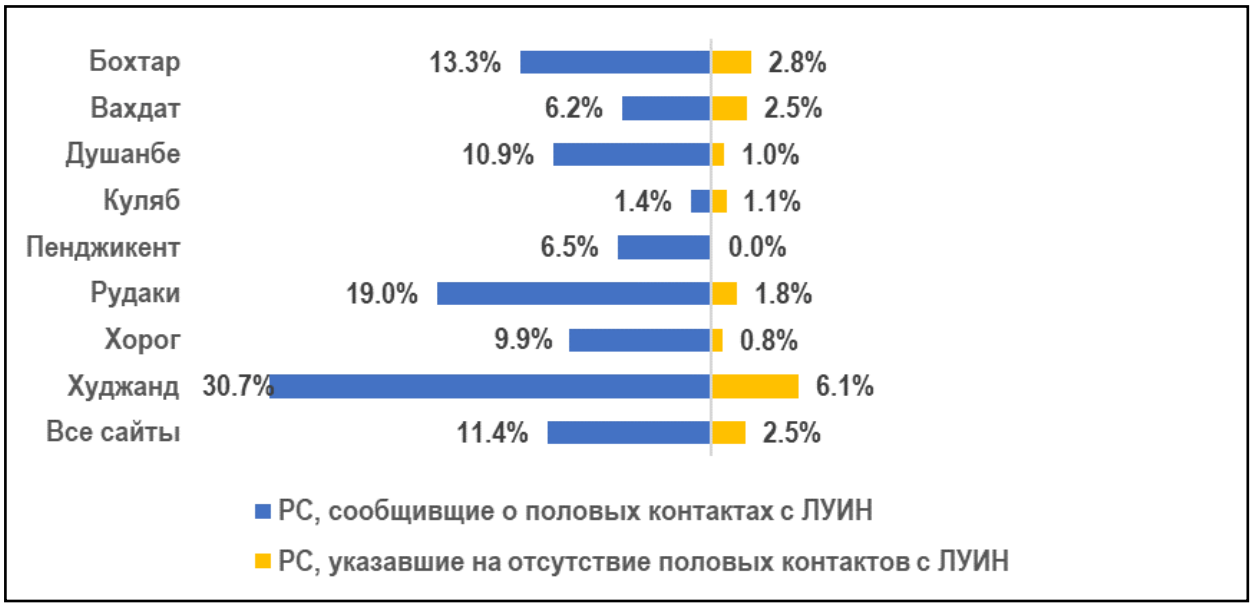


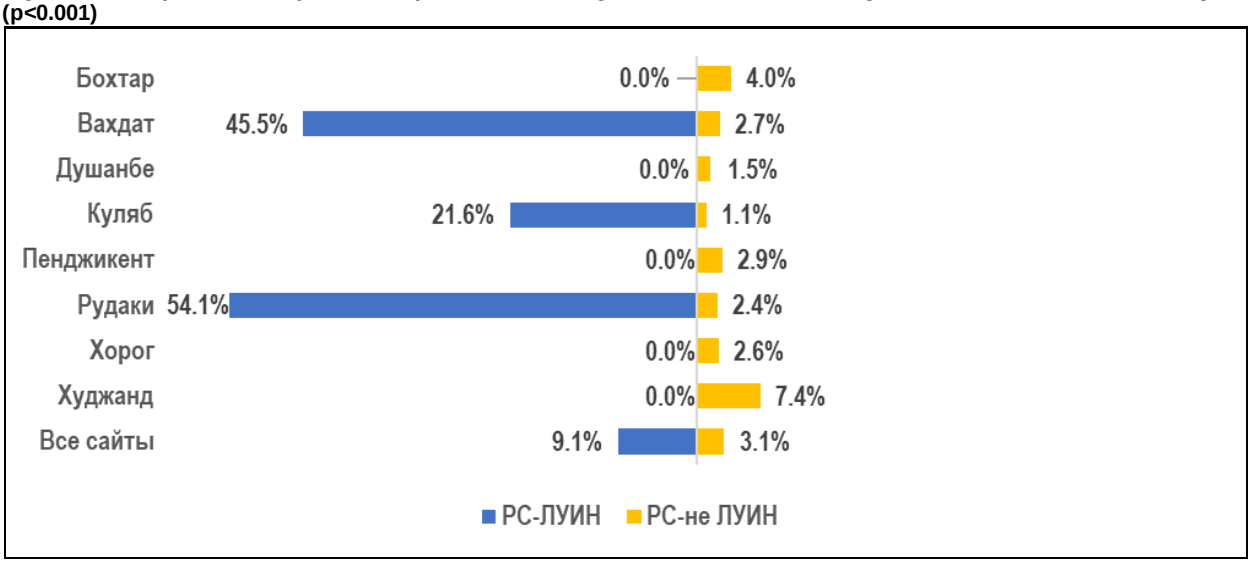
Figure 72. Prevalence of HIV among SW, who have indicated having sexual intercourse with PWID (p<0.05)



Prevalence of HIV infection among SW, who had sexual intercourse with PWID, was statistically significantly higher, than among SW, who did not have sexual intercourse with PWID (11.4% and 2.5%, respectively, p<0.001).

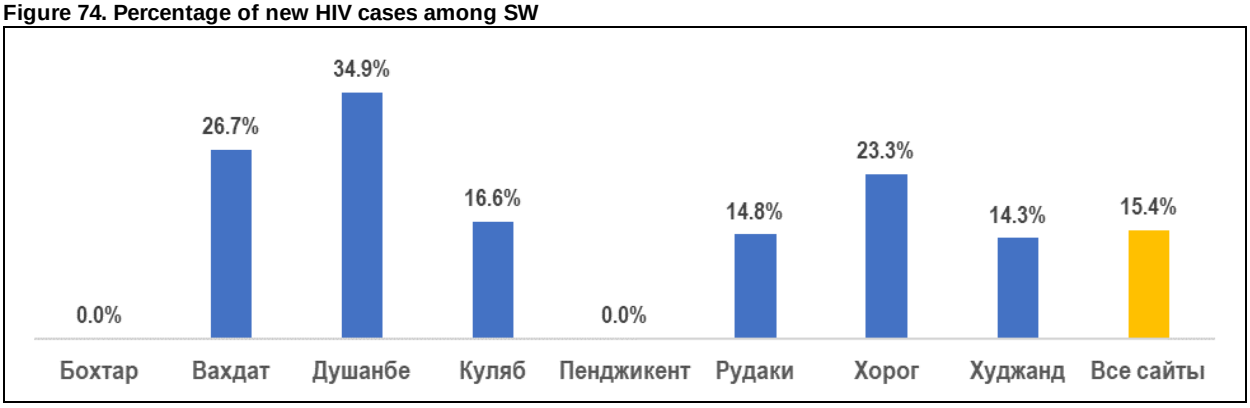
Prevalence of HIV infection among SW, who have used injection drugs at some point (SW/PWID), was 9.1% across all sites, which is significantly higher compared to SW, who deny having drug use experience – 3.1% (p<0.001).

Figure 73. Comparative analysis of HIV prevalence among SW, who have used drugs and SW, who never used drugs (p<0.001)



In total, only six new cases of HIV infection have been identified during the study. Share of new HIV cases among SW across all sites was 15.4% (from 0% in Bokhtar and Panjakent to 34.9% in Dushanbe).

Figure 74. Percentage of new HIV cases among SW



Based on the results of this study, it was noted that the level of condom use in all cases in the last 30 days among HIV-infected SW was low:

- 98.4% SW/PLH had sexual contacts with clients, and only 63.8% of respondents indicated that they always use a condom (from 0% in Panjakent to 100% in Khorugh);
- 11.1% SW/PLH said that they had sexual intercourse with casual sexual partners, of them only 40.4% of participants have said that they always used condoms (from 10.9% in Vahdat to 77.0% in Khujand);

Table 47. Use of condoms with clients and casual sexual partners in all cases in the last 30 days among HIV-positive SW

Site	Share of SW/PLH, who reported having sexual intercourse with at least one client	Of them share of SW/PLH, who indicated that they always used condoms with clients	Share of SW/PLH, who reported having sexual intercourse with a casual sexual partner	Of them share of SW/PLH, who indicated that they always used condoms with casual sexual partners
Bokhtar	100%	88.1%	0.0%	-
Vahdat	100%	10.9%	100%	10.9%
Dushanbe	100%	60.4%	0.0%	-
Kulyab	100%	39.8%	0.0%	-
Panjakent	100%	0.0%	0.0%	-
Rudaki	60.4%	18.8%	60.4%	33.7%
Khorugh	100%	100%	0.0%	-
Khujand	100%	66.1%	9.2%	77.0%
Total	**98.4%**	**63.8%**	**11.1%**	**40.4%**

Share of SW/PLH, who had sexual intercourse with regular sexual partners, was 57.7%, while only 46.2% of respondents said that they always used condoms (from 0% in Kulyab and Panjakent to 66.8% in Bokhtar). Among those SW/PLH, who did not always use condoms, 21.6% of SW/PLH knew about HIV-positive status of their latest regular sexual partner.

Table 48. Use of condoms with regular sexual partners in all cases in the last 30 days among HIV-positive SW

Site	Share of SW, who reported having sexual intercourse with a regular sexual partner	Of them share of SW, who indicated that they always used condoms	Among SW/PLH, who DID NOT use a condom, share of SW, who know about HIV-positive status of their regular sexual partner
Bokhtar	35.5%	66.8%	0.0%
Vahdat	80.9%	13.5%	25.4%

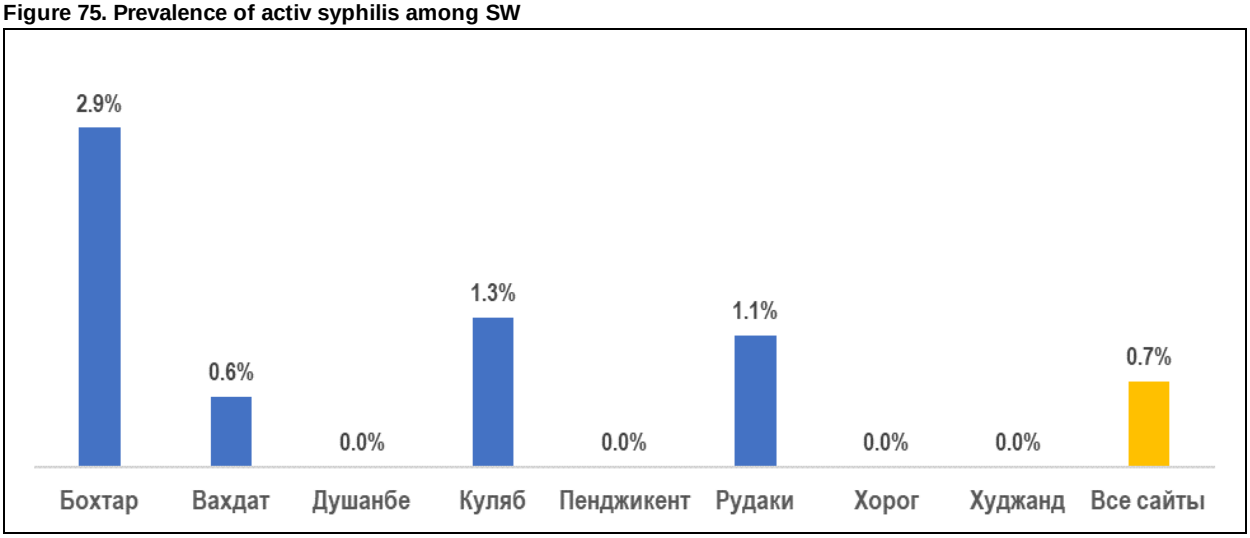
Dushanbe	66.7%	27.3%	0.0%
Kulyab	47.1%	0.0%	24.1%
Panjakent	43.6%	0.0%	0.0%
Rudaki	60.4%	33.7%	0.0%
Khorugh	100.0%	53.9%	49.5%
Khujand	62.6%	59.1%	44.4%
Total	**57.7%**	**46.2%**	**21.6%**

Knowledge of their own HIV-positive status did not affect the frequency of condom use with clients or casual partners. For instance, 33.3% of SW, who have learned about their HIV-positive status during this study and 50.0% of HIV-positive SW, who knew about their status before the study, indicated that they always used condoms with clients and casual partners in the last 30 days (p=0.44). Out of five SW, who have reported having a regular sexual partner in the last 30 days and who learned about their HIV-positive status during the study, none knew the HIV-status of their regular sexual partner and used condoms for each sexual intercourse with a regular partner.

7.8. PREVALENCE OF SYPHILIS

Prevalence of active syphilis[5] among SW was 0.7% with the highest indicator in Bokhtar (2.9%) and Kulyab (1.3%).

Figure 75. Prevalence of activ syphilis among SW

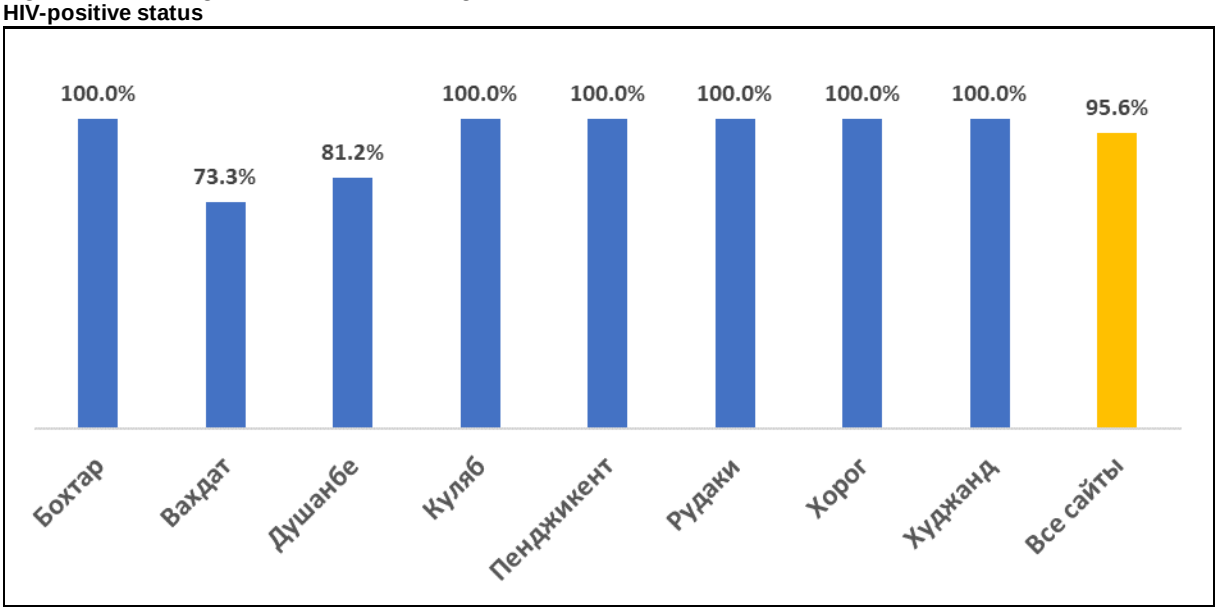


7.9. HIV CARE AND TREATMENT

Out of SW, who knew about their HIV-positive status before the study, 95.6% were registered in AIDS centers with HIV infection. This percentage was 100% at all sites with exception of Vahdat (73.3%) and Dushanbe (81.2%).

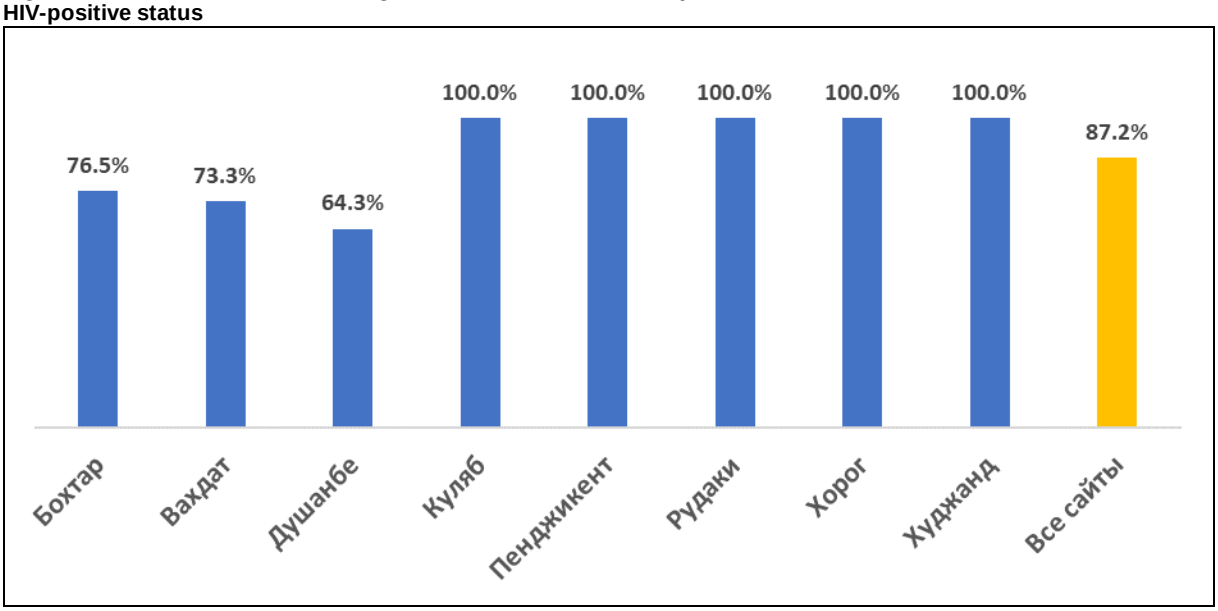
[5] Reactive screening and confirmatory syphilis test Chembio DPP, indicating presence of antibodies to Treponema pallidum

Figure 76. Percentage of PLH/SW, who are registered in AIDS center out of the number of PLH/SW, who know about their HIV-positive status



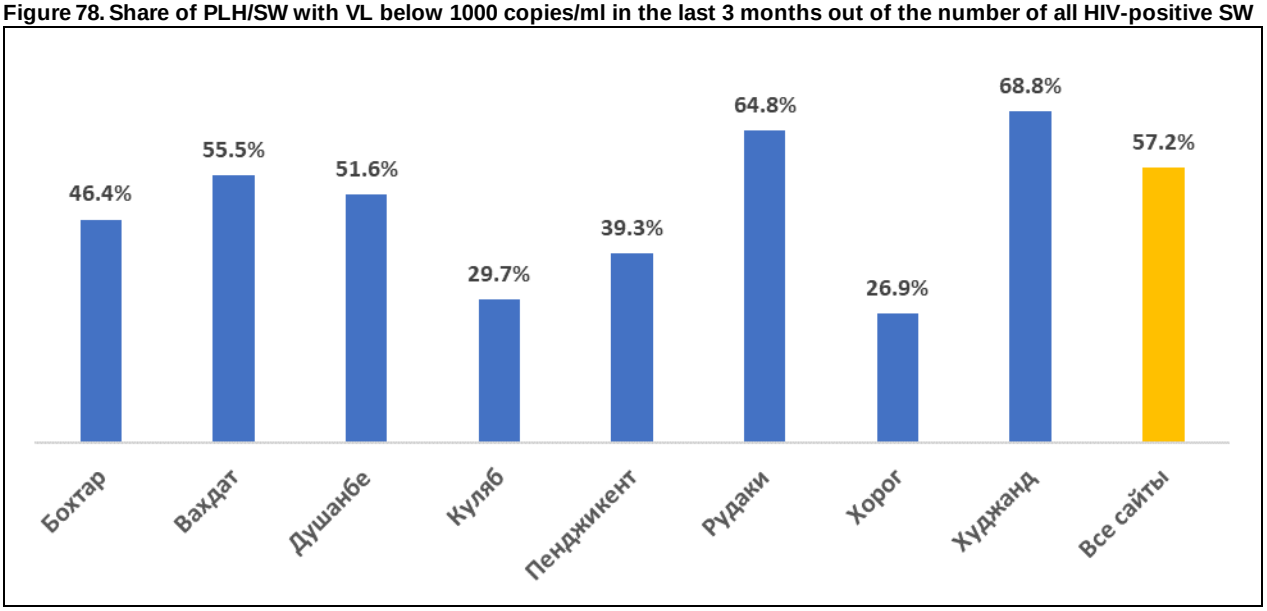
Based on the results of the survey, coverage with antiretroviral therapy (ART) of PLH/SW was 87.2% of the number of PLH/SW, who know about their HIV-positive status. 100% ART coverage was seen at almost all sites with exception of Dushanbe (64.3%), Vahdat (73.3%) and Bokhtar (76.5%).

Figure 77. Share of PLH/SW, receiving ART at the time of the study out of the number of PLH/SW, who know about their HIV-positive status



In general, percentage of PLH/SW with the viral load (VL) below 1000 copies/ml in the last 3 months across all sites was 57.2% of the number of all HIV-positive SW (from 26.9% in Khorugh to 68.8% in Khujand).

Figure 78. Share of PLH/SW with VL below 1000 copies/ml in the last 3 months out of the number of all HIV-positive SW



7.9.1. HIV TREATMENT CASCADE

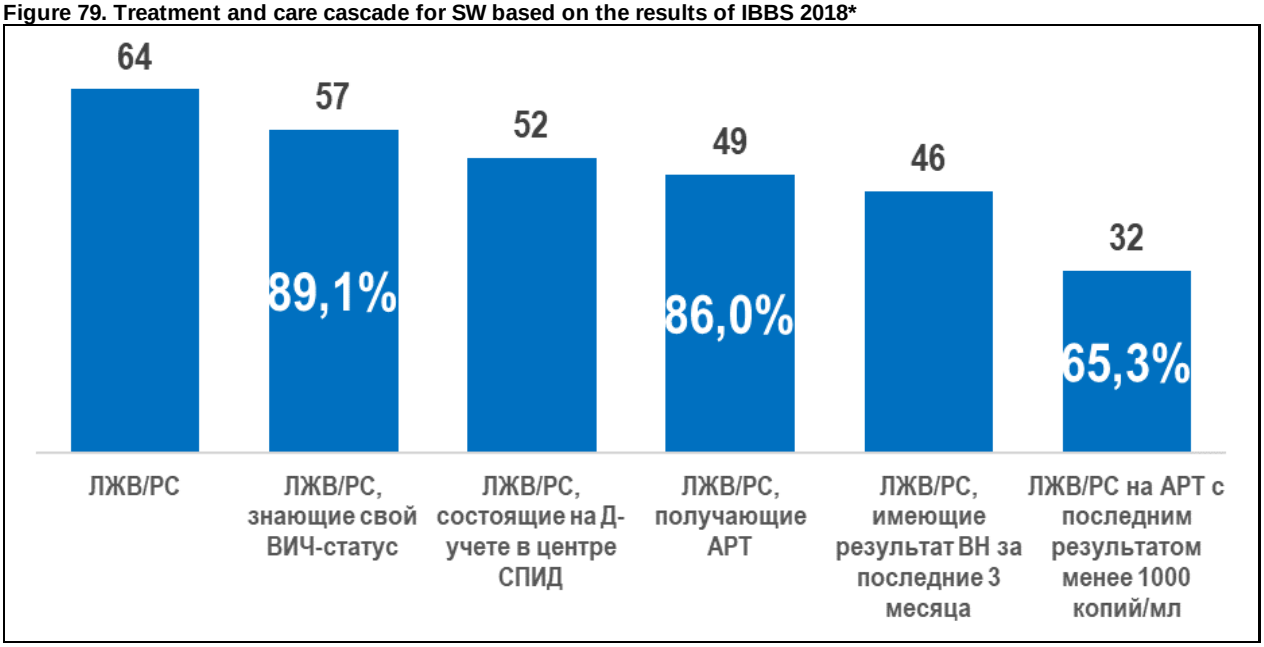
To assess progress in achieving 90-90-90 targets among SW – knowing their HIV status, receiving antiretroviral therapy and achieving viral suppression – PLH/SW were accompanied to AIDS centers, where they checked information on registration of the patient in the electronic monitoring system, provision of ART and identification of viral load.

As it was specified above, 87.9% PLH/SW knew their HIV-status (from 73.4% in Panjakent to 100% in Bokhtar and Vahdat). Out of the number of PLH/SW, who know their HIV-status, 87.2% received ART (from 64.3% in Dushanbe to 100% in Kulyab, Panjakent, Rudaki, Khorugh and Khujand). 74.6% of the patients on ART had viral suppression (VL below 1000 copies/ml) (from 35.1% in Khorugh to 100% in Dushanbe).

