PUBLIC HEALTH CENTER

# ANALYTICAL REPORT

## POPULATION SIZE ESTIMATION OF MEN WHO HAVE SEX WITH MEN IN CITIES OF INTEGRATED BIO-BEHAVIORAL SURVEILLANCE (2024)

KYIV, 2025

**Report Author: I. Titar, Department of Scientific Research, Public Health Center of the Ministry of Health of Ukraine.**

**UDC 316.344.8**

**Citation:** Titar I. Population Size Estimation of Men Who Have Sex with Men in Cities of Integrated Bio-Behavioral Surveillance (2024): Analytical Report / Public Health Center of the Ministry of Health of Ukraine. — Kyiv, 2025. — 72 p.

# Contents

## SOURCE OF FUNDING

The Integrated Bio-Behavioral Surveillance among Men Who Have Sex with Men in 2024 (hereinafter – IBBS MSM 2024), the results of which were used to calculate the estimates presented in this report, was conducted within the framework of the SILTP project ("Strengthening HIV Treatment, Laboratory Services, Medication Assisted Therapy, and Program Monitoring in Ukraine") under the U.S. President's Emergency Plan for AIDS Relief (PEPFAR). The project was implemented by the State Institution "Public Health Center of the Ministry of Health of Ukraine" with the support of the U.S. Centers for Disease Control and Prevention (CDC).

## ACKNOWLEDGMENTS

The author of the report expresses gratitude to:

- **Maksym Kasianczuk**, M&E Coordinator, Eesti HIV-positiivsete võrgustik;
- **Avi Hakim**, U.S. Centers for Disease Control and Prevention (CDC);
- **Yana Sazonova**, Deputy PEPFAR Coordinator in Ukraine for Strategic Information, PEPFAR Coordination Office in Ukraine;
- **Lyudmyla Dobrovolska**, Strategic Information and Program Management Advisor, U.S. Centers for Disease Control and Prevention (CDC), DGHT, Ukraine Office;
- **Andrii Bohoslavets**, NGO "ALLIANCE.GLOBAL";
- Managers and employees of the **Hornet** application;
- **Andrii Chernyshev**, Head of External Relations and Advocacy Department, NGO "ALLIANCE.GLOBAL", member of the National Council on TB and HIV/AIDS from the MSM community;
- **"100% LIFE"** organizations (central office and regional offices in Kyiv, Zaporizhzhia, and Lviv), **"ALLIANCE.GLOBAL"**, **"LGBT-LIGA" Association**;
- **ICF "Alliance for Public Health"** and personally **Oksana Pashchuk**, Head of Strategic Information, Monitoring and Evaluation Department, and her colleagues;
- **"The European MSM Internet Survey" (EMIS) Consortium**, Robert Koch Institute (Berlin, Germany) and personally **Nikolay Lunchenkov**, **Ulrich Marcus**, and **Barbara Gunsenheimer-Bartmeyer**;
- **Yevhen Mishchenko**, Scientific Research Specialist, Department of Scientific Research, SI "Public Health Center of the Ministry of Health of Ukraine" (PHC);
- **Yelyzaveta Trofymenko**, Scientific Research Specialist, Department of Scientific Research, PHC;
- Staff of the Department of HIV Management and Response, PHC;
- Consultants for counting profiles in applications and websites for finding male partners in the cities of Dnipro, Zaporizhzhia, Kharkiv, and Poltava;
- **Kostiantyn Dumchev**, Research Fellow, Center for Mental Health, National University of Kyiv-Mohyla Academy;
- **Serhii Hrabovyi**, Consultant on Data Analysis and Use for the Recent HIV Infection Surveillance System Implementation Study, PHC.

# INTRODUCTION

Accurate population size estimation (PSE) of key populations is crucial for monitoring the HIV epidemic, planning effective prevention and treatment programs, and advocating for management decisions.

The HIV/AIDS epidemic in Ukraine is classified as a concentrated type, where the main drivers of the epidemic are the so-called "key populations" (KPs) – groups of individuals who have a higher risk of HIV infection compared to the general population.[1]

Most key populations are "hidden" populations. Stigma and discrimination drive many members of key populations to conceal their affiliation with them; consequently, information about their size cannot be obtained from official data sources. This creates a need for specialized studies designed specifically for population size estimation.

Estimates of the MSM population size have been conducted in Ukraine since the early 2000s. The most recent MSM population size estimates in Ukraine were published in 2019[2] and 2023[3], but the estimates themselves refer to the periods of 2017 and 2021 (chronologically linked to the rounds of bio-behavioral surveillance conducted in those years). That is, they refer to the period prior to the full-scale invasion by Russia, which caused mass population migration and the mobilization of a significant portion of the male population into the ranks of the Defense Forces of Ukraine.

The current round of MSM population size estimation is linked to the conduct of the Integrated Bio-Behavioral Surveillance among Men Who Have Sex with Men in 2024 (IBBS MSM 2024). The estimation was carried out in accordance with the Protocol of this study, with some deviations caused by objective circumstances described below.

The field stage of IBBS MSM 2024 was conducted in 10 cities of Ukraine. The realized sample size of the study was 3,491 participants. Detailed information on the planned and realized sample sizes by city is presented in Table 1.

[1] People who inject drugs (PWID), men who have sex with men (MSM), sex workers (SW), persons held in prisons and pre-trial detention facilities, etc.

[2] "Estimation of the Size of Key Populations in Ukraine" by Y. Sazonova, G. Duchenko, O. Kovtun, I. Kuzin. International Charitable Foundation "Alliance for Public Health." 2019 – 84 p.

[3] Kasianczuk M. et al. Estimation of the Size of the Population of Men Who Have Sex with Men and Transgender People in Ukraine as of the Start of the Great War (2021): Analytical Report Based on Research Findings / M. Kasianczuk, I. Titar, S. Salnikov, S. Ogorodnik (Public Health Center of the Ministry of Health of Ukraine). — Mariupol, Kyiv, 2023. — 34 p.

**Table 1. Planned and realized sample sizes of IBBS MSM 2024**

| | Sample Size | |
|---|---|---|
| | **Planned** | **Realized** |
| **Kyiv** | **550** | **550** |
| **Odesa** | **500** | **412** |
| **Kharkiv** | **400** | **400** |
| **Dnipro** | **450** | **450** |
| **Lviv** | **450** | **450** |
| Cherkasy | 300 | 300 |
| Vinnytsia | 300 | 300 |
| Zaporizhzhia | 300 | 166 |
| Chernivtsi | 300 | 163 |
| Poltava | 300 | 300 |
| Total | 3850 | 3491 |

** Cities in the sentinel cluster are highlighted in bold.*

The data collection stage (field stage) of the study lasted from October 11, 2024, to January 12, 2025. Detailed information on the dates of the field stage in each study city is presented in Table 2.

**Table 2. Dates of the data collection stage (field stage) of IBBS MSM 2024**

| | Start of data collection stage | End of data collection stage | Duration, days |
|---|---|---|---|
| **Kyiv** | 17.10.2024 | 24.12.2024 | 69 |
| **Odesa** | 17.10.2024 | 12.01.2025 | 88 |
| **Kharkiv** | 11.10.2024 | 28.11.2024 | 49 |
| **Dnipro** | 13.10.2024 | 15.12.2024 | 64 |
| **Lviv** | 14.10.2024 | 03.01.2025 | 82 |
| Cherkasy | 15.10.2024 | 13.11.2024 | 30 |
| Vinnytsia | 11.10.2024 | 04.12.2024 | 55 |
| Zaporizhzhia | 15.10.2024 | 28.11.2024 | 45 |
| Chernivtsi | 14.10.2024 | 12.01.2025 | 91 |
| Poltava | 17.10.2024 | 27.12.2024 | 72 |
| Total | 11.10.2024 | 12.01.2025 | |

** Cities in the sentinel cluster are highlighted in bold.*

# METHODOLOGY OF THE STUDY AND METHODS FOR CALCULATING MSM POPULATION SIZE ESTIMATES[4]

## Study Goal

The goal of the study is to estimate the size of the MSM group at the level of individual cities where the IBBS MSM 2024 was conducted.

## Definition of the Target Group

Inclusion criteria for the target group of the MSM population size estimation study were established in accordance with the participation criteria for IBBS MSM 2024 specified in its Protocol. Thus, MSM within the framework of this study are defined as males aged 16 years and older who have had at least one sexual (oral or anal) contact with a male person within the last 6 months.

## Study Geography

The study covered 10 cities where IBBS MSM 2024 was conducted: Kyiv, Kharkiv, Odesa, Dnipro, Lviv, Zaporizhzhia, Vinnytsia, Cherkasy, Poltava, and Chernivtsi.

## Information Sources

During this study, the following sources of information were used to estimate the size of the MSM population:

- Results of IBBS MSM 2024;
- Results of IBBS MSM 2021;
- Results of "The European MSM Internet Survey" (EMIS) 2024;
- Data on the number of MSM who used applications and websites for finding male partners (obtained both directly from the owners of such services and collected by external observers);
- Data from non-governmental organizations (NGOs) on MSM coverage with prevention services (provided both directly by them and via the SyrEx database);
- Data from the Public Health Center regarding clients who were registered in connection with receiving Pre-Exposure Prophylaxis (PrEP) as of January 1, 2025;
- Data from the State Statistics Service of Ukraine regarding the population of Ukraine as of January 1, 2022.

[4] The text of this section uses materials from Section 9 of the Protocol of the IBBS MSM 2024.

## Methods

The Protocol of IBBS MSM 2024 stipulated that the population size estimation of MSM in the study cities would be carried out using the following methods:

- Multiplier method based on data on prevention service coverage and the use of applications for finding male partners;
- Privatized Network Sampling (PNS) method;
- Capture-recapture method;
- Successive sampling method.

## Multiplier Method Based on Prevention Service Coverage Data

This method compares data on a single population from two independent data sources. For example, the multiplier method based on prevention service coverage (the so-called service multiplier) uses statistical data on the number of group members who received a prevention service, alongside data from self-reports of IBBS participants regarding their receipt of the corresponding service.

The formula used to calculate the point estimate is:

$$O_1 = \frac{M}{P}$$

Where:

$O_1$ – estimated size of the MSM population;

$M$ – quantitative statistical indicator of registered MSM group members in a specific data source;

$P$ – proportion of MSM group members who confirmed their registration in the specific data source during the IBBS;

$S$ – sample size of MSM within the IBBS.

Variance (Var) is calculated using the formula:

$$Var(O_1) = \frac{(M * S * (M - P) * (S - P))}{P^3}$$

The 95% confidence interval is calculated based on the formula:

$$95\%\ CI: O1\ \pm 1.96 * \sqrt{Var}(O_1)$$

## Method Based on Apps or Sites for Finding Male Partners

Effectively, this method is a variation of the multiplier method that relies on data regarding the use of mobile applications or websites for finding male partners. According to IBBS MSM 2021 data, 54% of MSM used special mobile applications to meet other men, and 39% used specialized dating websites. The leaders in coverage among such virtual platforms are the mobile application Hornet (profiles held by 57% of participants), the website Bluesystem (23%), and the mobile application Badoo (20%). In Ukraine, this method is the most popular way for MSM to find partners.

Information obtained during IBBS MSM 2024 regarding the use of a specific application or website is combined with data on the number of clients of the corresponding services. The latter data are obtained either directly through contacts with service owners or administrators, or by counting profiles using accounts/profiles that allow for this.

Calculated estimates may be adjusted based on coefficients that account for the fact that a single participant may have more than one profile/account on the corresponding application or website.

## Privatized Network Sampling (PNS) Method

This method constitutes a component of IBBS MSM 2024. It relies on the creation of unique cryptographic hash codes for each study participant and for 5 MSM acquaintances named by them (whom participants are asked to select randomly from their phone's contact book). The codes are based on the encoded first letter of the first name, first letter of the surname, and part of the phone number.

It is impossible to identify a specific individual based on such a code, but the hash codes of the same person named by different participants will match. The collected hash codes of participants and their acquaintances are compared to establish overlaps (connections) between them. The frequency of matches in acquaintance networks is related to population size. Corresponding calculations are performed using a special R package hosted on GitHub (https://github.com/fellstat/pnspop).

## Capture-Recapture Method

The capture-recapture method was originally developed in biology to estimate animal populations by selecting and marking members of a population at a certain point in time, followed by a subsequent selection of members of the same population at another point in time. Population size is estimated using the sample sizes and the number of population members common to both samples.

The capture-recapture method is based on a number of assumptions:

a) the population must be closed (i.e., no new members should join, and old members should not leave);

b) objects from the first sample must be identified in the second sample;
c) the selection of both samples must be independent (the probability of being included in one sample should not affect the probability of being included in the second);
d) all objects must have an equal probability of being included in each sample.
To calculate point estimates of population size, the so-called Lincoln-Petersen formula is used:

$$N = \frac{(S_1 * S_2)}{R}$$

Where:
$N$ – estimate of the total population size;
$S_1$ – number of persons covered by the first "capture";
$S_2$ – number of persons covered by the second "capture";
$R$ – number of study participants who reported being covered during the first "capture".

Variance is calculated using the formula:

$$Var(N) = \frac{(S_1 * S_2 * (S_1 - R) * (S_2 - R))}{R^3}$$

The 95% confidence interval is calculated based on the formula:

$$95\%\ CI: N\ \pm 1.96 * \sqrt{Var}(N)$$

## Successive Sampling Method

In the calculations presented in this report, we decided not to use the successive sampling method, as according to our previous experience, its results depend significantly on estimates obtained earlier. Furthermore, such previous estimates related to the period prior to the full-scale Russian invasion of 2022, which caused significant forced migration of the MSM population in Ukraine.

# RESULTS

## Multiplier Method

### Dating Sites/Apps

During the IBBS MSM 2024, participants were asked whether they use the Internet or mobile applications to find male partners. If they answered affirmatively, they were asked to clarify whether they have profiles on websites or mobile applications from a suggested list, whether they had visited them within the last 30 days, and whether this occurred in the city where the participant was located at the time of the survey. Additionally, participants were asked to specify the number of profiles they maintain on each application or website (although maintaining multiple profiles is typically explicitly prohibited by the terms of service, in practice, it occurs).[5]

These data were cross-referenced with data regarding the probable number of unique clients who used the corresponding websites or applications during a period maximally approximated to the fieldwork stage in the respective city. These data were obtained from three sources:

A) Counts by external consultants in the cities of Dnipro, Zaporizhzhia, Kharkiv, and Poltava (other cities could not be covered due to organizational issues). These consultants either possessed or installed the relevant applications on their smartphones or accessed the corresponding websites (using profiles and settings that allowed visibility of the maximum available number of potential partners). Where the service permitted, consultants set a search radius approximately corresponding to the size of the data collection city. Consultants were also instructed to count the number of available potential male partners on different days of the week (specifically on weekdays and weekends) and at different times of the day. The counts were conducted during September-October 2024. Thus, information was collected regarding the services Hornet, Grindr, Badoo, Planetromeo, and Bluesystem (the latter only for Poltava). No summation of unique profiles fixed during the observation period was performed. For further calculations, the maximum values recorded during the series of counts were used. The obtained data and the estimates calculated based on them are presented in Tables 3–6.

