ANALYTICAL REPORT
based on sociological study results Estimation of the Size of Populations Most-at-Risk for HIV Infection in Ukraine in 2009

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CONTENT

LIST OF ABBREVIATIONS

RDS – respondent driven sampling

TLS – time-location sampling

Alliance – International HIV/AIDS Alliance in Ukraine

ART – antiretroviral therapy

HIV – human immune deficiency virus

WHO – World Health Organization

DCIDC – Department to Combat Illegal Drug Circulation at the MIA of Ukraine

SIFYA – State Institute for Family and Youth Affairs

FSW – (female sex workers) women, who provide sexual services for payment

Media – mass media

SMT – substitution maintenance therapy

STI – sexually transmitted infections

KIIS – Kyiv International Institute of Sociology

LGBT community – community of lesbians, gays, bisexuals and transgender people

PLWHA – people living with HIV/AIDS

HCF – health care facilities

MIA – Ministry of Internal Affairs of Ukraine

M/O – monitoring and evaluation

MoH – Ministry of Health

NGO – non-governmental organizations

LEA – law enforcement agency (of internal affairs)

UN – United Nations

HCI – health care institutions

CSW – (commercial sex workers) men and women, who provide sexual services for payment

PSA – participatory site assessment

IDU – injecting drug users

AIDS – acquired immune deficiency syndrome

UISR – Ukrainian Institute for Social Research

MSW – (male sex workers) men, who provide sexual services for payment

MSM – men who have sex with men

UNAIDS – Joint United Nations Programme on HIV/AIDS

UNICEF – United Nations Children's Fund

INTRODUCTION

Ukraine is one of the Eastern European countries that are most affected by HIV/AIDS epidemic. According to the recent official data, the rates of HIV/AIDS epidemic in Ukraine continue to grow in spite of the comprehensive response activities that are being implemented in the country. Since the identification of the first HIV infection case in Ukraine in 1987 and up till 2009 there were 162,591 officially reported HIV infection cases[1]. By 01.01.2010, according to the data of Ukrainian AIDS Prevention Centre at the MOH of Ukraine, 101,183 HIV positive people were under official medical check-up in the country, among whom 11,827 were diagnosed with AIDS[2].

In 2007, thanks to the introduction of large-scale antiretroviral therapy (ART) programmes, Ukraine had for the first time registered a decline in AIDS incidence (by 3% compared to similar indicator in 2006), and in 2009 the number of AIDS related deaths reduced for the first time compared to the previous year (by 2.6%). In spite of all these facts, AIDS continues to pose a serious problem to Ukraine as currently it is still impossible to ensure access to antiretroviral therapy to all people in need to its extremely high cost.

Sexual (mostly heterosexual) and parenteral (mostly due to the injecting of drugs) are key HIV transmission routes in Ukraine. Statistical data show that in recent years the share of infections caused by drug injections in the total number of HIV infections cases is declining, while sexual transmission is on the rise. However it should be taken into account that reduction of the share of IDU among newly HIV infected people is observed on the background of an overall increase of new HIV infections, because the total number of HIV infections among IDU has practically not changed in recent 4 years (2006–2009) and varied in the range of 7,000–7,130 people. Overall, for all years since the moment of detection of HIV in Ukraine in 1987, the officially reported number of HIV infections through homosexual relations was relatively small (319 cases). However, in recent years (starting from 2005) the number of officially reported HIV infection cases among the men who have sex with men has been growing (in five recent years the number of such cases grew almost fivefold).

Sentinel surveillance data demonstrate[3] that HIV epidemic in Ukraine continues to concentrate in the groups most at risk for infection, such as injecting drug users (IDU) and commercial sex workers (CSW). Men who have sex with men (MSM) should also be included in the high risk groups.

