# ESTIMATING THE SIZE OF PEOPLE WHO INJECT DRUGS, FEMALE SEX WORKERS, AND MEN WHO HAVE SEX WITH MEN IN THE REPUBLIC OF MOLDOVA, 2020

CHISINAU, 2020

COORDINATION UNIT OF THE NATIONAL PROGRAM FOR PREVENTION AND CONTROL OF HIV/AIDS AND STI
DERMATOLOGY AND COMMUNICABLE DISEASES HOSPITAL

Estimating the sizes of key population 2020

The exercise of estimating the size of the groups of Injecting Drug Users, Sex Workers, Men Having Sex with Men in the Republic of Moldova was conducted under the program "Strengthening tuberculosis control and reducing AIDS-related mortality in the Republic of Moldova", financed by the Global Fund to Fight AIDS, Tuberculosis and Malaria, in support of the National Program for the Prevention and Control of HIV / AIDS and STIs for the years 2016-2020 and technical assistance provided by the UNAIDS Moldova Country Office and the WHO Country Office in the Republic of Moldova.

The exercise was coordinated by the Coordination Unit of the National Program for Prevention and Control of HIV / AIDS / STIs within the Dermatology and Communicable Diseases Hospital (DCDH) under the auspices of the Ministry of Health, Labor and Social Protection (MHLSP).

The data used during the exercise were presented by: Dermatology and Communicable Diseases Hospital, Republican Narcology Dispensary, Tiraspol AIDS Center, General Police Inspectorate.

The results of the estimation exercise were discussed and agreed during the joint meeting of the Technical Working Group on HIV Prevention and TB / HIV Monitoring and Evaluation of the National Coordinating Council (NCC) on August 14, 2020.

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## Technical support:

Independent consultant Lisa G. Johnston (lsjohnston.global@gmail.com, www.lisagjohnston.com) provided technical assistance during data collection, data analysis, and report writing.

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## Abbreviations and definitions

| | |
|---|---|
| IBSS | Integrated Biological-Behavioral Surveillance Survey among groups at high risk of HIV |
| HRGI | High Risk Groups for HIV Infection |
| UNAIDS | Joint United Nations Programme on HIV/AIDS |
| WHO | World Health Organization |
| AIDS | Acquired immunodeficiency syndrome |
| HIV | Human immunodeficiency virus |
| FSW | Female Sex Workers |
| PWID | People who inject drugs |
| MSM | Men who have sex with Men |
| HRP | Harm reduction programs |
| HBV | Hepatitis B Virus |
| HCV | Hepatitis C Virus |
| RDS | Respondent Driven Sampling |
| NGO | Nongovernmental Organization |

## Summary

Estimating the number of persons at high risk for HIV infection (also called key populations) at the national and local levels represents an important strategy for making decisions regarding the response to HIV/AIDS epidemics.

The real magnitude of HIV/AIDS in the Republic of Moldova is not fully reflected in the official statistics, as it considers only those persons who were identified with HIV as a result of the test to HIV antibodies. In reality, the number of persons living with HIV is much higher than that mentioned in official statistics. For the purpose of assessing the real situation and increasing the efficiency of country's response to HIV, it is important to obtain well-reasoned data about the number of key populations.

This estimation results will be used to estimate subsequently and to forecast the HIV/AIDS situation in the country, to plan, implement and assess prevention programs, advocate for changes in HIV/AIDS policy, and to calculate sample sizes for carrying out behavioral surveys and epidemiological studies among HRGI members.

This report describes the process and results of the study for estimating the size of HRGI populations in the Republic of Moldova, using the multiplier method, successive sampling method, as well as the workshop results for consensus validation and consolidation to obtain final estimates of the HRGI population sizes. This estimation exercise covered the following 'key populations': people who inject drugs (PWID), female sex workers (FSW) and men who have sex with men (MSM).

The previous estimation exercise, the Integrated Biological-Behavioral Surveillance Survey (IBBS 2020) was carried out in the first half of 2020 in the Republic of Moldova among the PWID, FSW, and MSM, using respondent driven sampling (RDS), which provided essential data for estimating the sizes of PWID, FSW, and MSM. Population size estimations were obtained from unique object and service multipliers from the IBBS 2020; the nominal technique was applied wherever possible and the successive sampling method was used for the first time, based on the preliminary estimates of population size, the data on the social network size and the persons' sampling order in the IBBS survey.

Methods: the given estimating exercise was guided by experts' opinions and took into consideration the limitations of the previous estimation exercise, carried out in 2017. Specialized literature was consulted regarding the estimation methods, the data triangulation methods for performing the estimations, the needs of additional data were identified and all exiting data related to the key groups were reviewed. The estimations were carried out separately for Chisinau and Balti municipalities on the right bank of the river Nistru, Tiraspol municipality and Ribnita city on the left bank of the river Nistru and for the rest of districts on both banks. The obtained estimate results were discussed with key partners and approved within the HIV / AIDS and STI working group.

Outcomes: The estimated size of PWID in the Republic of Moldova accounts for 27,5 thousands, with 22,78 thousands for the right bank and 4,72 thousands for the left bank of the River Nistru. The size of the FSW population was estimated for 15,8 thousands, with 13,45 thousands for the right bank and 2,35 thousands for the left bank. The estimated size of the MSM group in the Republic of Moldova accounts for 14,6 thousands, with 12,965 thousands on the right bank and 1,635 thousands on the left bank of the River Nistru.

## Background

The Republic of Moldova is situated in the center of Europe, in the north-eastern part of Balkans; with Chisinau as the capital city. The Republic of Moldova is divided in 32 districts, 13 municipalities, and 2 regions with special status. The regions with special status: ATU Gagauzia (which is composed of 3 districts) and administrative-territorial units from the left side of the Nistru (5 districts). The population of the Republic of Moldova, including the districts from the left side of the River Nistru account for about 3 169,5 thousand. According to UNAIDS, Republic of Moldova is classified as a country with a concentrated HIV epidemic, with a national HIV prevalence of 0.29%.

According to UNAIDS*, about 14,300 adults (15 years and over) were living with HIV by the end of 2019.

According to the data of the Dermatology and Communicable Diseases Hospital (DCDH), as of 01 January 2020, there were 13 706 HIV cases (starting from 1987) registered in the Republic of Moldova (including the left bank of Nistru. A number of 9 407 persons out of those identified are alive and living with HIV.

In 2019, official statistics reported 922 new HIV cases, of which 88.5% was through sexual transmission. The HIV epidemic started among the PWID, but since 2002 - an increase has been registered as being heterosexually transmitted and since 2010 – increasing trends have been registered among men and in rural area [5].

Knowing the sizes of key populations, such as PWID, MSM and FSW, is necessary for designing, assessing, and funding programs for reducing the spread of the infection. Size estimation provides data to calculate the number of persons living with HIV, assess the intervention coverage, project infection burden and model HIV transmission. Reliable estimates of the key population sizes contribute to documenting the progress in extending HIV prevention and obtaining continuous financing for supply of different services. Nevertheless, measuring the size of the key populations is complicated because of the stigmatization or illegal nature of some behaviors, hence making these populations difficult to be found.

The size of key populations may be estimated using different methods, each of them having its strong and weak points.

In line with the results of the IBSS-2020 among key populations, the estimated prevalence of HIV among PWID in the capital city accounts for 8.1%, FSW for 2.1% and MSM for 11.6%. In Balti, HIV prevalence among PWID accounts for 14.9%, FSW for 4.4% and MSM for 8.4%. In Tiraspol and Ribnita, HIV prevalence among PWID accounts for 23.5% and 14.5% respectively. HIV prevalence among penitentiary detainees on the right side of Nistru is 3.8% [3].

To meet the changes emerging in the HIV/AIDS epidemics in the Republic of Moldova, the National Program on Prevention and Control of HIV/AIDS/STI for 2021 – 2025 was developed to focus on the following strategic directions: decreasing new cases of HIV infection, especially among key populations; improving access to healthcare and health indicators among persons infected with HIV and sexually transmitted infections (STI); ensuring efficient management of the National Program.

* SPECTRUM estimates

As previously, the current national program on HIV/AIDS/STIs sets forth ambitious targets based on data of key populations. This report presents the methodology and the results of the undertaken exercise to estimate the size of PWID, FSW and MSM groups on both banks of the River Nistru.

## Methods

UNAIDS and WHO recommend using a number of methods estimate the sizes of 'key populations' in a region, due to the variability of estimates produced by individual studies. The methods for estimating key population sizes may be classified generally in:

- methods based on collecting data directly from the key populations, including official statistics data (Narcological Service, treatment, police, NGOs, multipliers, *capture-recapture*);
- successive sampling method;
- methods through which data are collected from the general population (surveys in general population, *Network scale-up*);
- extrapolation at the national level based on NGOs' knowledge.