[5] Responses to the following questions from the IBBS MSM 2024 questionnaire were used: "Do you use the Internet or mobile applications to find male partners?", "Do you currently have profiles (personal pages) on internet sites or mobile applications (for finding male partners)?", "Tell me, do you have profiles on the sites or mobile applications I will list now [Bluesystem, Planetromeo, Hornet, Grindr, BADOO, other dating sites or apps], and if so, how many? Did you visit them during the last 30 days (month)? Did you use them during the last 30 days in the city where we are currently located?".

B) Data on the number of profiles on the Bluesystem service as of September 2024, collected and kindly provided by Maksym Kasianczuk. The obtained data and the estimates calculated based on them are presented in Table 7.

C) Data on the monthly number of unique users (Monthly Active Users - MAU) of the Hornet service in September 2024, kindly provided by the service itself (facilitated by Andrii Bohoslavets). The obtained data and the estimates calculated based on them are presented in Table 8.

## A. Data Collected by Consultants

### *Dnipro*

**Table 3. MSM population size estimates using the multiplier method based on data regarding the use of services for finding male partners (data collected by external consultants)**

| Site/Service | Counted number of profiles | Average number of profiles per IBBS participant having relevant profiles | Proportion of IBBS MSM 2024 participants using the corresponding service in the last 30 days in the respective city | Calculated point estimate, without correction for number of profiles | Calculated point estimate, with correction for number of profiles |
|---|---|---|---|---|---|
| Hornet | 259 | 1.38 | 0.411 | 630 | 457 |
| Badoo | 85 | 1.08 | 0.089 | 956 | 885 |
| Grindr | 52 | 1.12 | 0.058 | 900 | 804 |
| Planetromeo | 25 | 1.05 | 0.031 | 804 | 765 |

*Zaporizhzhia*

**Table 4. MSM population size estimates using the multiplier method based on data regarding the use of services for finding male partners (data collected by external consultants)**

| Site/Service | Counted number of profiles | Average number of profiles per IBBS participant having relevant profiles | Proportion of IBBS MSM 2024 participants using the corresponding service in the last 30 days in the respective city | Calculated point estimate, without correction for number of profiles | Calculated point estimate, with correction for number of profiles |
|---|---|---|---|---|---|
| Hornet | 231 | 1.25 | 0.705 | 328 | 262 |
| Badoo | 70 | 1.07 | 0.066 | 1056 | 987 |
| Grindr | 45 | 1.08 | 0.090 | 498 | 461 |
| Romeo | 24 | 1 | 0.036 | 664 | 664 |

*Kharkiv*

**Table 5. MSM population size estimates using the multiplier method based on data regarding the use of services for finding male partners (data collected by external consultants)**

| Site/Service | Counted number of profiles | Average number of profiles per IBBS participant having relevant profiles | Proportion of IBBS MSM 2024 participants using the corresponding service in the last 30 days in the respective city | Calculated point estimate, without correction for number of profiles | Calculated point estimate, with correction for number of profiles |
|---|---|---|---|---|---|
| Hornet | 293 | 1.22 | 0.523 | 561 | 460 |
| Badoo | 61 | 1.05 | 0.06 | 1017 | 968 |
| Grindr | 15 | 1.07 | 0.1 | 150 | 140 |
| Romeo | 36 | 1.23 | 0.02 | 1800 | 1463 |

*Poltava*

**Table 6. MSM population size estimates using the multiplier method based on data regarding the use of services for finding male partners (data collected by external consultants)**

| Site/Service | Counted number of profiles | Average number of profiles per IBBS participant having relevant profiles | Proportion of IBBS MSM 2024 participants using the corresponding service in the last 30 days in the respective city | Calculated point estimate, without correction for number of profiles | Calculated point estimate, with correction for number of profiles |
|---|---|---|---|---|---|
| Hornet | 12 | 1.05 | 0.477 | 25 | 24 |
| Badoo | 15 | 1 | 0.123 | 122 | 122 |
| Grindr | 6 | 1.02 | 0.163 | 37 | 36 |
| Romeo | 19 | 1 | 0.6 | 317 | 317 |
| Bluesystem | 2 | 1 | 0.77 | 26 | 26 |

B. Data Collected by Maksym Kasianczuk

**Table 7. MSM population size estimates using the multiplier method based on data regarding the use of the "Bluesystem" service (data collected by Maksym Kasianczuk)**

| City | Counted number of profiles | Avg. number of profiles per IBBS participant having relevant profiles | Realized Sample Size IBBS MSM 2024 | Proportion of IBBS MSM 2024 participants using the service in the last 30 days in the city | Calculated point estimate, with correction for number of profiles | Var | Lower CI Limit | Upper CI Limit |
|---|---|---|---|---|---|---|---|---|
| Vinnytsia | 542 | 1.08 | 299 | 0.084 | 6002 | 1254760 | 4882 | 7122 |
| Zaporizhzhia | 664 | 1.23 | 166 | 0.139 | 3896 | 544349 | 3158 | 4634 |
| Kyiv | 4821 | 1.01 | 550 | 0.049 | 97233 | 331086169 | 79037 | 115429 |
| Lviv | 977 | 1.82 | 450 | 0.289 | 1858 | 14314 | 1739 | 1978 |
| Odesa | 1218 | 1.05 | 412 | 0.206 | 5623 | 273561 | 5100 | 6146 |
| Poltava | 472 | 1.09 | 300 | 0.077 | 5648 | 1212679 | 4547 | 6749 |
| Kharkiv | 1252 | 1.05 | 400 | 0.213 | 5611 | 270911 | 5091 | 6132 |
| Cherkasy | 446 | 1.24 | 300 | 0.333 | 1079 | 5604 | 1004 | 1154 |
| Chernivtsi | 241 | 1.82 | 163 | 0.08 | 1660 | 175980 | 1241 | 2080 |
| Dnipro | 1461 | 1,41 | 450 | 0.209 | 4960 | 188295 | 4526 | 5394 |

## C. Data Provided by Hornet Service

The Hornet service kindly shared its internal data regarding the number of Monthly Active Users (MAU) in the respective cities during September 2024.

**Table 8. MSM population size estimates using the multiplier method based on data regarding the use of the Hornet service (data provided by Hornet)**

| City | Number of profiles | Avg. number of profiles per IBBS participant having relevant profiles | Realized Sample Size IBBS MSM 2024 | Proportion of IBBS MSM 2024 participants using the service in the last 30 days in the city | Calculated point estimate, with correction for number of profiles | Var | Lower CI Limit | Upper CI Limit |
|---|---|---|---|---|---|---|---|---|
| Vinnytsia | 1722 | 1.08 | 299 | 0.572 | 2788 | 17372 | 2656 | 2920 |
| Zaporizhzhia | 2580 | 1.25 | 166 | 0.705 | 2928 | 20409 | 2786 | 3071 |
| Kyiv | 26984 | 1.19 | 550 | 0.629 | 36045 | 1371530 | 34874 | 37216 |
| Lviv | 14798 | 1.25 | 450 | 0.738 | 16046 | 197657 | 15601 | 16491 |
| Odesa | 8859 | 1.08 | 412 | 0.551 | 14888 | 426310 | 14235 | 15541 |
| Poltava | 5680 | 1.05 | 300 | 0.477 | 11349 | 458877 | 10671 | 12026 |
| Kharkiv | 6679 | 1.22 | 400 | 0.523 | 10478 | 241242 | 9987 | 10969 |
| Cherkasy | 611 | 1.07 | 300 | 0.507 | 1127 | 3025 | 1072 | 1182 |
| Chernivtsi | 556 | 1.26 | 163 | 0.46 | 959 | 5495 | 885 | 1033 |
| Dnipro | 10677 | 1.38 | 450 | 0.411 | 18820 | 1100456 | 17771 | 19869 |

## Clients of Prevention Programs

Considering the conclusions drawn from issues related to the duplication of unique clients in the SyrEx database against the backdrop of the transition of many prevention programs to state budget financing (beginning in 2019), in the current round of population size estimation, information regarding coverage by prevention services was collected in a more differentiated manner. Specifically, study participants were asked which specific organizations they received prevention services from.[6] In turn, statistical information regarding the number of unique MSM clients provided with prevention services was also collected at the level of individual organizations.

Overall, this approach proved effective, but it had the following limitations:

- The problem of participants correctly recalling exactly which organization and in what period the service was received;
- The complex structure of subordination and interaction of organizations, which requires a good understanding of the context of prevention service provision by Non-Governmental Organizations (NGOs) in a specific city. Specifically, regional units of organizations may work with different projects than the organization as a whole. Also, service provider organizations may hire other organizations as subcontractors or be hired in this role themselves. As a result, the formal provider of prevention services and the actual provider may differ principally, but the client may not understand this and may mistake them for each other;
- Service provider organizations may work with different projects and maintain client records for these projects separately, being unable or unwilling to estimate the number of unique clients at their intersection;
- Some organizations (sometimes the provider with the largest coverage of MSM clients in the region/city) ceased to exist or stopped providing services[7] during the period for which data were collected due to the deteriorating security situation or organizational-economic reasons. Consequently, their statistical data were unavailable or had significant gaps;
- Some organizations provide services under a low-threshold scheme and do not have a sufficiently developed system for tracking unique clients.

Information on prevention service coverage was collected from organizations which (with a few exceptions indicated below) demonstrated the highest coverage in the respective city of the IBBS MSM 2024 based on participant self-reports.

[6] The following questions from the IBBS MSM 2024 questionnaire were used: "In the last three months, did you receive free condoms and lubricants (e.g., at an NGO, through an outreach service, sexual health clinic, medical facility)?", "During the last three months, did you receive free testing services for sexually transmitted infections (e.g., at an NGO, through an outreach service or sexual health clinic)?", "During the last three months, did you receive free counseling on condom use and safer sex (e.g., at an NGO, through an outreach service or sexual health clinic)?", "From which organization(s) did you receive the service?".

[7] Sometimes services continued to be provided informally (without formal record-keeping), for example, from existing stock residues.

## A. Data from ALLIANCE.GLOBAL

Statistical data provided by the NGO "ALLIANCE.GLOBAL" regarding the number of unique clients covered by prevention services (distribution of free condoms/lubricants, STI testing, counseling on safer sexual behavior) in the study cities during the three months preceding the fieldwork stage of the study are presented in Table 9. As can be seen, in Kyiv and Dnipro, services were provided within the framework of three different projects. The organization did not have a reliable method to verify whether there were unique clients who received services from more than one project. However, organization representatives estimated the number of such clients who might have been counted more than once as insignificant. Furthermore, in both Kyiv and Dnipro, despite the presence of clients from three different projects, one of the projects significantly prevailed in terms of the number of unique clients, and the share of clients from the remaining projects was negligible. Considering the above, a decision was made to sum the number of unique clients of all existing projects.

**Table 9. Data from "ALLIANCE.GLOBAL" on the number of unique clients covered by prevention services**

| City | Period | Project | Total unique clients | Unique clients who received free condoms/lubricants | Unique clients who tested for sexually transmitted infections (STIs) | Unique clients who received individual counseling on safer sexual behavior |
|---|---|---|---|---|---|---|
| Kyiv | 17.07.24-17.10.24 | APH* | 318 | 318 | 165 | 318 |
| | | PHC | 7270 | 7262 | 1641 | 7262 |
| | | Pact | 510 | 508 | 221 | 132 |
| Odesa | Prevention services are not provided directly by ALLIANCE.GLOBAL | | | | | |
| Kharkiv | 11.07.24-11.10.24 | APH | 311 | 311 | 81 | 311 |
| Dnipro | 13.07.24-13.10.24 | APH | 283 | 283 | 89 | 283 |
| | | PHC | 4851 | 4851 | 4229 | 4851 |
| | | Pact | 277 | 277 | 268 | 224 |
| Lviv | 14.07.24-14.10.24 | APH | 226 | 226 | 80 | 226 |
| Cherkasy | Prevention services are not provided directly by ALLIANCE.GLOBAL | | | | | |
| Vinnytsia | ALLIANCE.GLOBAL does not operate in this region | | | | | |
| Zaporizhzhia | ALLIANCE.GLOBAL does not operate in this region | | | | | |
| Chernivtsi | 14.07.24-14.10.24 | APH | 1 | 1 | 1 | 1 |
| Poltava | Prevention services are not provided directly by ALLIANCE.GLOBAL | | | | | |

** ICF "Alliance for Public Health"*

Calculations of MSM population size estimates in the IBBS MSM 2024 cities based on data from the NGO "ALLIANCE.GLOBAL" regarding the number of unique clients covered by prevention services are presented in Table 10.