It is commonly recognized that the official statistics does not reflect the real scale of HIV/AIDS epidemic in Ukraine, as it takes into account only those people in whom HIV infection was found through the testing for HIV antibodies. It is clear that people, who were not tested for HIV and thus do not know their status, are not

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[1] MoH of Ukraine information update on HIV/AIDS incidence, January 2010 <http://www.moz.gov.ua/ua/main/icsm/sesinfo/ >

[2] Information Bulletin "HIV Infection in Ukraine". – K., 2010.

[3] Ibid.

taken into account. In order to evaluate the real HIV/AIDS situation in the country and to increase efficiency of epidemic response in the country in the conditions of its concentrated stage, it is important to obtain accurate data about the number of people that currently constitute key high risk groups vulnerable to HIV infection at both national and local levels.

Estimation of the total number of representatives of the populations most at risk for HIV infection at the national and local levels is an important strategic resource for further decision making on HIV/AIDS epidemic response.

The results of estimation of the size of risk groups can be used in several areas of activities aimed at overcoming HIV/AIDS epidemic, which can be determined as follows:

1. Estimation and forecasting HIV/AIDS related situation in the country:
   - calculation of the estimated size of people, living with HIV/AIDS;
   - forecasting of HIV/AIDS epidemic spread;
   - estimation of the burden and possible scale of HIV epidemic, if the efficient prevention activities are not implemented.

2. Efficient planning, implementation and evaluation of prevention programmes, development of HIV-servicing organizations[4]:
   - estimating the level of coverage of target populations with prevention interventions;
   - substantiation and determination of quantitative indicators of prevention programmes development;
   - calculations of the cost estimates to ensure the planned coverage level for the target populations and purchasing of the needed amount of HIV prevention means and production of the necessary amount of information and educational materials;
   - calculation of costs to purchase test kits for HIV infection diagnostics and costs related to the provision of treatment and care for people, living with HIV/AIDS, and social support to HIV infected people and their families;
   - planning of the development of the networks of NGO and other HIV-servicing organizations.

3. Evaluation and planning for the provision of tertiary treatment:
   - determination of the needs in antiretroviral therapy (ART);
   - calculation of the number of injecting drug users (i.e., opiate users) in need of substitution maintenance treatment (SMT).

4. Substantiation of the lobbying for the changes in government policy on HIV/AIDS.

5. Calculations of the sampling aggregates to perform behavioural, epidemiological and other studies among the representatives o frisk groups and general population.

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[4] Методичні рекомендації з проведення досліджень для моніторингу відповіді країни на епідемію ВІЛ-інфекції. / О. М. Балакірєва, М.Ю. Варбан, Г.В. Довбах [та ін.] ; МБФ «Міжнар. Альянс з ВІЛ/СНІД в Україні». – К. : 2008. – С. 22–23.

[5] Створення мережі НУО, які працюють з жінками секс-бізнесу в Україні / О.М. Балакірєва, Л.І. Андрущак, М.Ю. Варбан. – К. : Укр. ін.-т соц. дослідж., 2000. – С. 82.

In recent decade there were several attempts to estimate the size of risk groups at the local level in Ukraine.

In 1999–2000 several estimations of the number of female sex workers (FSW) were performed at the local level[5]. In 2001 the estimated data about the size of this risk group in the cities with the population of more than 200,000 people were presented and comprised 17,500 FSW. According to the experts, at that moment the total number of FSW in the country was at least 180,000 women[6].

The first attempt to estimate the number of injecting drug users was made in 2002 by the Social Monitoring Centre with the support from the United Nations Children's Fund (UNICEF), Joint United Nations Programme on HIV/AIDS (UN-AIDS) in Ukraine and with active participation of the representatives of regional projects in 20 cities of the country (the project leader was Doctor of Sociology, Olga Balakireva). The methodology of this study was based on the strategy that combined quantitative and qualitative data collection methods, simultaneous use of different information sources, and triangulation[7] and verification of results in the study process. Methods and tools that were used (interviews with injecting drug users; interviews with experts from among representatives of social environment of injecting drug users; analysis of the statistical data about the number of injecting drug users; secondary analysis of previous behavioural studies; analysis of the number of IDU covered with prevention programmes; capture-recapture method[8]; estimation of the total size of injecting drug users population with the use of coefficients method) helped to perform estimations of the size of IDU populations in 20 cities and to extrapolate the data for the urban population of the country. The number of IDU among urban population was estimated at at least 560,000 people[9].