Table 49. HIV treatment cascade among SW

Site	Share of PLH/SW, who know their HIV status	Share of PLH/SW, registered in AIDS center	Share of PLH/SW on ART	Share of PLH/SW on ART with VL results in the last 3 months	Share of PLH/SW on ART with the last VL result below 1000 copies/ml
Bokhtar	100.0%	100.0%	76.5%	100.0%	60.7%
Vahdat	100.0%	73.3%	73.3%	100.0%	75.8%
Dushanbe	80.2%	81.2%	64.3%	100.0%	100.0%
Kulyab	83.4%	100.0%	100.0%	63.4%	35.7%
Panjakent	73.4%	100.0%	100.0%	100.0%	53.5%
Rudaki	85.2%	100.0%	100.0%	89.4%	76.1%
Khorugh	76.7%	100.0%	100.0%	100.0%	35.1%
Khujand	85.7%	100.0%	100.0%	100.0%	80.2%
All sites	**87.9%**	**95.6%**	**87.2%**	**97.6%**	**74.6%**

Figure 79. Treatment and care cascade for SW based on the results of IBBS 2018*



*-Note: treatment and care cascade uses non-weighted indicators (data from the sample)

7.10. CONCLUSION

Duration of the field stage varied from 27 to 44 working days, median duration across the country was 38 days. Number of respondents, who participated in the study per day varied from 1 to 32, and median number was 7. Duration of the field stage depended largely on the intensiveness of recruiting process, sample size, and other features of the sentinel sites. For instance, in the city of Khorugh, to achieve the sample size of 160, 42 days were required, whereas in a shorter timeframe (38 days), 500 respondents were surveyed in Dushanbe (see Table 49a). The main reason was the difference in the number of people, who participated in the study per day.

Table 49a. Information about timeframe and duration of study, number of respondents, who have participated in the study per day

№	Sentinel site	Sample size	Study timeframe		Duration of field stage (in days)	Number of respondents, who have participated in the study per day		
			Start date	End date		Min	Max	Median
1	Bokhtar	350	09.04.2018	31.05.2018	38	1	17	10
2	Vahdat	200	10.04.2018	14.06.2018	44	1	11	4
3	Dushanbe	500	09.04.2018	16.05.2018	38	1	32	13
4	Kulyab	350	09.04.2018	01.06.2018	39	2	20	8
5	Panjakent	200	09.04.2018	28.05.2018	30	1	14	6
6	Rudaki	200	09.04.2018	30.05.2018	36	1	12	6
7	Khorugh	160	11.04.2018	12.06.2018	42	1	10	3
8	Khujand	200	09.04.2018	21.05.2018	27	2	16	7

Maximum number of waves varied by sites from 6 to 15 and median number was 11. Minimal size of the social network across all sentinel sites was from 1 to 4, maximum size from 21 to 50, median was 9. Results of DBS tests agreed with rapid tests for both positive and negative results at all sites in 100% of cases.

When comparing study participants in 2014 and 2018, it can be seen that maximum age of respondents decreased from 62 in 2014 to 59 in 2018. However, median age has increased from 30 in 2014 to 32 in 2018. At the time of participation in the study of 2018, majority of SW (64.1%) were divorced; 17.6% SW were widows; 13.5% SW have never married; and 4.7% were married. During the study of 2014, majority of SW (52.1%) were also divorced; however, second largest group (24.4%) consisted of SW, who have never been married; 13.4% of SW were widows; and 10.1% were married.

Prevalence of HIV among SW in 2018 has decreased compared to 2014 across the country from 3.5% to 3.2%. However, in Bokhtar, Rudaki and Khujand HIV prevalence has significantly increased in 2018 compared to 2014. In terms of syphilis test results, as it was mentioned above, rapid testing in IBBS 2018 was done using CHEMBIO DPP® syphilis screen & confirm rapid test, which allowed to detect both treponema and non-treponema antibodies. Presence of both treponema and non-treponema antibodies indicated prevalence of active syphilis (column C of table 49b). Since syphilis testing in sentinel surveillance of 2014 was done using ICE* Syphilis Murex® ELISA test system, which is aimed at detecting total treponema antibodies, we have compared prevalence of treponema antibodies in the results of 2014 and 2018 (columns A and B of table 49b). According to the results of the studies in 2014 and 2018, prevalence of treponema antibodies among the respondents increased in 2018 at three out of eight sentinel sites, including Bokhtar, Vahdat and Rudaki.

Table 49b. Comparative analysis of HIV and syphilis prevalence in the studies of 2014 and 2018

№	Sentinel site	HIV prevalence (%)		Syphilis prevalence (%)		
				A	B	C
		2014	2018	2014	2018	2018
1	Bokhtar	0.6	3.9	5.2	17.7	2.9
2	Vahdat	11.3	3.4	2.6	7.5	0.6
3	Dushanbe	3.0	1.5	14.5	2.8	0.0
4	Kulyab	7.5	1.2	10.0	5.7	1.3
5	Panjakent	3.8	2.8	15.0	5.1	0.0
6	Rudaki	0	2.9	0	3.5	1.1
7	Khorugh	10.7	2.5	5.3	4.4	0.0
8	Khujand	0	7.2	37.3	1.0	0.0

A-total treponema antibodies; B – total treponema antibodies; C-treponema and non-treponema antibodies

Main characteristics of SW based on the results of IBBS 2018:

- 98.4% of SW reported that they had sexual intercourse with at least one client in the last 30 days. Median number of clients was 9. At the same time the study identified that only 47.5% of SW have regularly used condoms with clients in the last 30 days.
    - 98.4% of SW/PLH had sexual intercourse with clients in the last 30 days, of them only 63.8% noted regular use of condoms with clients.

- When speaking about reasons for not always using condoms for all types of sexual intercourse in the last 30 days, majority of respondents (65.5%) noted that partner did not want to use a condom, and second top reason (14.3%) was not having a condom on them.

- Out of all SW, 13.0% stated that they had sexual intercourse with at least one casual partner in the last 30 days (median number of partners: 2), while less than half of SW (44.3%) mentioned always using condoms with casual sexual partners.

    - 11.1% of SW/PLH stated that they had sexual intercourse with casual sexual partners in the last 30 days, of them only 40.4% of study participants noted that they always used condoms with casual sexual partners.

- Share of SW, who reported having at least one of the listed STI symptoms in the last 6 months, varied significantly across sentinel sites from 11.6% in Dushanbe to 82.8% in Panjakent (across all sites it was 30.5%). Of the number of SW with STI symptoms almost two thirds (68.4%) have sought medical attention to treat STI.

- In 2018 prevalence of HIV among SW has decreased compared to 2014 from 3.5% to 3.2%.

- Prevalence of HIV among SW, who had history of using injection drugs (SW/PWID), was 9.1% across all sites, which is significantly higher than among SW, who denied using drugs – 3.1% ($p<0.001$).

- HIV prevalence among SW, who had sexual intercourse with PWID was statistically significantly higher than among SW, who had no intercourse with PWID (11.4% and 2.5%, respectively, $p<0.001$).

- HIV prevalence across all sites was 2.1% among SW below 25 years and 3.4% in the age group of 25 years and older. However, in Bokhtar, Vahdat, Kulyab and in Panjakent prevalence of HIV in the group below 25 years exceeded the indicator in the group of SW 25 years and older.

- 47.3% of SW in this study indicated having HIV test done in the last 12 months. Given the fact, that in 2018, 79% of previously estimated number of SW were tested for HIV using code 105 (14100), this may be an indirect indicator of greater real number of SW in the country.

- Only 12.0% of SW have correctly answered all questions on HIV transmission routes and HIV infection risk reduction. SW, who have correctly answered all questions on transmission routs and HIV infection risk reduction have more often reported regular use of condoms with any partners in the last 30 days compared to the SW, who did not have sufficient knowledge on HIV (30.6% compared to 17.6, $p<0.0001$).

- In the last 3 months, 41% of SW (indicator varied from 4.9% in Panjakent to 62.9% in Kulyab), have received at least two of three prevention service mentioned below:
    - Condoms
    - STI testing
    - Verbal information on reducing HIV infection risk or counselling on use of condoms and safe sex (through outreach services, in the drop-in center/friendly offices etc.);

- In the last three months, the following number of respondents indicated free receipt of the following items: 32.2% of SW (indicator varied from 11.9% in Dushanbe to 73.6% in Khorugh) indicated that they have received printed materials on prevention of HIV infection, 46.8% received condoms (from 5.8% in Panjakent to 73% in Khujand), 44.9% (from 17.6% in Bokhtar to 77.5% in Vahdat) have received verbal information on reducing HIV infection risk, including counselling on use of condoms and safe sex.

- Most frequently sited sources of information on HIV/AIDS were outreach workers (75.6%) and friendly offices (59.4%).

- In the last 12 months, most SW bought condoms in pharmacies (38.6%). Over one third of SW (36.3%) received condoms from outreach workers, employees of friendly offices and drop-in centers.

- Out of the number of PLH/SW, who knew their HIV-status, 87.2% received ART (from 64.3% in Dushanbe to 100% in Kulyab, Panjakent, Rudaki, Khorugh and Khujand). At the same time, 74.6% of the patients on ART had viral suppression (VL below 1000 copies/ml) (from 35.1% in Khorugh to 100% in Dushanbe).

8. CALCULATION OF THE ESTIMATED NUMBER OF PWID AND SW

8.1. MULTIPLIERS METHOD (RATIO)

To estimate the population of PWID/SW, multiplier method (ratio) was used. This method requires two independent sources of data, which account for the same unit of measurement (target population definition). One of these sources of data is administrative/healthcare statistical data, which register the target population, when providing certain services or during other types of contact. The second source is the results of the studies in population of PWID/SW, who are asked questions about receiving services in organizations, whose administrative/healthcare statistics (benchmarks) are used to estimate population size.

To calculate the estimate size benchmark is divided by the proportion of respondents from the sample, who have indicated use of services over certain timeframe within certain geographic boundaries.

Calculation formula S=N/P, where:

S = estimated size of populations (PWID/SW);

N = number of population representatives, who have received certain services (according to administrative/healthcare statistics);

P = proportion of study participants, who have responded during the study that they have received certain services.

Main assumptions of multiplier (ratio) method:

- Representatives of the population from two sources are similar, but independent (use of services does is not a defining criterion for participation in the survey);
- Sources of data are overlapping (sample should randomly include representatives of the target population, who have used certain services);
- Probability of population representatives to be included into one or the other source should be greater than zero;

- Study should be random and cover representatives of sub-populations, which use benchmark services, and population representatives that do not use the services, so it should opt for representativeness of the studied population;
- Administrative/healthcare statistical data should be group-specific and collected not by random methods.

Main requirements for applying multiplier method:

- Same definition of target population, geographic boundaries and timeframes in both sources;
- Possibility to isolate the target group in administrative/healthcare statistics;
- Eliminating double counting in administrative/healthcare statistics;
- The more multipliers, the better.

The same definition was followed when selecting the benchmark, however there can be errors related to quality of both statistical (benchmark), and IBBS data. Geographical boundaries of each sentinel site, where data was collected, were clearly defined. Multiplier method is used with direct questions related to own experience of the respondent (direct multiplier), and with indirect questions related to his immediate social environment (indirect multiplier). To improve the reliability of the results, it is recommended to use maximum possible number of multipliers. When drafting a questionnaire, data sources of administrative statistics were assessed to check their compliance with assumptions and requirements of the multiplier method.

Table 50. Sources of data to estimate population size of PWID, multiplier method

Name of multiplier	Sources of data	
	Statistical data	**IBBS results**
1. Number of PWID, registered in narcology register	**Republican clinical center of narcology of the Republic of Tajikistan:** Number of PWID of 18 years and above, who are registered in narcology register at each of the sentinel sites as of the end of 2018	Number of PWID from the sample, who have answered affirmatively to the following questions: **30)** are you registered in the Narcology clinic due to use of injection drugs? **31)** are you registered with the narcology in our district/city? (meaning the territory of the sentinel site).
2. PWID, newly registered in narcology register	**Republican clinical center of narcology of the Republic of Tajikistan:** Number of PWID of 18 years and above, registered in this sentinel site during 2017.	Number of PWID from the sample, who have said that they have been registered in narcology register in 2017 in response to the following question: **32)** in which year were you first registered in the narcology clinic in our city/district?

3. Coverage of PWID with HIV prevention programs	**Initial registration logs of the drop-in centers, which provide services to PWID** Number of PWID of 18 years and above, who have received HIV prevention services in this sentinel site from the beginning of 2018 until the field stage of IBBS.	Number of PWID from the sample, who have answered affirmatively to the following question: **82)** are you registered in (specify an organization from the list) for provision of services in 2018? *If the respondent is unable to answer the following question, he/she was asked, whether he/she used their unique identification code to get the services in 2018 on the territory of the district/city, where the study was conducted (meaning territory of the sentinel site).*
4. HIV rapid test testing of PWID	**RAC** Number of HIV rapid tests for PWID (VCT data base, including all sources of data on rapid testing of PWID) on the territory of individual sentinel sites in the 12 months prior to the field stage of IBBS.	Number of PWID from the sample, who have specified getting HIV rapid test in the 12 months, prior to the field stage of IBBS. **76)** how many times have you been HIV tested with rapid method in our city/district in the last 12 months (blood sample drawn from the finger with quick result)? *Given the opportunity of multiple tests in the reporting period, one should consider the ratio of repeats, which is an average value of this variable among the studied respondents (ratio of the total number of HIV rapid tests based on the answers of respondents to the total number of respondents, who have said that they have been HIV tested using rapid method in 12 months before the field stage of IBBS).*
5. Number of PWID acquaintances, who are registered in narcology register	**Republican clinical center of narcology of the Republic of Tajikistan:** Number of PWID of 18 years and above, registered in narcology register at each of sentinel site as of the end of 2018.	PWID were asked the following questions: **42)** how many acquaintances you have now, who use drugs through syringe, who are not in prison and live in our district/city (you know each other's names, you have seen them or talked on the phone in the last 12 months)? **43)** how many of these acquaintances are registered in narcology clinic of our city/district?

Table 51. Sources of data to estimate the size of SW population, multiplier method.

Name of the multiplier	Data sources	
	Statistical data	**IBBS results**
1. Number of SW, who	**Registration logs for visits to**	Number of SW from the sample,

have received free condoms in organizations, which provide SW-focused services	**the friendly offices, which provide services to SW** Number of SW of 18 years and above, who have received free condoms in 3 months prior to the field stage of IBBS.	who have answered affirmatively to the following question: **62c)** Have you received free condoms in 3 months prior to the study participation date
2. HIV rapid testing for SW in AIDS center, friendly office or by mobile team	**RAC** Number of HIV rapid tests of SW (VCT data base, including sources of data on testing of SW with rapid method in AIDS centers, friendly offices and by mobile teams) on the territory of individual sentinel sites in 2018.	Number of SW from the sample, who have indicated that they had HIV rapid test in 2018. **75)** Did you have an HIV rapid test in AIDS center, friendly office or with mobile team in this city/district in 2018?
3. HIV rapid testing of SW	**RAC** Number of HIV rapid tests for SW (VCT data base, including sources of data on testing of SW with rapid method) on the territory of individual sentinel sites in 12 months prior to the field stage of IBBS.	Number of SW from the sample, who have specified getting HIV rapid test in the 12 months, prior to the field stage of IBBS. **68)** how many times have you been HIV tested with rapid method in our city/district in the last 12 months (blood sample drawn from the finger with quick result)? *Given the opportunity of multiple tests in the reporting period, one should consider the ratio of repeats, which is an average value of this variable among the studied respondents (ratio of the total number of HIV rapid tests based on the answers of respondents to the total number of respondents, who have said that they have been HIV tested using rapid method in 12 months before the field stage of IBBS).*

8.1.1. RESULTS, RECEIVED USING MULTIPLIER METHOD

8.1.1.1. PWID

Results, obtained using multiplier methods by sentinel sites for PWID are presented below (tables 52-56).

Multiplier №1: Number of PWID, registered in narcology clinics

N – number of PWID of 18 years and above, registered in narcology clinic as of 31.12.2017 within the boundaries of individual sentinel sites.

P – proportion of PWID from the sample, who have affirmatively answered **question 31** “Are you registered with narcologist in our city/district?”

Table 52. Multiplier №1: Number of PWID, who are registered in narcology clinic.

Sentinel site	Sample	Number and weighted proportion of PWID from the sample, who have given affimative response to the questions: 30) Are you registered in narcology clinic due to injection drugs use? 31) are you registered with narcologist in our city/district?				Benchmark for multiplier №1: Number of PWID ≥ 18 years, registered in narcology register as of 31.12.18?	Population size		
		Number	Average proportion	min. proportion (95% CI)	max. proportion (95% CI)		Average estimate	Max. estimate (95% CI)	Min. estimate (95% CI)
			P average	P min.	P max.	N			
Dushanbe	500	145	25.2%	20.7%	29.7%	1,435	5,694	6,932	4,832
Rudaki	240	73	29.0%	23.3%	35.0%	110	379	472	314
Vahdat	200	70	30.0%	23.1%	37.1%	131	437	567	353
Kulyab	350	217	54.3%	47.8%	60.8%	319	587	667	525
Bokhtar	350	123	30.3%	25.9%	34.7%	140	462	541	403
Khorugh	350	179	46.5%	41.2%	51.8%	189	406	459	365
Panjakent	200	70	34.0%	27.8%	40.7%	84	247	302	206
Khujand	200	55	23.4%	16.0%	31.2%	323	1,380	2,019	1,035

Multiplier №2: Number of PWID, first registered in narcology clinics in 2017.

N – number of PWID of 18 years and above, first registered in narcology register in the sentinel site in 2017.

P – proportion of PWID from the sample, who have said that they were first registered in 2017 to the **question 32** "In which year were you first registered in the narcology clinic?"

Table 53. Multiplier №2: Number of PWID, first registered in narcology register.

Sentinel site	Sample	Number and weighted proportion of PWID from the sample, who said they were first registered in 2017 in this district/city?				Benchmark for №2: Number of PWID ≥ 18 years, first registered in this sentinel site in 2017.	Population size		
		Number	Average proportion	min. proportion (95% CI)	max. proportion (95% CI)		Average estimate	Max. estimate (95% CI)	Min. estimate (95% CI)
			P average	P min.	P max.	N			
Dushanbe	500	5	0.6%	0.06%	1.0%	24	4,000	40,000	2,400
Rudaki	240	11	4.7%	2.2%	7.1%	43	915	1,955	606
Vahdat	200	34	13.3%	8.7%	17.9%	122	917	1,402	682
Kulyab	350	5	1.7%	0.026%	3.5%	8	471	30,769	229
Bokhtar	350	20	5.5%	3.3%	7.7%	24	436	727	312
Khorugh	350	13	4.5%	2.1%	7.0%	20	444	952	286
Panjakent	200	4	1.5%	0.6%	2.4%	6	400	1,071	250
Khujand	200	3	0.7%	-0.1%	1.6%	7	1,000	-7,000	438

Multiplier №3: Coverage of PWID with HIV prevention programs.

N – number of PWID of 18 years and above, who have received HIV prevention services on the territory of sentinel site since the beginning of 2018 until the start of field stage of IBBS.

P – proportion of PWID from the sample, who have given affirmative response to **question 82** "Are you registered in (specify organization from the list) for receipt of services in 2018?"

If the respondent is unable to answer this question, he/she was asked, whether he/she used their unique identification code to get the services in 2018 on the territory of the district/city, where the study was conducted (meaning territory of the sentinel site).

Table 54. Multiplier №3: Coverage of PWID with HIV prevention programs

Sentinel site	Sample	Number and weighted proportion of PWID from the sample, who have given affirmative response to question 82 "Are you registered in (specify organization from the list) to get services in 2018"				Benchmark for multiplier №3: Number of PWID ≥ 18 years, who have received HIV prevention services within the boundaries of sentinel site since the beginning of 2018 until the start of the field stage of IBBS.	Population size		
		Number	Average proportion	min. proportion (95% CI)	max. proportion (95% CI)		Average estimate	Max. estimate (95% CI)	Min. estimate (95% CI)
			P average	P min.	P max.	N			
Dushanbe	500	180	33.0%	28.4%	37.5%	1,912	5,794	6,732	5,099
Rudaki	240	56	22.5%	17.2%	27.7%	215	956	1,250	776
Vahdat	200	90	44.5%	34.2%	54.8%	591	1,328	1,728	1,078
Kulyab	350	329	95.4%	93.3%	97.4%	1,440	1,509	1,543	1,478
Bokhtar	350	238	61.2%	55.1%	67.1%	425	694	771	633
Khorugh	350	94	23.3%	19.8%	26.8%	705	3,026	3,561	2,631
Panjakent	200	138	68.2%	61.4%	75.0%	620	909	1,010	827
Khujand	200	78	32.0%	25.2%	40.3%	849	2,653	3,369	2,107

Multiplier №4: Rapid HIV testing for PWID.

N – Number of HIV rapid tests for PWID (VCT data base, including all sources of data on rapid testing of PWID) on the territory of individual sentinel sites in the 12 months prior to the field stage of IBBS.

P – Number of PWID from the sample, who have specified getting HIV rapid test in the 12 months, prior to the field stage of IBBS, in response to **question 76:** how many times have you been HIV tested with rapid method in our city/district in the last 12 months (blood sample drawn from the finger with quick result)?

Given the opportunity of multiple tests in the reporting period, one should consider the ratio of repeats, which is an average value of this variable among the studied respondents (ratio of the total number of HIV rapid tests based on the answers of respondents to the total number of respondents, who have said that they have been HIV tested using rapid method in 12 months before the field stage of IBBS).

Table 55. Multiplier №4: HIV rapid testing for PWID.

Sentinel site	Sample	Number and weighted proportion of PWID from the sample, who indicated that they had HIV rapid test in 12 months prior to the field stage of IBBS within the boundaries of sentinel site (blood drawn from the finger with quick results).				Average number of HIV tests	Benchmark for multiplier №4: Number of HIV rapid tests for PWID ≥ 18 years in 12 months prior to the beginning of field stage of IBBS	Population size		
		Number	Average proportion	min. proportion (95% CI)	max. proportion (95% CI)			Average estimate	Max. estimate (95% CI)	Min. estimate (95% CI)
			P average	P min.	P max.		N			
Dushanbe	500	336	0.66	0.61	0.71	1.4	2,162	2,347	2,544	2,178
Rudaki	240	111	0.47	0.41	0.54	1.6	156	207	238	181
Vahdat	200	155	0.75	0.68	0.83	1.4	986	939	1,036	849
Kulyab	350	146	0.34	0.29	0.39	2.0	1,601	2,354	2,760	2,053
Bokhtar	350	198	0.52	0.47	0.57	1.8	351	375	415	342
Khorugh	350	272	0.76	0.71	0.80	2.0	159	105	112	99
Panjakent	200	99	0.48	0.42	0.55	1.7	1,099	1,347	1,539	1,175
Khujand	200	123	0.55	0.43	0.67	1.9	1,832	1,753	2,242	1,439

Multiplier №5: number of PWID acquaintances, registered in narcology clinic

N – number of PWID of 18 and above, registered in narcology clinic as of 31.12.2017 within the boundaries of individual sentinel sites.

P – proportion of PWID registered in narcology clinic out of the total number of PWID "acquaintances".

To calculate this proportion, a new variable is introduced – proportion of "acquaintances", who are registered in narcology clinic: total number of "acquaintances". Registered in narcology clinic (responses to question 43) is divided by the total number of PWID acquaintances (responses to question 42).

Table 56. Multiplier №5: Number of PWID acquaintances, registered in narcology clinic

Sentinel site	Sample	Proportion of PWID registered in narcology clinic out of the total number of PWID "acquaintances".	Benchmark for multiplier №1: Number of PWID ≥ 18 years, registered in narcology clinic as of 31.12.18?	Population size
-	-	P	N	S
Dushanbe	500	41.1%	1,435	3,491
Rudaki	240	66.0%	110	167
Vahdat	200	73.1%	131	179
Kulyab	350	46.0%	319	693
Bokhtar	350	38.5%	140	364
Khorugh	350	85.0%	189	222
Panjakent	200	52.0%	84	162
Khujand	200	31.0%	323	1,042

8.1.1.2. SW

Below you will see results, received by using multiplier method by sentinel sites for SW (tables 57-59).