**Table 10. MSM population size estimates using the multiplier method based on prevention service coverage data (data provided by "ALLIANCE.GLOBAL")**

| City | Service Name | Average number of unique clients receiving the service* | Proportion of IBBS MSM 2024 participants receiving the service | Proportion of IBBS MSM 2024 participants receiving the service (absolute values, recalculated from sample size) | Calculated point estimate | Realized Sample Size IBBS MSM 2024 | Var | Lower CI Limit | Upper CI Limit |
|---|---|---|---|---|---|---|---|---|---|
| Kyiv | free condoms | 8088 | 0.316 | 174 | 25595 | 550 | 2522786 | 22482 | 28708 |
| | STI testing | 2027 | 0.339 | 186 | 5979 | 550 | 115091 | 5314 | 6644 |
| | individual counseling on safer sexual behavior | 7712 | 0.297 | 163 | 25966 | 550 | 2840270 | 22663 | 29270 |
| Lviv | free condoms | 226 | 0.069 | 31 | 3275 | 450 | 277474 | 2243 | 4308 |
| | STI testing | 80 | 0.094 | 42 | 851 | 450 | 7311 | 683 | 1019 |
| | individual counseling on safer sexual behavior | 226 | 0.064 | 29 | 3531 | 450 | 353622 | 2366 | 4697 |
| Kharkiv | free condoms | 311 | 0.163 | 65 | 1908 | 400 | 36936 | 1531 | 2285 |
| | STI testing | 81 | 0.196 | 78 | 413 | 400 | 56 | 399 | 428 |
| | individual counseling on safer sexual behavior | 311 | 0.184 | 74 | 1690 | 400 | 24178 | 1385 | 1995 |
| Dnipro | free condoms | 5411 | 0.118 | 53 | 45856 | 450 | 34584555 | 34329 | 57382 |
| | STI testing | 4586 | 0.104 | 47 | 44096 | 450 | 36847570 | 32199 | 55994 |
| | individual counseling on safer sexual behavior | 5358 | 0.105 | 47 | 51029 | 450 | 48887879 | 37324 | 64733 |
| Chernivtsi | free condoms | 1 | 0.186 | 30 | 5 | 163 | -23 | NA | NA |
| | STI testing | 1 | 0.175 | 29 | 6 | 163 | -26 | NA | NA |
| | individual counseling on safer sexual behavior | 1 | 0.166 | 27 | 6 | 163 | -29 | NA | NA |

B. Data from Association "LGBT-LIGA" (Odesa)

Calculations based on data provided by the Association "LGBT-LIGA" (Odesa) regarding prevention services in the period preceding the fieldwork stage of the study are presented in Table 11.

**Table 11. MSM population size estimates using the multiplier method based on prevention service coverage data (data provided by Association "LGBT-LIGA")**

| Service Name | Number of unique clients receiving the service | Proportion of IBBS MSM 2024 participants receiving the service | Proportion of IBBS MSM 2024 participants receiving the service (absolute values, recalculated from sample size) | Calculated point estimate | Realized Sample Size IBBS MSM 2024 | Var | Lower CI Limit | Upper CI Limit |
|---|---|---|---|---|---|---|---|---|
| free condoms/ lubricants | 647 | 0.235 | 97 | 2753 | 412 | 50930 | 2311 | 3196 |
| STI testing | 253 | 0.26 | 107 | 973 | 412 | 3772 | 853 | 1093 |
| individual counseling on safer sexual behavior | 639 | 0.186 | 77 | 3435 | 412 | 110334 | 2784 | 4087 |

## C. Data from 100%LIFE

According to IBBS MSM 2024 data, the CO "100% LIFE" had significant coverage of MSM with prevention services in three cities: Kyiv, Zaporizhzhia, and Lviv. Accordingly, statistics on the number of unique clients covered by these services were provided by "100% Life. Kyiv Region", "100% Life. Zaporizhzhia", and "100% Life. Lviv".

*Kyiv*

Statistical data from "100% Life. Kyiv Region" covered not the entire region, but only Kyiv city. Also, the statistics included services provided by "ALLIANCE.GLOBAL" as a subcontractor. Furthermore, "100% Life. Kyiv Region" had the opportunity to provide information for three time intervals corresponding to three months before the start, middle, and end of the fieldwork stage. Averaging statistical data over these intervals allowed for a more accurate accounting of possible seasonal fluctuations in service provision. As Table 12 shows, these fluctuations were quite significant.

**Table 12. Data from "100%LIFE" on the number of unique clients covered by prevention services**

| | 17.07-17.10.2024 | 05.08-05.11.2025 | 24.09-24.12.2024 | Average number |
|---|---|---|---|---|
| **number of unique clients who received condoms from CO "100% Life. Kyiv Region" during the period** | 7570 | 6940 | 10913 | 8474 |
| **number of unique clients who received STI testing services from CO "100% Life. Kyiv Region" during the period** | 7570 | 6940 | 10913 | 8474 |
| **number of unique clients who received individual counseling on safer sexual behavior from CO "100% Life. Kyiv Region" during the period** | 17915 | 17707 | 17367 | 17663 |

Calculations based on these data are presented in Table 13.

**Table 13. MSM population size estimates using the multiplier method based on prevention service coverage data (data provided by "100%LIFE")**

| Service Name | Average number of unique clients receiving the service | Proportion of IBBS MSM 2024 participants receiving the service | Proportion of IBBS MSM 2024 participants receiving the service (absolute values, recalculated from sample size) | Calculated point estimate | Realized Sample Size IBBS MSM 2024 | Var | Lower CI Limit | Upper CI Limit |
|---|---|---|---|---|---|---|---|---|
| condoms | 8474 | 0.102 | 56.1 | 83082 | 550 | 109758872 | 62548 | 103616 |
| testing for sexually transmitted infections (STIs) | 8474 | 0.102 | 56.1 | 83082 | 550 | 109758872 | 62548 | 103616 |
| individual counseling on safer sexual behavior | 17663 | 0.109 | 59.95 | 162046 | 550 | 388944749 | 123391 | 200700 |

*Zaporizhzhia*

Given that the duration of the fieldwork stage in Zaporizhzhia was forcedly (due to the growing military threat) shorter, the provided statistical data reflected a period of three months before the start and end of the fieldwork stage in the city (Table 14).

**Table 14. Data from "100%LIFE" on the number of unique clients covered by prevention services**

| | 15.07.2024-15.10.2024 | 28.08.2024 - 28.11.2024 |
|---|---|---|
| **number of unique clients who received condoms from CO "100% Life. Zaporizhzhia"** | 26 | 12 |
| **number of unique clients who received STI testing services from CO "100% Life. Zaporizhzhia"** | 26 | 12 |
| **number of unique clients who received individual counseling on safer sexual behavior from CO "100% Life. Zaporizhzhia"** | 26 | 12 |

Calculations of population size estimates based on these data are presented in Table 15.

**Table 15. MSM population size estimates using the multiplier method based on prevention service coverage data (data provided by "100%LIFE")**

| Service Name | Average number of unique clients receiving the service | Proportion of IBBS MSM 2024 participants receiving the service | Proportion of IBBS MSM 2024 participants receiving the service (absolute values, recalculated from sample size) | Calculated point estimate | Realized Sample Size IBBS MSM 2024 | Var | Lower CI Limit | Upper CI Limit |
|---|---|---|---|---|---|---|---|---|
| condoms | 19 | 0.091 | 15 | 209 | 166 | 538 | 163 | 254 |
| testing for sexually transmitted infections (STIs) | 19 | 0.109 | 18 | 174 | 166 | 71 | 158 | 191 |
| individual counseling on safer sexual behavior | 19 | 0.122 | 20 | 156 | 166 | -69* | * | * |

**Impossible to calculate due to negative value.*

*Lviv*

In Lviv, "100%LIFE. Lviv" provided only one prevention service out of three - free distribution of condoms and lubricants. Statistical data, as in Zaporizhzhia, were tied to the three months preceding the start and end of the fieldwork stage (Table 16).

**Table 16. Data from "100%LIFE" on the number of unique clients covered by prevention services**

| | |
|---|---|
| **number of unique clients who received condoms from CO "100% Life. Lviv" during the period 14.07.2024-14.10.2024** | 859 |
| **number of unique clients who received condoms from CO "100% Life. Lviv" during the period 03.10.2024 - 03.01.2025** | 1138 |

Calculations of population size estimates based on these data are presented in Table 17.

**Table 17. MSM population size estimates using the multiplier method based on prevention service coverage data (data provided by "100%LIFE")**

| Service Name | Average number of unique clients receiving the service | Proportion of IBBS MSM 2024 participants receiving the service | Proportion of IBBS MSM 2024 participants receiving the service (absolute values, recalculated from sample size) | Calculated point estimate | Realized Sample Size IBBS MSM 2024 | Var | Lower CI Limit | Upper CI Limit |
|---|---|---|---|---|---|---|---|---|
| condoms | 999 | 0.051 | 23 | 19588 | 450 | 15501750 | 11871 | 27305 |
| testing for sexually transmitted infections (STIs) | 0 | 0.037 | 17 | 0 | 450 | | | |
| individual counseling on safer sexual behavior | 0 | 0.025 | 11 | 0 | 450 | | | |

## D. Data from Alliance for Public Health (SyrEx Database)

In addition to the data presented earlier, statistical data regarding the number of unique clients covered by three prevention services in the study cities, broken down by individual organizations, were provided by the ICF "Alliance for Public Health". The SyrEx database was used, containing data on clients who received services under projects of the Alliance for Public Health and the Public Health Center (PHC), except for the period of 2025, when the PHC switched to using its own new system. However, considering that in 2025 IBBS MSM 2024 participants were recruited in insignificant numbers and only in three cities, this limitation likely did not have a serious impact on the calculations. Data from the SyrEx database on service coverage were provided for two time intervals corresponding to the three months before the start and the completion of the fieldwork stage in the specific study city.

### *Vinnytsia*

Data for Vinnytsia are presented in Table 18.

**Table 18. Data from SyrEx database regarding the number of unique clients covered by prevention services**

| Number of unique MSM clients who received condoms in the NGO network | | | Number of unique MSM clients who received individual counseling on safer sexual behavior in the NGO network | | Number of unique MSM clients who underwent STI testing (excluding HIV testing) in the NGO network | |
|---|---|---|---|---|---|---|
| NGO | 11.07.2024 - 11.10.2024 | 04.09.2024 - 04.12.2024 | 11.07.2024 - 11.10.2024 | 04.09.2024 - 04.12.2024 | 11.07.2024 - 11.10.2024 | 04.09.2024 - 04.12.2024 |
| Alliance for Public Health | 8 | 19 | 7 | 3 | NA | NA |

Since no IBBS MSM 2024 participant from Vinnytsia mentioned receiving prevention services from the Alliance for Public Health, these statistical data were not used for population size estimation calculations.

*Dnipro*

Data for Dnipro are presented in Table 19.

**Table 19. Data from SyrEx database regarding the number of unique clients covered by prevention services**

| Number of unique MSM clients who received condoms in the NGO network | | | | Number of unique MSM clients who received individual counseling on safer sexual behavior in the NGO network | | | | Number of unique MSM clients who underwent STI testing (excluding HIV testing) in the NGO network | | |
|---|---|---|---|---|---|---|---|---|---|---|
| NGO | 13.07.2024 - 13.10.2024 | 15.09.2024 - 15.12.2024 | | NGO | 13.07.2024 - 13.10.2024 | 15.09.2024 - 15.12.2024 | | NGO | 13.07.2024 - 13.10.2024 | 15.09.2024 - 15.12.2024 |
| Alliance for Public Health | 35 | 43 | | Alliance for Public Health | 16 | 11 | | "ALLIANCE.GLOBAL, NGO" | 92 | 166 |
| "ALLIANCE.GLOBAL, NGO" | 5155 | 4633 | | "ALLIANCE.GLOBAL, NGO" | 5238 | 4794 | | | | |
| Total unique | 5190 | 4675 | | Total unique | 5254 | 4805 | | | | |

The provided data regarding the number of unique clients of NGO "ALLIANCE.GLOBAL" generally corresponded to the data provided by the organization itself. Therefore, they were not used again for population size estimation calculations.

*Zaporizhzhia*

**Table 20. Data from SyrEx database regarding the number of unique clients covered by prevention services**

| Number of unique MSM clients who received condoms in the NGO network | | | | Number of unique MSM clients who received individual counseling on safer sexual behavior in the NGO network | | | | Number of unique MSM clients who underwent STI testing (excluding HIV testing) in the NGO network | | |
|---|---|---|---|---|---|---|---|---|---|---|
| NGO | 15.07.2024 - 15.10.2024 | 28.08.2024 - 28.11.2024 | | NGO | 15.07.2024 - 15.10.2024 | 28.08.2024 - 28.11.2024 | | NGO | 15.07.2024 - 15.10.2024 | 28.08.2024 - 28.11.2024 |
| Network 100 percent of life. Zaporizhzhia | 4 | 2 | | Network 100 percent of life. Zaporizhzhia | 14 | 14 | | Network 100 percent of life. Zaporizhzhia | 4 | 2 |

The provided data regarding the number of unique clients of "100%LIFE" generally corresponded to the data provided by the organization itself. Therefore, they were not used again for population size estimation calculations.

*Kyiv*

**Table 21. Data from SyrEx database regarding the number of unique clients covered by prevention services**

| Number of unique MSM clients who received condoms in the NGO network | | | | Number of unique MSM clients who received individual counseling on safer sexual behavior in the NGO network | | | | Number of unique MSM clients who underwent STI testing (excluding HIV testing) in the NGO network | | |
|---|---|---|---|---|---|---|---|---|---|---|
| NGO | 17.07.2024 - 17.10.2024 | 24.09.2024 - 24.12.2024 | | NGO | 17.07.2024 - 17.10.2024 | 24.09.2024 - 24.12.2024 | | NGO | 17.07.2024 - 17.10.2024 | 24.09.2024 - 24.12.2024 |
| Alliance for Public Health | 162 | 286 | | Alliance for Public Health | 98 | 67 | | "ALLIANCE. GLOBAL, NGO | 146 | 135 |
| "ALLIANCE. GLOBAL, NGO" | 499 | 509 | | "ALLIANCE. GLOBAL, NGO" | 755 | 668 | | "ACO 'Chas zhyttya plus'" | 15 | 12 |
| "ACO 'Chas zhyttya plus'" | 22 | 23 | | Network 100 percent of life. Kyiv region | 17095 | 16044 | | Network 100 percent of life. Kyiv region | 2802 | 2569 |
| Network 100 percent of life. Kyiv region | 17095 | 15997 | | Total unique | 17909 | 16753 | | Total unique | 2962 | 2716 |

In Kyiv, ALLIANCE.GLOBAL provided services as a subcontractor for "100% LIFE". Therefore, to compare the obtained statistical data with self-reported data from IBBS participants, the quantitative indicators of these two organizations were combined.