Starting from 2005, the method of participatory site assessment (PSA) has been used in Ukraine within the «SUNRISE»[10] project. The key objective of PSA is to evaluation the situation with HIV/AIDS prevention services provided to the representatives of risk groups at the level of a separate territorial unit, and mobilization of IDU, FSW and MSM communities to perform epidemic response activities. In the process of PSA the assessment is being performed by the teams comprised from the representatives of groups that are most vulnerable to HIV (IDU, FSW, MSM), and it is a distinctive feature of this method. Local estimates of the size of risk groups are made during the PSA. Unfortunately, currently these estimates do not provide an opportunity to make conclusions on the national or even regional levels.

The first comprehensive study that made it possible to estimate the size of key risk groups (IDU – injecting drug users, FSW – female sex workers and MSM

[6] Ibid.

[7] Triangulation in this context envisages synthesis and integration of data from different sources. It is used to establish the reliability and probability of the facts reflected by the data.

[8] Capture-recapture method implies the dual interviewing. After the first interview the respondents are marked as those, who were questioned. The main assumption of this method is based on the idea that when respondents return to their groups they mix there to homogeneity. Knowing the number of respondents interviewed the first time and the share of the first-time respondents in the sampling of the secondary interview, one can calculate the estimate of the total size of the studied population.

[9] Оцінка можливостей розвитку програм профілактики ВІЛ в середовищі споживачів ін'єкційних наркотиків. / О.М. Балакірєва, М.Ю. Варбан, О.О. Яременко та ін.. – К. : Укр. ін.-т соц. дослідж., 2003.

[10] Joint efforts of International HIV/AIDS Alliance in Ukraine, Program for Appropriate Technology in Health (PATH) and All-Ukrainian Network of People, Living with HIV/AIDS to implement the project "Scaling-up the National Response to HIV/AIDS through Information and Services" (SUNRISE). For more details about the SUNRISE project, please, visit the Alliance website www.aidsalliance.org.ua

– men who have sex with men) at the national level was implemented in 2005 with a financial support from ICF International HIV/AIDS Alliance in Ukraine within the programme "Overcoming HIV/AIDS Epidemic in Ukraine". The methodology of this comprehensive study implied the use of different information sources, secondary analysis of the existing information and performance of ad-hoc research. The following estimation methods and tools were used in the course of this study: estimation of the size using the "imagined friend" method[11]; estimation of the size with coefficient method with the use of existing statistical data and results of survey of target groups[12]; estimation of the size with coefficient method with the use results of the mass interviewing of the population about behavioural practices[13]; estimation of the size with coefficient method on the basis of capture-recapture results; estimation of the size with coefficient method on the bases of results of behavioural studies among the IDU and FSW.

On the basis of the comprehensive study results and in coordination with the experts the total number of risk groups in Ukraine was estimated as follows:

- IDU – 325,000 to 425,000 people – an estimate with the coefficient method on the basis of "hospitalization" indicator (recommended to evaluate the level of coverage of a target group by prevention programmes – 425,000 people);
- FSW – 110,000 to 250,000 people – estimates with the method of "imagined friend" and coefficient method by the results of mass population survey (recommended for the evaluation of the level of coverage of a target group by prevention programmes – 180,000 people);
- MSM – 177,000 t0 430,000 people – an estimate with the coefficient method by the results of mass population survey and on the basis of international experience (recommended for the evaluation of the level of coverage of a target group by prevention programmes – 30-0,000 people).