Initially, the populations were defined, for which it is necessary to provide size estimates. These definitions are included also in the specifications for international reporting [6].

Final national estimates were carried out separately for: Chisinau municipality, Balti municipality, rest of localities from the right bank of the River Nistru, Tiraspol municipality, rest of localities from the left bank of the River Nistru (including Ribnita city).

The methodologies for estimating the size of key popualtions were reviewed, and namely the estimated through the multiplier method [7], capture-recapture method [7], successive sampling methods [18].

The data available in the Republic of Moldova allowed estimation using the methods based on collecting direct data from key populations, including official statistics data (Narcological Service, treatment, police, NGOs, multipliers, *capture-recapture*) and the consensus within the technical working group. The successive sampling method was used for the first time[†] and it offer a promising alternative as compared to other methods, previously used for estimating the size of key populations. The successive sampling method is based only on data already collecting in RDS, imputed visibility of every sampling participant, recruitment pattern and the time of entry in the survey.

The IBBS 2020 carried out among the PWID, MSM and FSW, based on RDS provided the opportunity to apply the multiplier and successive sampling methods, in correlation with the IBBS 2020 implementation. The estimates were submitted subsequently to the technical working group and interested stakeholders for synthesis and validation. The use of a number of methods increased the reliability of estimates, supplied the inferior and superior limits of acceptability, and reduced the probability for the bias induced by any method to produce substantially biased results.

The estimation of key populations' size was carried out in 2020 and was coordinated by the National Program on Prevention and Control of HIV/AIDS/STI under the Dermatology and Communicable Diseases Hospital, which

[†] Handcock et al. 2014, Estimating hidden population size using Respondent-Driven Sampling data.

benefited from the support of national representatives of UNAIDS and WHO, and technical assistance of the expert Lisa G. Johnston, independent consultant (lsjohnston.global@gmail.com, www.lisagjohnston.com). Nongovernmental organizations working with hard-to-reach populations had an active and important involvement during the entire exercise.

## *Multiplier-based estimates*

The multiplier was obtained from the results of the IBBS 2020 carried out in the Republic of Moldova among PWID, FSW, and MSM.

Two types of multipliers were used: service multipliers and unique object multiplier.

The service multiplier uses of programmatic data from NGOs, which are cross-referenced with data collected from respondents about the use of specific services over the last six/twelve months before the survey. More exactly, data were collected from NGOs/health center/medical units about the number of unique PWID, FSW and MSM, who have accessed a certain service within a certain period of time. During the survey, every participant was asked if he/she has received a certain service within a certain period of time.

The unique object multiplier implies the distribution of a unique object (keychain) to as many as possible PWID/FSW and MSM two weeks before starting the survey in every sampling unit. All participants were asked during the survey if they have received the unique object.

The multipliers were calculated by overlapping the service data and/or the number of distributed objects and adjusted estimates of people who stated that they received the service and/or unique object.

## People who inject drugs

RDS was used to recruit PWID in four localities: Chisinau and Balti municipalities (right bank of the River Nistru), Tiraspol and Ribnita (left bank of the River Nistru). Initially, 5 persons primary respondents, also called 'seeds', were selected in every location from different population layers of PWID (age, opioids/ephedrine/etc. users, men/women, beneficiaries/non-beneficiaries of harm reduction services). Over the time, 2 seeds were added to Chisinau.

A primary incentive was provided to every respondent for participation in the survey, accounting for 130 MDL (equivalent of about US $ 7,5). The maximum number of recruitment coupons issued per respondent was three. The value of the secondary incentive was 70 MDL (equivalent of about US $ 4) for every representative of the recruited target-group. Data were collected during 19 February 2020 – 05 June 2020.

The electronic questionnaire was available in Russian language[‡]. The questionnaire was developed based on the most recent WHO guidelines on bio-behavioral surveillance in high-risk groups for HIV infection and based on the questionnaire applied in 2016 in the integrated bio-behavioral survey. After filling in the questionnaire, rapid tests were used for capillary blood sampling, with appropriate pre-test counselling, result presentation, and post-test counselling. The test results were immediately registered in the electronic form for test results. Every

[‡] Upon NGOs' request, which work with target groups.

respondent received a set of information materials on how to prevent HIV and list of relevant service providers within the limits of data collection localities and at the national level. The survey was carried out confidentially/anonymously.

The following IBBS 2020 indicators were used for the estimates based on service multiplier for PWIDs:

1. Share of PWID registered with the Narcological Service by end of 2019;
2. Share of new PWID registered with the Narcological Service by end of 2019;
3. Share of PWID who benefited from syringes/condoms under harm reduction programs over the last 6 months of 2019, separately for each NGO working with the respective target group;
4. Share of PWID who benefited from syringes/condoms from pharmacies based on the NGO's beneficiary card over the last 6 months of 2019, separately for every NGO;
5. Share of PWID who reported HIV testing over the last 6 months of 2019 as PWID, within the NGO working with the respective target group, separately for every NGO.

These data were overlapped with the data from routine statistics to come up with the estimates based on the multiplier method. Subsequently, to estimate the users of opioids, the share of respondents who have used opioids over the last month and the last 6 months was calculated for every survey site.

## Female sex workers

RDS used to recruit FSW in two localities: Chisinau and Balti municipalities (on the right bank of the River Nistru) Initially 5 seeds were selected in both locations from different population layers of the persons practicing commercial sex (age, beneficiaries/non-beneficiaries of harm reduction services, place of service provision, etc.).

A primary incentive was provided to every respondent for participation in the survey, accounting for 200 MDL (equivalent of about US $ 11,6). The maximum number of recruitment coupons issued per respondent was three. The value of the secondary incentive was 70 MDL (equivalent of about US $ 4) for every representative of the recruited target-group. Data were collected during 24 February 2020 – 27 May 2020.

Questionnaire design, confidentiality frame, and blood sampling were similar to those used for PWID group.

The following IBBS 2020 indicators were used for the estimates based on service multiplier for FSW:

1. Share of FSW who benefited from condoms under the harm reduction programs over the last 6 months of 2019, separately for every NGO working with the respective target group;
2. Share of FSW who benefited from condoms under the harm reduction programs over the last 6 months of 2019 within the IBBS 2020 survey implementation site.
3. Share of FSW/PWID who benefited from syringes under harm reduction programs over the last 6 months of 2019, separately for every NGO working with the respective target group;

## Men who have sex with men

RDS was used to recruit the MSM in two localities: Chisinau and Balti municipalities (the right bank of the River Nistru). Initially 5 persons seeds were selected in both locations from different population layers of men who have sex with men (age, beneficiaries/non-beneficiaries of harm reduction services, etc.).

A primary incentive was provided to every respondent for participation in the survey, accounting for 200 MDL (equivalent of about US $ 11,6). The maximum number of recruitment coupons issued per respondent was

three. The value of the secondary incentive was 70 MDL (equivalent of about US $ 4) for every representative of the recruited target-group. Data were collected during 20 February 2020 – 02 May 2020.

The questionnaire design and translation, confidentiality frame, blood sampling were similar as for PWID and FSW.

The following IBBS 2020 indicators were used for the estimates based on service multiplier for MSM:

1. Share of MSM who benefited from condoms under harm reduction programs over the last 6 months of 2019, separately for every NGO working with the respective target group;
2. Share of MSM who benefited from lubricants under harm reduction programs over the last 6 months of 2019, separately for every NGO working with the respective target group;
3. Share of MSM who benefited from condoms under harm reduction programs over the last 6 months of 2019 within IBBS 2020 implementation sites;
4. Share of MSM who benefited from lubricants under harm reduction programs over the last 6 months of 2019 within IBBS 2020 implementation sites;
5. Share of MSM who reported HIV testing as MSM over the last 6 months of 2019 within the NGO which works with the respective group, separately for every NGO.

The following IBBS 2020 indicator was used for estimates based unique object multiplier for all the three groups:

- Share of PWID/FSW/MSM who received the unique object (keychain) two week before the survey start.

## *Nominal technique*

Respondents were asked how many friends they have from the target group they represent (PWID/FSW/MSM) and how many of them are not beneficiaries of harm reduction programs. The ratio between the average number of friends in total and the average number of non-beneficiary friends was used as multiplier in association with the data from the HRP.

## *SS PSE*

The SS-PSE method uses the size data of every participant's social network and the registration time collected during the RDS to quantify the size of population, assuming that the distribution of successive waves network size reflects population depletion. The estimates are using a Bayesian frame (meaning, that it quantifies the uncertainty regarding the unknown quantities, correlating them with known quantities), encompassing information about an "assumption" or prior knowledge about the size of sampled population. The Bayesian frame allows, as well, calculating the probability intervals.

## *Estimates derived by districts, regions and nationally*

After calculating the populations size estimates according to the above-mentioned methods, they were sent to the working group responsible for estimating the populations sizes of key populations, to get a consensus regarding the final population size estimates for each key population from each city where the IBBS 2020 was carried out and to extrapolate these results so as to obtain the estimates for district and national levels.