**Table 22. MSM population size estimates using the multiplier method based on prevention service coverage data (SyrEx database)**

| Service Name | Avg. number of unique clients receiving the service | Proportion of participants receiving the service | Proportion of participants receiving the service (absolute values, recalculated from sample size) | Calculated point estimate based on data of those receiving the service* | Var | Lower CI Limit | Upper CI Limit | IBBS MSM 2024 Sample Size |
|---|---|---|---|---|---|---|---|---|
| condoms | 16546 | 0.411 | 226 | 40258 | 4165230 | 36258 | 44258 | 550 |
| STI testing | 2686 | 0.441 | 243 | 6090 | 77745 | 5543 | 6636 | 550 |
| individual counseling on safer sexual behavior | 16570 | 0.393 | 216 | 42162 | 4926795 | 37811 | 46512 | 550 |

*Lviv*

**Table 23. Data from SyrEx database regarding the number of unique clients covered by prevention services**

| Number of unique MSM clients who received condoms in the NGO network | | | | Number of unique MSM clients who received individual counseling on safer sexual behavior in the NGO network | | | | Number of unique MSM clients who underwent STI testing (excluding HIV testing) in the NGO network | | |
|---|---|---|---|---|---|---|---|---|---|---|
| NGO | 14.07.2024 - 14.10.2024 | 03.10.2024 - 03.01.2025 | | NGO | 14.07.2024 - 14.10.2024 | 03.10.2024 - 03.01.2025 | | NGO | 14.07.2024 - 14.10.2024 | 03.10.2024 - 03.01.2025 |
| Alliance for Public Health | 28 | 87 | | Alliance for Public Health | 16 | 27 | | "ALLIANCE. GLOBAL, NGO" | 79 | 101 |
| "ALLIANCE. GLOBAL, NGO" | 238 | 276 | | "ALLIANCE. GLOBAL, NGO" | 410 | 467 | | "All-Ukrainian Network PLWH, Lviv" | 341 | 8 |
| "All-Ukrainian Network PLWH, Lviv" | 1169 | 1136 | | "All-Ukrainian Network PLWH, Lviv" | 1169 | 1136 | | Total unique | 419 | 109 |
| Total unique | 1429 | 1494 | | Total unique | 1581 | 1618 | | | | |

The provided data regarding the number of unique clients of "100%LIFE" as well as "ALLIANCE.GLOBAL" generally corresponded to the data provided by these organizations themselves. Therefore, they were not used again for population size estimation calculations.

*Odesa*

**Table 24. Data from SyrEx database regarding the number of unique clients covered by prevention services**

| Number of unique MSM clients who received condoms in the NGO network | | | | Number of unique MSM clients who received individual counseling on safer sexual behavior in the NGO network | | | | Number of unique MSM clients who underwent STI testing (excluding HIV testing) in the NGO network | | |
|---|---|---|---|---|---|---|---|---|---|---|
| NGO | 17.07.2024 - 17.10.2024 | 12.10.2024 - 12.01.2025 | | NGO | 17.07.2024 - 17.10.2024 | 12.10.2024 - 12.01.2025 | | NGO | 17.07.2024 - 17.10.2024 | 12.10.2024 - 12.01.2025 |
| Alliance for Public Health | 26 | 59 | | Alliance for Public Health | 13 | 19 | | "Youth public movement 'Partner'" | 131 | 20 |
| "Youth public movement 'Partner'" | 4944 | 4905 | | "Youth public movement 'Partner'" | 5142 | 5086 | | | | |
| Total unique | 4970 | 4964 | | Total unique | 5155 | 5105 | | | | |

The obtained statistical data for Odesa diverged significantly from the self-reported data of the study participants. Specifically, according to IBBS MSM 2024 data, only 2% reported receiving prevention services from YPM "Partner". At the same time, according to SyrEx data, this organization was the main provider of prevention services commissioned by the PHC. Meanwhile, 38.8% of participants stated that they received services from the Association LGBT "LIGA". A possible explanation for this situation is the overrepresentation of "LIGA" clients in the sample and the inability or unwillingness of "Partner" clients to participate in the study (whose site was located at the "LIGA" office base). However, such an explanation is not entirely convincing, and accordingly, the situation requires additional discussion and analysis.

*Poltava*

**Table 25. Data from SyrEx database regarding the number of unique clients covered by prevention services**

| Number of unique MSM clients who received condoms in the NGO network | | | | Number of unique MSM clients who received individual counseling on safer sexual behavior in the NGO network | | | | Number of unique MSM clients who underwent STI testing (excluding HIV testing) in the NGO network | | |
|---|---|---|---|---|---|---|---|---|---|---|
| NGO | 17.07.2024 - 17.10.2024 | 27.09.2024 - 27.12.2024 | | NGO | 17.07.2024 - 17.10.2024 | 27.09.2024 - 27.12.2024 | | NGO | 17.07.2024 - 17.10.2024 | 27.09.2024 - 27.12.2024 |
| Alliance for Public Health | 5 | 34 | | Alliance for Public Health | 2 | 7 | | Svitlo Nadiyi | 180 | 44 |
| Svitlo Nadiyi | 278 | 296 | | Svitlo Nadiyi | 274 | 296 | | | | |
| Total unique | 283 | 329 | | Total unique | 276 | 303 | | | | |

The situation in Poltava generally resembles the situation in Odesa, as participants named one organization (in this case "ALLIANCE.GLOBAL") as the main provider, while according to SyrEx data, the main provider was another organization ("Svitlo Nadiyi"), from which only 1.4% of participants reported receiving services.

*Kharkiv*

**Table 26. Data from SyrEx database regarding the number of unique clients covered by prevention services**

| Number of unique MSM clients who received condoms in the NGO network | | | | Number of unique MSM clients who received individual counseling on safer sexual behavior in the NGO network | | | | Number of unique MSM clients who underwent STI testing (excluding HIV testing) in the NGO network | | |
|---|---|---|---|---|---|---|---|---|---|---|
| NGO | 11.07.2024 - 11.10.2024 | 28.08.2024 - 28.11.2024 | | NGO | 11.07.2024 - 11.10.2024 | 28.08.2024 - 28.11.2024 | | NGO | 11.07.2024 – 11.10.2024 | 28.08.2024 – 28.11.2024 |
| Alliance for Public Health | 25 | 21 | | Alliance for Public Health | 16 | 9 | | "ALLIANCE. GLOBAL, NGO" | 80 | 110 |
| "ALLIANCE. GLOBAL, NGO" | 314 | 334 | | "ALLIANCE. GLOBAL, NGO" | 371 | 402 | | Network 100 percent of life. Kharkiv | 1 | 4 |
| Network 100 percent of life. Kharkiv | 17 | 28 | | Network 100 percent of life. Kharkiv | 17 | 28 | | "Kharkiv Charity Fund 'Blago'" | 393 | 134 |
| "Kharkiv Charity Fund 'Blago'" | 1474 | 1134 | | "Kharkiv Charity Fund 'Blago'" | 1474 | 1134 | | Total unique | 474 | 248 |
| Total unique | 1827 | 1514 | | Total unique | 1873 | 1570 | | | | |

Calculations of population size estimates based on averaged data on clients of CF "Blago" are presented in Table 27.

**Table 27. MSM population size estimates using the multiplier method based on prevention service coverage data (SyrEx database)**

| Service Name | Avg. number of unique clients receiving the service | Proportion of participants receiving the service | Proportion of participants receiving the service (absolute values, recalculated from sample size) | Calculated point estimate based on data of those receiving the service* | Var | Lower CI Limit | Upper CI Limit | IBBS MSM 2024 Sample Size |
|---|---|---|---|---|---|---|---|---|
| condoms | 1304 | 0.069 | 28 | 18899 | 11792525 | 12168 | 25629 | 400 |
| STI testing | 264 | 0.074 | 30 | 3561 | 352101 | 2398 | 4724 | 400 |
| individual counseling on safer sexual behavior | 1304 | 0.073 | 29 | 17863 | 9903092 | 11695 | 24031 | 400 |

*Cherkasy*

**Table 28. Data from SyrEx database regarding the number of unique clients covered by prevention services**

| Number of unique MSM clients who received condoms in the NGO network | | | | Number of unique MSM clients who received individual counseling on safer sexual behavior in the NGO network | | | | Number of unique MSM clients who underwent STI testing (excluding HIV testing) in the NGO network | | |
|---|---|---|---|---|---|---|---|---|---|---|
| NGO | 15.07.2024 - 15.10.2024 | 13.08.2024 - 13.11.2024 | | NGO | 15.07.2024 - 15.10.2024 | 13.08.2024 - 13.11.2024 | | NGO | 15.07.2024 - 15.10.2024 | 13.08.2024 - 13.11.2024 |
| CO "100% Life Cherkasy " | 8 | 7 | | CO "100% Life Cherkasy " | 8 | 7 | | CO "100% Life Cherkasy " | 2 | 2 |

In Cherkasy, 4.3% of study participants reported receiving services from "ALLIANCE.GLOBAL", but according to the organization's own data, they did not provide services in this city. As a result, it was decided to try calculating the estimated MSM population size based on data from the second most frequently mentioned service provider organization by study participants (but with a very low coverage indicator based on self-reports – 0.6%) "100%LIFE. Cherkasy". The corresponding calculations are presented in Table 29.

**Table 29. MSM population size estimates using the multiplier method based on prevention service coverage data (SyrEx database)**

| Service Name | Avg. number of unique clients receiving the service | Proportion of participants receiving the service | Proportion of participants receiving the service (absolute values, recalculated from sample size) | Calculated point estimate based on data of those receiving the service* | Var | Lower CI Limit | Upper CI Limit | IBBS MSM 2024 Sample Size |
|---|---|---|---|---|---|---|---|---|
| condoms | 8 | 0.006 | 2 | 1250 | 655764 | -337 | 2837 | 300 |
| STI testing | 2 | 0.006 | 2 | 333 | 6136 | 180 | 487 | 300 |
| individual counseling on safer sexual behavior | 8 | 0 | 0 | * | * | * | * | 300 |

** Impossible to calculate due to division by 0.*

*Chernivtsi*

**Table 30. Data from SyrEx database regarding the number of unique clients covered by prevention services**

| Number of unique MSM clients who received condoms in the NGO network | | | | Number of unique MSM clients who received individual counseling on safer sexual behavior in the NGO network | | | | Number of unique MSM clients who underwent STI testing (excluding HIV testing) in the NGO network | | |
|---|---|---|---|---|---|---|---|---|---|---|
| NGO | 14.07.2024 - 14.10.2024 | 12.10.2024 - 12.01.2025 | | NGO | 14.07.2024 - 14.10.2024 | 12.10.2024 - 12.01.2025 | | NGO | 14.07.2024 - 14.10.2024 | 12.10.2024 - 12.01.2025 |
| Alliance for Public Health | 3 | 20 | | Alliance for Public Health | 3 | 7 | | "ALLIANCE.GLOBAL, NGO" | 1 | |
| "ALLIANCE.GLOBAL, NGO" | 2 | 12 | | "ALLIANCE.GLOBAL, NGO" | 7 | 12 | | "Nova Simya, CF" | 295 | 193 |
| "Nova Simya, CF" | 426 | 382 | | "Nova Simya, CF" | 427 | 382 | | Total unique | 296 | 193 |
| Total unique | 431 | 412 | | Total unique | 437 | 399 | | | | |

The provided data regarding the number of unique clients of "ALLIANCE.GLOBAL" generally corresponded to the data provided by the organization itself. Therefore, additional population size estimate calculations were performed based on data on clients of CF "Nova Simya" (Table 31).

**Table 31. MSM population size estimates using the multiplier method based on prevention service coverage data (SyrEx database)**

| Service Name | Avg. number of unique clients receiving the service | Proportion of participants receiving the service | Proportion of participants receiving the service (absolute values, recalculated from sample size) | Calculated point estimate based on data of those receiving the service* | Var | Lower CI Limit | Upper CI Limit | IBBS MSM 2024 Sample Size |
|---|---|---|---|---|---|---|---|---|
| condoms | 404 | 0.179 | 29 | 2257 | 132985 | 1542 | 2972 | 163 |
| STI testing | 244 | 0.164 | 27 | 1488 | 61641 | 1001 | 1974 | 163 |
| individual counseling on safer sexual behavior | 405 | 0.144 | 23 | 2809 | 271065 | 1789 | 3829 | 163 |

## Clients of the Pre-Exposure Prophylaxis (PrEP) Program

Although not stipulated by the IBBS MSM 2024 Protocol and the initial plan, in this round it was decided to use another source for population size estimation – data on receiving Pre-Exposure Prophylaxis (PrEP), since information regarding clients of this service was collected during the study and presumably reliable statistics were available. The Public Health Center provided data on PrEP clients registered in the Information System "Monitoring of Socially Significant Diseases" as of January 1, 2025. The data contained the client's identifier code, the name of the healthcare facility where the client was registered, the region to which the facility belonged, the client's gender, and the type of key population to which the client might belong. Based on data about the actual location of the facility, the dataset was additionally recoded to determine the list of clients of facilities corresponding to the IBBS MSM 2024 study cities. The number of PrEP program clients in IBBS MSM 2024 cities was calculated for groups: a) persons identified in the dataset as MSM and b) this group plus men who were classified as members of discordant couples regarding HIV status (without specifying the partner's gender).[8] Calculations of population size estimates using the multiplier method (incorporating data on the proportion of PrEP clients obtained during IBBS MSM 2024) were performed for both of these groups. The results are presented below in Tables 32 and 33. However, we consider it appropriate for further calculations to use data obtained based on the number of PrEP clients representing the second group.

[8] In cities where strong stigma exists, MSM clients may identify themselves not as MSM, but as members of discordant couples (without specifying the gender of their partner/partners). This may also be at the initiative of the medical professional entering the record into the database.

**Table 32. Calculations of MSM population size estimates in IBBS MSM 2024 cities using the multiplier method based on PrEP program coverage data, only for clients identified in the database as MSM**

| City | Number of unique clients receiving the service | Proportion of participants receiving the service[9] | Proportion of participants receiving the service (absolute values, recalculated from sample size) | IBBS MSM 2024 Sample Size | Calculated point estimate based on data of those receiving the service* | Var | Lower CI Limit | Upper CI Limit |
|---|---|---|---|---|---|---|---|---|
| Kyiv | 1638 | 0.422 | 232 | 550 | 3882 | 32203 | 3530 | 4233 |
| Odesa | 553 | 0.137 | 56 | 412 | 4036 | 223689 | 3109 | 4963 |
| Kharkiv | 461 | 0.072 | 29 | 400 | 6403 | 1238443 | 4222 | 8584 |
| Dnipro | 729 | 0.04 | 18 | 450 | 18225 | 17277300 | 10078 | 26372 |
| Lviv | 450 | 0.237 | 107 | 450 | 1899 | 19680 | 1624 | 2174 |
| Cherkasy | 29 | 0.053 | 16 | 300 | 547 | 8055 | 371 | 723 |
| Vinnytsia | 20 | 0.074 | 22 | 300 | 270 | -335 | * | * |
| Zaporizhzhia | 38 | 0.184 | 31 | 166 | 207 | 224 | 177 | 236 |
| Chernivtsi | 26 | 0.118 | 19 | 163 | 220 | 579 | 173 | 268 |
| Poltava | 26 | 0.045 | 14 | 300 | 578 | 11353 | 369 | 787 |

** Impossible to calculate.*

[9] Used answers of IBBS MSM 2024 participants to the questionnaire question: "Have you taken pre-exposure prophylaxis (PrEP) drugs during the last 12 months?"