On the basis of 2005 estimates of the size of the populations most-at-risk for HIV infection, in 2007 the HIV/AIDS situation in Ukraine was evaluated including the estimation of the number of people, living with HIV/AIDS[14]. By the end of 2007 the number of people, living with HIV/AIDS in Ukraine was estimated at 440,000 people. It included 344,000 adults aged 15-49 years, which constitutes 1.63% of the general population of the country in this age group. These estimates were developed by the Ukrainian AIDS Prevention Centre at the Ministry of Health of Ukraine in close cooperation with the World Health Organization Office in Ukraine, UNAIDS Secretariat and International HIV/AIDS Alliance in Ukraine.

[11] The method of "anonymous friend" (or "imagined friend") is used to survey the general population. Respondents are asked to write a list of their good acquaintances and the interviewer asks about certain activities of these people.

[12] Monitoring behavioural studies conducted among IDU and FSW (by the State Institute on Family and Youth Issues and Ukrainian Institute for Social Research) and MSM (performed by the Centre for Social Research at the Institute of Sociology of the NAS of Ukraine) in 2004.

[13] Sociological surveys of young people aged 14-24 years within the project "Monitoring of Young People's Behaviour as a Component of Second Generation Surveillance", and of adults aged 25-49 years "Attitudes and Behavioural Orientation of Adult Population to HIV/AIDS Problem and People Living with HIV/AIDS".

[14] Report on the national consensus estimates on HIV and AIDS in Ukraine as of end of 2007. Kyiv, 2008. Ukrainian AIDS Prevention Centre, Ministry of Health of Ukraine, World Health Organization, International HIV/AIDS Alliance in Ukraine, Joint United Nations Programme on HIV/ AIDS.

[15] Methodological guidelines on conducting research to monitor the national HIV epidemic response. / O.M. Balakireva, M.Y. Varban, G.V. Dovbakh [et al.] ; ICF International HIV/AIDS Alliance in Ukraine. – K. : 2008. – p. 24

In the end of 2008 – beginning of 2009, following the recommendations to perform such studies once every 4 years[15], another comprehensive research "Estimating the Size of Populations with High HIV Infection Risk" was conducted. The following methods were used to obtain estimates: social networks scale-up, "imagined friend" method and coefficient method.

In addition to the results of the estimate of the size of key risk groups (IDU, CSW and MSM), the research also allowed estimating the number of male sex workers and main bridge groups (sexual partners of IDU, clients of FSW and sexual female partners of MSM). This publication contains a detailed description and results of this research.

On the basis of the estimates of the size of risk groups obtained in this research, in September 2009 the estimates of HIV/AIDS situation in Ukraine were reviewed[16]. Description of the calculation process, the results of estimating the size of PLH and forecasts of HIV/AIDS epidemic development in Ukraine are provided in the section "National Estimate of HIV/AIDS Situation in Ukraine as of beginning of 2009" of this publication.

Key outputs of this research were the estimates of the size of IDU, FSW and MSM, coordinated at the national and regional levels and recommended for broad use. However, taking into account the specific features of the target populations, one should remember that all estimates provided in this publication should be viewed as approximate ones, as they are based on certain assumptions. So, all estimates of the size of risk groups specified in this document are hypothetical and should not be viewed as unambiguous and final.

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[16] National estimate of HIV/AIDS situation in Ukraine as of beginning of 2009. Ukrainian AIDS Centre, Ministry of Health, World Health Organization, International HIV/AIDS Alliance in Ukraine, UNAIDS

KEY RESULTS OF ESTIMATION OF THE SIZE OF POPULATIONS MOST-AT-RISK FOR HIV INFECTION IN UKRAINE IN 2009

This section presents general estimates on the size of populations most-at-risk for HIV infection (IDU, FSW[17] and MSM) in Ukraine that were calculated in the course of 2009 research. It is recommended to use these very data to describe the situation in Ukraine related to the size of most-at-risk populations.

On the basis of the estimated obtained with the use of different estimation methods (social network scale-up method or coefficient method)[18], preliminary ranges of the size of key risk groups vulnerable to HIV (IDU, FSW and MSM) were determined and they are recommended for a further use. These recommended estimation ranges are provided in Table 1.