Multiplier №1: SW, who have received free condoms in organizations that provide SW-focused services

N – number of SW of 18 years and above, who have received free condoms in 3 months prior to the field stage of IBBS.

P – proportion of SW from the sample, who have given affirmative response to **question 62c** "Have you received free condoms in 3 months prior to your participation in the study"

Table 57. Multiplier №1: SW, who have received free condoms in organizations that provide SW-focused services

Sentinel site	Sample	Number and weighted proportion of SW from the sample, who have given affirmative response to question 62c "have you received free condoms in 3 months prior to participation in the study"				Benchmark for multiplier №1: Number of SW ≥ 18 years, who have received free condoms in 3 months prior to the start of field stage of the IBBS	Population size		
		Number	Average proportion	min. proportion (95% CI)	max. proportion (95% CI)		Average estimate	Max. estimate (95% CI)	Min. estimate (95% CI)
			P average	P min.	P max.	N			
Dushanbe	500	208	38.9%	35.2%	42.7%	1,550	3,985	4,403	3,630
Rudaki	200	It was not possible to use this Multiplier, because there are no organizations in this area that provide SW-focused services							
Vahdat	200		45.5%	38.6%	52.3%	263	578	681	503
Kulyab	350	247	68.1%	63.6%	72.5%	903	1,326	1,420	1,246
Bokhtar	350	92	25.9%	21.6%	30.2%	655	2,529	3,032	2,169
Khorugh	160	It was not possible to use this Multiplier, because there are no organizations in this area that provide							

Panjakent	214	SW-focused services							
Khujand	200	155	73.1%	63.1%	83.0%	1,099	1,503	1,742	1,324

Multiplier №2: HIV rapid testing of SW in AIDS center, friendly office or by mobile team

N – number of HIV rapid testing for SW (pre-counselling testing database, including sources of data on rapid testing of SW in AIDS centers, friendly offices and by mobile teams) on the territory of individual sentinel sites in 2018.
P – proportion of SW from the sample, who have indicated that they had HIV rapid test in 2018 in response to **question 75** "Have you had HIV rapid test in AIDS center, friendly office or by mobile team in this district/city in 2018"?

Table 58. Multiplier №2: HIV rapid testing of SW in AIDS center, friendly office or by mobile team

Sentinel site	Sample	Number and weighted proportion of SW from the sample, who have indicated HIV rapid testing in AIDS center, friendly office or by mobile team within the boundaries of sentinel sites in 2018.				Benchmark for multiplier №2: Number of HIV rapid tests of SW ≥ 18 years in AIDS centers, friendly offices and by mobile teams on the territory of individual sentinel sites in 2018.	Population size		
		Number	Average proportion P average	min. proportion (95% CI) P min.	max. proportion (95% CI) P max.	N	Average estimate	Max. estimate (95% CI)	Min. estimate (95% CI)
Dushanbe	500	67	13.3%	10.7%	15.9%	453	3,406	4,234	2,849
Rudaki	200	14	4.8%	2.9%	6.8%	35	729	1,207	515
Vahdat	200	1	0.4%	0.01%	0.7%	169	42,250	1,300,	24,143
Kulyab	350	52	13.0%	10.1%	16.0%	323	2,485	3,198	2,019
Bokhtar	350	6	1.4%	0.5%	2.2%	128	9,143	25,600	5,818
Khorugh	160	1	0.6%	0.6%	0.6%	46	7,404	7,405	7,405
Panjakent	214	3	1.4%	0.9%	2.0%	15	1,071	1,667	750
Khujand	200	25	14.4%	7.7%	21.0%	386	2,681	5,013	1,838

Multiplier №3: HIV rapid testing for SW in the last 12 months.

N – Number of HIV rapid tests for SW (VCT data base, including all sources of data on rapid testing of PWID) on the territory of individual sentinel sites in the 12 months prior to the field stage of IBBS.
P – Number of SW from the sample, who have specified getting HIV rapid test in the 12 months, prior to the field stage of IBBS, in response to **question 68:** how many times have you been HIV tested with rapid method in our city/district in the last 12 months (blood sample drawn from the finger with quick result)?"

Given the opportunity of multiple tests in the reporting period, one should consider the ratio of repeats, which is an average value of this variable among the studied respondents (ratio of the total number of HIV rapid tests based on the answers of respondents to the total number of respondents, who have said that they have been HIV tested using rapid method in 12 months before the field stage of IBBS).

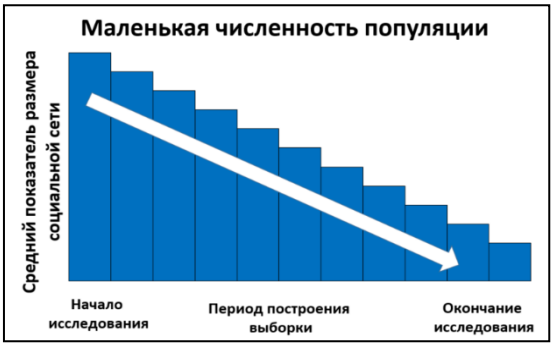
Table 59. Multiplier №3: HIV rapid testing for SW in the last 12 months

Sentinel site	Sample	Number and weighted proportion of PWID from the sample, who have indicated that they had HIV rapid test done within 12 months prior to start of IBBS field stage within the boundaries of sentinel site (blood drawn from the finger with quick results).				Average number of HIV tests	Benchmark for multiplier №4: Number of HIV rapid tests for ≥ 18 years in the last 12 months prior to the beginning of the field stage of IBBS	Population size		
		Number	Average proportion	min. proportion (95% CI)	max. proportion (95% CI)			Average estimate	Max. estimate (95% CI)	Min. estimate (95% CI)
			P average	P min.	P max.		N			
Dushanbe	500	201	0.39	0.34	0.43	1.4	2,488	4,340	4,978	3,936
Rudaki	200	45	0.20	0.16	0.25	1.2	68	268	335	214
Vahdat	200	37	0.20	0.15	0.25	1.0	611	2,910	3,879	2,328
Kulyab	350	222	0.61	0.56	0.66	2.0	1,700	1,393	1,518	1,288
Bokhtar	350	161	0.44	0.40	0.49	1.0	355	761	837	683
Khorugh	160	68	0.42	0.42	0.43	1.1	83	178	180	175
Panjakent	214	5	0.023	0.018	0.027	1.6	22	598	764	509
Khujand	200	152	0.75	0.67	0.83	1.8	1,238	902	1,010	815

8.2. ESTIMATION OF POPULATION SIZE USING RDS-A

RDS-A has population estimation function (Estim.), based on the sampling sequence (SS). Estimation by sampling sequence (SS-Estim.) is an effective method to estimate population groups, which are difficult to reach. Data from RDS studies (respondent-driven sample) is used for these purposes. SS-Estimates allow to estimate population size without using other methods, such as double sampling, multipliers method etc. This is related to the fact that RDS data contains information on the size of social network.

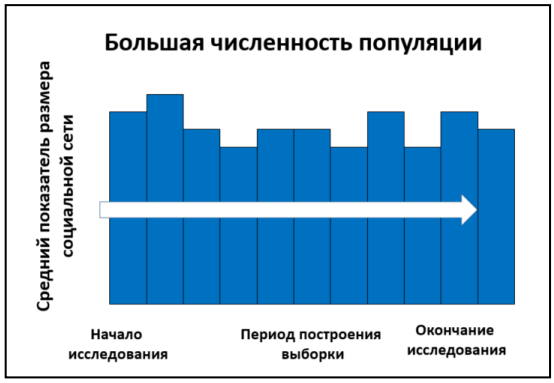
Figure 80. Changes in average size of social network with low population size



An assumption of this method is the fact that people with broader social network are more "noticeable" among people from the same population, there is greater chance of them being attracted to participate in the study at earlier stages. Changes in the size of social network along the sequence of waves can indicate population size. RDS-A analyzes built sequence of the social network sizes to estimate population size. When conducting RDS studies, during sample building, decrease in the average size of social network from the first wave to the next ones implies reduction of the representatives of the studied population with big social network, hence indicating small population size (Figure 80). RDS studies, where there is an insignificant reduction in the average size of social network with increase in the number of waves, imply that there is no reduction in number of representatives with big/wide social network, therefore one can assume greater population size (Figure 81).

The following information is required for the SS-Estim. method:

Figure 81. Change in average size of soicla network with small population size



- Size of social network of study participants (respondents provide this information during interview);
- Date of participation in the study;
- Maximum number of coupons that were given to the participants;
- Available population size estimates;

This method uses size of social network to calculate the probability of being included in the sample. Information on the size of social network is provided by the participants themselves and is subject to such biases, as rounding the answers, i.e. some respondents round their responses to 5, 10, or 20 instead of giving more precise answers, such as 6, 9, 11, 19. Other frequent bias is the fact that some respondents over- or underestimate the size of their social network.

In RDS-A both data on the size of social network, collected during the study, and function "calculated prominence/calculated probability of being included in the sample" can be used, when applying SS-Estimation to assess "prominence" (probability of being included in the sample) of each respondent. The process for calculating the probability of being included in the sample is based on the measurement error model, which corrects errors in information about the size of social network, provided by respondents themselves. To use "calculated prominence" function, the following data is needed:

- Size of social network, as stated by the participants of the study;
- Number of coupons, which were given to the participants for dissemination;
- Time between issuance of coupons and participation of the respondents in the study (based on the variable "date of participation in the study")

So, SS-Estimation function calculates population estimates based on two factors:

- Available data on population estimates;
- Data, collected during this study, including the following:
  - Size of social network of study participants;
  - Sequence of attracting respondents to participate in the study.

8.2.1. PWID

Table 60. Results of population estimation, obtained through sample sequence based on the size of social network

Sentinel site	Sample	Population							
		Average	Median	Mode	25.0%	75.0%	90.0%	2.50%	97.50%
Dushanbe	500	923	**893**	859	814	988	1,113	694	1,386
Rudaki	240	438	**384**	335	335	473	623	286	928
Vahdat	200	828	**719**	596	530	1,017	1,446	277	1,987
Kulyab	350	463	**457**	449	435	486	515	394	559
Bokhtar	350	473	**462**	449	432	500	556	389	607
Khorugh	350	543	**527**	522	497	572	628	446	704
Panjakent	200	381	**341**	309	291	424	534	240	766

Khujand	200	217	**217**	215	210	221	227	204	237

Table 61. Results of population estimation through sample sequence based on the *calculated prominence/calculated probability of being included in the sample*

Sentinel site	Sample	Population							
		Average	Median	Mode	25.0%	75.0%	90.0%	2.50%	97.50%
Dushanbe	500	2,435	**2,198**	1,665	1,511	3,159	4,310	699	5,166
Rudaki	240	727	**583**	444	439	850	1,317	280	2,117
Vahdat	200	743	**615**	485	455	915	1,334	257	1,887
Kulyab	350	582	**515**	453	446	629	846	386	1,210
Bokhtar	350	453	**423**	393	393	474	552	363	745
Khorugh	350	623	**572**	517	492	699	871	358	1,174
Panjakent	200	430	**355**	307	288	478	702	213	1,169
Khujand	200	382	**327**	267	275	412	558	231	930

8.2.2. SW

Table 62. Results of population estimation through sample sequence on the basis of social network size

Sentinel site	Sample	Population							
		Average	Median	Mode	25.0%	75.0%	90.0%	2.50%	97.50%
Dushanbe	500	2,678	2,336	1,709	1,676	3,496	4,672	938	5,687
Rudaki	200	236	230	223	220	243	264	208	294
Vahdat	200	374	336	286	289	411	506	236	756
Kulyab	350	2,885	2,958	4,408	2,174	3,689	4,124	947	4,339
Bokhtar	350	427	408	396	387	446	504	367	629
Khorugh	160	160	160	160	160	160	160	160	160
Panjakent	214	315	313	313	296	329	378	247	411
Khujand	200	1,378	1,397	1,383	1,028	1,764	2,007	443	2,132

Table 63. Results of population estimation through sample sequence, on the basis of calculated prominence/calculated probability of being included in the sample

Sentinel site	Sample	Population							
		Average	Median	Mode	25.0%	75.0%	90.0%	2.50%	97.50%
Dushanbe	500	1,467	1,238	1,010	960	1,759	2,419	605	3,740
Rudaki	200	440	327	266	266	459	774	208	1,461
Vahdat	200	400	333	270	270	439	606	208	923
Kulyab	350	1,111	894	756	695	1,244	1,983	427	3,352
Bokhtar	350	486	446	437	408	508	620	367	916
Khorugh	160	174	173	173	169	178	187	160	205
Panjakent	214	223	214	214	214	230	247	214	263
Khujand	200	928	838	609	599	1,180	1,573	324	1,946

As opposed to using information about the size of social network, provided by the respondents themselves, estimation with “calculated prominence/calculated probability of being included in the sample” takes into account several errors, which is the reason for greater spread of the estimation results. Therefore, many researchers recommend using “calculated prominence/calculated probability of being included in the sample” instead of information about the size of social network, when calculating population estimates, using SS-estimation.

8.3. POPULATION ESTIMATION, USING UNIQUE OBJECT

Multiplier with unique object: mathematically it is the same thing that services multiplier. The main difference is that instead of counting the number of representatives of key population, who have used certain service, number of unique objects, distributed among studied population is used. To use this method, prior to the field stage of the study, the researchers have

distributed unique objects among members of studied population. In particular, the following steps were done:

- A question was included in the questionnaire about whether respondent received certain object at certain time from certain person.
- Based on the results of the survey of key informants during formative study among PWID and SW, decision was made to disseminate keychain flashlights and hair clips as unique objects to the representatives of PWID and SW, respectively.
- 1-2 weeks prior to the start of IBBS, outreach workers from partners NGOs started distributing unique objects among PWID and SW separately at each sentinel site. Before distributing the objects, outreach workers checked the compliance with inclusion criteria to ensure that the individuals, who received it, will have a chance to be included in the IBBS sample. Outreach workers also checked, whether a representative of key population has already received the unique object from other outreach worker. This was done to eliminate repeat distribution of the object to the same representative of studied populations (PWID and SW). Each individual, who received the object, was asked to keep or remember the object and do not transfer it to anyone. All outreach workers had the same easy to remember scarves, which should have helped the receivers of unique object, which were included in IBBS sample, to remember, from whom they got this object. Locations for dissemination of unique objects were identified during formative study.

To calculate the estimated number of PWID and SW, using this method, total number of distributed objects is divided by proportion of respondents in the sample, who have indicated that they have received this object, when it was distributed by staff of the study.

N=n/p, where:

N is the estimated size of key population; **n** = is number of unique objects, disseminated before the start of the study; **p** = proportion of the respondents in the study, who have indicated that they have received this object, when it was distributed by the staff of the study. For example, if 1000 objects **(n)** were distributed among PWID at certain sentinel site and 10% of respondents **(p)** of an RDS study, done at the same site, have noted that they have received this object, then we divide n (1000) by p (0.10) and get 10000 as estimate of key population at this sentinel site.

The tables below (table 64 for PWID and table 65 for SW) indicate achieved sample (B), number (C) and weighted proportions with 95%CI (D, E, F) of the respondents, who have indicated during the survey, that they have received unique object before the start of the study, number of unique objects distributed (G) and population estimates for these groups (PWID and SW) with 95%CI under this method (H, I, J). Unfortunately, population estimation with this method was not done in Dushanbe, Kulyab and Khujand due to distribution of an incorrect number of unique objects (number of distributed unique objects was significantly less than the expected sample size).

Table 64. Results of PWID estimation using unique object method

Sentinel site	Sample	Number and weighted proportion of PWID from the sample, who responded that they have received unique object before the start of the study (Question 83).				Number of unique objects dissemin ated	Population size		
		Numb er	average proportion	min. proportion (95% CI)	max. proportion (95% CI)		Average estim.	Max. estim (95% CI)	Min. estim. (95% CI)

			p (average)	p (min.)	p (max.)	n	N average. = n/p (average)	N max. = n/p (max)	N min. = n/p (min)
A	B	C	D	E	F	G	H	I	J
Dushanbe	It was impossible to use this method, because incorrect number (significantly less than expected sample size) of unique objects was given for distribution								
Rudaki	240	64	25.0%	20.0%	30.0%	120	480	600	400
Vahdat	200	135	68.4%	62.0%	74.7%	331	484	534	443
Kulyab	It was impossible to use this method, because incorrect number (significantly less than expected sample size) of unique objects was given for distribution								
Bokhtar	350	156	43.4%	38.4%	48.5%	188	433	490	388
Khorugh	350	101	28.0%	24.0%	32.0%	274	979	1,142	856
Panjakent	200	143	68.5%	62.1%	75.0%	487	711	784	649
Khujand	It was impossible to use this method, because incorrect number (significantly less than expected sample size) of unique objects was given for distribution								

Table 65. Results of SW estimation using unique object method

Sentinel site	Sample	Number and weighted proportion of SW from the sample, who responded that they have received unique object before the start of the study (Question 76).				Number of unique objects disseminated	Population size		
		Number	average proportion	min. proportion (95% CI)	max. proportion (95% CI)		Average estim.	max. estim. (95% CI)	min. estim (95% CI)
			p (average)	p (min.)	p (max.)	n	N average. = n/p (average)	N max. = n/p (max)	N min. = n/p (min)
A	B	C	D	E	F	G	H	I	J
Dushanbe	It was impossible to use this method, because incorrect number (significantly less than expected sample size) of unique objects was given for distribution								
Rudaki	200	66	33.0%	27.0%	39.1%	200	606	741	512
Vahdat	200	177	88.0%	83.9%	92.1%	222	252	265	241
Kulyab	It was impossible to use this method, because incorrect number (significantly less than expected sample size) of unique objects was given for distribution								
Bokhtar	350	68	19.2%	15.0%	23.4%	206	1,073	1,373	880
Khorugh	160	65	40.5%	40.0%	41.1%	64	158	160	156
Panjakent	214	203	95.4%	94.0%	96.7%	244	256	260	252
Khujand	It was impossible to use this method, because incorrect number (significantly less than expected sample size) of unique objects was given for distribution								

8.4. PARTICIPATION IN SIMILAR STUDY DONE IN 2014

IBBS among PWID and SW in 2014 was done in all cities/districts, where IBBS 2018 was done. The tables below (table 66 for PWID and table 67 for SW) list achieved sample (B), number (C) and weighted proportions with 95%CI (D, E, F) of those respondents, who have indicated during the survey, that they have participated in a similar study in 2014, sample size of IBBS 2014 (G) and estimated size of studied populations (PWID and SW) with 95%CI under this method (H, I, J).

Table 66. Results of using method of checking participation in a similar study in 2014 for PWID

Sentinel site	Sample	Number and weighted proportion of PWID from the sample, who gave affirmative response to question 81 "Have you participated in the same study about 4 years ago" (invitation with coupons, questions on drug use and drawing blood from the finger)"?				Benchmark: Sample (PWID ≥ 18 years) IBBS 2014	Population size		
		Number	average proportion	min. proportion (95% CI)	max. proportion (95% CI)		Average estim.	max. estim. (95% CI)	min. estim (95% CI)
			p (average)	p (min.)	p (max.)	n	N average. = n/p (average)	N max. = n/p (max)	N min. = n/p (min)
A	B	C	D	E	F	G	H	I	J
Dushanbe	500	35	5.9%	3.8%	8.0%	400	6,780	10,526	5,000
Rudaki	240	20	8.8%	5.6%	12.0%	110	1,250	1,964	917
Vahdat	200	7	5.0%	1.3%	9%	180	3,600	13,846	2,093
Kulyab	350	147	36.8%	30.6%	43%	230	625	752	536
Bokhtar	350	17	3.8%	2.2%	5.4%	160	4,211	7,273	2,963
Khorugh	350	94	23.5%	19.9%	27.0%	240	1,021	1,206	889
Panjakent	200	18	9.3%	5.6%	12.9%	120	1,290	2,143	930
Khujand	200	17	6.0%	2.8%	9%	200	3,333	7,143	2,151

Table 67. Results of using method checking participation in similar study in 2014 for SW

Sentinel site	Sample	Number and weighted proportion of SW from the sample, who gave affirmative response to question 74 "Have you participated in the same study about 4 years ago (questions on provision of sexual services and drawing blood from the finger)"?				benchmarks: Sample (SW ≥ 18 years) IBBS 2014	Population size		
		Number	average proportion	min. proportion (95% CI)	max. proportion (95% CI)		Average estim.	max. estim. (95% CI)	min. estim (95% CI)
			p (average)	p (min.)	p (max.)	n	N average. = n/p (average)	N max. = n/p (max)	N min. = n/p (min)
A	B	C	D	E	F	G	H	I	J
Dushanbe	500	3	0.55%	0.03%	1.06%	300	54,545	909,091	28,302
Rudaki	200	16	5.6%	3.5%	7.70%	80	1,429	2,286	1,039
Vahdat	200	4	1.9%	0.50%	3.2%	115	6,053	23,000	3,594
Kulyab	350	51	13.1%	10.0%	16.1%	120	916	1,200	745
Bokhtar	350	This method was not used in Bokhtar city, because none of the participants said that they have participated in similar study in 2014. Researchers suppose that this is due to a data collection error.							
Khorugh	160	34	21.2%	20.7%	21.7%	75	354	362	346
Panjakent	214	1	0.5%	0.3%	0.6%	80	16,000	26,667	13,333
Khujand	200	12	2.8%	1.2%	4.3%	110	3,929	9,167	2,558

8.5. RANKING AND SELECTION OF ESTIMATIONS, OBTAINED THROUGH DIFFERENT MULTIPLIERS AND METHODS

After completion of data collection stage, meetings of the working group were organized to conduct estimation of PWID and SW population sizes. The following was discussed during the first meeting of the working group: results of the previous estimates and lessons learned; sources and collection of administrative/healthcare statistics (benchmarks) for multipliers; weaknesses and strengths of the methods, which were proposed for this estimation; compliance with methodological conditions and impact on the results; expected biases.

After conducting the estimation using different methods, all values obtained were ranked in the ascending order (see Table 68 D-K for PWID and table 69 D-I for SW). Then, values that the working group deemed obviously overestimated or underestimated were excluded. Values, which were close to 110% of coverage of the representatives of key population with prevention programs at each individual sentinel site were considered underestimated (see table 68 C for PWID and table 69 C for SW). In turn, overestimated results were identified by experts (specialists of republican, regional, district AIDS centers, and specialists of local and international NGOs, which work with this population). None of the results obtained can be considered absolutely reliable and accurate due to influence of various factors. After excluding obviously overestimated and underestimated values, median value was calculated for the remaining set of values (see table 68 Q for PWID and table 69 N for SW), which was then accepted as the estimated number of PWID and SW. Minimal value was identified as lower boundary of the estimate (see table 68 R for PWID and table 69 O for SW) and maximum value was identified as upper boundary (see table 68 S for PWID and table 69 P for SW) of the estimated number of PWID and SW in each individual sentinel site.

For instance, for Rudaki district, nine values were received when estimating number of PWID, using different multipliers and methods (see table 68 D-K). After excluding all values below 237 (see table 68 C / 110% coverage of the representatives of key population with prevention programs in Rudaki) and values above 1000 (which was deemed upper boundary of PWID estimates), five values remained, varying from 379 to 956 (see table 68 L-P). Median value was calculated for these values (583), which was then recognized as PWID estimate in Rudaki. Lower and upper boundaries were chosen as minimum (379) and maximum (956) numbers, which remained after excluding obviously overestimated and underestimated values.