**Table 33. Calculations of MSM population size estimates in IBBS MSM 2024 cities using the multiplier method based on PrEP program coverage data, for clients identified in the database as MSM, as well as male members of discordant couples**

| City | Number of unique clients receiving the service | Proportion of participants receiving the service | Proportion of participants receiving the service (absolute values, recalculated from sample size) | IBBS MSM 2024 Sample Size | Calculated point estimate based on data of those receiving the service* | Var | Lower CI Limit | Upper CI Limit |
|---|---|---|---|---|---|---|---|---|
| Kyiv | 1677 | 0.422 | 232 | 550 | 3974 | 33884 | 3613 | 4335 |
| Odesa | 603 | 0.137 | 56 | 412 | 4401 | 268475 | 3386 | 5417 |
| Kharkiv | 470 | 0.072 | 29 | 400 | 6528 | 1288914 | 4303 | 8753 |
| Dnipro | 791 | 0.04 | 18 | 450 | 19775 | 20381433 | 10926 | 28624 |
| Lviv | 457 | 0.237 | 107 | 450 | 1928 | 20393 | 1648 | 2208 |
| Cherkasy | 56 | 0.053 | 16 | 300 | 1057 | 47614 | 629 | 1484 |
| Vinnytsia | 31 | 0.074 | 22 | 300 | 419 | 2078 | 330 | 508 |
| Zaporizhzhia | 61 | 0.184 | 31 | 166 | 332 | 1466 | 256 | 407 |
| Chernivtsi | 32 | 0.118 | 19 | 163 | 271 | 1345 | 199 | 343 |
| Poltava | 74 | 0.045 | 14 | 300 | 1644 | 156398 | 869 | 2420 |

## Capture-Recapture Method

During the survey, participants were asked questions regarding their participation in other similar surveys, namely IBBS MSM 2021 and "The European MSM Internet Survey" 2024 (EMIS 2024). Considering the increased migration of the population of Ukraine in general and the MSM group in particular due to the full-scale Russian invasion, clarification was made whether this participation took place when participants were located in the same cities where they were at the time of IBBS MSM 2024. Detailed information and calculations based on these data are presented in Tables 34 and 35.

**Table 34. Calculations of MSM population size estimates in IBBS MSM 2024 cities using the capture-recapture method based on participation in IBBS MSM 2021**

| City | IBBS MSM 2021 Sample | IBBS MSM 2024 Sample | IBBS MSM 2024 participants who reported participating in IBBS MSM 2021[10] | Calculated point estimate | Var | Lower CI Limit | Upper CI Limit |
|---|---|---|---|---|---|---|---|
| Dnipro | 400 | 450 | 6 | 30000 | 145780000 | 6335 | 53665 |
| Kharkiv | 451 | 400 | 13 | 13877 | 13918472 | 6565 | 21189 |
| Kyiv | 600 | 550 | 0 | | | | |
| Odesa | 600 | 412 | 36 | 6867 | 1123590 | 4789 | 8945 |
| Zaporizhzhia | 450 | 166 | 18 | | | | |
| Cherkasy | 400 | 300 | 115 | 1043 | 4160 | 917 | 1169 |
| Chernivtsi | 0 | 163 | 1 | | | | |
| Lviv | 500 | 450 | 51 | 4412 | 303872 | 3332 | 5492 |
| Poltava | 350 | 300 | 17 | 6176 | 2014064 | 3394 | 8958 |
| Vinnytsia | 350 | 299 | 119 | 879 | 2582 | 779 | 979 |

[10] Used answers of IBBS MSM 2024 participants to the question "Did you participate in a similar study for men who have sex with men in 2021, when you were asked questions about your sexual behavior, you took an HIV test and received participant coupons?". Only participants who reported being in the same city at the time of participation in the mentioned study were considered.

The EMIS-2024 questionnaire did not contain a question about the name of the city where the respondent resides. Instead, responses were collected regarding the region (oblast) where the respondent resides, as well as the population size of the settlement. Considering that all IBBS MSM 2024 cities are regional centers and the largest cities in the respective region, most of them could be identified based on questions about the region name and population size in the settlement. Exceptions were Dnipro and Poltava, since in the Dnipropetrovsk region, the cities of Dnipro and Kryvyi Rih, and in the Poltava region, Poltava and Kremenchuk, fall into approximately the same population category. Also, a more detailed review of the data showed that respondents had a problem of not knowing the correct population size of their city. Therefore, calculations were made based on assumptions that account for the most probable errors in answering this question. Also, no correction was made for calculations regarding when participants had their last sex, as well as whether they were internally displaced persons.

**Table 35. Calculations of MSM population size estimates in IBBS MSM 2024 cities using the capture-recapture method based on participation in EMIS***

| City | EMIS-2024 Sample* | IBBS MSM 2024 Sample | IBBS MSM 2024 participants who reported participating in EMIS[11] | Calculated point estimate | Var | Lower CI Limit | Upper CI Limit |
|---|---|---|---|---|---|---|---|
| Dnipro | 60 | 450 | 1 | 27000 | 715257000 | -25419 | 79419 |
| Kharkiv | 100 | 400 | 3 | 13333 | 57050370 | -1471 | 28138 |
| Kyiv | 273 | 550 | 0 | | | | |
| Odesa | 42 | 412 | 12 | 1442 | 120167 | 763 | 2121 |
| Zaporizhzhia | 24 | 166 | 1 | 3984 | 15119280 | -3637 | 11605 |
| Cherkasy | 6 | 300 | 0 | | | | |
| Chernivtsi | 17 | 163 | 4 | 693 | 89495 | 106 | 1279 |
| Lviv | 90 | 450 | 1 | 40500 | 1618420500 | -38350 | 119350 |
| Poltava | 34 | 300 | 30 | 340 | 408 | 300 | 380 |
| Vinnytsia | 14 | 299 | 0 | | | | |

** Calculated based on data kindly provided by the Robert Koch Institute.*

**** Presented under a more reliable assumption. May also equal up to 116 inclusive.*

**** May include respondents from Kremenchuk.*

[11] Used answers of IBBS MSM 2024 participants to the question "Did you participate in the EMIS study - European MSM Internet Survey in 2023-24, when you were asked questions about your sexual behavior, etc. on the Internet?". Only participants who reported being in the same city at the time of participation in the mentioned study were considered.

## Privatized Network Sampling (PNS) Method

In the current round, the Privatized Network Sampling (PNS) method was used for the first time. In accordance with the requirements posted on the EPI APPS website (https://epiapps.com/), where the tool for calculating population size estimates based on the aforementioned method is located, the data obtained during the study were additionally recoded. Specifically, all irrelevant data (0 and missing values in the social network size variable, refusal codes, as well as incorrectly or incompletely entered hash codes were coded as missing data ("NA"). After this, the collected data were uploaded into the tool, point estimate calculations were performed, and then confidence intervals for the estimates were calculated (number of bootstraps - 1000).

Detailed calculations are presented below in Table 36.

**Table 36. Calculations of MSM population size estimates in IBBS MSM 2024 cities using the Privatized Network Sampling method**

| City | Total Contacts | Unique Contacts | PNS Sample Size | Unique Contacts in Sample | Unique Hashed Identifiers in Contacts and Sample | r_h0 | num_matches | num_pos_matches | Calculated point estimate | Lower CI Limit | Upper CI Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vinnytsia | 390 | 367 | 254 | 17 | 604 | 0 | 46 | 177460 | 5798 | 3858 | 8713 |
| Dnipro | 252 | 226 | 229 | 15 | 440 | 0 | 50 | 86277 | 3529 | 2499 | 4984 |
| Zaporizhzhia | 416 | 319 | 143 | 40 | 422 | 0 | 210 | 144314 | 1665 | 1073 | 2583 |
| Kyiv | 1692 | 1584 | 513 | 48 | 2049 | 0 | 419 | 2942535 | 11324 | 9589 | 13372 |
| Lviv | 1152 | 980 | 444 | 56 | 1368 | 0 | 379 | 1414533 | 6998 | 6075 | 8062 |
| Odesa | 1255 | 757 | 396 | 86 | 1067 | 0 | 5979 | 1515985 | 609 | 518 | 715 |
| Poltava | 501 | 375 | 287 | 58 | 604 | 0 | 1345 | 330756 | 445 | 369 | 535 |
| Kharkiv | 1244 | 1037 | 393 | 66 | 1364 | 0 | 446 | 1009823 | 3972 | 3309 | 4767 |
| Cherkasy | 814 | 494 | 300 | 0 | 794 | 0 | 2192 | 676961 | 575 | 499 | 663 |
| Chernivtsi | 476 | 256 | 155 | 74 | 337 | 0 | 856 | 213346 | 605 | 419 | 874 |

## Validation

The obtained point estimates and confidence intervals of the MSM population underwent a validation procedure to discard values that are highly likely to be unrealistic. As a lower limit for validation (similar to the previous round of estimates based on IBBS MSM 2021 data), 1% of the male population of the respective city aged 15-59 years as of January 1, 2022, was used.[12]More receent demographic data in the disaggregation required for these calculations were unavailable. As an upper limit for validation, 5% of the respective male population was used. The use of this indicator is due to the fact that data for other indicators that might be better suited for this role were unavailable, and also because the size of the MSM population in Eastern, Central, and Western European countries very rarely exceeds 4% of the male population. For the purposes of our study, this figure was increased to 5%, taking into account potential migration due to the war. The results of the validation of the obtained estimates are presented in Table 37.

**Table 37. Validation of Obtained Population Size Estimates**

| IBBS MSM 2024 City | Calculated Point Estimate by Privatized Network Sampling | Lower CI Limit | Upper CI Limit | Calculated Point Estimate by Capture-Recapture based on participation in IBBS MSM 2021 | Lower CI Limit | Upper CI Limit | Calculated Point Estimate by Capture-Recapture based on participation in EMIS study* | Lower CI Limit | Upper CI Limit |
|---|---|---|---|---|---|---|---|---|---|
| **Vinnytsia** | 5798 | 3858 | 8713 | 879 | 779 | 979 | | | |
| **Dnipro** | 3529 | 2499 | 4984 | 30000 | 6565 | 53665 | 27000 | -25419 | 79419 |
| **Zaporizhzhia** | 1665 | 1073 | 2583 | | | | 3984 | -3637 | 11606 |
| **Kyiv** | 11324 | 9589 | 13372 | | | | | | |
| **Lviv** | 6998 | 6075 | 8062 | 4412 | 3332 | 5492 | 40500 | -38350 | 119350 |
| **Odesa** | 609 | 518 | 715 | 6867 | 4789 | 8945 | 1442 | 763 | 2121 |
| **Poltava** | 445 | 369 | 535 | 6176 | 3394 | 8958 | 340 | 300 | 380 |
| **Kharkiv** | 3972 | 3309 | 4767 | 13877 | 6565 | 21189 | 13333 | -1471 | 28138 |
| **Cherkasy** | 575 | 499 | 663 | 1043 | 917 | 1169 | | | |
| **Chernivtsi** | 605 | 419 | 874 | | | | 693 | 106 | 1279 |

[12] Data from the statistical yearbook of the State Statistics Service of Ukraine "Distribution of the resident population of Ukraine by sex and age as of January 1, 2022" were used. URL: https://ukrstat.gov.ua/druk/publicat/kat_u/publnasel_u.htm.

*(continuation of Table 37)*

| IBBS MSM 2024 City | Calculated Point Estimate by Multiplier Method based on Hornet usage (with correction for number of profiles) (consultant profile count data) | Calculated Point Estimate by Multiplier Method based on Badoo usage (with correction for number of profiles) (consultant profile count data) | Calculated Point Estimate by Multiplier Method based on Grindr usage (with correction for number of profiles) (consultant profile count data) | Calculated Point Estimate by Multiplier Method based on Romeo usage (with correction for number of profiles) (consultant profile count data) | Calculated Point Estimate by Multiplier Method based on Bluesystem usage (M. Kasianczuk data) | Lower CI Limit | Upper CI Limit | Calculated Point Estimate by Multiplier Method based on Hornet usage (Hornet/A. Bohoslavets data) | Lower CI Limit | Upper CI Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| **Vinnytsia** | | | | | 6002 | 4882 | 7122 | 2788 | 2656 | 2920 |
| **Dnipro** | 457 | 885 | 804 | 765 | 4960 | 4526 | 5394 | 18820 | 17771 | 19869 |
| **Zaporizhzhia** | 262 | 987 | 461 | 664 | 3896 | 3158 | 4634 | 2929 | 2786 | 3071 |
| **Kyiv** | | | | | 97233 | 79037 | 115429 | 36045 | 34874 | 37216 |
| **Lviv** | | | | | 1858 | 1739 | 1978 | 16046 | 15601 | 16491 |
| **Odesa** | | | | | 5623 | 5100 | 6146 | 14888 | 14235 | 15541 |
| **Poltava** | 24 | 122 | 36 | 317 | 5648 | 4547 | 6749 | 11349 | 10671 | 12026 |
| **Kharkiv** | 460 | 968 | 140 | 1463 | 5611 | 5091 | 6132 | 10478 | 9987 | 10969 |
| **Cherkasy** | | | | | 1079 | 1004 | 1154 | 1127 | 1072 | 1182 |
| **Chernivtsi** | | | | | 1660 | 1241 | 2080 | 959 | 885 | 1033 |

*(continuation of Table 37)*

| IBBS MSM 2024 City | Calculated Point Estimate by Multiplier Method based on Condom/Lubricant Receipt Data (ALLIANCE.GLOBAL) | Lower CI Limit | Upper CI Limit | Calculated Point Estimate by Multiplier Method based on STI Testing Data (ALLIANCE.GLOBAL) | Calculated Point Estimate by Multiplier Method based on Individual Counseling on Safer Sexual Behavior Data (ALLIANCE.GLOBAL) | Lower CI Limit | Upper CI Limit | Calculated Point Estimate by Multiplier Method based on Condom/Lubricant Receipt Data (LGBT-LIGA) | Calculated Point Estimate by Multiplier Method based on STI Testing Data (LGBT-LIGA) | Calculated Point Estimate by Multiplier Method based on Individual Counseling on Safer Sexual Behavior Data (LGBT-LIGA) | Lower CI Limit | Upper CI Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Vinnytsia** | | | | | | | | | | | | |
| **Dnipro** | 45856 | | | 44096 | 51029 | | | | | | | |
| **Zaporizhzhia** | | | | | | | | | | | | |
| **Kyiv** | 25595 | | | 5979 | 25966 | | | | | | | |
| **Lviv** | 3275 | | | 851 | 3531 | | | | | | | |
| **Odesa** | | | | | | | | 2753 | 973 | 3435 | 2784 | 4087 |
| **Poltava** | | | | | | | | | | | | |
| **Kharkiv** | 1908 | | | 413 | 1690 | | | | | | | |
| **Cherkasy** | | | | | | | | | | | | |
| **Chernivtsi** | 5 | | | 6 | 6 | | | | | | | |