To get a consensus regarding the estimated final size, the members of the technical group were divided into three groups, each being responsible for one of the target groups within IBBS. The groups assessed all the methodologies and the results of population size estimation multipliers, depending on the specific bias inherent to these methods. The groups got consensus regarding the most reasonable estimates of population size for each population from every city where IBBS was carried out based on their own knowledge and experience. The final consensus was obtained from each of those three groups and was presented to the entire group for a general consensus.

## *Creating the ranking of density groups[§] PWID, FSW and MSM*

The next step in estimating the national population size for PWID, FSW and MSM groups was to use the results of population size estimates in IBBS 2020 implementation sites in order to obtain the ranking of density groups for the cities where the survey was carried out and for the rest of districts. The same working groups have identified the classification criteria for districts with high density (districts with the highest share for each of the key populations), medium and low density. The criteria used for classifying the key populations took into consideration if the districts are developed / or industrialized, if there is high mobility level, recreation or tourism areas, cities with universities or military bases, or are close to borders. The estimate values obtained by successive sampling method in the cities where IBBS was implemented, were used as benchmarks for parameters representing the classification of cities ranked as high prevalence of PWID, FSW and MSM populations.

During this process, every group was provided a map to fill in the map areas, by coloring the red zones (high concentration of a key population), blue (medium) or green (low), and to identify the percentage of the target group in adult population for each category of colored zones. The areas were classified by the working groups based on their knowledge and first-source experience, as well as information from secondary sources. All the groups participated in the process by connecting through online meetings and suggesting their opinions about the existence of key populations, and discussing different zones and their situation. The filled in maps were presented to all participants for their final input and consensus (Figure 1.1., Figure 2.1., Figure 3.1.)

As a result of the online workshop, the final consensus information was combined with a secondary literature review of materials describing key populations to obtain the final shares to represent the high, medium and low prevalence of key population. These shares were calculated by dividing the number of each key population estimated for every city in which the survey was carried out to the size of adult population in every city, according to the last census implemented in Moldova. Afterwards the shares were applied to the size of adult population from the corresponding groups (total adult population for PWID, female adult population for FSW and male adult population for MSM) for the rest of districts (in which the IBBS was not implemented). These figures were summed up, hence the final national total number of PWID/FSW/MSM was obtained for the country.

[§] Johnston LG, Soe PM, Aung MY, Ammassari S. Estimating the Population Size of Males Who Inject Drugs in Myanmar: Methods for Obtaining Township and National Estimates. AIDS Behav. 2019 Jan 15;23(1):295–301.

# Results

## *Injection drug use*

The current estimation exercise used the following definition for PWID - "a person who injected drugs at least once in the past 12 months prior to data collection".

The multiplier-based estimates for PWID group in cities where IBBS 2020 was implemented, as well as the value obtained by applying the successive sampling method are provided in Table 1.1. The final estimated value of PWID population size, approved in consensus by the working group responsible for carrying out the estimation exercise accounts for 7160 – Chisinau mun., 5400 – Balti mun., 2200 – Tiraspol and 1020 – Ribnita.

The values obtained based on multipliers, lower than NGOs' statistics were excluded from the estimation value range. HIV testing of PWID in medical institutions and number of new PWID registered with the Narcological Service for all the sites produced underestimated data because of the small number reported by the respective institutions.

The multiplier of PWID registered with the Narcological Service by the end of 2019 produced useful data only for the capital city – Chisinau mun. and for Tiraspol mun., where the number of registered PWID and the share of respondents registered with the Narcological Service in IBBS 2020 was sufficiently high to produce reliable results.

The multipliers of syringe and condom services in pharmacies based on the NGO beneficiary card were useful only for Chisinau site, probably due higher density of pharmacies through which such services were provided to the target group, as compared to the rest of survey sites.

The unique object multiplier produced underestimated data, especially in Chisinau and Tiraspol, due to the big number of unique objects returned in the study, because of object distribution sources' dependence on service supply sources/survey sites, and especially in Chisinau – due to the insufficient number of distributed unique objects.

**Table 1.1.** Estimating the size of PWID population, multiplier method, successive sampling method, national consensus

| | | | ***Chisinau (adult population 651 400)*** | |
|---|---|---|---|---|
| **Multiplier method** | Source I<br>IBBS, (%, 95% CI) | Source II official statistics | Estimated size (#, 95% CI) | % of adult population |
| **1. Received syringes based on beneficiary card from PA «I.P.»** | 20.8 (14.2-27.4) | 667 | 3207 (2470-4764) | 0.49 |
| **2. Tested for HIV in PA «P.P.V»** | 26.7 (15.8-37.7) | 1289 | 4828 (3392-8046) | 0.74 |
| **3. PWID registered with the Narcological Service by end of 2019** | 34.8 (28.1-41.4) | 2583 | 7422 (6300-9225) | 1.14 |

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|---|---|---|---|---|
| **4. PWID newly registered with the Narcological Service in 2019** | 1.6 (0.2-3) | 128 | 8000(4267-64000) | 1.23 |
| **5. Received syringes based on beneficiary card from PA «P.P.V.»** | 29.2 (17.1-41.2) | 2641 | 9045 (6441-15535) | 1.39 |
| **6. Received condoms based on beneficiary card from PA «P.P.V.»** | 28.8 (15.4-42.3) | 2639 | 9163 (6283-17593) | 1.41 |
| **Successive sampling method (median)** | | | 8439 (1390-56624) | 1.30 |
| **Average value** | | | 7158 | 1.10 |
| **CONSENSUS** | | | **7160** | **1.10** |
| | | | | ***Balti (adult population 115 300)*** |
| **Multiplier method** | Source I<br>IBBS, (%, 95% CI) | Source II official statistics | Estimated size (#, 95% CI) | % of adult population |
| **1. Tested for HIV in PA «T.D.V.»** | 19.9 (15.2-24.7) | 453 | 2276 (1812-3020) | 1.97 |
| **2. Participated in the previous IBBS 2016 survey (source IBBS 2020)** | 13.6 (8.9-18.3) | 342 | 2515(1900-3800) | 2.18 |
| **3. Received the unique object in IBBS 2020** | 6.1 (2.8-9.4) | 400 | 6557 (4444-13333) | 5.69 |
| **4. Median number of friends, non-beneficiaries of NGOs, IBBS 2020** | 4 (0-9.3) | 1873 | 7492 (0-17419) | 6.50 |
| **5. Received syringes based on beneficiary card from PA «T.D.V.» in IBBS 2020** | 26 (20.3-31.7) | 2221 | 8542 (6941-11105) | 7.41 |
| **6. Received condoms based on beneficiary card from PA «T.D.V.» in IBBS 2020** | 25.8 (20.3-31.4) | 2247 | 8709 (7248-11235) | 7.55 |
| **Successive sampling method (median)** | | | 2234 (784-7097) | 1.94 |
| **Average value** | | | 5475 | 4.75 |
| **CONSENSUS** | | | **5400** | **4.68** |

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| | | | | ***Tiraspol (adult population 94 900)*** |
| **Multiplier method** | Source I<br>IBBS, (%, 95% CI) | Source II official statistics | Estimated size (#, 95% CI) | % of adult population |
| **1. PWID registered with the Narcological Service by end of 2019** | 34.5 (28.3-40.7) | 325 | 942 (793-1161) | 0.99 |
| **2. Tested for HIV in PA «Z.B.»** | 10.2 (5.8-14.6) | 147 | 1441 (980-2450) | 1.52 |
| **3. PWID newly registered with the Narcological Service in 2019** | 1.6 (0.2-3.1) | 31 | 1938 (1033-15500) | 2.04 |
| **4. Received condoms from pharmacies based on beneficiary card from PA «Z.B.»** | 13.9 (9.5-18.4) | 295 | 2122 (1639-2950) | 2.24 |
| **5. Received syringes from pharmacies based on beneficiary card from PA «Z.B.»** | 13.3 (9-17.5) | 290 | 2180 (1611-3222) | 2.30 |
| **6. Participated in the previous IBBS 2016 survey (source IBBS 2020)** | 11.1 (7-15.1) | 334 | 3009 (2227-4771) | 3.17 |
| **7. Received condoms based on beneficiary card from PA «Z.B.»** | 19.8 (14.4-25.2) | 732 | 3697 (2928-5229) | 3.90 |
| **8. Received syringes based on beneficiary card from PA «Z.B.»** | 19.5 (13.8-25.1) | 727 | 3738 (2908-5193) | 3.94 |
| **9. Median number of friends, non-beneficiaries of NGOs, IBBS 2020** | 4 (0-11.8) | 1004 | 4016 (0-11847) | 4.23 |
| **Successive sampling method (median)** | | | 2211 (674-9294) | 2.33 |
| **Average value** | | | 2529 | 2.66 |
| **CONSENSUS** | | | **2200** | **2.32** |