Table 68. Ranking estimation values, exclusion of underestimated and overestimated values, finding median value, lower and upper boundaries of the PWID estimates

Cities/districts		#	Dushanbe	Rudaki	Vahdat	Kulyab	Bokhtar	Khorugh	Panjakent	Khujand
Coverage with prevention programs		A	1,912	215	591	1,440	425	705	620	849
10% of coverage with prevention programs		B	191	22	59	144	43	71	62	85
Minimal supposed estimated population size		C	2,103	237	650	1,584	468	776	682	934
Ranking estimation data, received with different multipliers and methods	1	D	2,198	167	179	471	364	105	162	327
	2	E	2,347	207	437	515	375	222	247	1,000
	3	F	3,491	379	484	587	423	406	355	1,042
	4	G	4,000	480	615	625	433	444	400	1,380
	5	H	5,694	583	917	693	436	572	711	1,753
	6	I	5,794	915	939	1,509	462	979	909	2,653
	7	J	6,780	956	1,328	2,354	694	1,021	1,290	3,333
	8	K		1,250	3,600		4,211	3,026	1,347	
Selected estimates (based on expert opinion)	1	L	2,198	379	615	1,509	462	979	711	1,000
	2	M	2,347	480	917	2,354	694	1,021	909	1,042
	3	N	3,491	583	939					1,380
	4	O	4,000	915	1,328					
	6	P		956						

Estimates	**Median**	Q	2,919	583	928	1,932	578	1,000	810	1,042
	Lower boundary	R	2,198	379	615	1,509	462	979	711	1,000
	Upper boundary	S	4,000	956	1,328	2,354	694	1,021	909	1,380

Table 69. Ranking estimation values, exclusion of underestimated and overestimated values, finding median value, lower and upper boundaries of the SW estimates

Cities/districts		#	**Dushanbe**	**Rudaki**	**Vahdat**	**Kulyab**	**Bokhtar**	**Khorugh**	**Panjakent**	**Khujand**
Coverage with prevention programs		A	1,550	No info.	263	986	793	No info.	No info.	1,099
10% of coverage with prevention programs		B	155	No info.	26	99	79	No info.	No info.	110
Minimal supposed estimated population size		C	1,705	No info.	289	1,085	872	No info.	No info.	1,209
Ranking estimation data, received with different multipliers and methods	**1**	D	1,238	268	252	894	446	158	214	838
	2	E	3,406	327	333	916	761	173	256	902
	3	F	3,985	606	578	1,326	1,073	178	598	1,503
	4	G	4,340	729	2,910	1,393	2,529	354	1,071	2,681
	5	H	54,545	1,429	6,053	2,485	9,143	7,404	16,000	3,929
	6	I			42,250					
Selected estimates (based on expert opinion)	**1**	J	3,406	268	333	1,326	1,073	173	214	1,503
	2	K	3,985	327	578	1,393	2,529	178	256	2,681
	3	L	4,340	606				354	598	
	4	M		729						
Estimates	**Median**	N	3,985	467	456	1,360	1,801	178	256	2,092
	Lower boundary	O	3,406	268	333	1,326	1,073	173	214	1,503
	Upper boundary	P	4,340	729	578	1,393	2,529	354	598	2,681

No information – there is no information for these cities/districts on coverage with HIV prevention programs, because there are no organizations, which provide SW-focused services in these locations.

8.6. ANALYZING SAMPLE FROM THE STANDPOINT OF AGE AND GENDER DISTRIBUTION, USING THIS DATA FOR PWID ESTIMATES (LOWER BOUNDARY/MEDIAN/UPPER BOUNDARY)

The next stage of estimating the size of studied populations (PWID and SW) was analysis of the sample in relation to age and gender distribution for PWID population and age distribution for SW population. Annexes 3 and 4 contain information on gender composition of study participants for PWID group and distribution of male (annex 3) and female (annex 4) populations by age groups. For instance, in Dushanbe, out of the total sample (500), 88% and 12% were men and women, respectively. Out of the total number of male respondents, 3% were in the age group of 18-24 years, 18% in the age group of 25-29 years etc. Similar age analysis was done for female respondents. Table 9 contains information on age distribution of study participants in SW group. For instance, in Dushanbe, out of the total sample (500), 20% and 19% were respondents in the age groups of 18-24 and 25-29 years, respectively.

Assuming that the sample is representative of the general population of PWID and SW at sentinel sites, we have extrapolated age and gender structure of the sample on the estimated number (median, upper and lower boundary) of PWID and SW at sentinel sites to identify gender and age composition of the whole population of PWID and SW above 18 years. For instance, in Dushanbe 88% (2575) and 12% (344) of median estimated number of PWID supposedly can be men and women, respectively. According to the age composition of the sample in Dushanbe, of 2575 estimated number of male PWID, 3% or 82 can be in the age group of 18-24 years, 18% or 461 can be in the age group of 25-29 years etc. according to the age composition of sample in Dushanbe, of 3985 estimated number of SW, about 20% or 813 can be in the age group of 18-24 years, 19% or 757 – in the age group of 25-29 years etc.

This calculation was done for PWID to calculate estimated prevalence on injection drug use (IDU) among men and women of different age groups, and for SW – to calculate estimated prevalence of provision of sexual services in exchange for remuneration (PSSER) among women of different age groups at the sentinel sites, and to apply these proportions in other cities/districts, where the study was not conducted, but which are similar to sentinel sites under certain parameters. Estimated prevalence of IDU in each group was calculated by dividing the estimated number of PWID in each group by the total population of this group at this sentinel site. Similarly, estimated prevalence of PSSER among women in each group was calculated by dividing estimated number of SW in each group by the total of female population in this group at sentinel site.

8.7. TYPOLOGY OF STUDY LOCATIONS AND CALCULATION OF THE ESTIMATED PREVALENCE OF RISKY BEHAVIOR (INJECTION DRUG USE FOR PWID AND PROVIDING SEXUAL SERVICES IN EXCHANGE FOR REMUNERATION FOR SW) OUT OF THE GENERAL POPULATION (MEN AND WOMEN ≥ 18 ≤ 69 FOR PWID AND WOMEN ≥ 18 ≤ 59 FOR SW).

8.7.1. PWID

Subsequently, for PWID, all study locations were broken down into urban (100% urban population), mixed (> 15%, but less than 50% urban population) and rural (<15% urban population) areas. Such locations, as Dushanbe, Bokhtar, Khorugh, Khujand and Kulyab were classified as urban areas. “Mixed areas” included Vahdat and Panjakent. Rudaki district was classified as rural area. According to the statistical data on population of the Republic of Tajikistan (as of 1 January 2018, Agency for statistics under the President of the Republic of Tajikistan), number of male (Annex 6) and female (Annex 7) population in the age ≥ 18 ≤ 69 years was identified for each city/district, where the study was conducted. Then, number of various age groups within the limit of ≥ 18 ≤ 69 years was identified in each group (men and women in the age ≥ 18 ≤ 69 years).

Using the data on distribution of estimated number of PWID (Annexes 3 and 4) and total population in the age of ≥ 18 ≤ 69 years (Annexes 6 and 7) by gender and age groups, estimated prevalence of IDU (lower boundary/median/upper boundary) was calculated among different age groups of male (Annex 6) and female (Annex 7) population by various locations, including urban, mixed and rural. For instance, it was calculated that lower boundary, median and upper boundary in the estimated prevalence of IDU among MALE population in the age group of ≥ 18 ≤ 69 years are as follows: in the urban area 0.014, 0.017 and 0.022; in mixed area 0.00761, 0.00999, 0.01289; in rural area 0.0030, 0,0046, 0.0076, respectively (annex 6). Lower boundary, median and upper boundary in the estimated prevalence of IDU among FEMALE population in the age group of ≥ 18 ≤ 69 years are as follows: in urban area 0.0010, 0.0013 and

0.0017; in mixed area 0.0003, 0.0004, 0.0005; in rural area 0.00002, 0,00002, 0.00003 respectively (Annex 7). Lower boundary, median and upper boundary of estimated prevalence of PWID in various age groups from 18 to 69 years (tables 9 and 100) were estimated in each group (male and female) by dividing estimated number of PWID in each group by the total population of this group at this sentinel site.

8.7.2. SW

The next step for SW group was dividing all study locations into three groups, including ***(1)*** urban (100% urban population/ capital and regional administrative centers); ***(2)*** suburbs (geographic locations, bordering big cities, such as the capital and regional centers; or geographic locations, which do not border big cities, but whose administrative centers are located at a distance less than 25 km, and with good transport infrastructure at a distance less than 50 km from centers of big cities, such as the capital and regional centers); and ***(3)*** other area (geographic locations, which do not have common borders with big cities, such as the capital and regional centers; or geographic locations, whose administrative centers are located at the distance of over 25 km, and with good transport infrastructure of over 50 km from the center of big cities, such as the capital and regional centers). "Urban area" group included such cities as Dushanbe, Kulyab, Bokhtar, Khujand and Khorugh. The second group ("suburbs") included city of Vahdat and Rudaki district. The group "other areas" included Panjakent city.

Using data on distribution of estimated number of SW (Annex 5) and total female population in the age of ≥ 18 ≤ 59 years (Annex 8) by age groups, estimated prevalence of such phenomenon as PSSER (lower boundary / median/ upper boundary) was calculated for different age groups of female population (Annex 8) by different locations, including urban areas, suburbs and other areas. For instance, it was calculated that lower boundary, median and upper boundary for estimated prevalence of PSSER among female population in the age of ≥ 18 ≤ 59 years are as follows: for suburbs, 0.0030, 0.0047 and 0.0066; for "other" areas 0.0028, 0.0034, and 0.0080 (Annex 8). Lower boundary, median and upper boundary of estimated prevalence of PSSER were calculated for different age groups from 18 to 59 years (Annex 8) by dividing estimated number of SW in each group by the total population in this group at each sentinel site.

8.8. EXTRAPOLATION OF OBTAINED ESTIMATED PREVALENCE OF IDU AND PSSR TO CALCULATE LOWER BOUNDARY, MEDIAN AND UPPER BOUNDARY OF ESTIMATED NUMBER OF PWID AND SW IN VARIOUS LOCATIONS, NOT COVERED BY THE STUDY

8.8.1. PWID

At this stage, locations, not covered by the study were classified into urban (100% urban population)/ mixed (> 15%, but below 50% of urban population)/ rural (<15% urban population), using the same criterion of proportion of urban population that was used for the study locations. Calculated estimated IDU prevalence (lower boundary / median / upper boundary) in urban / mixed/ rural areas) covered by the study, were applied to calculate estimated number of PWID in the locations, not covered by the study. For instance, estimated prevalence of IDU in urban areas, covered by the study, was used to calculate estimated number of PWID in urban location, not covered by the study.

All areas, classified as rural, were also divided into three groups, including rural areas with supposedly low, average and high levels of PWID concentration. To calculate estimated

number of PWID, lower boundary/median/upper boundary of estimated prevalence of IDU in rural areas, covered by the study (Rudaki district) were used.

Annex 9 (female population) and annex 10 (female population) list results of estimated lower boundary/median/upper boundary of male and female PWID in urban/median/rural areas, where the study was not done. For instance, estimated lower boundary/median/upper boundary of number of ***male*** PWID in ***urban areas,*** where the study was not done, was calculated as 418, 507 and 637, respectively (Annex 9). Estimated lower boundary/median/upper boundary of the number of ***female*** PWID in ***mixed areas***, where study was not conducted, were calculated as 173, 205 and 258, respectively (Annex 10).

8.8.2. SW

All locations, not covered by the study, were divided into two groups: (1) suburbs (geographic locations, which do not border big cities, but whose administrative centers are located at a distance less than 25 km, and with good transport infrastructure at a distance less than 50 km from centers of big cities, such as the capital and regional centers); and (2) other areas (geographic locations, which do not have common borders with big cities, such as the capital and regional centers; or geographic locations, whose administrative centers are located at the distance of over 25 km, and with good transport infrastructure of over 50 km from the center of big cities, such as the capital and regional centers). Calculated estimated prevalence of PSSER (lower boundary / median/ upper boundary) in “suburbs” and “other” areas, covered by the study, were used to calculate estimated number of SW in areas, not covered by the study. For instance, results of estimated prevalence of PSSER in “suburbs” (mid-level cities of Vahdat and Rudaki districts), covered by the study, were used to calculated estimated number of SW in “suburbs”, not covered by the study. Table 15 lists cities and suburbs, assigned to them in the framework of this study.

Table 70: Cities and suburbs, assigned to them

№	Name of the city	Name of the city/district, assigned as suburb
1	Dushanbe	Vahdat city, Hisor city, Tursunzoda city, district Rudaki, district Varzob, district Shahrinav
2	Bokhtar	Levakant city, district Kushoniyen, district Khuroson, district Vakhsh
3	Kulob	district Muminabod, district Vose
4	Khorug	district Shugnan
5	Khujand	Guliston city, Buston city, district Spitamen, district Jabor Rasulov, district Bobojon Gafurov

All areas, classified as “other”, were also divided into three groups, including areas with supposedly low, average and high levels of SW concentration. To calculate estimated number of SW for these areas, lower boundary/median and average value of median and upper boundary of estimated prevalence of PSSER in locations, classified as “other”, which was covered by the study (Panjakent city) were used.

Annexes 11a and 11b list results of estimated lower boundary/median/upper boundary of SW population in “suburbs” and “other” areas, where study was not done. For example, estimated lower boundary/median/upper boundary of SW population in ***“suburbs” of***

Dushanbe, where the study was not done, were calculated as 581, 893 and 1265, respectively (Annex 11a Suburbs). Estimated number of SW in ***"other" locations with supposedly low concentration of SW***, where the study was not done, was calculated as 851 (Annex 11b Other locations).

8.9. CALCULATION OF TOTAL NUMBER OF PWID AND SW IN THE COUNTRY

8.9.1. PWID

To calculate the total number of PWID in the country, estimated numbers of PWID in urban/mixed and rural areas, where the study was done, was added to the estimated number of PWID in similar locations, where study was not conducted (Annex 12). Results of the calculations show, that lower and upper boundary of estimated PWID population in the country are ***19058*** and ***23684,*** respectively. Median estimate number of PWID in the country is ***22208*** (Annex 12). The following results from the analysis (Annex 12):

- estimated lower boundary/median/upper boundary of PWID population, living in locations, classified as "urban area" (100% of urban population) in this report, with the total population of 1454400 (16.3% of the total country population) are ***6596, 8016, and 10133,*** respectively (34.6%, 36.1% and 42.8% of countrywide estimated number of PWID).
- estimated lower boundary/median/upper boundary of PWID population, living in locations, classified as "mixed area" (> 15%, but less than 50% of urban population), with the total population of 2646600 (29.7% of the total country population) are ***5633, 7364, and 9489,*** respectively (29.6%, 33.2% and 40.1% of countrywide estimated number of PWID).
- Estimated number of PWID, living in locations, classified in this report as "rural area with supposedly low, average and high concentration of PWID" (<15% of urban population), with the total population of 4805719 (54% of the total country population) is ***6829*** (31% of median estimated number of PWID across the country).

Annex 13 provides distribution of median estimated number of PWID in the country by districts/cities/regions, as well as by age and gender.

8.9.2. SW

To calculate the total number of SW in the country, results of estimation of SW in urban areas/ suburbs/ and other area from sentinel sites were added to the results of estimation of SW numbers in other locations, where the study was not done (Annex 14). Results of the calculations show that lower and upper boundaries of the estimated number of SW population in the country are ***14370*** and ***21012,*** respectively. Median estimated number of SW in the country is ***17591*** (Annex 14). The following results from the analysis (Annex 14):

- estimated lower boundary/median/upper boundary of SW population, living in locations, classified as "urban area" (100% of urban population) in this report, with the total population of 1358300 (15.3% of the total country population) and with female population in the age of ≥ 18 ≤ 59, 361958 (16.1% of the total female population of the country in the age of ≥ 18 ≤ 59) are the values of ***7482, 9416, and 11297,*** respectively (52.1%, 53.5% and 53.8% of the countrywide indicators of estimated number of SW).

- estimated lower boundary/median/upper boundary of SW population, living in locations, classified in this report as “suburbs” (geographic locations, bordering big cities, such as the capital of the country and regional centers; geographic locations, which do not border big cities, but whose administrative centers are located at a distance less than 25 km, and with good transport infrastructure at a distance less than 50 km from centers of big cities, such as the capital and regional centers), with total population of 3213019 (36.1% of the total country population) and with female population in the age group of ≥ 18 ≤ 59, 797714 (35.6% of the total female population in the age group ≥ 18 ≤ 59 of the country) are ***2397, 3685, and 5225,*** respectively (16.7%, 20.9% and 24.9% of the countrywide estimated number of SW).
- estimated number of SW living in locations, classified in this report as “other” area (geographic locations, which do not have common borders with big cities, such as the capital and regional centers; or geographic locations, whose administrative centers are located at the distance of over 25 km, and with good transport infrastructure of over 50 km from the center of big cities, such as the capital and regional centers) with supposedly low, average and high concentration of SW, with the total population of c 4335400 (48.7% of the total country population) and with female population in the age group of ≥ 18 ≤ 59, 1082884 (48.3% of the total female population in the age group ≥ 18 ≤ 59 of the country) is ***4489*** (25.5% of the median estimated number of SW in the country).

Annex 15 has distribution of the median estimated number of SW in the country by districts/cities/regions, as well as by age groups.

8.10. LIMITATIONS IN ESTIMATES OF PWID AND SW

Estimation of population size, just as other studies among PWID and SW, has its own limitations related to the characteristics of the groups, which affect reliability of data collection. All inputs, used to calculate estimated number of PWID and SW in the framework of this study, were provided by RAC and Republican clinical center of Narcology. Reliability of the results is derivative of the quality of inputs. Correct understanding of possible issues with inputs defines the ability to use adjustments.

Possible errors, related to quality of statistical data (benchmarks):
For all multipliers:

1. Incompliance with age criterion can lead to distortion of estimates:
   - overestimation (if statistical data include PWID and SW younger than 18 years, which is an exclusion criterion for participation in IBBS);
   - underestimation (if statistical data include PWID not from 18 years (if any), but from older age).
2. Incompliance with territorial criterion can lead to distortion of estimates:
   - overestimation (if statistical data include more settlements, than the territory of the sentinel site);
   - underestimation (if statistical data include less settlements, than the territory of the sentinel site).
3. Incompliance with time criterion can lead to distortion of estimates:
   - overestimation (if statistical data was collected over the greater period, than specified in the questionnaire),

- underestimation (if statistical data was collected over shorter period, than specified in the questionnaire).

For multipliers 1, 2 and 5 for PWID:

1. lack of timely update (at the end of the reporting period) of statistical data on the registered PWID, not taking into account diseased and drop-outs can lead to distortion of estimates, namely overestimation.
2. Lack of differentiation of people, who use drugs, by method of use (injection, non-injection forms) can lead to distortion of estimates:
    - overestimation (if the statistics include drug users, who do not inject drugs);
    - underestimation (if the statistics does not include all PWID).

Possible errors, related to IBBS data quality for all multipliers:

Distortion of estimates is possible in case of any error during IBBS, which affects the representativeness of the results (during preparation, collection, recording and analysis of the data). Incompliance with sampling methodology – random nature and quality of data collection are key conditions for applying multiplier method.

Table 71. Possible errors, related to quality of IBBS data for multipliers

№	Name of the multiplier and sources of data	Possible errors, related to statistical data (benchmark) quality	Possible errors, related to IBBS data quality
1	Number of PWID, registered in narcology register	lack of timely update (at the end of the reporting period) of statistical data on the registered PWID, not taking into account diseased and drop-outs can lead to distortion of estimates, namely overestimation. Lack of differentiation of people, who use drugs, by method of use (injection, non-injection forms) can lead to distortion of estimates; overestimation (if the statistics include drug users, who do not inject drugs); underestimation (if the statistics does not include all PWID) Sources of data are narcology centers at sentinel sites.	Data may be underestimated, if the sample has more representation of PWID, registered in narcology clinic, because they commit more to participate in the study. Values may be overestimated, if the sample has more PWID, who are not registered in narcology clinic.
2	PWID, first registered in narcology register	If the number of newly registered PWID in narcology register is insignificant, this may lead to underestimation. Sources of data are narcology centers at sentinel sites	Similarly to item 1, when this multiplier is used, PWID, registered in narcology register before previous year, should not be included in statistical data.
3	Coverage of PWID with HIV prevention programs	If statistical data on the number of PWID, covered with HIV prevention programs do not reflect true number of PWID, covered with prevention programs, this may lead to overestimation (with repeat inclusion of PWID, i.e. double-counting, or with overestimated coverage data) or underestimation (if the statistics does not include all PWID, covered with prevention programs on the territory of the sentinel site).	Data may be underestimated, if the sample has more representation of PWID, covered with the prevention programs, because they are more inclined to participate in the study. Values may be overestimated, if the sample has more PWID, who are not covered with prevention programs.

		Source of data is the department for monitoring and evaluation of RAC.	
4	SW, who have received free condoms in the organizations, which provide SW-focused services, in 3 months prior to participation in the study	If statistical data about number of SW, who have received free condoms, are collected over wrong period of time, this may lead to overestimation (if data is collected over a longer period) or underestimation (if data is collected over period less than 3 months prior to participation in the study). Source of data is the department for monitoring and evaluation of RAC.	Underestimation of values can happen, if the sample has more representation of SW, covered with prevention programs, who have received free condoms, because they are more inclined to participate in the study. Other factor for underestimation of data is the fact that by mistake an interviewer can be collecting data on receiving free condoms over a period greater than 3 months. Overestimation of values can happen, if sample has greater representation of SW, not covered with prevention programs, who have not received free condoms.
5	HIV rapid testing for PWID/SW	If statistical data on the number of rapid tests do not reflect true number of HIV rapid tests for PWID/SW, this may lead to overestimation (if the statistics on rapid testing includes not only PWID/SW, but also other categories of population) or underestimation (if the statistics on rapid testing does not include all tests for PWID/SW) Source of data is the department for monitoring and evaluation of RAC.	Underestimation of values can happen, if the sample has more representation of PWID/SW, covered with prevention services (who had rapid tests), because they are more inclined to participate in the IBBS. Overestimation of values can happen, if sample has greater representation of PWID/SW, not covered with prevention services, who had no opportunity to have rapid testing. Distorted estimate can be received, if PWID/SW cannot definitively answer, whether they had rapid test and how many times.
6	Number of PWID acquaintances, registered in narcology clinic.	Similar to item 1 Sources of data are narcology centers at sentinel sites.	Values may be underestimated, if the sample has more representation of PWID, whose acquaintances are registered in narcology clinic. Values may be overestimated, if the sample has more PWID, whose acquaintances are less frequently registered in the narcology clinic. Distortion of estimates is possible, if PWID do not discuss the fact of being registered in narcology clinic (error on the level of information transmission between PWID acquaintances).

8.11. CONCLUSION ON ESTIMATES OF PWID AND SW POPULATIONS SIZE

Final estimate of PWID and SW populations in 2018 for 8 sentinel sites was 9 792 and 10 595, respectively, and when extrapolated for the territory of the whole country it was 22 208 PWID (23 684 – upper boundary and 19 058 – lower boundary) and 17 591 SW (21 012 – upper boundary and 14 370 – lower boundary). Age range of the assessed population of PWID and SW agreed with age range of the study sample (IBBS) and was 18-69 years for PWID and 18-59 years for SW. prevalence of injection drug use among population of Tajikistan in the age group from 18 to 69 years according to the estimates is 0.46% (0.9% among male population and 0.035% among female population), it varied from 0.35% in RRS to 1.07% in GBAR. Prevalence of provision of sexual services in exchange for some kind of remuneration among female population of Tajikistan in the age group of 18 to 59 years according to the estimates was 0.78% and varied from 0.43% in RRS to 1.8% in Dushanbe. These data were deemed acceptable and will be used for planning of prevention activities for PWID and SW in Tajikistan, and namely to identify the following:

- Funding to procure consumables (IEM, prevention items, rapid tests);
- Rational location of drop-in centers and number of paid staff, outreach workers, taking into account the planned coverage;
- Comparison of data, received during IBBS and epidemiologic surveillance of HIV cases (awareness and HIV prevalence indicators, coverage with prevention programs, identifying links to other vulnerable populations);
- Assessing prevalence of HIV and calculation of the number of people, living with HIV (PLH).

Furthermore, PWID and SW population estimation results will be applied to calculate the sample size for the following IBBS. Indirectly, based on the population estimates and lessons learned (overestimated, underestimated results for some multipliers) one can judge the effectiveness of work with PWID and SW, already done in the region, and define areas with the biggest challenges.

9. PRESENTATION OF STUDY RESULTS

Results of IBBS and estimation of PWID and SW population size, specified in this report, will be translated into English and posted on the website of RAC for all interested stakeholders, including international partners. Results of this study will be used in preparation of the National progress report on global measures in response to AIDS for 2018, for publications and presentations on various levels.