*(continuation of Table 37)*

| IBBS MSM 2024 City | Calculated Point Estimate by Multiplier Method based on Condom/Lubricant Receipt Data (100%LIFE) | Lower CI Limit | Upper CI Limit | Calculated Point Estimate by Multiplier Method based on STI Testing Data (100%LIFE) | Lower CI Limit | Upper CI Limit | Calculated Point Estimate by Multiplier Method based on Individual Counseling on Safer Sexual Behavior Data(100%LIFE) | Lower CI Limit | Upper CI Limit |
|---|---|---|---|---|---|---|---|---|---|
| **Vinnytsia** | | | | | | | | | |
| **Dnipro** | | | | | | | | | |
| **Zaporizhzhia** | 209 | 163 | 254 | 174 | 158 | 191 | 156 | Not calculated due to negative variance | Not calculated due to negative variance |
| **Kyiv** | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| **Lviv** | 19588 | 11871 | 27305 | 0** | | | 0** | | |
| **Odesa** | | | | | | | | | |
| **Poltava** | | | | | | | | | |
| **Kharkiv** | | | | | | | | | |
| **Cherkasy** | | | | | | | | | |
| **Chernivtsi** | | | | | | | | | |

*(continuation of Table 37)*

| IBBS MSM 2024 City | Calculated Point Estimate by Multiplier Method based on Condom/Lubricant Receipt Data (SyrEx, provided by Alliance) | Lower CI Limit | Upper CI Limit | Calculated Point Estimate by Multiplier Method based on STI Testing Data (SyrEx, provided by Alliance) | Lower CI Limit | Upper CI Limit | Calculated Point Estimate by Multiplier Method based on Individual Counseling on Safer Sexual Behavior Data (SyrEx, provided by Alliance) | Lower CI Limit | Upper CI Limit |
|---|---|---|---|---|---|---|---|---|---|
| **Vinnytsia** | | | | | | | | | |
| **Dnipro** | | | | | | | | | |
| **Zaporizhzhia** | | | | | | | | | |
| **Kyiv** | 40258 | 36258 | 44258 | 6090 | 5543 | 6636 | 42162 | 37811 | 46512 |
| **Lviv** | | | | | | | | | |
| **Odesa** | | | | | | | | | |
| **Poltava** | | | | | | | | | |
| **Kharkiv** | | | | | | | | | |
| **Cherkasy** | | | | | | | | | |
| **Chernivtsi** | | | | | | | | | |

*(continuation of Table 37)*

| IBBS MSM 2024 City | Calculated Point Estimate by Multiplier Method based on PHC Data regarding PrEP clients identified in the database as MSM and as men in discordant couples | Lower CI Limit | Upper CI Limit | 1% of male pop. of the city aged 15-59 as of 01.01.2022* | | 5% of male pop. of the city aged 15-59 as of 01.01.2022* | | Comparison: 2017-18 Point Estimate |
|---|---|---|---|---|---|---|---|---|
| **Vinnytsia** | 419 | 330 | 508 | 1095 | | 5475 | | 2100 |
| **Dnipro** | 19775 | 10926 | 28624 | 2810 | | 14050 | | 4500 |
| **Zaporizhzhia** | 332 | 256 | 407 | 2082 | | 10410 | | 3700 |
| **Kyiv** | 3974 | 3613 | 4335 | 8570 | | 42850 | | 31800 |
| **Lviv** | 1928 | 1648 | 2208 | 2157 | | 10785 | | 4900 |
| **Odesa** | 4401 | 3386 | 5417 | 3040 | | 15200 | | 6000 |
| **Poltava** | 1644 | 869 | 2420 | 859 | | 4295 | | 2300 |
| **Kharkiv** | 6528 | 4303 | 8753 | 4429 | | 22145 | | 7900 |
| **Cherkasy** | 1057 | 629 | 1484 | 804 | | 4020 | | 1900 |
| **Cherkasy** | 271 | 199 | 343 | 796 | | 3980 | | 1700 |

*Values less than 1% of the male population of the city aged 15-59 as of 01.01.2022 are considered invalid and are marked in red. Values greater than 5% are marked in green. Values whose confidence intervals cross 0 are marked in orange (corresponding estimates are considered invalid).*

** Used as a temporary measure until more current estimates are available. Taking into account forced migration, the numerical values of this indicator may be reduced in regions with population outflow and increased in regions with population inflow.*

*** Service was not provided.*

**** Data for Kyiv are presented in columns based on SyrEx database data (in Kyiv, services were provided jointly by 100%LIFE and Alliance.Global (as a subcontractor)).*

**Triangulation**

To obtain final MSM population size estimates, a triangulation procedure was used, which allows drawing conclusions about the true value of the estimate based on the intersections of estimates from various independent sources, as well as information about the confidence level in the corresponding estimates. Technically, triangulation was carried out using the Triangulator tool located at https://epiapps.com/.

Triangulator suggests using previous population size estimates as additional information for calculations; however, we decided not to do this. This was done for two reasons. Firstly, due to significant forced migration resulting from the full-scale Russian aggression, previous estimates in cities with significant population outflow/inflow might be insufficiently relevant. Secondly, comparing new obtained estimates with previous estimates could serve as an additional source of confirmation or refutation of the validity of the obtained calculations.

Below are the data (converted into the appropriate format)[13] used during triangulation, as well as its results. Only estimates that were validated at the previous stage were used. The confidence level in the data was set at 75% (0.75) for all types and in all locations. The corresponding confidence indicators were discussed and approved by experts of the Technical Group on HIV Key Population Size Estimation, as well as the National Working Group on Bio-Behavioral Surveillance. If information regarding the validity and reliability of data from a specific source for a specific location is refined, the confidence assessment may be changed, and the population size estimate calculations updated.

[13] To avoid excessive influence on the resulting estimate by numerous data points from a single source, data obtained from a single source were additionally averaged

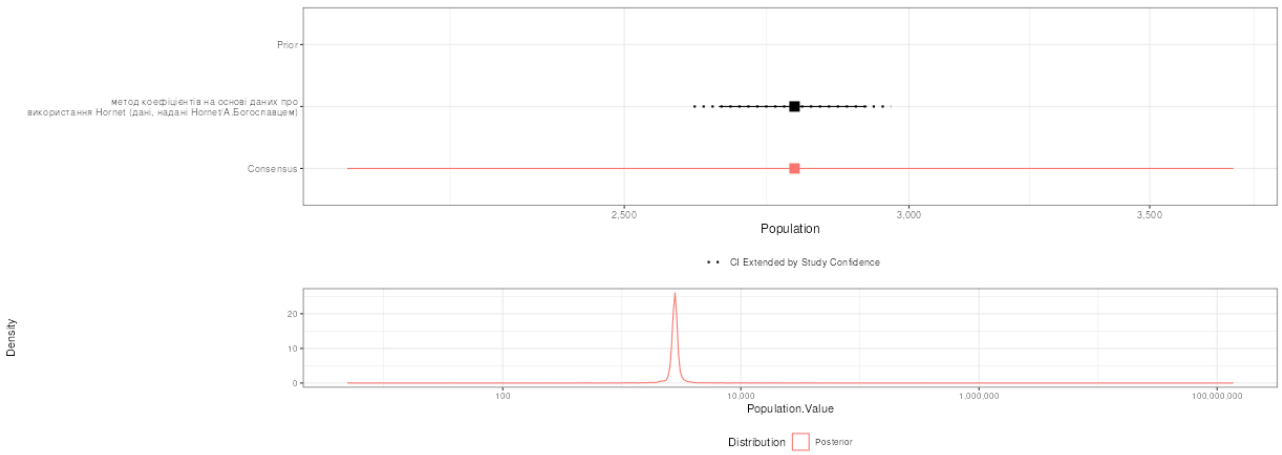
*Vinnytsia*

**Table 38. Population size estimates that passed validation and were prepared for entry into the Triangulator tool**

| | Calculated Point Estimate | Lower CI Limit | Upper CI Limit | Confidence in Estimates |
|---|---|---|---|---|
| **Multiplier method based on Hornet usage data (data provided by Hornet/A. Bohoslavets)** | 2788 | 2656 | 2920 | 75 |

**Table 39. Triangulation Results**

| Percent of Estimate Variability Attributable to Unaccounted-for Study Bias: NA% | | | | |
|---|---|---|---|---|
| Consensus Estimate: | | | | |
| **Median** | **Mean** | **Standard Deviation** | **95% CI** | **90% CI** |
| 2787.93 | 43540.84 | 2196441.69 | (2094, 3693) | (2410, 3224) |



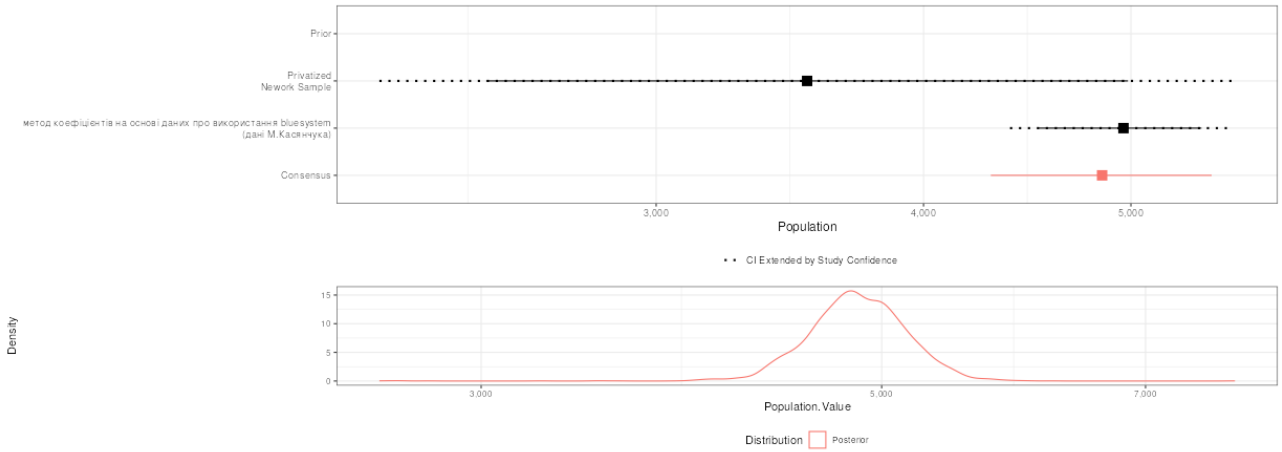
*Dnipro*

**Table 40. Population size estimates that passed validation and were prepared for entry into the Triangulator tool**

| | Calculated Point Estimate | Lower CI Limit | Upper CI Limit | Confidence in Estimates |
|---|---|---|---|---|
| **Privatized Network Sampling** | 3529 | 2499 | 4984 | 75 |
| **Multiplier method based on Bluesystem usage data (M. Kasianczuk data)** | 4960 | 4526 | 5394 | 75 |

**Table 41. Triangulation Results**

| Percent of Estimate Variability Attributable to Unaccounted-for Study Bias: 0% | | | | |
|---|---|---|---|---|
| Consensus Estimate: | | | | |
| **Median** | **Mean** | **Standard Deviation** | **95% CI** | **90% CI** |
| 4847.34 | 4854.30 | 309.32 | (4300, 5453) | (4381, 5351) |



*Zaporizhzhia*

**Table 42. Population size estimates that passed validation and were prepared for entry into the Triangulator tool**

| | Calculated Point Estimate | Lower CI Limit | Upper CI Limit | Confidence in Estimates |
|---|---|---|---|---|
| **Multiplier method based on Bluesystem usage data (M. Kasianczuk data)** | 3896 | 3158 | 4634 | 75 |
| **Multiplier method based on Hornet usage data (data provided by Hornet/A. Bohoslavets)** | 2929 | 2786 | 3071 | 75 |

**Table 43. Triangulation Results**

| Percent of Estimate Variability Attributable to Unaccounted-for Study Bias: 2% | | | | |
|---|---|---|---|---|
| Consensus Estimate: | | | | |
| **Median** | **Mean** | **Standard Deviation** | **95% CI** | **90% CI** |
| 2982.28 | 2989.59 | 166.88 | (2778, 3239) | (2817, 3174) |

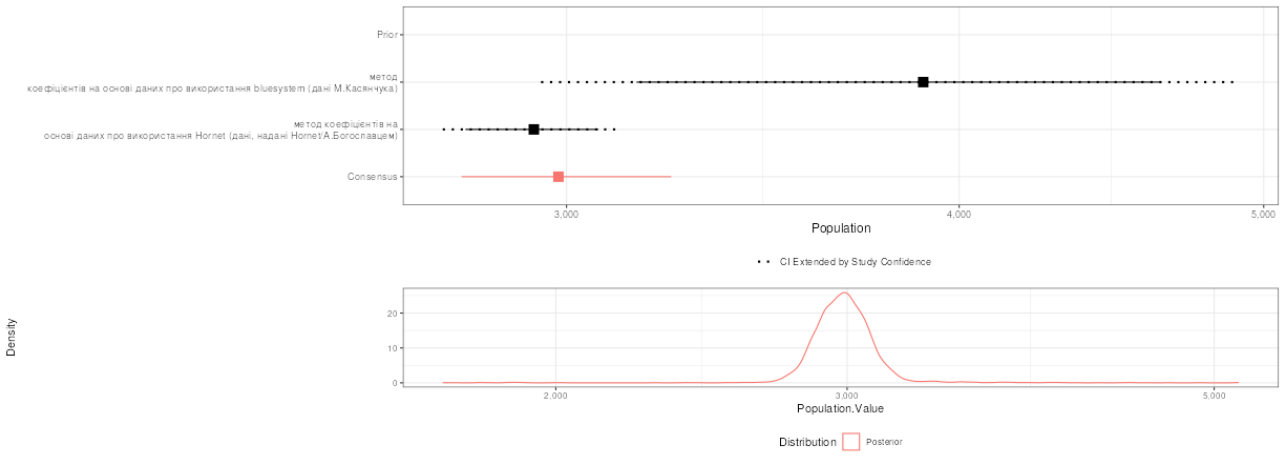


**Table 44. Population size estimates that passed validation**

| | Calculated Point Estimate | Lower CI Limit | Upper CI Limit |
|---|---|---|---|
| **Privatized Network Sampling** | 11324 | 9589 | 13372 |
| **Multiplier method based on Hornet usage data (data provided by Hornet/A. Bohoslavets)** | 36045 | 34874 | 37216 |
| **Multiplier method based on condom/lubricant receipt data (ALLIANCE.GLOBAL)** | 25595 | 22482 | 28708 |
| **Multiplier method based on individual counseling on safer sexual behavior data (ALLIANCE.GLOBAL)** | 25966 | 22663 | 29270 |
| **Multiplier method based on condom/lubricant receipt data (SyrEx, provided by Alliance)** | 40258 | 36258 | 44258 |
| **Multiplier method based on individual counseling on safer sexual behavior data (SyrEx, provided by Alliance)** | 42162 | 37811 | 46512 |