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| | | | | ***Ribnita (adult population 32 900)*** |
| **Multiplier method** | Source I<br>IBBS, (%, 95% CI) | Source II official statistics | Estimated size (#, 95% CI) | % of adult population |
| **1. Tested for HIV in PA «Trinity»** | 24.7 (18.9-30.3) | 113 | 457 (377-595) | 1.39 |
| **2. Received the unique object in IBBS 2020** | 54.3 (47.4-61.1) | 300 | 552 (492-638) | 1.68 |
| **3. Received condoms based on beneficiary card from PA «Trinity»** | 41.9 (35.3-48.6) | 296 | 706 (604-846) | 2.15 |
| **4. Received syringes based on beneficiary card from PA «Trinity»** | 42.4 (36-48.9) | 387 | 913 (790-1075) | 2.77 |
| **5. Participated in the previous IBBS 2016 survey (source IBBS 2020)** | 23.3 (17.3-29.4) | 300 | 1288 (1034-1765) | 3.91 |
| **6. Median number of friends, non-beneficiaries of NGOs, IBBS 2020** | 5 (0.2-9.8) | 378 | 1890 (76-3704) | 5.74 |
| **Successive sampling method (median)** | | | 1309 (538-5564) | 3.98 |
| **Average value** | | | 1017 | 3.09 |
| **CONSENSUS** | | | **1020** | **3.10** |

To estimate the size of the PWID group in the remaining districts of the Republic of Moldova, where the IBBS 2020 survey was not carried out, based on the classification identified by the working group, responsible for estimating PWID population size, the prevalence map was outlined for injection drug use (Figure 1.1.).

According to the successive sampling method, the share of PWID in adult population varied within sites where IBBS survey was carried out from 1.30% (in Chisinau mun.) up to 3.98% (in Ribnita). These values served as benchmarks for attributing the percentage value of the estimated size of PWID group out of adult population in the remaining districts, depending on the attributed classification. Hence, after consultations with all working group members, especially NGOs' representatives working with target groups in all the districts, it was mutually agreed that the value of 0.95% of adult population is optimal for districts with high prevalence of PWID, 0.65% - for medium prevalence of PWID and 0.25% - for low prevalence of PWID. The estimated size of the PWID group separately for every district is provided in Table 1.2.

**Figure 1.1.** Map of injection drugs' use prevalence in the Republic of Moldova: high (red), medium (blue) and low (green), identified in the working group responsible for estimating the PWID population size

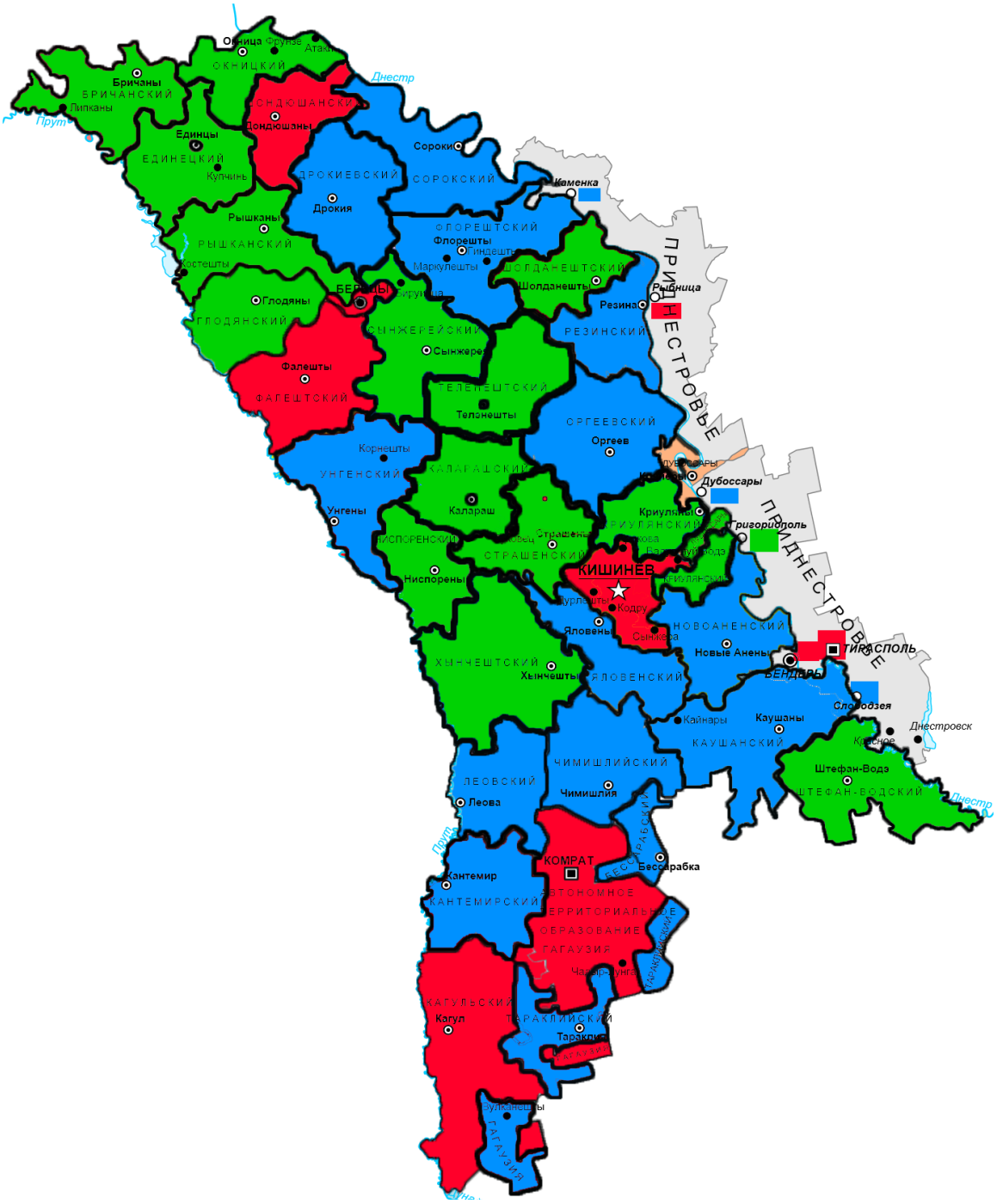

Table 1.2. Estimating PWID population size by districts

| | ***NORTH (adult population 585 278)*** | |
|---|---|---|
| **Districts** | ***Adult population*** | ***PWID estimated number*** |
| **Briceni** | 50 740 | 130 |
| **Donduseni** | 28 860 | 320 |
| **Drochia** | 59 570 | 390 |
| **Edinet** | 55 771 | 140 |
| **Falesti** | 63 672 | 600 |
| **Floresti** | 63 672 | 400 |
| **Glodeni** | 41 741 | 100 |
| **Ocnita** | 38 813 | 100 |
| **Riscani** | 46 865 | 120 |
| **Singerei** | 65 011 | 160 |
| **Soroca** | 72 953 | 470 |
| | | **2 930** |
| | ***CENTER (adult population 764 500)*** | |
| **Districts** | ***Adult population*** | ***PWID estimated number*** |
| **Anenii Noi** | 61 644 | 400 |
| **Calarasi** | 55 649 | 140 |
| **Criuleni** | 53 355 | 130 |
| **Dubasari** | 25 751 | 60 |
| **Hincesti** | 87 071 | 220 |
| **Ialoveni** | 75 448 | 490 |
| **Nisporeni** | 47 404 | 120 |
| **Orhei** | 91 221 | 590 |
| **Rezina** | 36 297 | 240 |
| **Soldanesti** | 28 615 | 70 |
| **Straseni** | 67 002 | 170 |
| **Telenesti** | 51 296 | 130 |
| **Ungheni** | 83 727 | 670 |
| | | **3 430** |

Estimating the sizes of key population 2020

| | ***SOUTH (adult population 506 259)*** | |
|---|---|---|
| **Districts** | ***Adult population*** | ***PWID estimated number*** |
| **Basarabeasca** | 21 401 | 140 |
| **Cahul** | 92 100 | 870 |
| **Cantemir** | 44 540 | 290 |
| **Causeni** | 65 320 | 420 |
| **Ciadir-Lunga** | 41 107 | 460 |
| **Cimislia** | 44 114 | 290 |
| **Comrat** | 46 876 | 610 |
| **Leova** | 38 271 | 250 |
| **Stefan Voda** | 49 912 | 120 |
| **Taraclia** | 31 968 | 210 |
| **Vulcanesti** | 30 650 | 200 |
| | | **3 860** |
| | ***LEFT BANK OF NISTRU RIVER (adult population 216 170)*** | |
| **Districts** | ***Adult population*** | ***PWID estimated number*** |
| **Bender** | 72 099 | 680 |
| **Grigoriopol** | 28 672 | 70 |
| **Dubasari** | 22 594 | 150 |
| **Camenca** | 14 584 | 90 |
| **Slobozia** | 60 987 | 400 |
| **Ribnita** | 17 235 | 110 |
| | | **1 500** |

* districts with PWID high prevalence
* districts with PWID medium prevalence
***** districts with PWID low prevalence

Hence, summing it up, the estimated size of the PWID population for the districts where IBBS 2020 was not carried out accounts for 10 220 – for the districts on the right bank and 1500 – for the districts on the left bank of the River Nistru. Together with Chisinau and Balti municipalities, the estimated figure for the entire region of Right Bank of the River Nistru is 22 780; the estimated figure for the entire region of Left Bank of the River Nistru, including Tiraspol municipality and Ribnita city is 4720 CDI. In total, the estimated size of PWID for the Republic of Moldova is **27 500**.