References

1. Population of the Republic of Tajikistan as of 1 January 2018. Agency for statistics under the President of the Republic of Tajikistan
2. Statistics of HIV cases registration in cities and districts of the Republic of Tajikistan since registration of the first case to 31.12.2018.
3. http://aidsinfo.unaids.org/
4. Annual progress report of 2018, UNDP, Dushanbe, Tajikistan.
5. Report with analysis of the sentinel surveillance data among people, who inject drugs in the Republic of Tajikistan in 2014. Ministry of healthcare and social protection of the population of the Republic of Tajikistan, State enterprise «Republican center for AIDS prevention and control», Dushanbe, 2014.
6. Presentation on analysis of HIV/AIDS epidemiologic situation in the Republic of Tajikistan (presenter Turashokh Saimuddinov). RAC, Dushanbe, 2019.
7. Report with analysis of the sentinel surveillance data among sex workers in the Republic of Tajikistan in 2014. Ministry of healthcare and social protection of the population of the Republic of Tajikistan, State enterprise «Republican center for AIDS prevention and control», Dushanbe, 2014
8. Estimation of the number of sex workers and people, who inject drugs in the Republic of Tajikistan in 2014. Narrative report, Dushanbe, 2014.
9. Protocol of the formative qualitative study done for the purpose of selecting methods to conduct bio-behavioral study and estimating number of people, who inject drugs, and sex workers in Tajikistan. Version 3.0, Dushanbe, 31 July 2016.
10. Results of the formative qualitative study done for the purpose of selecting methods to conduct bio-behavioral study and estimating number of people, who inject drugs, and sex workers in Tajikistan, Dushanbe, 2017 г.
11. Heckathorn DD. (1997) Respondent-driven sampling: A new approach to the study of hidden populations. Sociological Problems. 44 (2), 174-199. 6 Heckathorn, DD. (2002).
12. Respondent driven sampling II: deriving valid population estimates from Chain-Referral samples of hidden populations. Sociological Problems,49(1), 11-34.
13. Protocol of the bio-behavioral study for HIV and estimation of the number of people, who inject drugs, and sex workers in Tajikistan. Version 5.0, 18 December 2017.

Annex 1: Program of the training on conducting Integrated bio-behavioral study (IBBS) among people, who inject drugs and sex workers in Tajikistan

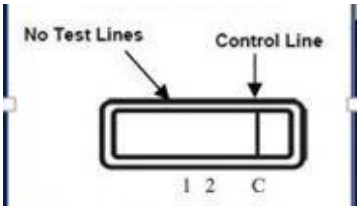
Day 1 ***General day.*** ***All members of the research team (site managers, coupon managers, screeners, interviewers and laboratory technicians) meet in one room***		
Time	**Activity**	**Presenters and facilitators**
8.30 - 9.00	Registration of participants	
9.00 - 9.40	Opening Introducing trainers and program of the workshop. Expectations and rules of the workshop. Housekeeping items.	Saidburhonov D., deputy director of RAC Courey M.., CDC Kazakhstan Nabijonov A., CDC Tajikistan Boymurodov K., RAC
9:40 – 10:00	Formative qualitative study with the purpose of selecting methods for conducting integrated bio-behavioral study and estimating number of people, who inject drugs, and sex workers in Tajikistan	Shirijonov U., RAC
10.00-10.45	New protocol of IBBS among PWID and SW: Relevance of implementation, objectives and methods, sentinel sites, sentinel groups, calendar schedule, brief overview of methodology, research design, ethical aspects and data quality management aspects, inclusion/exclusion criteria, methodology for calculating sample size.	Nabijonov A. Courey M..
10:45 – 11:00	***Break***	
11:00 – 11:20	Electronic sentinel surveillance system	Ivakin V., ICAP Kazakhstan
11:20 – 12:00	Roles and responsibilities of each research team member	Boymurodov K., RAC
12.00 - 13.00	Documentation required for the IBBS research team (annexes A-S). Sentinel surveillance readiness checklist	Boymurodov K. Nabijonov A.
13:00 – 14:00	***Lunch***	
14:00 – 15:00	RDS methodology, peculiarities of preparatory and field stages of IBBS using RDS method. Defining territory of a sentinel site.	Kaspirova A.
15:00 – 15:30	Selecting "seeds" to launch recruitment chain	Alaye A.
15:30 – 16:00	Communication with representatives of key populations (PWID and SW).	Alaye A.
16:00- 16:15	***Break***	
16:15 – 17:00	Ethical issues in conducting IBBS. Stigma and discrimination of SW and PWID.	Kholov S., ICAP Tajikistan
17:00 - 17:15	Adverse situations reporting and documenting complaints.	Kholov S.
17:15 – 17:30	Q&A.	Nabijonov A.
Day 2. ***4 thematic subgroups, sessions will be done in 4 separate rooms (for coupon managers, screeners, lab technicians and interviewers).*** ***Site managers will be located in different groups***		
Time	**Activity**	**Presenters and facilitators**
	Site managers group	
9.00 - 9.20	Welcoming respondents at study sites	Kaspirova A. Mirzoaliyev Yu., ICAP Tajikistan
09:20 – 10:00	Anonymous identifiers (respondent coupon identification number, study participant registration number, unique respondent identification code)	Kaspirova A. Kholov S.
10.00 - 11.00	Coupon validation procedure (Stage 1 of the checklist) and decision-making algorithm on further participation of a respondent in the study	Kaspirova A. Mirzoaliyev Yu.
11.00 - 11.15	***Break***	
11.15 - 11.45	Placing coupons in "used" and "invalid" folders. Recording relevant information in sections of Annex G (Log for registration of IBBS participation) and Annex L (Log for recording refusals to participate and incompliance with selection criteria). ***Managers participate in the session***	Kaspirova A. Mirzoaliyev Yu.
11.45 - 13.00	Conditions for providing primary compensation (at which stage and under which conditions / Stage 7 of the Checklist). Training on recruiting process and issuing coupons (Stage 8 of the Checklist) ***Managers participate in the session***	Kaspirova A. Mirzoaliyev Yu.
13.00 - 14.00	***Lunch***	
14:00-15:00	***Continued:*** Training on recruiting process and issuing coupons (Stage 8 of the Checklist)	Kaspirova A. Mirzoaliyev Yu.
15:00 – 15:30	Providing secondary compensation for recruiting (Annex F, columns 8 and 9)	Kaspirova A. Mirzoaliyev Yu.
15.30 - 16.00	***Break***	
16:00 – 17:00	Using electronic sentinel surveillance system for monitoring recruiting, checking	Kaspirova A.

	correct numbering of coupons, checking the quality of collected data ***Managers participate in the session***	Mirzoaliyev Yu. Ivakin V.
17.00 - 17.15	Summary of the day	
	Screener group	
9.00 – 10:00	Training on conducting screening of a potential respondent to check their belonging to certain key population (PWID and SW). Interaction with coupon managers (Stage 2 of the Checklist). ***Managers participate in the session***	Shirijonov U., RAC Muzafarov M., CDC Tajikistan
10.00 - 11.00	Decision-making algorithm on continuation of respondent's participation based on the screening results. Recording relevant information in the lines of Annex G (Log for registration of IBBS participation) and Annex L (Log for refusals to participate and incompliance with selection criteria). ***Managers participate in the session***	Shirijonov U. Muzafarov M.
11.00 - 11.15	***Break***	
11.15 - 13.00	Training on the process of obtaining verbal informed consent to participate in the study / Stage 3 of the Checklist (Annexes E and F).	Shirijonov U. Muzafarov M.
13.00 - 14.00	***Lunch***	
14.00 – 15.00	Accompanying study participants with positive HIV rapid test results to the AIDS center for follow-up procedures (checking registration in ES, confirmatory testing, drawing blood for VL testing). Referral of study participants with positive syphilis rapid test results to receive relevant services	Shirijonov U. Muzafarov M.
15.00 -15.30	Practical work on conducting screening of potential participants and recording relevant information in lines of annexes and checklist	Shirijonov U. Muzafarov M. Nabijonov A.
15.30 - 16.00	***Break***	
16.00 - 17.00	Practical work on conducting screening of potential participants and recording relevant information in lines of annexes and checklist	Shirijonov U. Muzafarov M. Nabijonov A.
17.00 - 17.15	Q&A.	Shirijonov U. Muzafarov M.
	Interviewer group	
9:00 – 11:00	Identifying social network of the respondent and conducting a survey /Stage 4.1 of the checklist (annexes A and B). Collection of social-demographic and behavioral data. Instructions on completing the questionnaire and conducting a survey.	Kryukova V., ICAP Kazakhstan Kholov S.
11.00 -11.15	***Break***	
11:15 – 12:15	Overview of mobile application e-sentinel surveillance, potential issues and ways to overcome them	Ivakin V.
12:15 – 13: 00	Practicing working with a tablet (turning on, off, using sensor screen, charging, use of a power bank for charging, connection to the Internet etc.)	Ivakin V. Ali-Zade D., ICAP Tajikistan Kryukova V.
13.00 - 14.00	***Lunch***	
14:00 – 15:30	Training on collecting IBBS data from PWID and SW using tablets (participants will be subdivided into two groups depending on the sentinel population they will be working with during IBBS). ***Managers participate in the session***	Ivakin V. Ali-Zade D. Kryukova V.
15.30-16.00	***Break***	
16:00 – 17:00	Training on collecting IBBS data from PWID and SW using tablets (participants will be subdivided into two groups depending on the sentinel population they will be working with during IBBS).	Ali-Zade D. Kryukova V.
17.00-17.30	Q&A.	
	Lab technicians' group	
9.00-9.30	Organizing and conducting serological stage in the framework of IBBS	Ashurova R., CDC Tajikistan Ismatova L., RAC
9.30-10.30	Pre-test counselling (principles, standards and aspects that need to be covered during pre-test counselling).	Dodarbekov M. ICAP Tajikistan Ashurova R.
10.30-11.00	***Break***	
11.00-12.00	Overview of the checklist (Annex A / PWID and B / SW) and its completion process/ Stages 5 and 6.	Ashurova R.
12.00-13.00	DBS (dried blood spot sample) collection and processing	Ashurova R. Ismatova L.
13.00-14.00	***Lunch***	
14.00-14.30	DBS (dried blood spot sample) collection and processing Annex ***P***	Ashurova R. Ismatova L.

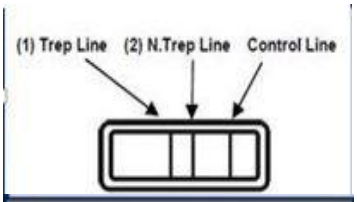
14.30-15.10	Ensuring quality of HIV and syphilis RT. Safety at the testing sites.	Ashurova R. Ismatova L.
15.10–15.30	Confirmatory HIV testing (for newly identified cases) and checking registration in the ES (for old HIV cases). **Work with annex K.** Conducting viral load testing or collection of data on viral load from ES for HIV-positive study participants.	Ashurova R. Ismatova L.
15.30-16.00	***Break***	
16.00-17.00	Post-test counselling (Principles, standards and aspects, which need to be covered during post-test counselling). Psychological support. Referral issues.	Dodarbekov M. Ashurova R.
17.00-17.30	Q&A.	Ashurova R. Ismatova L.
Day 3. ***General part.*** ***All members of the research team (site managers, coupon managers, screeners, interviewers and laboratory technicians) meet in one room***		
Time	**Activity**	**Presenters and facilitators**
9.00 - 9.20	Review of the previous day	Muzafarov M. Mirzoaliyev Yu.
9.20 - 10.30	Issues that can arise during field stage of IBBS (recruiting slowing down, complying with participation timeframe/intent to participate in the study earlier or later than coupon expiration date etc.).	Kryukova V. Kaspirova A.
10.30 -10.45	***Break***	
10:45 – 11:45	Possible issues of the IBBS field stage and ways to prevent them. Actions of the staff in case of unexpected circumstances	Kryukova V. Kaspirova A.
11:45 – 12:15	Distribution of unique identifiers (who, how, to whom and when).	Nabijonov A. Boymurodov K.
12:15 – 12:45	Q&A on distribution of unique identifiers	Nabijonov A.
12.45-13.45	***Lunch***	
Participants go into 4 rooms (in each room there is the group for PWID + group for SW from one district/city).		
13:45 – 15:00	**PWID team practices and SW team observes (observers):** Role play. Participants will divide into 8 full groups in line with the planned composition of the research time in study points (site manager, coupon manager, screeners, interviewers, lab technicians). Employees of ICAP, CDC and RAC will act as respondents. **Group of observers (SW team) should note at least three aspects for improvement and three positive aspects in the work of PWID team.**	ICAP, CDC, RAC
15.00 – 15.15	***Break***	
15:15 – 16:45	**SW team practices and PWID observes:** Role play. Participants will divide into 8 full groups in line with the planned composition of the research time in study points (site manager, coupon manager, screeners, interviewers, lab technicians). Employees of ICAP, CDC and RAC will act as respondents. **Group of observers (PWID team) should note at least three aspects for improvement and three positive aspects in the work of SW team.**	ICAP, CDC, RAC
16:45 – 17:30	Feedback of each team on the results of role play (challenges and solutions).	Nabijonov A.
Day 4.		
Time	**Activity**	**Presenters and facilitators**
General part. ***All members of the research team (site managers, coupon managers, screeners, interviewers and laboratory technicians) meet in one room.***		
9.00 - 9.20	Review of the previous day	Muzafarov M. Mirzoaliyev Yu.
9:20 – 10:00	Information flow and reporting.	Muzafarov M. Nabijonov A.
Participants divide by sentinel groups in 4 rooms (each room will have 2 groups for SW or two groups for PWID)		
10:00 – 11:00	**SW/PWID team practices and SW/PWID team observes:** Role play. Participants will divide into 8 full groups in line with the planned composition of the research time in study points (site manager, coupon manager, screeners, interviewers, lab technicians). Employees of ICAP, CDC and RAC will act as respondents. **Group of observers should note at least three aspects for improvement and three positive aspects.**	ICAP, CDC, RAC RUDAKI + VAHDAT
11.00 – 11.15	***Break***	
11:15 – 13:00	**SW or PWID team practices and SW or PWID team observes:** Role play. Participants will divide into 8 full groups in line with the planned composition of the research time in study points (site manager, coupon manager, screeners, interviewers, lab technicians). Employees of ICAP, CDC and RAC will act as	ICAP, CDC, RAC KURGAN-TUBE + KULYAB

	respondents. **Group of observers should note at least three aspects for improvement and three positive aspects.**	
13.00 – 14.00	***Lunch***	
General part. ***All members of the research team (site managers, coupon managers, screeners, interviewers and laboratory technicians) meet in one room.***		
14.00 – 14.45	Feedback of each team on the results of role play (challenges and solutions)	ICAP, CDC, RAC
14.45 – 16.00	Role play. Best team will be selected, which will demonstrate to other training participants process of conducting the study from the point, when a respondent comes to take part in the study to the point of giving them secondary compensation.	ICAP, CDC, RAC
16.00 – 16.15	***Break***	
16.15 – 16.45	Summary of the role play. Feedback from training participants.	CDC, ICAP, RAC
16.45 – 17.15	Monitoring and reporting in the study	Ivakin V.
17:15 – 17:40	Post-test	
17:40 – 18:00	Summary, questions and answers. Certificates award	CDC, ICAP, RAC

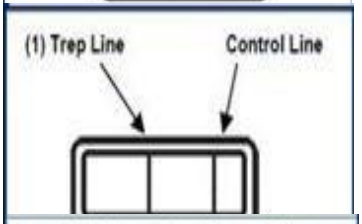
Annex 2: Guidelines for lab technicians of the sentinel points on codification the syphilis rapid test results



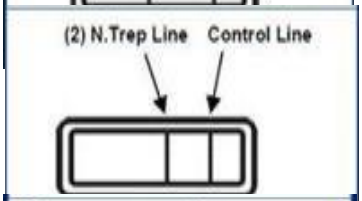
with this type of syphilis test result (line only at C) put **01** code in the column no. 7 of the HIV and syphilis rapid test registration log.



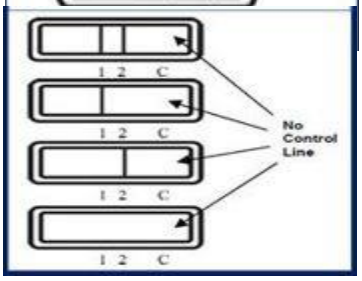
with this type of syphilis test result (lines for C, 1 and 2) put **02** code in the column no. 7 of the HIV and syphilis rapid test registration log. Tell the participant that according to the test results he/she has syphilis. Strongly recommend him/her to get specialized help of an STI specialist. Give the participant a referral to STI specialist.



with this type of syphilis test result (lines for C, and 1) put **03** code in the column no. 7 of the HIV and syphilis rapid test registration log. Tell the participant that according to the test results he/she possibly has old or previously treated syphilis, but according to the rapid test you cannot establish, whether he/she was cured. Strongly recommend him/her to get specialized help of an STI specialist. Give the participant a referral to STI specialist.



with this type of syphilis test result (lines for C, and 2) put **04** code in the column no. 7 of the HIV and syphilis rapid test registration log. Tell the participant that he/she needs a more detailed syphilis testing. Recommend him/her to get specialized help of an STI specialist. Give the participant a referral to STI specialist.



with this type of syphilis test result (no control line /C), put **05** code in the column no. 7 of the HIV and syphilis rapid test registration log. Then repeat the test, and document new test result after a slash sign (01, 02, 03, 04).

Annex 3. Share of male PWID RESPONDENTS in the sample and their distribution by age groups AND share of MEN AMONG ESTIMATED NUMBER OF PWID and their distribution by age groups

Sentinel site	Sample/ Estimated population	Respondents/ Part of the estimated numbers of MALE population																					
		Total		18-24		25-29		30-34		35-39		40 - 44		45-49		50-54		55-59		60-64		65-69	
		Absolute number	Share of the sample	Absolute number	Share of the total number of men	Absolute number	Share of the total number of men	Absolute number	Share of the total number of men	Absolute number	Share of the total number of men	Absolute number	Share of the total number of men	Absolute number	Share of the total number of men	Absolute number	Share of the total number of men	Absolute number	Share of the total number of men	Absolute number	Share of the total number of men	Absolute number	Share of the total number of men
Dushanbe	Sample	441	88%	14	3%	79	18%	59	13%	74	17%	85	19%	66	15%	34	8%	19	4%	9	2%	2	0.5%
	Estim. Median	2,575		82		461		344		432		496		385		198		111		53		12	
	Estim. (LB)	1,939		62		347		259		325		374		290		149		84		40		9	
	Estim. (UB)	3,528		112		632		472		592		680		528		272		152		72		16	
Rudaki	Sample	239	99.6%	16	7%	36	15%	46	19%	46	19%	42	18%	24	10%	21	9%	7	3%	1	0%	0	0%
	Estim. Median	581		39		87		112		112		102		58		51		17		2		0	
	Estim. (LB)	377		25		57		73		73		66		38		33		11		2		0	
	Estim. (UB)	952		64		143		183		183		167		96		84		28		4		0	
Vahdat	Sample	196	98%	1	1%	10	5%	22	11%	45	23%	51	26%	48	24%	10	5%	7	4%	2	1%	0	0%
	Estim. Median	909		5		46		102		209		237		223		46		32		9		0	
	Estim. (LB)	603		3		31		68		138		157		148		31		22		6		0	
	Estim. (UB)	1,301		7		66		146		299		339		319		66		46		13		0	
Kulyab	Sample	343	98%	7	2%	47	14%	70	20%	65	19%	57	17%	50	15%	25	7%	13	4%	6	2%	3	1%
	Estim. Median	1,893		39		259		386		359		315		276		138		72		33		17	
	Estim. (LB)	1,479		30		203		302		280		246		216		108		56		26		13	
	Estim. (UB)	2,307		47		316		471		437		383		336		168		87		40		20	

Bokhtar	Sample	335	96%	14	4%	36	11%	50	15%	47	14%	59	18%	60	18%	46	14 %	17	5%	5	1%	1	0%
	Estim. Median	553		23		59		83		78		97		99		76		28		8		2	
	Estim. (LB)	442		18		48		66		62		78		79		61		22		7		1	
	Estim. (UB)	664		28		71		99		93		117		119		91		34		10		2	
Khorugh	Sample	349	99.7%	1	0%	14	4%	35	10%	35	10%	68	19%	83	24%	48	14 %	41	12%	19	5%	5	1%
	Estim. Median	997		3		40		100		100		194		237		137		117		54		14	
	Estim. (LB)	976		3		39		98		98		190		232		134		115		53		14	
	Estim. (UB)	1,018		3		41		102		102		198		242		140		120		55		15	
Panjakent	Sample	189	95%	1	1%	12	6%	16	8%	20	11%	34	18%	25	13%	26	14 %	30	16%	17	9%	8	4%
	Estim. Median	765		4		49		65		81		138		101		105		122		69		32	
	Estim. (LB)	672		4		43		57		71		121		89		92		107		60		28	
	Estim. (UB)	859		5		55		73		91		155		114		118		136		77		36	
Khujand	Sample	182	91%	10	5%	18	10%	28	15%	34	19%	32	18%	31	17%	16	9%	10	5%	3	2%	0	0%
	Estim. Median	948		52		94		146		177		167		162		83		52		16		0	
	Estim. (LB)	910		50		90		140		170		160		155		80		50		15		0	
	Estim. (UB)	1,256		69		124		193		235		221		214		110		69		21		0	
All sites	Sample	2,274	95%	64	3%	252	11%	326	14%	366	16%	428	19%	387	17%	226	10 %	144	6%	62	3%	19	1%
	Estim. Median	9,317		262		1,032		1,336		1,500		1,754		1,586		926		590		254		78	
	Estim. (LB)	7,472		210		828		1,071		1,203		1,406		1,272		743		473		204		62	
	Estim. (UB)	12,028		339		1,333		1,724		1,936		2,264		2,047		1,195		762		328		101	

Annex 4. Share of female PWID RESPONDENTS in the sample and their distribution by age groups AND share of WOMEN AMONG ESTIMATED NUMBER OF PWID and their distribution by age groups

Sentinel site	Sample/ Estimated population	Respondents/ Part of the estimated numbers of FEMALE population																			
		Total		18-24		25-29		30-34		35-39		40 - 44		45-49		50-54		55-59		60-64		65-69	
		Absolute number	Share of the sample	Absolute number	Share of the total number of women	Absolute number	Share of the total number of women	Absolute number	Share of the total number of women	Absolute number	Share of the total number of women	Absolute number	Share of the total number of women	Absolute number	Share of the total number of women	Absolute number	Share of the total number of women	Absolute number	Share of the total number of women	Absolute number	Share of the total number of women	Absolute number	Share of the total number of women
Dushanbe	Sample	59	12%	2	3%	12	20%	9	15%	18	31%	11	19%	3	5%	3	5%	0	0%	1	2%	0	0%
	Estim. Median	344		12		70		53		105		64		18		18		0		6		0	
	Estim. (LB)	259		9		53		40		79		48		13		13		0		4		0	
	Estim. (UB)	472		16		96		72		144		88		24		24		0		8		0	
Rudaki	Sample	1	0.4%	0	0%	0	0%	0	0%	1	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
	Estim. Median	2		0		0		0		2		0		0		0		0		0		0	
	Estim. (LB)	2		0		0		0		2		0		0		0		0		0		0	
	Estim. (UB)	4		0		0		0		4		0		0		0		0		0		0	
Vahdat	Sample	4	2%	0	0%	0	0%	1	25%	1	25%	2	50%	0	0%	0	0%	0	0%	0	0%	0	0%
	Estim. Median	19		0		0		5		5		9		0		0		0		0		0	
	Estim. (LB)	12		0		0		3		3		6		0		0		0		0		0	
	Estim. (UB)	27		0		0		7		7		13		0		0		0		0		0	
Kulyab	Sample	7	2%	1	14%	2	29%	4	57%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
	Estim. Median	39		6		11		22		0		0		0		0		0		0		0	
	Estim. (LB)	30		4		9		17		0		0		0		0		0		0		0	
	Estim. (UB)	47		7		13		27		0		0		0		0		0		0		0	