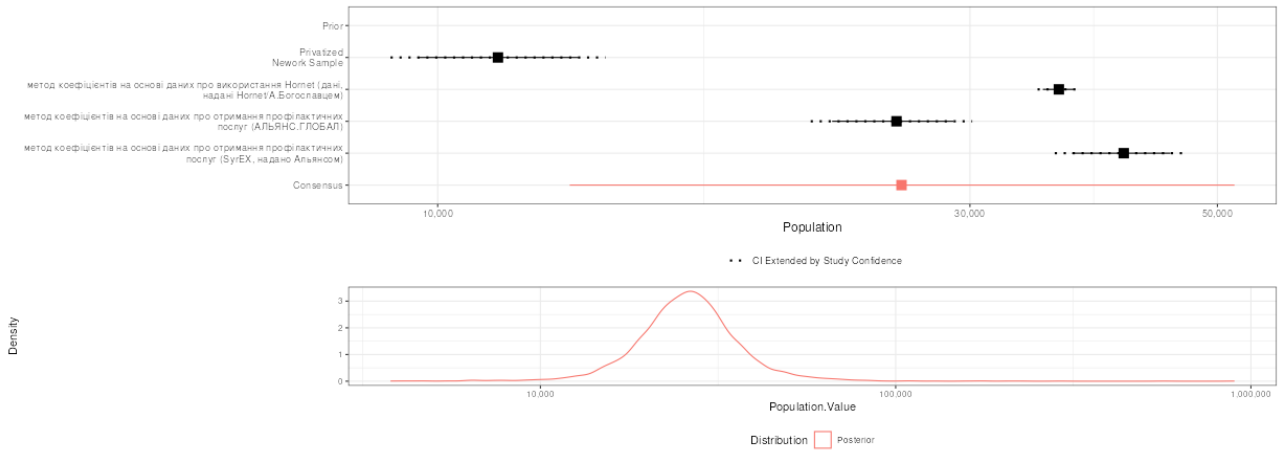
Averaging data from a single source

**Table 45. Population size estimates that passed validation, averaged by source and prepared for entry into the Triangulator tool**

| | Calculated Point Estimate | Lower CI Limit | Upper CI Limit | Confidence in Estimates |
|---|---|---|---|---|
| **Privatized Network Sampling** | 11324 | 9589 | 13372 | 75 |
| **Multiplier method based on Hornet usage data (data provided by Hornet/A. Bohoslavets)** | 36045 | 34874 | 37216 | 75 |
| **Multiplier method based on prevention service receipt data (ALLIANCE.GLOBAL)** | 25781 | 22573 | 28989 | 75 |
| **Multiplier method based on prevention service receipt data (SyrEx, provided by Alliance)** | 41210 | 37035 | 45385 | 75 |

**Table 46. Triangulation Results**

| Percent of Estimate Variability Attributable to Unaccounted-for Study Bias: 98% | | | | |
|---|---|---|---|---|
| Consensus Estimate: | | | | |
| **Median** | **Mean** | **Standard Deviation** | **95% CI** | **90% CI** |
| 26048.97 | 27979.89 | 20170.57 | (13132, 51792) | (15393, 43990) |



*Lviv*

**Table 47. Population size estimates that passed validation**

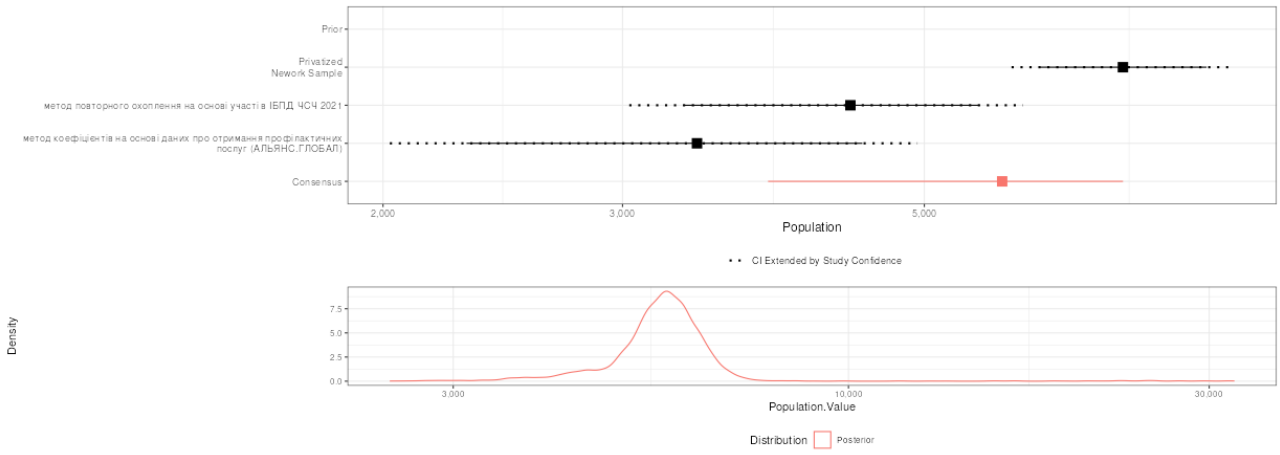
| | Calculated Point Estimate | Lower CI Limit | Upper CI Limit |
|---|---|---|---|
| **Privatized Network Sampling** | 6998 | 6075 | 8062 |
| **Capture-recapture method based on participation in IBBS MSM 2021** | 4412 | 3332 | 5492 |
| **Multiplier method based on condom/lubricant receipt data (ALLIANCE.GLOBAL)** | 3275 | 2243 | 4308 |
| **Multiplier method based on individual counseling on safer sexual behavior data (ALLIANCE.GLOBAL)** | 3531 | 2366 | 4697 |

**Table 48. Population size estimates that passed validation, averaged by source and prepared for entry into the Triangulator tool**

| | Calculated Point Estimate | Lower CI Limit | Upper CI Limit | Confidence in Estimates |
|---|---|---|---|---|
| **Privatized Network Sampling** | 6998 | 6075 | 8062 | 75 |
| **Capture-recapture method based on participation in IBBS MSM 2021** | 4412 | 3332 | 5492 | 75 |
| **Multiplier method based on prevention service receipt data (ALLIANCE.GLOBAL)** | 3403 | 2304 | 4502 | 75 |

**Table 49. Triangulation Results**

| Percent of Estimate Variability Attributable to Unaccounted-for Study Bias: 17% | | | | |
|---|---|---|---|---|
| Consensus Estimate: | | | | |
| **Median** | **Mean** | **Standard Deviation** | **95% CI** | **90% CI** |
| 5704.24 | 5795.71 | 1870.58 | (3838, 6999) | (4268, 6716) |



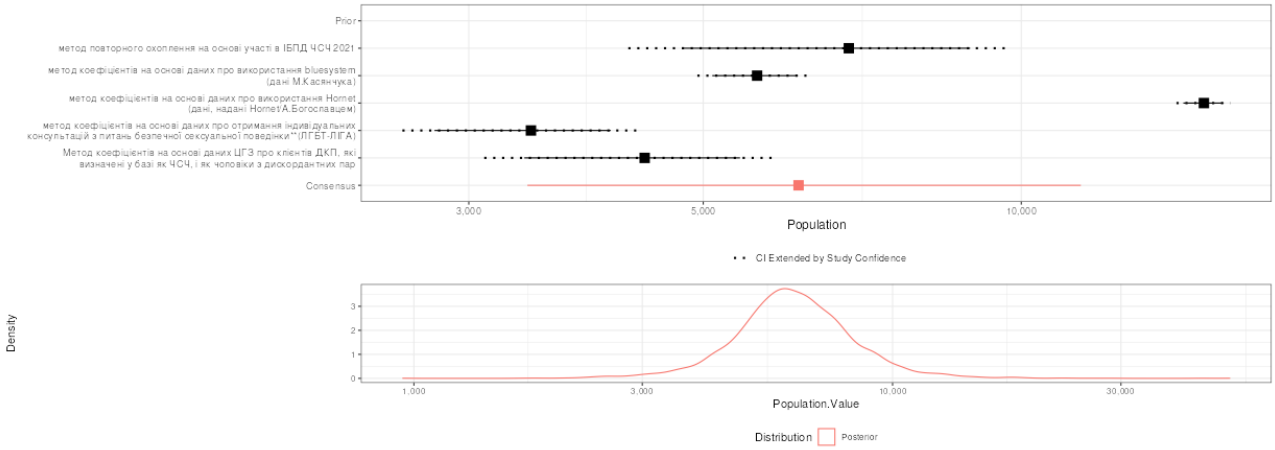
*Odesa*

**Table 50. Population size estimates that passed validation and were prepared for entry into the Triangulator tool**

| | Calculated Point Estimate | Lower CI Limit | Upper CI Limit | Confidence in Estimates |
|---|---|---|---|---|
| **Capture-recapture method based on participation in IBBS MSM 2021** | 6867 | 4789 | 8945 | 75 |
| **Multiplier method based on Bluesystem usage data (M. Kasianczuk data)** | 5623 | 5100 | 6146 | 75 |
| **Multiplier method based on Hornet usage data (data provided by Hornet/A. Bohoslavets)** | 14888 | 14235 | 15541 | 75 |
| **Multiplier method based on individual counseling on safer sexual behavior data** (LGBT-LIGA) | 3435 | 2784 | 4087 | 75 |
| **Multiplier method based on PHC data regarding PrEP clients identified in the database as MSM and as men in discordant couples** | 4401 | 3386 | 5417 | 75 |

**Table 51. Triangulation Results**

| Percent of Estimate Variability Attributable to Unaccounted-for Study Bias: 96% | | | | |
|---|---|---|---|---|
| Consensus Estimate: | | | | |
| **Median** | **Mean** | **Standard Deviation** | **95% CI** | **90% CI** |
| 6154.76 | 6497.41 | 2251.86 | (3409, 11386) | (3912, 9905) |


Prior
метод повторного охоплення на основі участі в ІБПД ЧСЧ 2021
метод коефіцієнтів на основі даних про використання bluesystem (дані М.Касянчука)
метод коефіцієнтів на основі даних про використання Hornet (дані, надані Hornet'а Богославцем)
метод коефіцієнтів на основі даних про отримання індивідуальних консультацій з питань безпечної сексуальної поведінки** (ЛГБТ-ЛІГА)
Метод коефіцієнтів на основі даних ЦГЗ про клієнтів ДКП, які визначені у базі як ЧСЧ, і як чоловіки з дискордантних пар
Consensus
3,000
5,000
10,000
Population


CI Extended by Study Confidence
Density
3
2
1
0
1,000
3,000
10,000
30,000
Population.Value
Distribution
Posterior

*Poltava*

**Table 52. [Population size estimates that passed validation and were prepared for entry into the Triangulator tool]**

| | Calculated Point Estimate | Lower CI Limit | Upper CI Limit | Confidence in Estimates |
|---|---|---|---|---|
| **Multiplier method based on PHC data regarding PrEP clients identified in the database as MSM and as men in discordant couples** | 1644 | 869 | 2420 | 75 |

**Table 53. [Triangulation Results]**

| Percent of Estimate Variability Attributable to Unaccounted-for Study Bias: 52% | | | | |
|---|---|---|---|---|
| Consensus Estimate: | | | | |
| **Median** | **Mean** | **Standard Deviation** | **95% CI** | **90% CI** |
| 1658.39 | 1650.22 | 525.18 | (639, 2676) | (767, 2513) |