The average respondents' share was used to estimate the size of opioids users, indicating the use of opioids in the last month and in the last 6 months from IBBS 2016 and IBBS 2020. The respective average accounted for 38.85% respondents in Chisinau, and 36.15% respondents in Balti. Applying the respective percentages to the estimated population size for Chisinau and Balti, the estimated number was obtained for opioids injectable users in Chisinau - 2 780 and Balti - 1 950 persons.

For the remaining districts on the right bank of the River Nistru, it was mutually considered the average value of the aggregated share of opioids users for Chisinau and Balti municipalities and the share of opioids users provided by the Narcological Service[**]. The average of these two values accounts for 53%, respectively the estimated size of the opioid users for the remaining districts on the right bank accounts for 5 440 persons.

The average share of respondents stating that they used opioids in the last month and in the past 6 months in IBBS 2016 and IBBS 2020 was applied for Tiraspol. The average value was 62,15%, respectively the estimated size of those who inject opioids in Tiraspol municipality is 1 370 persons. For the remaining districts on the left bank, the share of 54.8% of opioids' injectable users[††] was mutually accepted. Hence the estimated size of those who inject opioids for the remaining districts on the left bank accounts for 1 380 persons.

Summing it up, the estimated number for the entire right bank is 10 170 and for the entire left bank - 2 750 persons who inject opioids. The total estimated number for the Republic of Moldova accounts for **12 920** who inject opioids.

## *Female sex workers (FSW)*

The current estimation exercise used the following definition for FSW: "a female aged 16 years old and over, who exchanged sex for money or drugs at least once in the past 12 months prior to the survey".

The multiplier-based estimates for FSW in Chisinau and Balti municipalities, where the IBBS 2020 was implemented, as well as the value obtained applying the successive sampling method are provided in Table 2.1. The final estimated value for the FSW population size in these municipalities, mutually approved by the working group responsible for carrying out the estimation exercise, accounted for 4420 in Chisinau and 2000 in Balti.

As with PWID, the values obtained based on multipliers, which are lower than the NGOs' statistics, were excluded from the estimation value range.

The figures provided by medical institutions regarding HIV testing among FSW are very low, as well as the figures provided by police about the number of arrests for commercial sex; the same goes for the share of FSW from the sample tested for HIV in medical institutions or retained by police for commercial sex, hence these multipliers did not produce useful data.

The multiplier of condoms' services from pharmacies based on NGO's beneficiary card was not useful for any survey site, because of the small number of persons benefiting from this service, as reported by NGOs.

[**] The same share was provided by police.

[††] Percentage of injectable opioids' users in Tiraspol municipality, IBBS 2020.

The unique object multiplier in Chisinau produced underestimated data, due to the big number of unique objects, which returned to the study, and the insufficient number of distributed unique objects.

The multiplier of condoms' services from some NGOs in Chisinau was not useful for estimation, because of the share of beneficiaries, who received condoms from these NGOs was very low.

**Table 2.1.** Estimating the size of FSW population, multiplier method, successive sampling method, national consensus

| | | | | |
|---|---|---|---|---|
| | | | | ***Chisinau (female adult pop. 350 300)*** |
| **Multiplier method** | Source I<br>IBBS, (%, 95% CI) | Source II official statistics | Estimated size (#, 95% CI) | % of adult population |
| **1. Received condoms based on beneficiary card from PA «A.F.I.»** | 62 (42.9-81.1) | 2170 | 3500 (2679-5047) | 1.00 |
| **2. Received condoms based on beneficiary card at the survey site** | 62.6 (42.9-82.1) | 2659 | 4248 (3243-6184) | 1.21 |
| **3. Median number of friends, non-beneficiaries of NGOs, IBBS 2020** | 2 (0-4.6) | 2754 | 5508 (0-12668) | 1.57 |
| **Successive sampling method (median)** | | | | |
| | | | Did not function | |
| **Average value** | | | 4419 | 1.26 |
| **CONSENSUS** | | | **4420** | **1.26** |
| | | | | ***Balti (female adult pop. 62 650)*** |
| **Multiplier method** | Source I<br>IBBS, (%, 95% CI) | Source II official statistics | Estimated size (#, 95% CI) | % of adult population |
| **1. Received unique objects** | 24.3 (18-30.4) | 216 | 889 (720-1200) | 1.42 |
| **2. Received syringes based on beneficiary card at the survey site** | 18.9 (14.5-23.4) | 261 | 1381 (1135-1740) | 2.20 |

| | | | | |
|---|---|---|---|---|
| **3. Received condoms based on beneficiary card from PA «T.D.V.»** | 38.4 (30.9-46.1) | 827 | 2154 (1798-2668) | 3.44 |
| **4. Median number of friends, non-beneficiaries of NGOs, IBBS 2020** | 5 (2.6-7.4) | 709 | 3545 (1843-5247) | 5.66 |
| **Successive sampling method (median)** | | | | |
| | | | **2057 (614-7772)** | **3.28** |
| **Average value** | | | 2005 | 3.20 |
| **CONSENSUS** | | | **2000** | **3.19** |

To estimate the size of the FSW group in the remaining districts of the Republic of Moldova, where the IBBS 2020 survey was not carried out, based on the classification identified by the working group responsible for estimating the FSW population size, the FSW prevalence map was outlined (Figure 2.1.).

According to the results of the successive sampling method, the share of FSW in female adult population accounted for 3.28% of female adult population. The technical working group responsible for estimating the FSW population size mutually agreed, depending on the attributed classification, on the variation from 0.6% of female adult population for districts with low prevalence of FSW up to 1.6% - for districts classified as high prevalence of FSW.

The estimated size of the FSW group separately for every district is provided in Table 2.2.

**Figure 2.1.** Map of female sex workers' prevalence in the Republic of Moldova: high (red), medium (blue) and low (green), identified in the working group responsible for estimating the FSW population size