Bokhtar	Sample	15	4%	0	0%	8	53%	3	20%	0	0%	0	0%	3	20%	1	7%	0	0%	0	0%	0	0%
	Estim. Median	25		0		13		5		0		0		5		2		0		0		0	
	Estim. (LB)	20		0		11		4		0		0		4		1		0		0		0	
	Estim. (UB)	30		0		16		6		0		0		6		2		0		0		0	
Khorugh	Sample	1	0.3%	0	0%	0	0%	1	100%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
	Estim. Median	3		0		0		3		0		0		0		0		0		0		0	
	Estim. (LB)	3		0		0		3		0		0		0		0		0		0		0	
	Estim. (UB)	3		0		0		3		0		0		0		0		0		0		0	
Panjakent	Sample	11	6%	0	0%	0	0%	2	18%	3	27%	3	27%	1	9%	1	9%	1	9%	0	0%	0	0%
	Estim. Median	45		0		0		8		12		12		4		4		4		0		0	
	Estim. (LB)	39		0		0		7		11		11		4		4		4		0		0	
	Estim. (UB)	50		0		0		9		14		14		5		5		5		0		0	
Khujand	Sample	18	9%	0	0%	0	0%	4	22%	6	33%	1	6%	3	17%	4	22%	0	0%	0	0%	0	0%
	Estim. Median	94		0		0		21		31		5		16		21		0		0		0	
	Estim. (LB)	90		0		0		20		30		5		15		20		0		0		0	
	Estim. (UB)	124		0		0		28		41		7		21		28		0		0		0	

All sites	Sample	116	5%	3	3%	22	19%	24	21%	29	25%	17	15%	10	9%	9	8%	1	1%	1	1%	0	0%
	Estim. Median	475		12		90		98		119		70		41		37		4		4		0	
	Estim. (LB)	381		10		72		79		95		56		33		30		3		3		0	
	Estim. (UB)	614		16		116		127		153		90		53		48		5		5		0	

Annex 5. Distribution of SW RESPONDENTS by age groups and distribution of the ESTIMATED SW POPULATION by age groups

Sentinel site	Sample / Estimated population	SW respondents / Estimated number of SW																	
		Total	18-24		25-29		30-34		35-39		40 - 44		45-49		50-54		55-59	
		Absolute number	Absolute number	Share of the total number of men	Absolute number	Share of the total number of men	Absolute number	Share of the total number of men	Absolute number	Share of the total number of men	Absolute number	Share of the total number of men	Absolute number	Share of the total number of men	Absolute number	Share of the total number of men	Absolute number	Share of the total number of men
Dushanbe	Sample	500	102	20%	95	19%	92	18%	83	17%	61	12%	44	9%	23	5%	0	0%
	Estim. Median	3,985	813		757		733		662		486		351		183		0	
	Estim. (LB)	3,406	695		647		627		565		416		300		157		0	
	Estim. (UB)	4,340	885		825		799		720		529		382		200		0	
Rudaki	Sample	200	39	20%	51	26%	58	29%	23	12%	20	10%	7	4%	1	1%	1	1%
	Estim. Median	467	91		119		135		54		47		16		2		2	
	Estim. (LB)	268	52		68		78		31		27		9		1		1	
	Estim. (UB)	729	142		186		211		84		73		26		4		4	
Vahdat	Sample	200	32	16%	41	21%	43	22%	32	16%	29	15%	23	12%	0	0%	0	0%
	Estim. Median	456	73		93		98		73		66		52		0		0	
	Estim. (LB)	333	53		68		72		53		48		38		0		0	
	Estim. (UB)	578	92		118		124		92		84		66		0		0	
Kulyab	Sample	350	51	15%	72	21%	72	21%	64	18%	48	14%	34	10%	7	2%	2	1%
	Estim. Median	1,360	198		280		280		249		187		132		27		8	
	Estim. (LB)	1,326	193		273		273		242		182		129		27		8	
	Estim. (UB)	1,393	203		287		287		255		191		135		28		8	
Pokht	Sample	350	79	23%	129	37%	68	19%	36	10%	23	7%	12	3%	3	1%	0	0%

	Estim. Median	1,801	407		664		350		185		118		62		15		0	
	Estim. (LB)	1,073	242		395		208		110		71		37		9		0	
	Estim. (UB)	2,529	571		932		491		260		166		87		22		0	
Khorugh	Sample	160	19	12%	20	13%	21	13%	43	27%	42	26%	15	9%	0	0%	0	0%
	Estim. Median	178	21		22		23		48		47		17		0		0	
	Estim. (LB)	173	21		22		23		46		45		16		0		0	
	Estim. (UB)	354	42		44		46		95		93		33		0		0	
Panjakent	Sample	214	24	11%	54	25%	54	25%	47	22%	21	10%	12	6%	1	0%	1	0%
	Estim. Median	256	29		65		65		56		25		14		1		1	
	Estim. (LB)	214	24		54		54		47		21		12		1		1	
	Estim. (UB)	598	67		151		151		131		59		34		3		3	
Khujand	Sample	200	17	9%	18	9%	49	25%	42	21%	40	20%	24	12%	9	5%	1	1%
	Estim. Median	2,092	178		188		513		439		418		251		94		10	
	Estim. (LB)	1,503	128		135		368		316		301		180		68		8	
	Estim. (UB)	2,681	228		241		657		563		536		322		121		13	

All sites	Sample	2,174	363	17%	480	22%	457	21%	370	17%	284	13%	171	8%	44	2%	5	0%
	Estim. Median	10,595	1,769		2,339		2,227		1,803		1,384		833		214		24	
	Estim. (LB)	8,296	1,385		1,832		1,744		1,412		1,084		653		168		19	
	Estim. (UB)	13,202	2,204		2,915		2,775		2,247		1,725		1,038		267		30	

Annex 6. Calculation of the proportion of male PWID (≥ 18 ≤ 69) among the total male population (≥ 18 ≤ 69) for urban, missed and rural areas out of the study sites

Type of location		Population	Population, Total	Total male population (≥ 18 ≤ 69) / estimated number of PWID (lower boundary /median/upper boundary) / Proportion of PWID out of the total male population (≥ 18 ≤ 69)										
				Male										
				Total male (≥ 18 ≤ 69)	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69
Urban areas (100% of urban population)	Dushanbe	Total population	831,400	263,200	54,900	58,000	32,800	24,900	21,500	22,100	19,200	15,300	9,000	5,500
	Bokhtar		109,100	28,234	5,332	5,351	4,028	3,011	2,493	2,436	2,091	1,784	1,036	671
	Khorugh		29,900	9,600	1,100	2,100	1,400	1,000	900	900	800	600	500	300
	Khujand		179,900	51,714	7,511	9,514	7,594	5,897	4,952	4,562	4,061	3,728	2,448	1,447
	Kulob		208,000	53,828	10,166	10,203	7,679	5,741	4,754	4,644	3,986	3,401	1,975	1,280
	Total		1,358,300	406,576	79,009	85,168	53,502	40,550	34,599	34,642	30,138	24,812	14,958	9,198
	Dushanbe	PWID Estim. (Lower boundary)		1,939	62	347	259	325	374	290	149	84	40	9
	Bokhtar			442	18	48	66	62	78	79	61	22	7	1
	Khorugh			976	3	39	98	98	190	232	134	115	53	14
	Khujand			910	50	90	140	170	160	155	80	50	15	0
	Kulob			1,480	30	203	302	280	246	216	108	56	26	13
	Total			5,747	163	727	865	935	1,048	972	532	327	141	37
	Dushanbe	PWID Estim. (Median)		2,574	82	461	344	432	496	385	198	111	53	12
	Bokhtar			553	23	59	83	78	97	99	76	28	8	2
	Khorugh			996	3	40	100	100	194	237	137	117	54	14
	Khujand			949	52	94	146	177	167	162	83	52	16	0
	Kulob			1,894	39	259	386	359	315	276	138	72	33	17
	Total			6,966	199	913	1,059	1,146	1,269	1,159	632	380	164	45
	Dushanbe	PWID Estim.		3,528	112	632	472	592	680	528	272	152	72	16

	Bokhtar	(Upper boundary)		664	28	71	99	93	117	119	91	34	10	2
	Khorugh			1,018	3	41	102	102	198	242	140	120	55	15
	Khujand			1,256	69	124	193	235	221	214	110	69	21	0
	Kulob			2,305	47	316	471	437	383	336	168	87	40	20
	Total			8,771	259	1,184	1,337	1,459	1,599	1,439	781	462	198	53
	Proportion of PWID out of total male population / ≥ 18 ≤ 69 (Lower boundary)			0.014	0.002	0.009	0.016	0.023	0.030	0.028	0.018	0.013	0.009	0.004
	Proportion of PWID out of total male population / ≥ 18 ≤ 69 (Median)			0.017	0.003	0.011	0.020	0.028	0.037	0.033	0.021	0.015	0.011	0.005
	Proportion of PWID out of total male population / ≥ 18 ≤ 69 (Upper boundary)			0.022	0.003	0.014	0.025	0.036	0.046	0.042	0.026	0.019	0.013	0.006
Mixed areas (> 15%, but less than 50% of urban population)	Vahdat	Total population	330,100	87,624	15,544	15,526	14,152	10,344	8,129	6,994	6,133	5,328	3,350	2,124
	Panjakent		290,300	79,992	13,066	12,233	12,534	9,604	7,991	7,029	6,348	5,608	3,537	2,042
	Total		620,400	167,616	28,610	27,759	26,686	19,948	16,120	14,023	12,481	10,936	6,887	4,166
	Vahdat	PWID Estim. (Lower boundary)		604	3	31	68	138	157	148	31	22	6	0
	Panjakent			672	4	43	57	71	121	89	92	107	60	28
	Total			1,276	7	74	125	209	278	237	123	129	66	28
	Vahdat	PWID Estim. (Median)		909	5	46	102	209	237	223	46	32	9	0
	Panjakent			766	4	49	65	81	138	101	105	122	69	32
	Total			1,675	9	95	167	290	375	324	151	154	78	32
	Vahdat	PWID Estim. (Upper boundary)		1,301	7	66	146	299	339	319	66	46	13	0
	Panjakent			860	5	55	73	91	155	114	118	136	77	36
	Total			2,161	12	121	219	390	494	433	184	182	90	36
	Proportion of PWID out of total male population / ≥ 18 ≤ 69 (Lower boundary)			0.00761	0.00024	0.00267	0.00468	0.01048	0.01725	0.01690	0.00985	0.01180	0.00958	0.00672

	Proportion of PWID out of total male population / ≥ 18 ≤ 69 (Median)			0.00999	0.00031	0.00342	0.00626	0.01454	0.02326	0.02310	0.01210	0.01408	0.01133	0.00768
	Proportion of PWID out of total male population / ≥ 18 ≤ 69 (Upper boundary)			0.01289	0.00042	0.00436	0.00821	0.01955	0.03065	0.03088	0.01474	0.01664	0.01307	0.00864
Rural areas (<15% of urban population)	Rudaki	Total population	472,219	125,350	22,236	22,210	20,245	14,798	11,629	10,005	8,774	7,622	4,793	3,038
		PWID Estim. (LB)		378	25	57	73	73	66	38	33	11	2	0
		PWID Estim. (M)		580	39	87	112	112	102	58	51	17	2	0
		PWID Estim. (UB)		952	64	143	183	183	167	96	84	28	4	0
	Proportion of PWID out of total male population / ≥ 18 ≤ 69 (Lower boundary)			0.0030	0.0011	0.0026	0.0036	0.0049	0.0057	0.0038	0.0038	0.0014	0.0004	0.0000
	Proportion of PWID out of total male population / ≥ 18 ≤ 69 (Median)			0.0046	0.0018	0.0039	0.0055	0.0076	0.0088	0.0058	0.0058	0.0022	0.0004	0.0000
	Proportion of PWID out of total male population / ≥ 18 ≤ 69 (Upper boundary)			0.0076	0.0029	0.0064	0.0090	0.0124	0.0144	0.0096	0.0096	0.0037	0.0008	0.0000

Annex 7. Calculation of the proportion of female PWID (≥ 18 ≤ 69) out of total female population (≥ 18 ≤ 69) for urban, mixed and rural areas out of the study sites

Type of location		Population	Population, Total	Total female population (≥ 18 ≤ 69) / estimated number of female PWID (lower boundary /median/upper boundary) / proportion of female PWID out of total female population (≥ 18 ≤ 69)										
				Female										
				Total female (≥ 18 ≤ 69)	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69
Urban areas (100% of urban population)	Dushanbe	Total population	831,400	239,600	40,100	42,000	31,700	26,000	24,900	23,900	19,900	15,400	9,500	6,200
	Bokhtar		109,100	29,979	5,198	5,160	4,201	3,242	2,954	2,858	2,436	1,995	1,189	748
	Khorugh		29,900	9,900	1,100	1,600	1,300	1,100	1,100	1,000	900	800	600	400
	Khujand		179,900	52,409	7,455	8,318	7,261	5,925	5,146	4,896	4,423	4,228	2,893	1,864
	Kulob		208,000	57,156	9,910	9,837	8,008	6,180	5,632	5,449	4,644	3,803	2,267	1,426
	Total		1,358,300	389,045	63,763	66,914	52,470	42,447	39,732	38,103	32,303	26,226	16,450	10,638
	Dushanbe	PWID Estim. (Lower boundary)		259	9	53	40	79	48	13	13	0	4	0
	Bokhtar			20	0	11	4	0	0	4	1	0	0	0
	Khorugh			3	0	0	3	0	0	0	0	0	0	0
	Khujand			90	0	0	20	30	5	15	20	0	0	0
	Kulob			30	4	9	17	0	0	0	0	0	0	0
	Total			402	13	73	84	109	53	32	34	0	4	0
	Dushanbe	PWID Estim. (Median)		346	12	70	53	105	64	18	18	0	6	0
	Bokhtar			25	0	13	5	0	0	5	2	0	0	0
	Khorugh			3	0	0	3	0	0	0	0	0	0	0
	Khujand			94	0	0	21	31	5	16	21	0	0	0
	Kulob			39	6	11	22	0	0	0	0	0	0	0
	Total			507	18	94	104	136	69	39	41	0	6	0
	Dushanbe	PWID Estim.		472	16	96	72	144	88	24	24	0	8	0

	Bokhtar	(Upper boundary)		30	0	16	6	0	0	6	2	0	0	0
	Khorugh			3	0	0	3	0	0	0	0	0	0	0
	Khujand			125	0	0	28	41	7	21	28	0	0	0
	Kulob			47	7	13	27	0	0	0	0	0	0	0
	Total			677	23	125	136	185	95	51	54	0	8	0
	Proportion of female PWID out of total female population / ≥ 18 ≤ 69 (Lower boundary)			0.0010	0.0002	0.0011	0.0016	0.0026	0.0013	0.0008	0.0011	0.0000	0.0002	0.0000
	Proportion of female PWID out of total female population / ≥ 18 ≤ 69 (Median)			0.0013	0.0003	0.0014	0.0020	0.0032	0.0017	0.0010	0.0013	0.0000	0.0004	0.0000
	Proportion of female PWID out of total female population / ≥ 18 ≤ 69 (Upper boundary)			0.0017	0.0004	0.0019	0.0026	0.0044	0.0024	0.0013	0.0017	0.0000	0.0005	0.0000
Mixed areas (> 15%, but less than 50% of urban population)	Vahdat	Total population	330,100	86,800	15,214	15,947	13,933	9,850	7,873	6,902	6,225	5,364	3,387	2,105
	Panjakent		290,300	81,225	13,096	13,111	12,341	9,352	7,828	7,044	6,555	5,786	3,759	2,353
	Total		620,400	168,025	28,310	29,058	26,274	19,202	15,701	13,946	12,780	11,150	7,146	4,458
	Vahdat	PWID Estim. (Lower boundary)		12	0	0	3	3	6	0	0	0	0	0
	Panjakent			41	0	0	7	11	11	4	4	4	0	0
	Total			53	0	0	10	14	17	4	4	4	0	0
	Vahdat	PWID Estim. (Median)		19	0	0	5	5	9	0	0	0	0	0
	Panjakent			44	0	0	8	12	12	4	4	4	0	0
	Total			63	0	0	13	17	21	4	4	4	0	0
	Vahdat	PWID Estim. (Upper boundary)		27	0	0	7	7	13	0	0	0	0	0
	Panjakent			52	0	0	9	14	14	5	5	5	0	0
	Total			79	0	0	16	21	27	5	5	5	0	0
	Proportion of female PWID out of total female population / ≥ 18 ≤ 69 (Lower boundary)			0.0003	0.0000	0.0000	0.0004	0.0007	0.0011	0.0003	0.0003	0.0004	0.0000	0.0000

	Proportion of female PWID out of total female population / ≥ 18 ≤ 69 (Median)			0.0004	0.0000	0.0000	0.0005	0.0009	0.0013	0.0003	0.0003	0.0004	0.0000	0.0000
	Proportion of female PWID out of total female population / ≥ 18 ≤ 69 (Upper boundary)			0.0005	0.0000	0.0000	0.0006	0.0011	0.0017	0.0004	0.0004	0.0004	0.0000	0.0000
Rural areas (<15% of urban population)	Rudaki	Total population	472,219	124,171	21,765	22,812	19,931	14,091	11,262	9,874	8,905	7,674	4,845	3,012
		PWID Estim. (LB)		2	0	0	0	2	0	0	0	0	0	0
		PWID Estim. (M)		2	0	0	0	2	0	0	0	0	0	0
		PWID Estim. (UB)		4	0	0	0	4	0	0	0	0	0	0
	Proportion of female PWID out of total female population / ≥ 18 ≤ 69 (Lower boundary)			0.00002	0.00000	0.00000	0.00000	0.00014	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	Proportion of female PWID out of total female population / ≥ 18 ≤ 69 (Median)			0.00002	0.00000	0.00000	0.00000	0.00014	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	Proportion of female PWID out of total female population / ≥ 18 ≤ 69 (Upper boundary)			0.00003	0.00000	0.00000	0.00000	0.00028	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Annex 8. Calculation of proportion of SW (≥ 18 ≤ 59) out of the total female population (≥ 18 ≤ 59) for urban areas, suburbs and other locations out of the study sites.

Type of location	Population	Total	Female population									Definition of location
			Total female (≥ 18 ≤ 59)	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	
City	Dushanbe	831,400	223,900	40,100	42,000	31,700	26,000	24,900	23,900	19,900	15,400	City (capital of the country)
	SW Estim. (Lower boundary)		3,406	695	647	627	565	416	300	157	0	
	SW Estim. (Median)		3,985	813	757	733	662	486	351	183	0	
	SW Estim. (Upper boundary)		4,340	885	825	799	720	529	382	200	0	
Suburb	Vahdat	330,100	81,308	15,214	15,947	13,933	9,850	7,873	6,902	6,225	5,364	Suburbs (locations, bordering big cities, including the capital of the country and regional centers, or geographic locations, which do not border big cities, but whose administrative centers are located at a distance of less than 25 km, and with good transport network – at a distance of less than 50 km from centers of big cities, such as the capital and regional centers.
	Rudaki	472,219	116,314	21,765	22,812	19,931	14,091	11,262	9,874	8,905	7,674	
	Total for Vahdat and Rudaki	802,319	197,622	36,979	38,759	33,864	23,941	19,135	16,776	15,130	13,038	
	SW Estim. for Vahdat and Rudaki (Lower boundary)		599	105	136	150	84	75	47	1	1	
	SW Estim. For Vahdat and Rudaki (Median)		921	164	212	233	127	113	68	2	2	
	SW Estim. For Vahdat and Rudaki (Upper boundary)		1,306	234	304	335	176	157	92	4	4	
	Proportion of SW of the total female population (Lower boundary)		0.0030	0.0028	0.0035	0.0044	0.0035	0.0039	0.0028	0.0001	0.0001	
	Proportion of SW of the total female population (Median)		0.0047	0.0044	0.0055	0.0069	0.0053	0.0059	0.0041	0.0001	0.0002	
	Proportion of SW of the total female population (Upper boundary)		0.0066	0.0063	0.0078	0.0099	0.0074	0.0082	0.0055	0.0003	0.0003	
City	Kulob	208,000	53,463	9,910	9,837	8,008	6,180	5,632	5,449	4,644	3,803	City (regional center)
	SW Estim. (Lower boundary)		1,327	193	273	273	242	182	129	27	8	
	SW Estim. (Median)		1,361	198	280	280	249	187	132	27	8	
	SW Estim. (Upper boundary)		1,394	203	287	287	255	191	135	28	8	
City	Bokhtar	109,100	28,043	5,197	5,160	4,201	3,242	2,954	2,858	2,436	1,995	City (regional center)
	SW Estim. (Lower boundary)		1,072	242	395	208	110	71	37	9	0	
	SW Estim. (Median)		1,801	407	664	350	185	118	62	15	0	

	SW Estim. (Upper boundary)		**2,529**	**571**	**932**	**491**	**260**	**166**	**87**	**22**	**0**	
City	**Khujand**	**179,900**	**47,652**	**7,455**	**8,318**	**7,261**	**5,925**	**5,146**	**4,896**	**4,423**	**4,228**	City (regional center)
	SW Estim. (Lower boundary)		**1,504**	**128**	**135**	**368**	**316**	**301**	**180**	**68**	**8**	
	SW Estim. (Median)		**2,091**	**178**	**188**	**513**	**439**	**418**	**251**	**94**	**10**	
	SW Estim. (Upper boundary)		**2,681**	**228**	**241**	**657**	**563**	**536**	**322**	**121**	**13**	
City	**Khorugh**	**29,900**	**8,900**	**1,100**	**1,600**	**1,300**	**1,100**	**1,100**	**1,000**	**900**	**800**	City (regional center)
	SW Estim. (Lower boundary)		**173**	**21**	**22**	**23**	**46**	**45**	**16**	**0**	**0**	
	SW Estim. (Median)		**178**	**21**	**22**	**23**	**48**	**47**	**17**	**0**	**0**	
	SW Estim. (Upper boundary)		**353**	**42**	**44**	**46**	**95**	**93**	**33**	**0**	**0**	
Other	**Panjakent**	**290,300**	**75,113**	**13,096**	**13,111**	**12,341**	**9,352**	**7,828**	**7,044**	**6,555**	**5,786**	Other locations (geographic locations, which do not have common boundaries with big cities, such as the capital and regional centers; or geographic locations, whose administrative centers are located at a distance of over 25 km, and with good transport network – of more than 50 km from center of big cities)
	SW Estim. (Lower boundary)	**214**	**214**	**24**	**54**	**54**	**47**	**21**	**12**	**1**	**1**	
	SW Estim. (Median)	**256**	**256**	**29**	**65**	**65**	**56**	**25**	**14**	**1**	**1**	
	SW Estim. (Upper boundary)	**599**	**599**	**67**	**151**	**151**	**131**	**59**	**34**	**3**	**3**	
	Proportion of SW of the total female population (Lower boundary)		**0.0028**	**0.0018**	**0.0041**	**0.0044**	**0.0050**	**0.0027**	**0.0017**	**0.0002**	**0.0002**	
	Proportion of SW of the total female population (Median)		**0.0034**	**0.0022**	**0.0050**	**0.0053**	**0.0060**	**0.0032**	**0.0020**	**0.0002**	**0.0002**	
	Proportion of SW of the total female population (Upper boundary)		**0.0080**	**0.0051**	**0.0115**	**0.0122**	**0.0140**	**0.0075**	**0.0048**	**0.0005**	**0.0005**	

Annex 9. Calculation of lower boundary/median/upper boundary of the estimated number of MALE PWID in the age group of ≥ 18 ≤ 69 years for urban, mixed and rural areas out of places, where study was not done