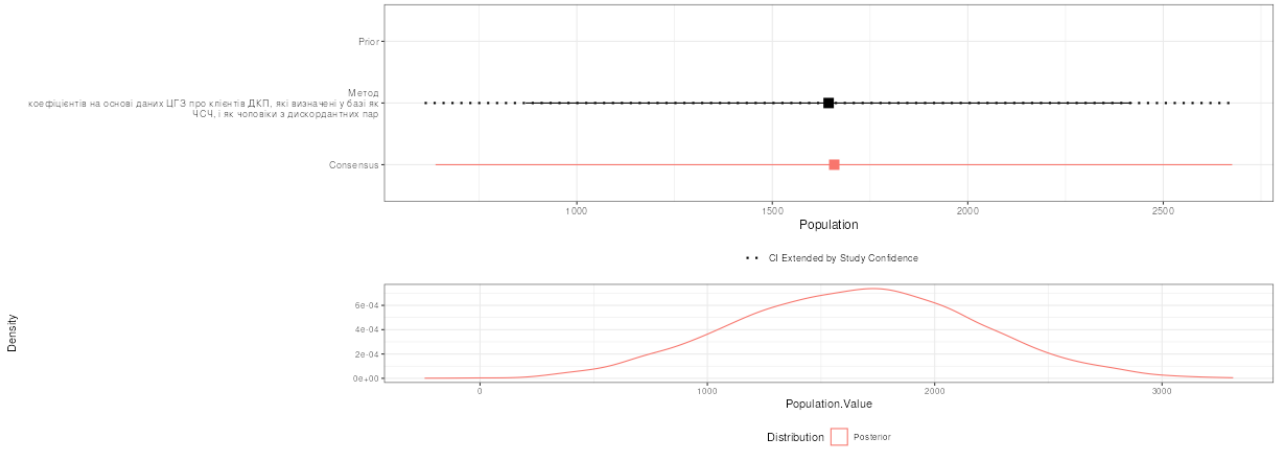
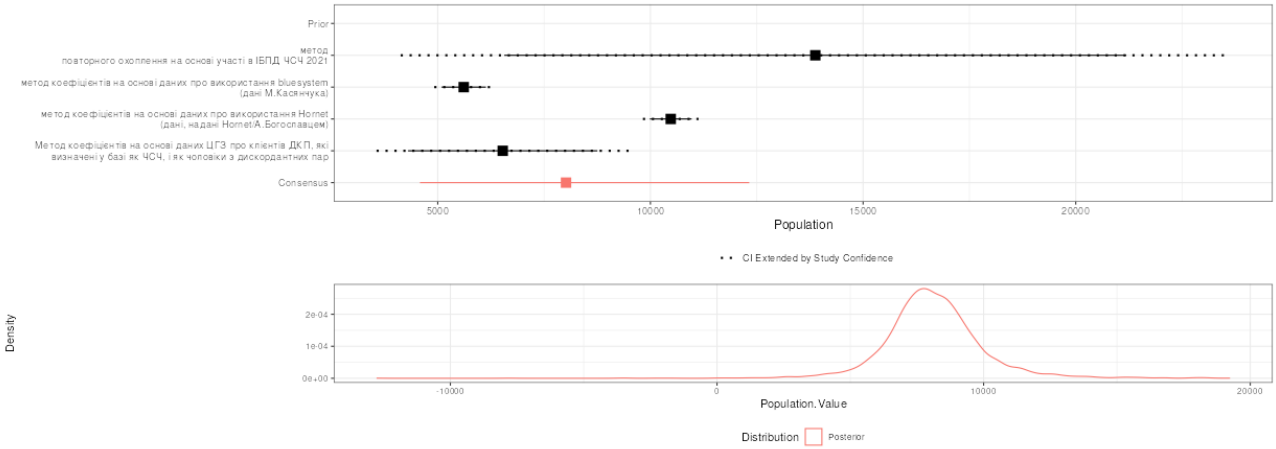


**Table 54. Population size estimates that passed validation and were prepared for entry into the Triangulator tool**

| | Calculated Point Estimate | Lower CI Limit | Upper CI Limit | Confidence in Estimates |
|---|---|---|---|---|
| **Capture-recapture method based on participation in IBBS MSM 2021** | 13877 | 6565 | 21189 | 75 |
| **Multiplier method based on Bluesystem usage data (M. Kasianczuk data)** | 5611 | 5091 | 6132 | 75 |
| **Multiplier method based on Hornet usage data (data provided by Hornet/A. Bohoslavets)** | 10478 | 9987 | 10969 | 75 |
| **Multiplier method based on PHC data regarding PrEP clients identified in the database as MSM and as men in discordant couples** | 6528 | 4303 | 8753 | 75 |

**Table 55. Triangulation Results**

| Percent of Estimate Variability Attributable to Unaccounted-for Study Bias: 52% | | | | |
|---|---|---|---|---|
| Consensus Estimate: | | | | |
| **Median** | **Mean** | **Standard Deviation** | **95% CI** | **90% CI** |
| 8016.34 | 8124.04 | 1920.92 | (4582, 12323) | (5494, 11228) |


Prior
метод повторного охоплення на основі участі в ІБПД ЧСЧ 2021
метод коефіцієнтів на основі даних про використання bluesystem (дані М.Касянчука)
метод коефіцієнтів на основі даних про використання Hornet (дані, надані Hornet/А.Богославцем)
Метод коефіцієнтів на основі даних ЦГЗ про клієнтів ДКП, які визначені у базі як ЧСЧ, і як чоловіки з дискордантних пар
Consensus
5000
10000
15000
20000
Population
CI Extended by Study Confidence
Density
2e-04
1e-04
0e+00
-10000
0
10000
20000
Population.Value
Distribution
Posterior

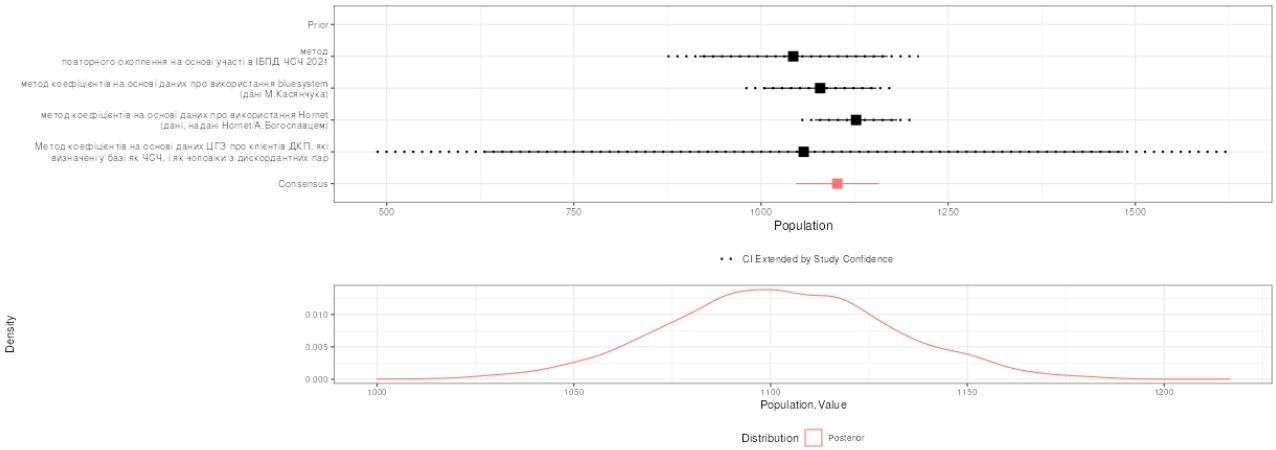
*Cherkasy*

**Table 56. Population size estimates that passed validation and were prepared for entry into the Triangulator tool**

| | Calculated Point Estimate | Lower CI Limit | Upper CI Limit | Confidence in Estimates |
|---|---|---|---|---|
| **Capture-recapture method based on participation in IBBS MSM 2021** | 1043 | 917 | 1169 | 75 |
| **Multiplier method based on Bluesystem usage data (M. Kasianczuk data)** | 1079 | 1004 | 1154 | 75 |
| **Multiplier method based on Hornet usage data (data provided by Hornet/A. Bohoslavets)** | 1127 | 1072 | 1182 | 75 |
| **Multiplier method based on PHC data regarding PrEP clients identified in the database as MSM and as men in discordant couples** | 1057 | 629 | 1484 | 75 |

**Table 57. Triangulation Results**

| Percent of Estimate Variability Attributable to Unaccounted-for Study Bias: 0% | | | | |
|---|---|---|---|---|
| Consensus Estimate: | | | | |
| **Median** | **Mean** | **Standard Deviation** | **95% CI** | **90% CI** |
| 1101.88 | 1102.24 | 28.47 | (1046, 1158) | (1056, 1150) |


Prior
метод повторного охоплення на основі участі в ІБПД ЧСЧ 2021
метод коефіцієнтів на основі даних про використання bluesystem (дані М.Касянчука)
метод коефіцієнтів на основі даних про використання Hornet (дані, надані Hornet/А.Богославцем)
Метод коефіцієнтів на основі даних ЦГЗ про клієнтів ДКП, які визначені у базі як ЧСЧ, і як чоловіки з дискордантних пар
Consensus
500
750
1000
1250
1500
Population


CI Extended by Study Confidence
Density
0.010
0.005
0.000
1000
1050
1100
1150
1200
Population.Value
Distribution
Posterior

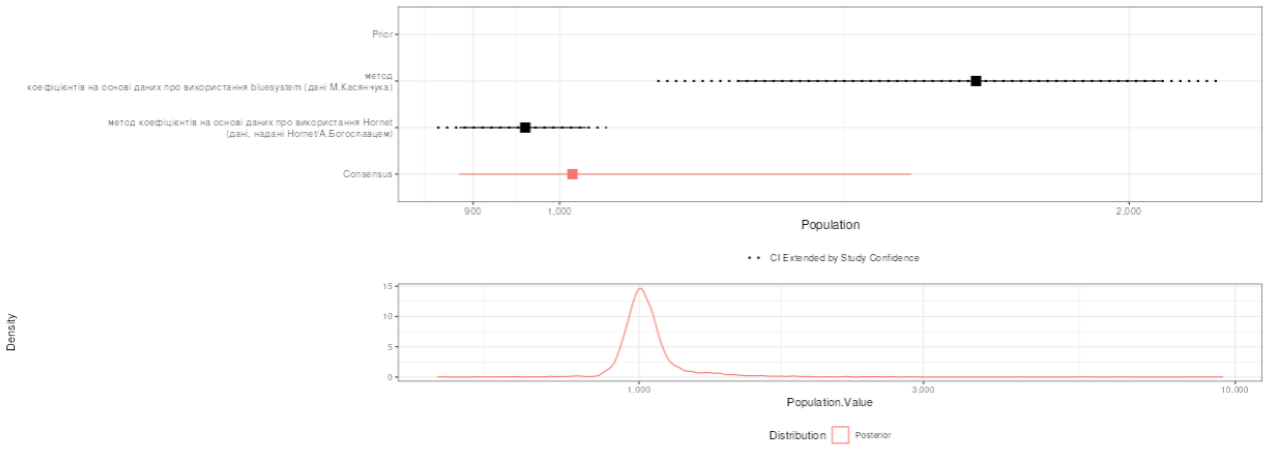
*Chernivtsi*

**Table 58. Population size estimates that passed validation and were prepared for entry into the Triangulator tool**

| | Calculated Point Estimate | Lower CI Limit | Upper CI Limit | Confidence in Estimates |
|---|---|---|---|---|
| **Multiplier method based on Bluesystem usage data (M. Kasianczuk data)** | 1660 | 1241 | 2080 | 75 |
| **Multiplier method based on Hornet usage data (data provided by Hornet/A. Bohoslavets)** | 959 | 885 | 1033 | 75 |

**Table 59. Triangulation Results**

| Percent of Estimate Variability Attributable to Unaccounted-for Study Bias: 2% | | | | |
|---|---|---|---|---|
| Consensus Estimate: | | | | |
| **Median** | **Mean** | **Standard Deviation** | **95% CI** | **90% CI** |
| 1015.75 | 1065.43 | 375.13 | (885, 1535) | (915, 1328) |



# RECOMMENDED MSM POPULATION SIZE ESTIMATES IN CITIES OF IBBS MSM 2024

The estimates obtained based on the triangulation procedure are presented in Table 60 (estimates for the corresponding cities from the previous round are provided for comparison).

**Table 60. Recommended MSM population size estimates in IBBS MSM 2024 cities compared to estimates from the previous round**

| | Estimates based on IBBS MSM 2024 | | | | Estimates based on IBBS MSM 2021 | | |
|---|---|---|---|---|---|---|---|
| | Median | 95% CI, Lower | 95% CI, Upper | | Median | 95% CI, Lower | 95% CI, Upper |
| Vinnytsia | 2788 | 2094 | 3693 | | 1556 | 1309 | 1820 |
| Dnipro | 4847 | 4300 | 5453 | | 5922 | 5130 | 6759 |
| Zaporizhzhia | 2982 | 2778 | 3239 | | 2797 | 2203 | 3456 |
| Kyiv | 26049 | 13132 | 51792 | | 32345 | 25239 | 40465 |
| Lviv | 5704 | 3838 | 6999 | | 4855 | 4826 | 4882 |
| Odesa | 6154 | 3409 | 11386 | | 6125 | 5640 | 6618 |
| Poltava | 1658 | 639 | 2676 | | 1552 | 1372 | 1733 |
| Kharkiv | 8124 | 4582 | 12323 | | 9261 | 5492 | 14050 |
| Cherkasy | 1102 | 1046 | 1158 | | 1927 | 1303 | 2683 |
| Chernivtsi | 1065 | 885 | 1535 | | NA | NA | NA |

## LIMITATIONS OF THE STUDY

Each of the sources for calculating the population size estimates presented above has its limitations.

Data from IBBS MSM 2024 are limited by the participant recruitment procedure (Respondent Driven Sampling (RDS)), which implies that the study might not have reached MSM whose social networks are significantly separated from the main community in the study city[14], or those MSM who consciously avoided identifying as MSM (due to unaddressed stigma and discrimination).

With some minor exceptions, the study also did not cover the institutional population, i.e., populations living not in private households but in organized communal conditions and under shared management (in military barracks, penitentiary institutions, hospitals, etc.). Probably, the largest part of this group were MSM who, at the time of the study, were in the ranks of the Armed Forces of Ukraine and other Defense Forces (including the National Guard, Border Guard Service, Security Service of Ukraine, and Police).

In addition, it is worth noting that the planned sample size of IBBS MSM 2024 in the cities of Chernivtsi, Zaporizhzhia, and Odesa was only partially reached.

Also, data from any studies that use information reported by participants themselves may have biases related to the inaccuracy of respondents' memory or, in some cases, deliberate distortion of information in responses. For example, participants might not accurately recall whether they received certain prevention services, during what period of time, and what the provider was named.

Most data sources (in particular, data from IBBS MSM 2024 itself, data from the SyrEx database) had quality control and verification procedures; however, for some sources (data on unique users of the Hornet service, data from counting users of the Bluesystem service), independent verification was unavailable, so we relied on the reputation of the persons who provided these data. The same logic had to be used relying on the correctness of algorithms embedded in the Triangulator tool.

All calculations obtained based on data on prevention service coverage concern mostly HIV-negative people or those who do not know their HIV status. Thus, the corresponding estimates can be adjusted depending on the HIV prevalence rate among MSM in a specific city.

Data obtained by the Privatized Network Sampling method may be limited by participants' reluctance to provide personal data about themselves and their acquaintances or (in the case of acquaintances) lack of knowledge of part of the necessary information (for example, the acquaintance's real name).

In addition, the study used outdated demographic statistics data from 2022, which may not reflect changes in the distribution of the existing population following the full-scale Russian

[14] In the current conditions, this specifically could have happened with MSM who, as a result of the full-scale Russian invasion, were forced to move to other cities and regions where they might not have had networks of acquaintances and contacts and had not managed to form them by the time of the study's fieldwork stage.

invasion of 2022. However, the State Statistics Service of Ukraine has not published updated statistical data. Alternative data (for example, based on extrapolation of National Health Service of Ukraine data or monitoring data from the International Organization for Migration) either did not have sufficient accuracy or (despite requests) were not provided. If updated demographic data are obtained, the corresponding estimates may be updated.