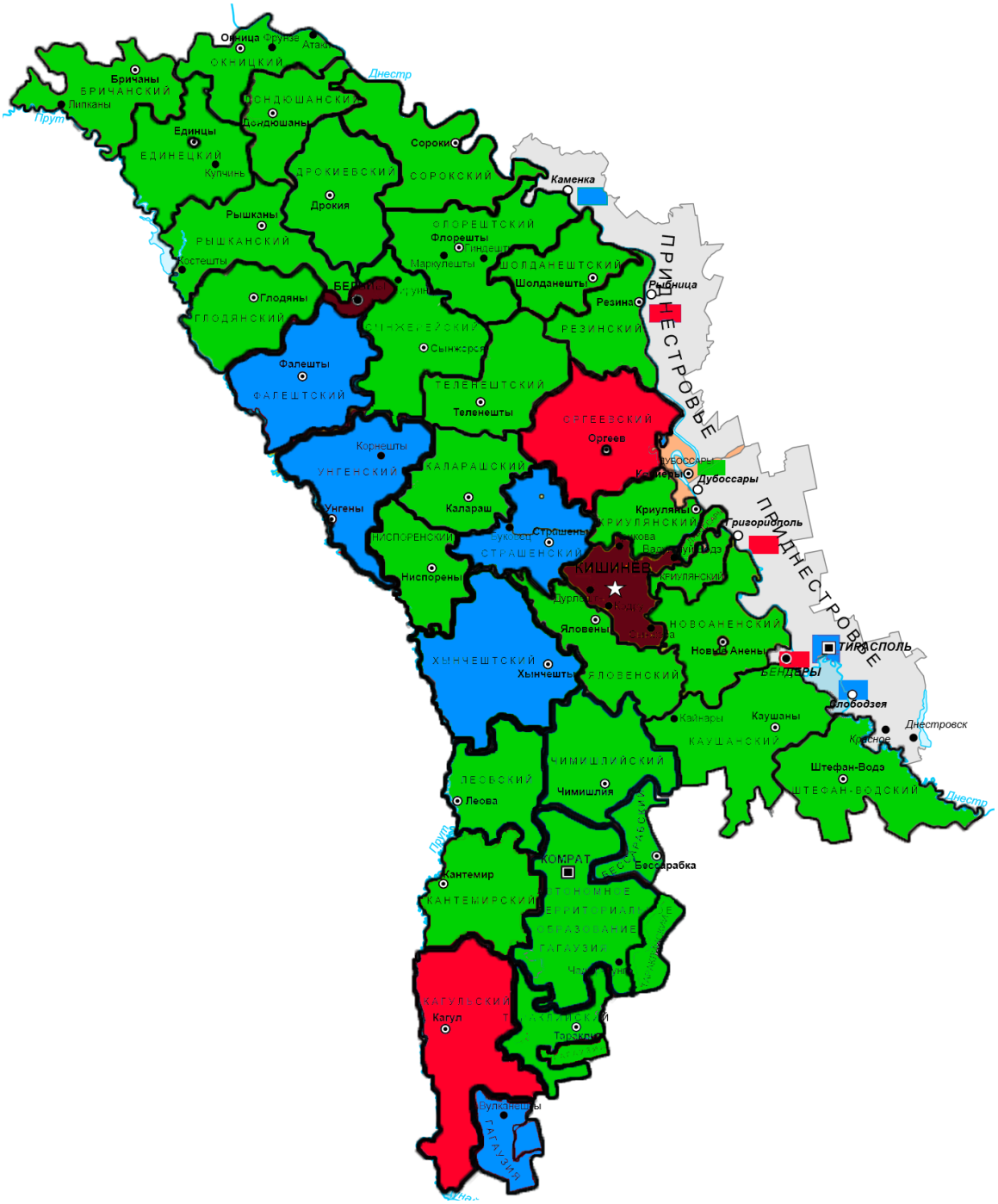

Table 2.2. Estimating the FSW population size by districts

| | ***NORTH*** ***(female adult population 297 906)*** | |
|---|---|---|
| **Districts** | ***Female adult population*** | ***FSW estimated number*** |
| **Briceni** | 25 853 | 160 |
| **Donduseni** | 14 843 | 90 |
| **Drochia** | 30 425 | 180 |
| **Edinet** | 28 701 | 170 |
| **Falesti** | 32 207 | 320 |
| **Floresti** | 31 120 | 190 |
| **Glodeni** | 21 264 | 130 |
| **Ocnita** | 19 997 | 120 |
| **Riscani** | 23 915 | 140 |
| **Singerei** | 32 731 | 200 |
| **Soroca** | 36 850 | 220 |
| | | **1 920** |
| | ***CENTER*** ***(female adult population 388 527)*** | |
| **Districts** | ***Female adult population*** | ***FSW estimated number*** |
| **Anenii Noi** | 31 330 | 190 |
| **Calarasi** | 27 976 | 170 |
| **Criuleni** | 27 156 | 160 |
| **Dubasari** | 13 046 | 80 |
| **Hincesti** | 44 091 | 440 |
| **Ialoveni** | 38 379 | 230 |
| **Nisporeni** | 23 871 | 140 |
| **Orhei** | 47 454 | 660 |
| **Rezina** | 17 987 | 110 |
| **Soldanesti** | 14 342 | 90 |
| **Straseni** | 34 086 | 270 |
| **Telenesti** | 25 459 | 150 |
| **Ungheni** | 43 350 | 430 |
| | | **3 120** |

Estimating the sizes of key population 2020

| | *SOUTH (female adult population 256 569)* | |
|---|---|---|
| **Districts** | ***Female adult population*** | ***FSW estimated number*** |
| **Basarabeasca** | 10 951 | 70 |
| **Cahul** | 47 336 | 660 |
| **Cantemir** | 22 057 | 130 |
| **Causeni** | 32 887 | 200 |
| **Ciadir-Lunga** | 21 227 | 130 |
| **Cimislia** | 22 254 | 150 |
| **Comrat** | 24 206 | 150 |
| **Leova** | 19 008 | 110 |
| **Stefan Voda** | 24 799 | 150 |
| **Taraclia** | 16 018 | 100 |
| **Vulcanesti** | 15 827 | 160 |
| | | **1 990** |
| | *LEFT BANK OF NISTRU RIVER (female adult population 187 815)* | |
| **Districts** | ***Female adult population*** | ***FSW estimated number*** |
| **Tiraspol** | 51 823 | 620 |
| **Bender** | 39 366 | 550 |
| **Camenca** | 7 963 | 80 |
| **Dubasari** | 12 336 | 70 |
| **Grigoriopol** | 15 655 | 250 |
| **Ribnita** | 27 374 | 380 |
| **Slobozia** | 33 299 | 400 |
| | | **2 350** |

* districts with FSW high prevalence
* districts with FSW medium prevalence
* districts with FSW low prevalence

Summing it up, the estimated size of FSW for districts where the IBBS 2020 survey was not carried out accounts for 7 030 FSW for the districts from the right bank of the River Nistru and 2 350 FSW for the region of the left side of the River Nistru. The total estimated size of the FSW group for the right bank of the River Nistru is 13 450 FSW and the estimated number of FSW for the Republic of Moldova is 15 800.

## *Men who have sex with men (MSM)*

The current estimation exercise used the following definition for MSM: "male who had at least one anal homosexual contact during the last 6 months prior to the interview".

The multiplier-based estimates for MSM in Chisinau and Balti, where the IBBS 2020 survey was carried out, as well as the value obtained based on the successive sampling method are presented in Table 3.1. The final estimated size for MSM in these municipalities, discussed and mutually accepted in the working group responsible for carrying out the estimation, accounted for 6 930 MSM in Chisinau and 1 050 MSM in Balti, representing the proportions of about 2.3% in Chisinau and 2% in Balti of the adult male population.

As with PWID and FSW, the values obtained for MSM based on multipliers, which are lower than the NGOs' statistics, were excluded from the estimation value range.

The figures provided by medical institutions regarding the HIV testing for MSM were very low. The MSM share of the sample who got tested for HIV in medical institutions was also very low.

The multipliers for such services as condoms and/or lubricants from pharmacies based on the beneficiary card of NGOs were not useful for any of sites.

The unique object multiplier produced underestimated data in Chisinau, due to the insufficient number of distributed unique objects.

The multiplier of condoms and/or syringe based on beneficiary card from an NGO was not useful for Chisinau, due to the small share in the sample of those who have reported about receiving such services and the small number of persons, reported by the respective NGO.

Table 3.1. Estimating the size of MSM population, multiplier method, successive sampling method, national consensus

| | | | ***Chisinau (male adult pop. 301 100)*** | |
|---|---|---|---|---|
| **Multiplier method** | Source I<br>IBBS, (%, 95% CI) | Source II official statistics | Estimated size (#, 95% CI) | % of adult population |
| **1. Tested for HIV in the PA «GDM»** | 27.5 (21.7-33.4) | 979 | 3560 (2967-4450) | 1.18 |
| **2. Received condoms based on beneficiary card from PA «GDM»** | 49.5 (42.7-56.3) | 2842 | 5741 (5075-6609) | 1.91 |
| **3. Received lubricants based on beneficiary card from PA «GDM»** | 49.2 (42.5-55.8) | 2841 | 5774 (5073-6607) | 1.92 |

| | | | | |
|---|---|---|---|---|
| **4. Received lubricants based on beneficiary card in the city where the survey is carried out** | 49.8 (42.9-56.7) | 2885 | 5793 (5061-6709) | 1.92 |
| **5. Received condoms based on beneficiary card in the city where the survey is carried out** | 49.7 (42.8-56.7) | 2886 | 5807 (5063-6712) | 1.93 |
| **6. Median number of friends, non-beneficiaries of NGOs, IBBS 2020** | 5 (0-12.8) | 3416 | 17080 (0-43725) | 5.67 |
| **Successive sampling method (median)** | | | | |
| | | | 4731 (889-35215) | 1.57 |
| **Average value** | | | 6927 | 2.30 |
| **CONSENSUS** | | | **6930** | **2.30** |
| | | | | ***Balti (male adult pop. 52 600)*** |
| **Multiplier method** | Source I<br>IBBS, (%, 95% CI) | Source II official statistics | Estimated size (#, 95% CI) | % of adult population |
| **1. Received lubricants based on beneficiary card in the city, where the survey is carried out** | 61.2 (55-67.6) | 315 | 515 (477-573) | 0.98 |
| **2. Received condoms based on beneficiary card in the city, where the survey is carried out** | 60.1 (54.2-66.2) | 315 | 524 (477-583) | 1.00 |
| **3. Participated in the previous IBBS 2016 survey (source IBBS 2020)** | 36.9 (31.4-42.5) | 292 | 791 (679-942) | 1.50 |
| **4. Received unique objects** | 12.2 (8.3-16.2) | 131 | 1074 (819-1638) | 2.04 |
| **5. Median number of friends, non-beneficiaries of NGOs, IBBS 2020** | 7 (3.8-10.2) | 315 | 2205 (1197-3213) | 4.19 |
| **Successive sampling method (median)** | | | | |
| | | | 1185 (461-4333) | 2.25 |

| | | | | |
|---|---|---|---|---|
| **Average value** | | | 1049 | 1.99 |
| **CONSENSUS** | | | **1050** | **2.00** |

To estimate population size of MSM in the remaining districts of the Republic of Moldova, where the IBBS 2020 was not carried out, as with PWID and FSW, a MSM prevalence map was outlined, based on the classification identified within the working group, responsible for carrying out the exercise of estimating the MSM population size. (Figure 3.1.).