Type of location		Population	Population, Total	Total MALE population (≥ 18 ≤ 69) / Estimated number of MALE PWID (lower boundary/median/upper boundary)											
				Male											
				Total male (≥ 18 ≤ 69)	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69
Urban area	Guliston	Total population	47,100	13,538	1,966	2,491	1,988	1,544	1,296	1,194	1,063	976	641	379
	Istiklol		16,900	4,859	706	894	713	554	465	429	382	350	230	136
	Buston		32,100	9,228	1,340	1,698	1,355	1,052	884	814	725	665	437	258
	Total		96,100	27,625	4,012	5,083	4,056	3,150	2,645	2,437	2,170	1,991	1,308	773
	Guliston, Istiklol, Buston	PWID Estim. (LB)		418	8	43	66	73	80	68	38	26	12	3
		PWID Estim. (M)		507	10	54	80	89	97	82	46	30	14	4
		PWID Estim. (UB)		637	13	71	101	113	122	101	56	37	17	4
Mixed areas	Isfara	Total population	265,100	73,826	11,718	11,881	11,383	8,751	7,297	6,494	5,844	5,214	3,313	1,931
	Konibodom		205,500	57,229	9,084	9,210	8,824	6,783	5,657	5,034	4,530	4,042	2,568	1,497
	Istaravshan		262,500	73,102	11,603	11,764	11,271	8,665	7,226	6,431	5,787	5,163	3,281	1,912
	Zafarobod		72,400	20,162	3,200	3,245	3,109	2,390	1,993	1,774	1,596	1,424	905	527
	Mastchoh		122,600	34,142	5,419	5,495	5,264	4,047	3,375	3,003	2,703	2,411	1,532	893
	Nurek		59,200	14,932	2,860	2,621	2,351	1,692	1,340	1,205	1,062	899	550	354
	Levakant		46,400	11,704	2,241	2,054	1,842	1,326	1,050	944	833	705	431	277
	Dangara		150,300	37,911	7,260	6,654	5,968	4,295	3,402	3,059	2,697	2,284	1,396	897
	Yovon		222,200	56,047	10,733	9,837	8,822	6,349	5,029	4,522	3,987	3,376	2,063	1,327
	Tursunzoda		286,200	76,460	13,610	13,555	12,158	8,921	7,068	6,183	5,436	4,730	2,946	1,853
	Hisor		293,900	78,517	13,976	13,919	12,485	9,161	7,258	6,349	5,582	4,858	3,025	1,903
	Roghun		39,900	10,660	1,897	1,890	1,695	1,244	985	862	758	659	411	258
	Total		2,026,200	544,693	93,602	92,124	85,172	63,623	51,680	45,861	40,814	35,765	22,421	13,630
	12 cities and districts	PWID Estim. (LB)		4,131	23	246	399	667	891	775	402	422	215	92
		PWID Estim. (M)		5,421	29	315	533	925	1,202	1,060	494	504	254	105
		PWID Estim. (UB)		6,991	39	402	699	1,244	1,584	1,416	602	595	293	118

Rural areas with supposedly low concentration of PWID	Ayni	Total population	81,000	22,316	3,646	3,410	3,497	2,680	2,230	1,961	1,771	1,565	987	570
	Devashtich		165,700	45,652	7,458	6,977	7,154	5,482	4,561	4,012	3,623	3,201	2,019	1,166
	Shahriston		41,500	11,434	1,868	1,747	1,792	1,373	1,142	1,005	908	802	506	292
	Kuhistoni		24,200	6,667	1,089	1,019	1,045	801	666	586	529	468	295	170
	Baljuvon		29,000	7,275	1,397	1,255	1,169	834	655	578	513	433	268	173
	Muminabod		90,800	22,779	4,375	3,929	3,660	2,610	2,051	1,809	1,606	1,357	839	542
	N. Khusrav		36,900	9,257	1,778	1,597	1,487	1,061	834	735	652	551	341	220
	Panj		113,800	28,548	5,483	4,925	4,587	3,272	2,571	2,268	2,012	1,701	1,052	679
	Khovaling		56,300	14,124	2,713	2,436	2,269	1,619	1,272	1,122	996	841	520	336
	Khuroson		110,600	27,746	5,329	4,786	4,458	3,180	2,498	2,204	1,956	1,653	1,022	660
	Jaykhun		132,700	33,290	6,394	5,743	5,349	3,815	2,997	2,644	2,346	1,983	1,226	792
	Shaartuz		123,700	31,032	5,960	5,353	4,986	3,556	2,794	2,465	2,187	1,849	1,143	739
	Sh. Shohin		53,400	13,396	2,573	2,311	2,152	1,535	1,206	1,064	944	798	493	319
	Varzob		78,700	20,891	3,706	3,701	3,374	2,466	1,938	1,667	1,462	1,270	799	506
	Lakhsh		63,800	16,935	3,004	3,001	2,735	1,999	1,571	1,352	1,185	1,030	648	410
	Nurabad		78,300	20,784	3,687	3,683	3,357	2,454	1,928	1,659	1,455	1,264	795	504
	Sangvor		22,400	5,946	1,055	1,054	960	702	552	475	416	362	227	144
	Tojikobod		43,900	11,653	2,067	2,065	1,882	1,376	1,081	930	816	709	446	282
	Faizobod		98,700	26,200	4,648	4,642	4,232	3,093	2,431	2,091	1,834	1,593	1,002	635
	Total:		1,445,400	375,926	68,228	63,634	60,147	43,905	34,977	30,627	27,212	23,429	14,626	9,141
	19 districts	PWID Estim. (LB)		1,131	77	163	217	217	199	116	102	34	6	0
		PWID Estim. (M)		1,735	120	249	333	332	307	178	158	52	6	0
		PWID Estim. (UB)		2,848	196	410	544	543	502	294	261	86	12	0
Rural areas with supposedly average concentration of PWID	Asht	Total population	161,600	44,523	7,274	6,804	6,977	5,346	4,448	3,913	3,534	3,122	1,969	1,137
	J. Balkhi		191,600	48,066	9,231	8,291	7,723	5,508	4,328	3,818	3,388	2,863	1,770	1,144
	Temurmalik		67,700	16,984	3,262	2,930	2,729	1,946	1,529	1,349	1,197	1,012	626	404
	Dusti		110,600	27,746	5,329	4,786	4,458	3,180	2,498	2,204	1,956	1,653	1,022	660
	Kabadiyan		178,400	44,754	8,595	7,720	7,191	5,129	4,030	3,555	3,155	2,666	1,649	1,065
	Rasht		122,300	32,464	5,759	5,752	5,243	3,832	3,012	2,591	2,272	1,974	1,241	787
	Darvoz		23,300	7,085	962	1,107	1,143	914	758	650	541	457	325	229
	Murgab		15,300	4,652	632	727	750	600	498	427	355	300	213	150
	Total:		870,800	226,274	41,044	38,117	36,215	26,456	21,100	18,506	16,398	14,047	8,815	5,576
	8 districts	PWID Estim. (LB)		681	46	98	131	131	120	70	62	20	4	0
		PWID Estim. (M)		1,045	72	149	200	200	185	107	95	31	4	0
		PWID Estim. (UB)		1,715	118	245	327	327	303	178	157	52	7	0

Rural areas with supposedly high concentration of PWID	Spitamen	Total population	136,800	37,690	6,157	5,760	5,906	4,526	3,766	3,312	2,991	2,643	1,667	962
	J. Rasulov		132,800	36,588	5,977	5,591	5,734	4,393	3,655	3,215	2,904	2,566	1,618	934
	B. Gafurov		367,600	101,278	16,546	15,478	15,871	12,161	10,118	8,900	8,039	7,102	4,478	2,586
	Kushoniyen		234,900	58,928	11,318	10,165	9,469	6,753	5,306	4,681	4,154	3,511	2,171	1,402
	Vakhsh		190,500	47,790	9,178	8,244	7,679	5,477	4,303	3,796	3,369	2,847	1,760	1,137
	Vose		207,700	52,105	10,007	8,988	8,372	5,971	4,692	4,139	3,673	3,104	1,919	1,240
	Hamadoni		143,900	36,099	6,933	6,227	5,800	4,137	3,250	2,867	2,545	2,151	1,330	859
	Farkhar		163,700	41,067	7,887	7,084	6,599	4,706	3,698	3,262	2,895	2,446	1,513	977
	A. Jomi		166,900	41,869	8,041	7,223	6,728	4,798	3,770	3,326	2,951	2,494	1,542	996
	Shahrinav		117,500	31,190	5,533	5,526	5,038	3,682	2,894	2,489	2,183	1,896	1,193	756
	Vanj		33,600	10,217	1,388	1,596	1,648	1,318	1,093	937	781	659	468	330
	Ishkashim		32,200	9,791	1,330	1,529	1,579	1,263	1,047	898	748	632	449	316
	Roshtkala		26,800	8,149	1,107	1,273	1,314	1,052	872	747	623	526	374	263
	Rushan		25,300	7,693	1,045	1,202	1,241	993	823	705	588	496	353	248
	Shugnan		37,100	11,281	1,532	1,762	1,820	1,456	1,207	1,034	862	728	517	364
	Total:		2,017,300	531,737	93,979	87,648	84,796	62,685	50,493	44,309	39,303	33,800	21,351	13,371
	15 districts	PWID Estim. (LB)		1,606	106	225	306	309	287	168	148	49	9	0
		PWID Estim. (M)		2,464	165	343	469	474	443	257	228	75	9	0
		PWID Estim. (UB)		4,045	270	564	766	775	725	425	376	124	18	0

Annex 10. Calculation of lower boundary/median/upper boundary of the estimated number of FEMALE PWID in the age group of ≥ 18 ≤ 69 years for urban, mixed and rural areas out of the places, where study was not done

Type of location		Population	Population, Total	Total number of FEMALE population (≥ 18 ≤ 69) / Estimated number of FEMALE PWID (lower boundary/median/upper boundary)										
				Female										
				Total male (≥ 18 ≤ 69)	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69
Urban area	Guliston	Total population	47,100	13,721	1,952	2,178	1,901	1,551	1,347	1,282	1,158	1,107	757	488
	Istiklol		16,900	4,923	700	781	682	557	483	460	416	397	272	175
	Buston		32,100	9,351	1,330	1,484	1,296	1,057	918	874	789	754	516	333
	Total		96,100	27,995	3,982	4,443	3,879	3,165	2,748	2,616	2,363	2,258	1,545	996
	Guliston, Istiklol, Buston	PWID Estim. (LB)		29	1	5	6	8	4	2	2	0	0	0
		PWID Estim. (M)		36	1	6	8	10	5	3	3	0	1	0
		PWID Estim. (UB)		48	1	8	10	14	7	4	4	0	1	0
Mixed areas	Isfara	Total population	265,100	74,934	11,718	12,044	11,129	8,588	7,257	6,616	6,128	5,509	3,638	2,307
	Konibodom		205,500	58,087	9,084	9,336	8,627	6,657	5,625	5,129	4,751	4,270	2,820	1,788
	Istaravshan		262,500	74,199	11,603	11,925	11,020	8,504	7,185	6,551	6,068	5,454	3,603	2,284
	Zafarobod		72,400	20,465	3,200	3,289	3,039	2,345	1,982	1,807	1,674	1,504	994	630
	Mastchoh		122,600	34,655	5,419	5,570	5,147	3,972	3,356	3,060	2,834	2,548	1,683	1,067
	Nurek		59,200	15,388	2,889	2,828	2,380	1,651	1,344	1,266	1,125	940	592	372
	Levakant		46,400	12,061	2,264	2,217	1,866	1,294	1,053	992	882	737	464	292
	Dangara		150,300	39,067	7,335	7,180	6,043	4,191	3,411	3,214	2,857	2,387	1,504	944
	Yovon		222,200	57,756	10,844	10,615	8,934	6,197	5,043	4,752	4,224	3,529	2,223	1,396
	Tursunzoda		286,200	75,962	13,209	13,693	11,964	8,562	6,985	6,238	5,616	4,813	3,029	1,853
	Hisor		293,900	78,006	13,564	14,062	12,286	8,792	7,173	6,406	5,767	4,943	3,111	1,903
	Roghun		39,900	10,590	1,842	1,909	1,668	1,194	974	870	783	671	422	258
	Total		2,026,200	551,169	92,973	94,667	84,102	61,946	51,388	46,901	42,708	37,305	24,083	15,096
	12 cities and districts	PWID Estim. (LB)		173	0	0	32	45	56	13	13	13	0	0
		PWID Estim. (M)		205	0	0	42	55	69	13	13	13	0	0

		PWID Estim. (UB)		258	0	0	51	68	88	17	17	17	0	0
Rural areas with supposedly low concentration of PWID	Ayni	Total population	81,000	22,663	3,654	3,658	3,443	2,609	2,184	1,965	1,829	1,614	1,049	656
	Devashtich		165,700	46,362	7,475	7,483	7,044	5,338	4,468	4,020	3,742	3,303	2,145	1,343
	Shahriston		41,500	11,611	1,872	1,874	1,764	1,337	1,119	1,007	937	827	537	336
	Kuhistoni Mastchoh		24,200	6,771	1,092	1,093	1,029	780	653	587	546	482	313	196
	Baljuvon		29,000	7,446	1,423	1,388	1,177	796	632	589	530	447	285	180
	Muminabod		90,800	23,314	4,454	4,347	3,684	2,493	1,978	1,844	1,661	1,398	891	563
	N. Khusrav		36,900	9,474	1,810	1,767	1,497	1,013	804	749	675	568	362	229
	Panj		113,800	29,219	5,582	5,448	4,617	3,124	2,480	2,311	2,082	1,753	1,116	705
	Khovaling		56,300	14,456	2,762	2,695	2,284	1,546	1,227	1,143	1,030	867	552	349
	Khuroson		110,600	28,398	5,425	5,295	4,488	3,037	2,410	2,246	2,023	1,703	1,085	686
	Jaykhun		132,700	34,072	6,510	6,353	5,384	3,643	2,891	2,695	2,427	2,044	1,302	823
	Shaartuz		123,700	31,761	6,068	5,922	5,019	3,396	2,695	2,512	2,263	1,905	1,214	767
	Sh. Shohin		53,400	13,711	2,620	2,557	2,167	1,466	1,164	1,084	977	822	524	331
	Varzob		78,700	20,694	3,627	3,802	3,322	2,348	1,877	1,646	1,484	1,279	808	502
	Lakhsh		63,800	16,776	2,941	3,082	2,693	1,904	1,522	1,334	1,203	1,037	655	407
	Nurabad		78,300	20,589	3,609	3,783	3,305	2,336	1,867	1,637	1,477	1,272	803	499
	Sangvor		22,400	5,890	1,032	1,082	945	668	534	468	422	364	230	143
	Tojikobod		43,900	11,544	2,023	2,121	1,853	1,310	1,047	918	828	713	450	280
	Faizobod		98,700	25,953	4,549	4,768	4,166	2,945	2,354	2,064	1,861	1,604	1,013	630
	Total:		1,445,400	380,705	68,528	68,519	59,882	42,091	33,906	30,820	27,997	24,003	15,334	9,624
	19 districts	PWID Estim. (LB)		6	0	0	0	6	0	0	0	0	0	0
		PWID Estim. (M)		6	0	0	0	6	0	0	0	0	0	0
		PWID Estim. (UB)		12	0	0	0	12	0	0	0	0	0	0
Rural areas with supposedly average concentration of PWID	Asht	Total population	161,600	45,215	7,290	7,298	6,870	5,206	4,358	3,921	3,649	3,221	2,092	1,310
	J. Balkhi		191,600	49,195	9,399	9,173	7,774	5,260	4,175	3,891	3,505	2,951	1,880	1,188
	Temurmalik		67,700	17,383	3,321	3,241	2,747	1,859	1,475	1,375	1,238	1,043	664	420
	Dusti		110,600	28,398	5,425	5,295	4,488	3,037	2,410	2,246	2,023	1,703	1,085	686
	Kabadiyan		178,400	45,806	8,751	8,541	7,239	4,898	3,887	3,623	3,263	2,748	1,750	1,106
	Rasht		122,300	32,159	5,637	5,908	5,162	3,649	2,917	2,557	2,306	1,987	1,255	780
	Darvoz		23,300	6,628	950	938	1,010	806	686	626	553	481	337	241
	Murgab		15,300	4,352	624	616	664	529	450	411	363	316	221	158
	Total:		870,800	229,135	41,398	41,011	35,953	25,244	20,357	18,649	16,901	14,450	9,285	5,887
	8 districts	PWID Estim. (LB)		4	0	0	0	4	0	0	0	0	0	0
		PWID Estim. (M)		4	0	0	0	4	0	0	0	0	0	0

		PWID Estim. (UB)		7	0	0	0	7	0	0	0	0	0	0
Rural areas with supposedly high concentration of PWID	Spitamen	Total population	136,800	38,276	6,171	6,178	5,816	4,407	3,689	3,319	3,089	2,727	1,771	1,109
	J. Rasulov		132,800	37,157	5,991	5,998	5,646	4,278	3,581	3,222	2,999	2,647	1,719	1,076
	B. Gafurov		367,600	102,852	16,583	16,602	15,627	11,842	9,912	8,919	8,301	7,327	4,759	2,979
	Kushoniyen		234,900	60,313	11,523	11,246	9,531	6,449	5,118	4,770	4,297	3,618	2,305	1,456
	Vakhsh		190,500	48,913	9,345	9,120	7,730	5,230	4,151	3,868	3,484	2,934	1,869	1,181
	Vose		207,700	53,329	10,189	9,944	8,427	5,703	4,526	4,218	3,799	3,199	2,038	1,287
	Hamadoni		143,900	36,948	7,059	6,889	5,839	3,951	3,136	2,922	2,632	2,216	1,412	892
	Farkhar		163,700	42,032	8,030	7,837	6,642	4,494	3,567	3,324	2,994	2,521	1,606	1,015
	A. Jomi		166,900	42,853	8,187	7,991	6,772	4,582	3,637	3,389	3,053	2,570	1,637	1,035
	Shahrinav		117,500	30,897	5,416	5,676	4,959	3,506	2,802	2,457	2,216	1,909	1,206	749
	Vanj		33,600	9,558	1,370	1,353	1,457	1,162	989	902	798	694	486	347
	Ishkashim		32,200	9,160	1,313	1,297	1,396	1,114	948	864	765	665	465	332
	Roshtkala		26,800	7,624	1,093	1,079	1,162	927	789	719	636	553	387	277
	Rushan		25,300	7,197	1,032	1,019	1,097	875	745	679	601	522	366	261
	Shugnan		37,100	10,553	1,513	1,494	1,609	1,283	1,092	996	881	766	536	383
	Total:		2,017,300	537,659	94,816	93,723	83,711	59,805	48,680	44,570	40,545	34,868	22,563	14,380
	15 districts	PWID Estim. (LB)		8	0	0	0	8	0	0	0	0	0	0
		PWID Estim. (M)		8	0	0	0	8	0	0	0	0	0	0
		PWID Estim. (UB)		17	0	0	0	17	0	0	0	0	0	0

Annex 11. Calculation of the lower/median/upper boundary of the estimated number of SW in the age group ≥ 18 ≤ 59 years for "suburbs" and "other" area, where the study was not done

Annex 11a: Suburbs

Type of location	Population	Total	Female population								
			Total women (≥ 18 ≤ 59)	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59
Suburb of Dushanbe	Tursunzoda	286,200	71,080	13,209	13,693	11,964	8,562	6,985	6,238	5,616	4,813
	Hisor	293,900	72,993	13,564	14,062	12,286	8,792	7,173	6,406	5,767	4,943
	Varzob	78,700	19,385	3,627	3,802	3,322	2,348	1,877	1,646	1,484	1,279
	Shahrinav	117,500	28,941	5,416	5,676	4,959	3,506	2,802	2,457	2,216	1,909
	Total:	776,300	192,399	35,816	37,233	32,531	23,208	18,837	16,747	15,083	12,944
	Proportion of SW of the total female population (Lower boundary)		0.0030	0.0028	0.0035	0.0044	0.0035	0.0039	0.0028	0.0001	0.0001
	Proportion of SW of the total female population (Median)		0.0047	0.0044	0.0055	0.0069	0.0053	0.0059	0.0041	0.0001	0.0002
	Proportion of SW of the total female population (Upper boundary)		0.0066	0.0063	0.0078	0.0099	0.0074	0.0082	0.0055	0.0003	0.0003
	SW Estim. (Lower boundary)		581	102	131	144	81	74	47	1	1
	SW Estim. (Median)		893	159	204	224	123	111	68	2	2
	SW Estim. (Upper boundary)		1,265	227	292	322	171	155	92	4	4
Suburb of Kulyab	Muminabod	90,800	21,859	4,454	4,347	3,684	2,493	1,978	1,844	1,661	1,398
	Vose	207,700	50,005	10,189	9,944	8,427	5,703	4,526	4,218	3,799	3,199
	Total:	298,500	71,864	14,643	14,291	12,111	8,196	6,504	6,062	5,460	4,597
	Proportion of SW of the total female population (Lower boundary)		0.0030	0.0028	0.0035	0.0044	0.0035	0.0039	0.0028	0.0001	0.0001
	Proportion of SW of the total female population (Median)		0.0047	0.0044	0.0055	0.0069	0.0053	0.0059	0.0041	0.0001	0.0002
	Proportion of SW of the total female population (Upper boundary)		0.0066	0.0063	0.0078	0.0099	0.0074	0.0082	0.0055	0.0003	0.0003
	SW Estim. (Lower boundary)		217	42	50	54	29	25	17	0	0
	SW Estim. (Median)		334	65	78	83	43	38	25	1	1

	SW Estim. (Upper boundary)		474	93	112	120	60	53	33	1	1
Suburb of Bokhtar	Levakant	46,400	11,305	2,264	2,217	1,866	1,294	1,053	992	882	737
	Khuroson	110,600	26,627	5,425	5,295	4,488	3,037	2,410	2,246	2,023	1,703
	Kushoniyen	234,900	56,552	11,523	11,246	9,531	6,449	5,118	4,770	4,297	3,618
	Vakhsh	190,500	45,862	9,345	9,120	7,730	5,230	4,151	3,868	3,484	2,934
	Total	582,400	140,346	28,557	27,878	23,615	16,010	12,732	11,876	10,686	8,992
	Proportion of SW of the total female population (Lower boundary)		0.0030	0.0028	0.0035	0.0044	0.0035	0.0039	0.0028	0.0001	0.0001
	Proportion of SW of the total female population (Median)		0.0047	0.0044	0.0055	0.0069	0.0053	0.0059	0.0041	0.0001	0.0002
	Proportion of SW of the total female population (Upper boundary)		0.0066	0.0063	0.0078	0.0099	0.0074	0.0082	0.0055	0.0003	0.0003
	SW Estim. (Lower boundary)		424	81	98	105	56	50	33	1	1
	SW Estim. (Median)		653	127	152	162	85	75	48	1	1
	SW Estim. (Upper boundary)		926	181	219	234	118	104	65	3	3
Suburb of Khujand	Guliston	47,100	12,476	1,952	2,178	1,901	1,551	1,347	1,282	1,158	1,107
	Buston	32,100	8,502	1,330	1,484	1,296	1,057	918	874	789	754
	Spitamen	136,800	35,396	6,171	6,178	5,816	4,407	3,689	3,319	3,089	2,727
	Jabor Rasulov	132,800	34,362	5,991	5,998	5,646	4,278	3,581	3,222	2,999	2,647
	Bobojon Gafurov	367,600	95,113	16,583	16,602	15,627	11,842	9,912	8,919	8,301	7,327
	Total	716,400	185,849	32,027	32,440	30,286	23,135	19,447	17,616	16,336	14,562
	Proportion of SW of the total female population (Lower boundary)		0.0030	0.0028	0.0035	0.0044	0.0035	0.0039	0.0028	0.0001	0.0001
	Proportion of SW of the total female population (Median)		0.0047	0.0044	0.0055	0.0069	0.0053	0.0059	0.0041	0.0001	0.0002
	Proportion of SW of the total female population (Upper boundary)		0.0066	0.0063	0.0078	0.0099	0.0074	0.0082	0.0055	0.0003	0.0003
	SW Estim. (Lower boundary)		548	91	114	134	81	76	49	1	1
	SW Estim. (Median)		841	142	177	208	123	115	71	2	2
	SW Estim. (Upper boundary)		1,192	203	254	300	170	160	97	4	4
Suburb of Khorug	Shugnan	37,100	9,634	1,513	1,494	1,609	1,283	1,092	996	881	766
	Proportion of SW of the total female population (Lower boundary)		0.0030	0.0028	0.0035	0.0044	0.0035	0.0039	0.0028	0.0001	0.0001

	Proportion of SW of the total female population (Median)		0.0047	0.0044	0.0055	0.0069	0.0053	0.0059	0.0041	0.0001	0.0002
	Proportion of SW of the total female population (Upper boundary)		0.0066	0.0063	0.0078	0.0099	0.0074	0.0082	0.0055	0.0003	0.0003
	SW Estim. (Lower boundary)		28	4	5	7	5	4	3	0	0
	SW Estim. (Median)		43	7	8	11	7	6	4	0	0
	SW Estim. (Upper boundary)		62	10	12	16	9	9	5	0	0