Taking into account the previously approved national estimates of the size of key risk groups vulnerable to HIV infection (IDU, FSW and MSM), the members of intersectoral Working Group on Monitoring and Evaluation (M&E) of the efficiency of implementation of the programmatic activities of HIV/AIDS response approved the estimates on the basis of which it is recommended to further plan the level of coverage of the representatives of risk groups with the services within HIV/AIDS prevention programmes in Ukraine.

Table 1

Recommended estimates of the general size of key populations most-at-risk for HIV in Ukraine, number of individuals

	IDU [19]	FSW [20]	MSM [21]
Interval of the estimated size of the population at the country level, recommended for use	230,000–360,000	65,000–93,000	95,000–213,000
An estimate recommended for the planning of coverage of the population with prevention services	290,000	70,000	9,000

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[17] The research results were used to determine the number of female sex workers (FSW) and not of CSW in general. It is conditioned by the fact that the group of male sex workers (MSW) in Ukraine is rather small, closed and hard to reach to conduct studies.

[18] The detailed estimation methods are described in the corresponding sections.

[19] The low margin of the estimated size is based on the calculations with the use of coefficient method on the basis of indicators of IDU coverage with prevention services. The upper margin of this range is an estimate that was calculated with the use of social network scale-up method adjusted to the insincerity bias in the answers of respondents. In order to plan the coverage with prevention services it is recommended to use a rounded mean estimate of the estimated range of IDU number.

[20] It is recommended to use the estimate of FSW number calculated with the use of social network scale-up method adjusted to the insincerity bias in the answers of respondents. In order to plan the coverage with prevention services it is recommended to use a rounded mean estimate of the estimated range of FSW number, with exclusion of FSW, who should be included in the IDU group due to their injecting drug use (11.5% – approximately 9,000 people).

[21] Estimates of the size of MSM population calculated with the use of different estimation methods were submitted for review to the members of the standing Reference Group on LGBT Communities and MSM-servicing projects in Ukraine, which thoroughly reviewed the process of calculations and the resulting estimates. On the basis of this discussion a decision was made to recommend for further use the interval of estimated size of the population calculated with the coefficient method on the basis of general population survey conducted in 2004. In order to plan the coverage with prevention services it is recommended to use the low margin of the estimated range, because the calculated range is related to men, who have the experience of homosexual relations but not necessarily practice same-sex relations on a regular basis.

Regional estimates of the size of key populations most-at-risk for HIV infection were also calculated and coordinated on a corresponding level (Table 2).

Table 2

Estimates of the size of key populations most-at-risk for HIV infection in Ukraine, coordinated on the regional level, number of individuals

AR Crimea/ Oblast/ City	IDU	FSW	MSM	Results of review and data of decision making[22]
AR Crimea	22, 600	4, 000	4, 000	Approved 02.07.2009
Vinnytsia*	6, 500	1, 200	3, 300	Coordinated 30.04.2009
Volyn	5, 000	1, 000	1, 000	Approved 29.09.2009
Dnipropetrovsk	17, 000	3, 700	7, 000	Taken into account 23.11.2009
Donetsk	60, 000	10, 700	9, 100	Approved 16.09.2009
Zhytomyr	7, 500	1, 200	2, 600	Approved 11.09.2009
Zakarpattya	500	500	— [23]	Approved 29.09.2009
Zaporizhja	18,000	4,500	3,700	Approved 31.03.2010
Ivano-Frankivsk	3, 000	1, 500	300	Approved 08.10.2009
Kyiv*	15, 200	2, 700	3, 600	Coordinated 30.04.2009
Kirovograd	2, 000	230	1, 500	Approved 29.09.2009
Luhansk	15, 000	4, 100	4, 800	Approved 13.10.2009
Lviv	9, 000	1, 600	5, 400	Approved 25.09.2009
Mykolayiv	10, 109	2, 900	2, 000	Approved 10.07.2009
Odessa	15, 500	8, 000	5, 500	Taken into account 28.10.2009
Poltava*	8, 000	1, 500	3, 000	Coordinated 30.04.2009
Rivne*	3, 000	600	700	Coordinated 30.04.2009
Sumy*	10, 000	1, 800	1, 200	Coordinated 30.04.2009
Ternopil*	3, 000	600	2, 200	Coordinated 30.04.2009
Kharkiv	13, 000	2, 300	5, 900	Approved 22.12.2009
Kherson	8, 000	1, 500	2, 300	Approved 08.09.2009
Khmelnitsky	8, 000	1, 500	2, 700	Approved 23.07.2009
Cherkassy	11, 000	2, 000	2, 600	Taken into account 15.07.2009
Chernivtsi	2, 500	500	1, 900	Approved 06.10.2009
Chernihiv	6, 500	1, 200	2, 200	Approved 22.09.2009
Kyiv City	38, 000	6, 800	14, 000	Approved 07.07.2009
Sevastopol City	5, 500	1, 000	800	Approved 02.07.2009