The values resulting for the estimated size of MSM population applying the successive sampling method for Chisinau and Balti municipalities, accounted for 1.57% and, respectively, 2.25% of the male adult population. The working group agreed mutually, depending on the attributed classification, upon the variation from 0.5% up to 1.8% of male adult population for districts with low prevalence and, respectively, high prevalence of MSM.

The estimated sizes of MSM for every district are presented in Table 3.2.

**Figure 3.1.** Map of men who have sex with men prevalence in the Republic of Moldova: high (red), medium (blue) and low (green), identified in the working group responsible for estimating the MSM population size

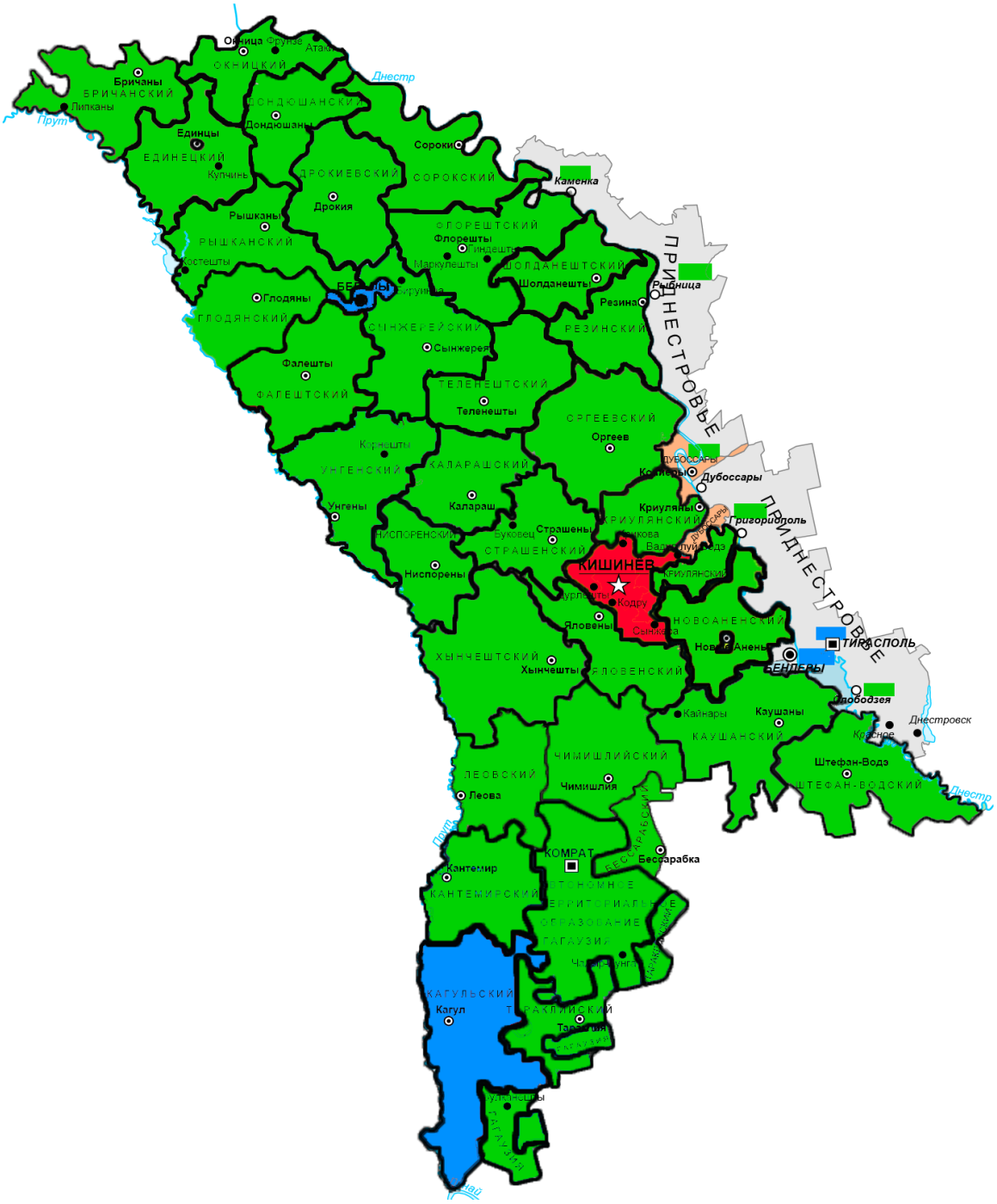

Table 3.2. Estimating the MSM population size by districts

| | ***NORTH*** ***(male adult pop. 287 372)*** | |
|---|---|---|
| **Districts** | ***Male adult population*** | ***MSM estimate number*** |
| **Briceni** | 24 887 | 124 |
| **Donduseni** | 14 017 | 70 |
| **Drochia** | 29 145 | 146 |
| **Edinet** | 27 070 | 135 |
| **Falesti** | 31 465 | 157 |
| **Floresti** | 30 162 | 151 |
| **Glodeni** | 20 477 | 102 |
| **Ocnita** | 18 816 | 94 |
| **Riscani** | 22 950 | 115 |
| **Singerei** | 32 280 | 161 |
| **Soroca** | 36 103 | 181 |
| | | **1437** |
| | ***CENTER*** ***(male adult pop. 381 816)*** | |
| **Districts** | ***Male adult population*** | ***MSM estimated number*** |
| **Anenii Noi** | 30 314 | 152 |
| **Calarasi** | 27 673 | 138 |
| **Criuleni** | 26 199 | 131 |
| **Dubasari** | 12 705 | 64 |
| **Hincesti** | 44 091 | 220 |
| **Ialoveni** | 38 379 | 192 |
| **Nisporeni** | 23 533 | 118 |
| **Orhei** | 43 767 | 219 |
| **Rezina** | 17 987 | 90 |
| **Soldanesti** | 14 273 | 71 |
| **Straseni** | 34 086 | 170 |
| **Telenesti** | 25 459 | 127 |
| **Ungheni** | 43 350 | 607 |
| | | **2299** |

Estimating the sizes of key population 2020

| | *SOUTH (male adult pop. 249 690)* | |
|---|---|---|
| **Districts** | ***Male adult population*** | ***MSM estimated number*** |
| **Basarabeasca** | 10 450 | 52 |
| **Cahul** | 44 764 | 224 |
| **Cantemir** | 22 483 | 112 |
| **Causeni** | 32 433 | 162 |
| **Ciadir-Lunga** | 19 880 | 99 |
| **Cimislia** | 21 860 | 109 |
| **Comrat** | 22 671 | 113 |
| **Leova** | 19 263 | 96 |
| **Stefan Voda** | 25 113 | 126 |
| **Taraclia** | 15 950 | 80 |
| **Vulcanesti** | 14 823 | 74 |
| | | **1248** |
| | ***LEFT BANK OF NISTRU RIVER (male adult pop. 156 168)*** | |
| **Districts** | ***Populație adultă masc.*** | ***Număr estimat BSB*** |
| **Tiraspol** | 43 091 | 775 |
| **Bender** | 32 733 | 458 |
| **Camenca** | 6 621 | 33 |
| **Dubasari** | 10 257 | 51 |
| **Grigoriopol** | 13 017 | 65 |
| **Ribnita** | 22 761 | 114 |
| **Slobozia** | 27 688 | 138 |
| | | **1635** |

* districts with MSM high prevalence
* districts with MSM medium prevalence
* districts with MSM low prevalence

The estimated size of the MSM population for the districts where the IBBS survey was not carried out accounts for 4 985 MSM for the districts from the right bank of the River Nistru and 1 635 MSM for the districts from the left bank of the River Nistru. The total estimated size of the MSM group for the right bank of the river, including Chisinau and Balti, accounts for 12 965 MSM, and the estimated number of MSM for the Republic of Moldova is 14 600 MSM, representing about 1.02% of the adult male population of the Republic of Moldova.