Annex 11b: Other areas

Type of location	Population	Total	Female population								
			Total women (≥ 18 ≤ 59)	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59
" other" locations with supposedly low concentration of SW	Ayni	81,000	20,956	3,654	3,658	3,443	2,609	2,184	1,965	1,829	1,614
	Shahriston	41,500	10,737	1,872	1,874	1,764	1,337	1,119	1,007	937	827
	Gornaya Mastcha	24,200	6,262	1,092	1,093	1,029	780	653	587	546	482
	Asht	161,600	41,813	7,290	7,298	6,870	5,206	4,358	3,921	3,649	3,221
	Temurmalik	67,700	16,299	3,321	3,241	2,747	1,859	1,475	1,375	1,238	1,043
	Baljuvon	29,000	6,982	1,423	1,388	1,177	796	632	589	530	447
	Khovaling	56,300	13,554	2,762	2,695	2,284	1,546	1,227	1,143	1,030	867
	Shamsiddini Shohin	53,400	12,857	2,620	2,557	2,167	1,466	1,164	1,084	977	822
	Kabadiyan	178,400	42,950	8,751	8,541	7,239	4,898	3,887	3,623	3,263	2,748
	Lakhsh	63,800	15,716	2,941	3,082	2,693	1,904	1,522	1,334	1,203	1,037
	Nurabad	78,300	19,286	3,609	3,783	3,305	2,336	1,867	1,637	1,477	1,272
	Sangvor	22,400	5,515	1,032	1,082	945	668	534	468	422	364
	Tojikobod	43,900	10,813	2,023	2,121	1,853	1,310	1,047	918	828	713
	Darvoz	23,300	6,050	950	938	1,010	806	686	626	553	481
	Murgab	15,300	3,973	624	616	664	529	450	411	363	316
	Rasht	122,300	30,123	5,637	5,908	5,162	3,649	2,917	2,557	2,306	1,987
	Vanj	33,600	8,725	1,370	1,353	1,457	1,162	989	902	798	694

	Ishkashim	32,200	8,362	1,313	1,297	1,396	1,114	948	864	765	665
	Roshtkala	26,800	6,958	1,093	1,079	1,162	927	789	719	636	553
	Rushan	25,300	6,570	1,032	1,019	1,097	875	745	679	601	522
	Total:	1,180,300	294,501	54,409	54,623	49,464	35,777	29,193	26,409	23,951	20,675
	Proportion of SW from total female population in "other" areas with supposedly low concentration of SW		0.0028	0.0018	0.0041	0.0044	0.0050	0.0027	0.0017	0.0002	0.0002
	SW Estimate in "other" locations with supposedly low concentration of SW		851	100	225	216	180	78	45	4	4
" other" locations with supposedly average concentration of SW	Jalolidini Balhi	191,600	46,128	9,399	9,173	7,774	5,260	4,175	3,891	3,505	2,951
	Dusti	110,600	26,627	5,425	5,295	4,488	3,037	2,410	2,246	2,023	1,703
	Zafarobod	72,400	18,840	3,200	3,289	3,039	2,345	1,982	1,807	1,674	1,504
	Mastchoh	122,600	31,906	5,419	5,570	5,147	3,972	3,356	3,060	2,834	2,548
	Devashtich	165,700	42,873	7,475	7,483	7,044	5,338	4,468	4,020	3,742	3,303
	Nossiri Khusrav	36,900	8,883	1,810	1,767	1,497	1,013	804	749	675	568
	Jaykhun	132,700	31,947	6,510	6,353	5,384	3,643	2,891	2,695	2,427	2,044
	Farkhar	163,700	39,409	8,030	7,837	6,642	4,494	3,567	3,324	2,994	2,521
	Abdurakhmoni Jomi	166,900	40,181	8,187	7,991	6,772	4,582	3,637	3,389	3,053	2,570
	Faizobod	98,700	24,311	4,549	4,768	4,166	2,945	2,354	2,064	1,861	1,604
	Total:	1,261,800	311,105	60,004	59,526	51,953	36,629	29,644	27,245	24,788	21,316
	Proportion of SW from general female population in "other" locations with supposedly low concentration of SW		0.0034	0.0022	0.0050	0.0053	0.0060	0.0032	0.0020	0.0002	0.0002
	SW Estimate in "other" locations with supposedly low concentration of SW		1,077	133	295	274	219	95	54	4	4
" other" locations with supposedly high concentration of SW	Istiklol	16,900	4,476	700	781	682	557	483	460	416	397
	Isfara	265,100	68,989	11,718	12,044	11,129	8,588	7,257	6,616	6,128	5,509
	Konibodom	205,500	53,479	9,084	9,336	8,627	6,657	5,625	5,129	4,751	4,270
	Istaravshan	262,500	68,310	11,603	11,925	11,020	8,504	7,185	6,551	6,068	5,454
	Nurek	59,200	14,423	2,889	2,828	2,380	1,651	1,344	1,266	1,125	940
	Dangara	150,300	36,618	7,335	7,180	6,043	4,191	3,411	3,214	2,857	2,387
	Yovon	222,200	54,138	10,844	10,615	8,934	6,197	5,043	4,752	4,224	3,529

	Roghun	39,900	9,911	1,842	1,909	1,668	1,194	974	870	783	671
	Panj	113,800	27,397	5,582	5,448	4,617	3,124	2,480	2,311	2,082	1,753
	Shaartuz	123,700	29,780	6,068	5,922	5,019	3,396	2,695	2,512	2,263	1,905
	Hamadoni	143,900	34,644	7,059	6,889	5,839	3,951	3,136	2,922	2,632	2,216
	Total:	1,603,000	402,165	74,724	74,877	65,958	48,010	39,633	36,603	33,329	29,031
	Proportion of SW from general female population in "other" locations with supposedly low concentration of SW		0.0057	0.0037	0.0082	0.0088	0.0100	0.0054	0.0034	0.0003	0.0003
	SW Estimate in "other" locations with supposedly low concentration of SW		2,305	274	617	577	480	213	125	10	10

Annex 12. Calculation of PWID estimates across the country

Type of area and estimates data	Total population	Population (M + F) 18 ≤69	PWID estimates by gender / age groups/ type of area																			
			M + F ≥ 18 ≤ 69	Male											Female										
				Total	18 -24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	Total	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69
Urban areas Lower boundary	1,454,400	851,241	6,596	6,165	171	770	931	1,008	1,128	1,040	570	353	153	40	431	14	78	90	117	57	34	36	0	4	0
Urban areas Median			8,016	7,473	209	967	1,139	1,235	1,366	1,241	678	410	178	49	543	19	100	112	146	74	42	44	0	7	0
Urban areas Upper boundary			10,133	9,408	272	1,255	1,438	1,572	1,721	1,540	837	499	215	57	725	24	133	146	199	102	55	58	0	9	0
Mixed areas Lower boundary	2,646,600	1,431,503	5,633	5,407	30	320	524	876	1,169	1,012	525	551	281	120	226	0	0	42	59	73	17	17	17	0	0

Mixed areas Median			7,364	7,096	38	410	700	1,215	1,577	1,384	645	658	332	137	268	0	0	55	72	90	17	17	17	0	0
Mixed areas Upper boundary			9,489	9,152	51	523	918	1,634	2,078	1,849	786	777	383	154	337	0	0	67	89	115	22	22	22	0	0
Rural area with low concentration of PWID	1,445,400	756,630	1,137	1,131	77	163	217	217	199	116	102	34	6	0	6	0	0	0	6	0	0	0	0	0	0
Rural area with average concentration of PWID	1,343,019	704,930	1,630	1,625	111	236	312	312	287	165	146	48	6	0	6	0	0	0	6	0	0	0	0	0	0
Rural area with high concentration of PWID	2,017,300	1,069,396	4,062	4,045	270	564	766	775	725	425	376	124	18	0	17	0	0	0	17	0	0	0	0	0	0
Country estimate (Lower boundary)	8,906,719	4,813,700	19,058	18,373	659	2,054	2,750	3,187	3,508	2,759	1,720	1,110	464	160	685	14	78	132	205	129	52	54	17	4	0
Country estimate (Median)			22,208	21,368	706	2,342	3,135	3,754	4,154	3,331	1,947	1,274	540	185	840	19	100	166	247	164	59	61	17	7	0

Country estimate (Upper boundary)			23,684	22,605	594	2,342	3,123	3,981	4,524	3,814	1,999	1,400	616	211	1,079	24	133	213	305	217	76	80	22	9	0

Annex 13. Distribution of country median estimated number of PWID (by gender and age groups) by districts/cities and regions of the country

City/ district/ region	Total population	Population (M + F) ≥ 18 ≤ 69	Estimated number of PWID by gender and age groups																						
			M + F ≥ 18 ≤ 69	Male												Female										
				Total	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	Total	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69
Dushanbe	831,400	502,800	2,920	2,574	82	461	344	432	496	385	198	111	53	12	346	12	70	53	105	64	18	18	0	6	0
Vahdat	330,100	174,424	928	909	5	46	102	209	237	223	46	32	9	0	19	0	0	5	5	9	0	0	0	0	0
Rudaki	472,219	249,521	582	580	39	87	112	112	102	58	51	17	2	0	2	0	0	0	2	0	0	0	0	0	0
Tursun-Zade	286,200	152,422	772	744	4	46	76	130	164	143	66	67	33	14	28	0	0	6	8	9	2	2	2	0	0
Hisor	293,900	156,523	793	764	4	48	78	133	169	147	68	68	34	15	29	0	0	6	8	10	2	2	2	0	0
Roghun	39,900	21,250	108	104	1	6	11	18	23	20	9	9	5	2	4	0	0	1	1	1	0	0	0	0	0
Varzob	78,700	41,585	32	32	2	5	6	6	6	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Lakhsh	63,800	33,712	63	63	4	9	12	12	11	6	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Nurabad	78,300	41,373	51	51	3	8	10	10	9	5	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Sangvor	22,400	11,836	63	63	4	9	12	12	11	6	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Tojikobod	43,900	23,197	18	18	1	3	3	3	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Faizobod	98,700	52,153	35	35	2	5	7	7	6	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0

Rasht	122,300	64,623	151	150	10	23	29	29	26	15	13	4	1	0	1	0	0	0	1	0	0	0	0	0	0
Shahrinav	117,500	62,087	238	237	16	36	46	46	42	24	21	7	1	0	1	0	0	0	1	0	0	0	0	0	0
Total RRS	2,047,919	1,084,705	3,834	3,749	97	331	504	727	809	656	296	212	86	31	85	0	0	18	26	29	4	4	4	0	0
Bokhtar	109,100	58,214	578	553	23	59	83	78	97	99	76	28	8	2	25	0	13	5	0	0	5	2	0	0	0
Kulyab	208,000	110,985	1,933	1,894	39	259	386	359	315	276	138	72	33	17	39	6	11	22	0	0	0	0	0	0	0
Nurek	59,200	30,320	148	143	1	9	15	25	31	28	13	13	6	3	5	0	0	1	1	2	0	0	0	0	0
Levakant	46,400	23,764	116	112	1	7	12	19	24	22	10	10	5	2	4	0	0	1	1	1	0	0	0	0	0
Dangara	150,300	76,978	376	362	2	23	37	62	79	71	33	32	16	7	14	0	0	3	4	5	1	1	1	0	0
Yovon	222,200	113,802	556	535	3	34	55	92	117	104	48	48	23	10	21	0	0	4	5	7	1	1	1	0	0
Baljuvon	29,000	14,721	22	22	2	3	4	4	4	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Muminabod	90,800	46,092	68	68	5	10	13	13	12	7	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0
N. Khusrav	36,900	18,731	28	28	2	4	5	5	5	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Panj	113,800	57,768	86	85	6	13	17	16	15	9	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Khovaling	56,300	28,579	42	42	3	6	8	8	7	4	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Khuroson	110,600	56,143	83	83	6	12	16	16	14	8	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Jaykhun	132,700	67,362	100	99	7	15	19	19	17	10	9	3	1	0	1	0	0	0	1	0	0	0	0	0	0
Shahrtuz	123,700	62,793	93	93	7	14	18	18	16	9	8	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Sh. Shohin	53,400	27,107	40	40	3	6	8	8	7	4	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0
J. Balkhi	191,600	97,261	221	220	16	32	43	42	38	22	20	6	1	0	1	0	0	0	1	0	0	0	0	0	0
Temurmalik	67,700	34,366	78	78	6	11	15	15	13	8	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusti	110,600	56,143	127	127	9	19	25	24	22	13	11	4	0	0	0	0	0	0	0	0	0	0	0	0	0
Qabodiyon	178,400	90,560	206	205	15	30	40	39	35	21	18	6	1	0	1	0	0	0	1	0	0	0	0	0	0
Kushoniyen	234,900	119,241	445	443	33	65	86	84	76	45	40	13	2	0	2	0	0	0	2	0	0	0	0	0	0
Vakhsh	190,500	96,702	361	359	26	53	69	68	62	36	32	10	1	0	1	0	0	0	1	0	0	0	0	0	0
Vose	207,700	105,434	393	391	29	58	76	74	67	40	35	11	2	0	2	0	0	0	2	0	0	0	0	0	0
Hamadoni	143,900	73,047	272	271	20	40	52	51	47	28	24	8	1	0	1	0	0	0	1	0	0	0	0	0	0
Farkhar	163,700	83,098	310	309	23	46	60	58	53	31	28	9	1	0	1	0	0	0	1	0	0	0	0	0	0
A. Jomi	166,900	84,723	316	315	23	47	61	59	54	32	28	9	1	0	1	0	0	0	1	0	0	0	0	0	0
Total Khatlon	3,198,300	1,633,935	6,997	6,875	310	875	1,222	1,255	1,227	931	611	297	105	41	122	6	24	37	25	15	8	5	3	0	0

Khujand	179,900	104,123	1,043	949	52	94	146	177	167	162	83	52	16	0	94	0	0	21	31	5	16	21	0	0	0
Panjakent	290,300	161,217	810	766	4	49	65	81	138	101	105	122	69	32	44	0	0	8	12	12	4	4	4	0	0
Guliston	47,100	27,259	266	248	5	27	39	44	48	40	22	15	7	2	18	1	3	4	5	2	1	1	0	0	0
Istiklol	16,900	9,782	95	89	2	10	14	16	17	14	8	5	3	1	6	0	1	1	2	1	0	1	0	0	0
Buston	32,100	18,579	181	169	3	18	27	30	32	27	15	10	5	1	12	0	2	3	3	2	1	1	0	0	0
Isfara	265,100	148,760	788	759	4	41	71	127	170	150	71	73	38	15	29	0	0	6	8	10	2	2	2	0	0
Konibodom	205,500	115,316	611	588	3	32	55	99	132	116	55	57	29	11	22	0	0	4	6	8	1	1	2	0	0
Istaravshan	262,500	147,302	780	752	4	40	71	126	168	149	70	73	37	15	28	0	0	5	8	10	2	2	2	0	0
Zafarobod	72,400	40,627	215	207	1	11	19	35	46	41	19	20	10	4	8	0	0	2	2	3	1	1	1	0	0
Mastchoh	122,600	68,797	364	351	2	19	33	59	79	69	33	34	17	7	13	0	0	3	4	4	1	1	1	0	0
Ayni	81,000	44,980	68	68	4	9	13	13	13	7	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Devashtich	165,700	92,014	140	139	8	18	26	27	26	15	14	5	1	0	1	0	0	0	1	0	0	0	0	0	0
Shahriston	41,500	23,045	35	35	2	4	6	7	6	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Gor. Mastchoh	24,200	13,438	20	20	1	3	4	4	4	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Asht	161,600	89,738	209	208	13	27	39	40	39	23	21	7	1	0	1	0	0	0	1	0	0	0	0	0	0
Spitamen	136,800	75,966	291	290	18	37	53	56	54	32	29	10	1	0	1	0	0	0	1	0	0	0	0	0	0
J. Rasulov	132,800	73,745	283	281	17	36	52	54	52	31	28	9	1	0	1	0	0	0	1	0	0	0	0	0	0
V. Gafurov	367,600	204,131	782	779	48	100	143	150	145	85	77	26	4	0	3	0	0	0	3	0	0	0	0	0	0
Total Sughd	2,605,600	1,458,819	6,982	6,700	190	573	877	1,145	1,336	1,069	661	522	240	88	282	1	6	56	88	56	29	35	11	1	0
Khorugh	29,900	19,500	999	996	3	40	100	100	194	237	137	117	54	14	3	0	0	3	0	0	0	0	0	0	0
Darvoz	23,300	13,713	34	34	2	4	6	7	7	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Murgab	15,300	9,005	22	22	1	3	4	5	4	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Vanj	33,600	19,775	81	80	4	10	15	16	16	9	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Ishkashim	32,200	18,951	77	77	4	10	14	16	15	9	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Roshtkala	26,800	15,773	64	64	3	8	12	13	13	7	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Rushan	25,300	14,890	61	61	3	8	11	12	12	7	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Shugnan	37,100	21,835	89	89	4	11	16	18	17	10	8	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Total GBAR	223,500	133,441	1,428	1,423	24	95	179	187	277	285	177	130	56	14	5	0	0	3	2	0	0	0	0	0	0
Total for the country	8,906,719	4,813,700	22,161	21,321	703	2,335	3,126	3,745	4,146	3,326	1,943	1,273	540	185	840	19	100	166	246	164	59	61	17	7	0

Annex 14. Calculation of the SW estimates in the country

	Type of locations	Population		Estimated number of SW								
		Total	Total women (≥ 18 ≤ 59)	Total	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59
SW estimates	Cities (Lower boundary)	1,358,300	361,958	7,482	1,279	1,472	1,499	1,279	1,015	662	261	16
	Cities (Median)			9,416	1,617	1,911	1,899	1,583	1,256	813	319	18
	Cities (Upper boundary)			11,297	1,929	2,329	2,280	1,893	1,515	959	371	21
	Suburbs (Lower boundary)	3,213,019	797,714	2,397	425	534	594	336	305	196	4	4
	Suburbs (Median)			3,685	663	832	922	508	459	284	8	8
	Suburbs (Upper boundary)			5,225	946	1,193	1,326	704	638	384	17	17
	"Other" locations with presumably low concentration of SW	1,180,300	294,501	851	100	225	216	180	78	45	4	4
	"Other" locations with presumably average concentration of SW	1,552,100	386,218	1,333	162	360	339	275	120	68	5	5
	"Other" locations with presumably high concentration of SW	1,603,000	402,165	2,305	274	617	577	480	213	125	10	10
	Country estimate (lower boundary)	8,906,719	2,242,556	14,370	2,239	3,208	3,225	2,550	1,730	1,096	284	39
	Country estimate (Median)			17,591	2,816	3,945	3,953	3,026	2,126	1,335	346	45
	Country estimate (upper boundary)			21,012	3,411	4,724	4,738	3,532	2,564	1,581	406	56

Annex 15. Distribution of the country median estimates of SW (by age groups) by districts/cities and regions of the country

City/ district/ region	Total population	Female population ≥ 18 ≤ 59	Estimated number of SW by age groups								
			Women								
			Total	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59
Dushanbe	831,400	223,900	3,985	813	757	733	662	486	351	183	0
Vahdat	330,100	81,308	378	67	87	96	52	46	28	1	1
Rudaki	472,219	116,314	543	97	125	137	75	67	40	1	1
Tursun-Zade	286,200	71,080	330	58	75	83	45	41	26	1	1
Hisor	293,900	72,993	339	60	77	85	47	42	26	1	1
Roghun	39,900	9,911	58	7	16	15	12	5	3	0	0
Varzob	78,700	19,385	90	16	21	23	12	11	7	0	0
Lakhsh	63,800	15,716	46	5	13	12	10	4	2	0	0
Nurabad	78,300	19,286	57	6	16	15	12	5	3	0	0
Sangvor	22,400	5,515	15	2	4	4	3	1	1	0	0
Tojikobod	43,900	10,813	33	4	9	8	7	3	2	0	0
Faizobod	98,700	24,311	86	10	24	22	18	8	4	0	0
Rasht	122,300	30,123	87	10	24	23	18	8	4	0	0
Shahrinav	117,500	28,941	135	24	31	34	19	17	10	0	0
Total RRS	2,047,919	505,696	2,197	366	522	557	330	258	156	4	4
Bokhtar	109,100	28,043	1,801	407	664	350	185	118	62	15	0
Kulyab	208,000	53,463	1,361	198	280	280	249	187	132	27	8
Nurek	59,200	14,423	83	11	23	21	17	7	4	0	0
Levakant	46,400	11,305	52	10	12	13	7	6	4	0	0
Dangara	150,300	36,618	212	27	59	53	42	18	11	1	1
Yovon	222,200	54,138	313	40	87	79	62	27	16	1	1
Baljuvon	29,000	6,982	21	3	6	5	4	2	1	0	0

Muminabod	90,800	21,859	102	20	24	25	13	12	8	0	0
N. Khusrav	36,900	8,883	31	4	9	8	6	3	1	0	0
Panj	113,800	27,397	161	21	45	41	31	13	8	1	1
Khovaling	56,300	13,554	39	5	11	10	8	3	2	0	0
Khuroson	110,600	26,627	123	24	29	31	16	14	9	0	0
Jaykhun	132,700	31,947	111	14	32	29	22	9	5	0	0
Shahrtuz	123,700	29,780	175	22	49	44	34	15	9	1	1
Sh. Shohin	53,400	12,857	37	5	10	10	7	3	2	0	0
J. Balkhi	191,600	46,128	163	21	46	41	32	13	8	1	1
Temurmalik	67,700	16,299	46	6	13	12	9	4	2	0	0
Dusti	110,600	26,627	92	12	26	24	18	8	4	0	0
Qabodiyon	178,400	42,950	125	16	35	32	24	10	6	1	1
Kushoniyen	234,900	56,552	264	51	62	66	34	30	20	0	1
Vakhsh	190,500	45,862	213	41	50	53	28	24	16	0	1
Vose	207,700	50,005	233	45	55	58	30	27	17	0	1
Hamadoni	143,900	34,644	202	26	56	51	40	17	10	1	1
Farkhar	163,700	39,409	139	18	39	35	27	11	7	1	1
A. Jomi	166,900	40,181	142	18	40	36	27	12	7	1	1
Total Khatlon	3,198,300	776,533	6,241	1,065	1,762	1,407	972	593	371	51	20
Khujand	179,900	47,652	2,091	178	188	513	439	418	251	94	10
Panjakent	290,300	75,113	256	29	65	65	56	25	14	1	1
Guliston	47,100	12,476	55	9	12	13	8	8	5	0	0
Istiklol	16,900	4,476	26	3	6	6	6	3	2	0	0
Buston	32,100	8,502	38	6	8	9	6	5	4	0	0
Isfara	265,100	68,989	391	43	99	98	86	39	22	2	2
Konibodom	205,500	53,479	303	34	77	76	67	30	17	1	1
Istaravshan	262,500	68,310	388	43	98	97	85	39	22	2	2
Zafarobod	72,400	18,840	63	7	16	16	14	6	4	0	0
Mastchoh	122,600	31,906	110	12	28	27	24	11	6	1	1

Ayni	81,000	20,956	59	7	15	15	13	6	3	0	0
Devashtich	165,700	42,873	146	16	37	37	32	14	8	1	1
Shahriston	41,500	10,737	31	3	8	8	7	3	2	0	0
Gor. Mastchoh	24,200	6,262	18	2	4	5	4	2	1	0	0
Asht	161,600	41,813	120	13	30	30	26	12	7	1	1
Spitamen	136,800	35,396	161	27	34	40	23	22	14	0	1
J. Rasulov	132,800	34,362	156	26	33	39	23	21	13	0	1
V. Gafurov	367,600	95,113	432	73	91	108	63	58	37	1	1
Total Sughd	2,605,600	677,255	4,844	531	849	1,202	982	722	432	104	22
Khorugh	29,900	8,900	178	21	22	23	48	47	17	0	0
Darvoz	23,300	6,050	17	2	4	4	4	2	1	0	0
Murgab	15,300	3,973	12	1	3	3	3	1	1	0	0
Vanj	33,600	8,725	25	2	6	6	6	3	2	0	0
Ishkashim	32,200	8,362	23	2	5	6	6	3	1	0	0
Roshtkala	26,800	6,958	19	2	4	5	5	2	1	0	0
Rushan	25,300	6,570	18	2	4	5	4	2	1	0	0
Shugnan	37,100	9,634	43	7	8	11	7	6	4	0	0
Total GBAR	223,500	59,172	335	39	56	63	83	66	28	0	0
Total across the country	8,906,719	2,242,556	17,602	2,814	3,946	3,962	3,029	2,125	1,338	342	46