## Limitations of current estimates

Due to confidentiality reasons, it was not possible to collect additional data, which would be useful for this exercise. For instance, the quality of administrative statistics (impossibility to verify the nominal cases), unavailability of data about younger members from the risk groups (teenagers younger than 16 years old)[‡‡]. At the same time, about one fifth (20.0 %) of PWID in Chisinau and, at least, one fourth of PWID in Balti – 24.7%, 28.3% in Tiraspol and 26.9% in Ribnita, stated that they have started injecting drugs at the age of 17 years old and younger.

Another possible bias in the estimates may be related to the period of data collection, which coincided with the period of emergency in the Republic of Moldova, caused by the COVID pandemic. In the created situation, the sampling took place more slowly, being restricted by the mobility of the entire population, not only of the target groups. Some NGOs have identified optimal solutions to minimize disruption in the sampling process, taking into account all the rigors and restrictions imposed for the safety of the target groups and staff involved in the data collection phase.

The key source for distorted estimates when using multipliers in general would be the sampling errors, which contribute to dependency of data sources. This is possible, if the representatives of the target group, who benefit from harm reduction services, are more likely to participate in the survey, than those who do not benefit from these services.

Efforts were undertaken to ensure safety, for the target groups from both data sources to be defined in the same way, refer to the same period of time and geographic areas, and unique objects were not distributed to persons, who are not part of the target groups.

The data provided by NGOs regarding the number of persons who received a certain service were sufficiently accurate. The Register for monitoring and keeping the record of services provided by NGOs allows monitoring the services provided online and avoiding the double counting of persons.

Another limitation was the usefulness of data obtained through capture-recapture due to several reasons: impossibility to find various points, independent from distribution of unique objects, distribution of a too small number of unique objects, return to the study of a too high number of unique objects, facts that led to underestimation of the group size.

Some statistics on population for districts were not updated; only the size of the general population for both banks of the River Nistru being available; the share of target groups from the respective group of the general population was adjusted, for the size of the target groups by districts to represent a reasonable share of real population at the moment when the updated data are available and separate by districts.

The selected method for estimating the size of key populations based on classifications attributed by NGOs working with these groups and identification of optimal shares of target groups from the respective groups of general population, depending on the attributed classification, has taken into account the information from first sources, NGOs' knowledge and peculiarities of districts: industrialization, tourism area, university centers,

[‡‡] In IBBS, PWID of at least 16 years old, FSW of minimum 16 years old, and MSM of minimum 16 years old were recruited.

nearby military units or border, high mobility. Hence, there was no linear relation between the general population and the key group, but it was a differentiated approach, identified via consensus within the working group, which focused on all above-mentioned criteria in classification.

No statistics was available for the districts from the left bank of the River Nistru for adult population; the share of adult population out of total population was the same as for the districts from the right bank of the River Nistru.

The accuracy of extrapolation at the national level based on NGOs' knowledge depends on participants' knowledge about a certain key group, type of carried out activity and their experience. If knowledge or perception are far from the real number of the target group, this fact will influence also the number estimated through consensus – this trend being more pronounced at the level of separate district, if discussions were held only with the representatives from this districts, without the representatives of other districts. Efforts were undertaken to have representativeness during the inline discussions in all the districts, and it was insisted for one classification to be provided from all the members of the working groups.

The extrapolation at the national level based on NGOs' knowledge may result in «forced consensus», when the group had different opinions – in this case, the average value for the share of the target group out of the adult population was considered, and hence the «forced consensus» was concluded.

# Conclusions and Recommendations

This exercise aimed to provide reasoning for the size of key populations in the Republic of Moldova, using different methods for planning, extending, launching and ensuring better coverage with HIV prevention programs among these populations. The estimation methods and results will be submitted to the relevant governmental agencies (e.g. in such areas as health, internal affairs, social assistance, education), nongovernmental organizations working in the area of reducing the risks and preventing HIV, Global Fund, and representatives of the PWID, FSW and MSM communities.

The estimates will be used as basis for planning interventions and HIV services, allocating resources, prioritizing districts for interventions, determining the volume of necessary services, and coordinating HIV prevention programs in the entire country. The repeated estimation of populations' sizes, together with the program data will improve the assessment of the program's coverage and quality, and will inform the efficient extension of the program.

The estimates will be updated depending on the needs and possibilities, as well as availability of new data.

The following recommendations are suggested based on the results of the estimation exercise:

Efforts are necessary to improve the quality of program data, as well as data supplied by other providers than NGOs providing services to key groups; for that purpose, it is necessary to coordinate the relevant public institutions (Narcological Service, MIA , SDMC), as the quality of official statistical data influence directly the quality of estimated data.

Some program data were not useful for the multiplier method, such as the number of persons from key groups, who benefited from services through pharmacies, because the number provided by NGOs was too low.

In a similar way, some data provided by the Narcological Service, medical institutions, or police, were not useful for the multiplier method either, being too low.

To use the testing service multiplier method in future estimations, it is especially important to improve the quality of program data, in favor of keeping the record of tested persons in correlation to the number of tests.

To minimize the divergences regarding the perceptions about the MSM group size, it is recommended to improve the knowledge of national partners about the MSM population. For the purpose of obtaining more ample information, it is recommended to use some national surveys, which would provide information regarding the sexual behavior among men who have sex with men.

Because there is not so much information about the transgender persons in the Republic of Moldova, it is suggested to have a formative assessment to determine the accessible size of this group, their needs, risky behavior for HIV transmission, so as to organize bio-behavioral surveys in this group as well.

According to IBBS 2020 data, the majority of prevention program beneficiaries contact with NGOs on monthly basis, and this implies the need to identify modalities for increasing the attractiveness of prevention services.

It is recommended to explore the possibility to carry out in parallel a RDS and a national survey among the general population, both on the right bank, and on the left bank of the River Nistru, as this would be a useful data source for the estimation of key populations' size in localities where the IBBS 2020 is not implemented.

# Brief description of the methods used in estimating key populations

## *Unique object method*

This method (on unique objects) represents a modification of the classical capture-recapture method and implied the distribution of some unique objects in the target groups participating in the IBSS with 2-3 weeks before collecting data. During the interview, the respondents were asked if they have received this unique object (keychain), and the design of the unique object was different for different groups.

## *Multiplier method*

The multiplier method is an indirect method to estimate the size of HRGI within the limits of a certain locality and needs the presence of two independent data sources, which have the same unit of measurement (the population to be estimated).

The following may be data sources for the multiplier method:

1. Administrative/medical statistics (standard), which registered the representatives of the target population by offering medical, social, prevention services, or the contacts with the services, which provide statistical record keeping for the HRGI, for instance registration of the PWID with the Narcological Service.
2. Representative surveys (behavioral, sociological) with questions about target group's contact with services, whose statistical data (standard) will be used to estimate the size of the HRGI.

The method is based on the fact that the number of representatives of the target group, covered with certain services, or having contacts with services, holding statistical records, reflects the share from the sample and

corresponds to the share from estimated population, thus offering the possibility of calculating the estimated number.

## *Nominal technique*

The respondents were asked how many PWID friends they have, who live in the locality where the survey is carried out (name, nickname or the first letter of their name) and how many of them are beneficiaries of harm reduction programs. The ratio between the average number of friends in total and the average number of non-beneficiary friends was used as a multiplier in association with the monitoring data of the harm reduction programs.

## *Successive sampling method and visibility imputation*

The approach of this method approximates the mechanism of respondent driven sampling (RDS) through its successive sampling model (Gile) and uses the sample selection order to supply information about the distribution of the network size among the population members [11]. The successive sampling method uses a Bayesian frame, treating the size of population N as something unknown, but with a previously specified distribution. The successive sampling frame allows incorporating previous knowledge regarding the size of the population, which is frequently available from experts' knowledge or size estimates from other sources, such as counting through mapping, network extension, multiplier or capture-recapture methods [12].

The successive sampling model implies that persons with a higher degree are more likely to be recruited earlier in the RDS process, because they are more connected and more accessible on social media.

The original successive sampling method is based on the size of self-reported network. Nevertheless, these values are subject to bias, due to doubling, rounding up, and intentional or accidental transmission errors. Additionally, these values may be inadmissibly low or high [13]. Hence, a modified version of successive sampling is used, which models the visibility of every person, using a measuring error model [16].

The imputed visibility in the successive sampling is a Bayesian method, in which the information about the unknown parameters is expressed through probability distributions over their possible values. Hence, the resulting estimates take the form of a distribution, called posterior distribution. The estimation of the posterior distribution for the N population size is carried out by considering the previous knowledge about the population size and observed data. For those 8 sets of data, the populations' sizes estimated in the previous estimation exercise were used as previous values of populations. Because the distributions of population sizes were inclined, the median was used for the posterior distribution as dotted estimation and confidence intervals of 95% for expressing the uncertainty of the estimates.

The imputed visibility for the estimates through the successive sampling method was performed by the international expert Lisa G. Johnston, using the posteriorisation function in SSPSE, version 0,8, for programming language R (Foundation R) [16].

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