* * Estimates were not submitted for review by Regional Councils, but were approved at the meeting of inter-regional Working Group on Monitoring and Evaluation.

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[22] Estimates were approved by the Regional Councils on Tuberculosis and HIV/AIDS Response, created pursuant to the Resolution of the Cabinet of Ministers of Ukraine № 926 "On making changes to the Provision on the National Council on Tuberculosis and HIV/AIDS Response and Its Composition" as of July 11, 2007. Item 5.

[23] The estimate has not been approved because this issue requires further study.

The research results also included the calculation of the estimated size of key bridge groups, that is, sexual partners of IDU, clients of FSW and women – sexual partners of MSM. Estimates of the size of bridge groups were not submitted for discussion at the meetings of inter-regional Working Group on M&E or territorial coordination councils on prevention of HIV/AIDS spread. That is why these estimates can be considered only as additional information and not as the final result of the comprehensive evaluation.

Table 3

Results of estimating the size of key bridge groups, number of individuals

Group / Estimation method	Sexual partners of IDU	FSW clients	Women – sexual partners of MSM
Social network scale-up method[24]	32,000	285,000	2,700
Coefficient method on the basis of results of survey of the representatives of the groups	669,000[25]	830,000	36,000
Coefficient method on the basis of results of survey of the general population	—	220,000[26]	—

The research to estimate the size of populations most-at-risk for HIV infection in Ukraine also made it possible to estimate the number of IDU who are in need of access to substitution maintenance therapy. The international experience and results of the joint mission of the World Health Organization (WHO), Joint United Nations Programme on HIV/AIDS (UNAIDS), and United Nations Office on Drugs and Crime (UNODC) show that in order to achieve the effective impact on HIV and drug use epidemics it is necessary to ensure access to substitution maintenance therapy (SMT) of 30%-40% of people with opioid dependence. Taking these recommendations into consideration, on the basis of the estimated size of IDU group (266,000 people), the number of people to be covered with SMT was calculated. According to a behavioural study[27], 77.5% of IDU were injecting opiates within 30 days preceding the interview. So, the general number of opioid dependent individuals is estimated at 175,000 people. Subsequently, the number of people in need of SMT was calculated and coordinated with the WHO experts – 53,000 (30% of the total estimated number of opioid dependent individuals).

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[24]   These estimates are predictably low, taking into account low visibility of risk groups in the social layers.

[25] In this case the estimation of the size of this bridge group was incorrect and excessively high, because it was impossible to estimate, which part of this group directly belongs to IDU.

[26] These estimates are predictably low because the question is rather sensitive, which results in a large number of insincere answers to a direct question about the practice of such risky behaviour.

[27] Data from the study "Monitoring of IDU behaviour as a component of second generation surveillance", 2008.

STUDY METHODOLOGY

Research goal:

To estimate the size of populations most-at-risk for HIV infection (IDU, CSW and MSM) and representatives of bridge groups (sexual partners of IDU, clients of FSW women – sexual partners of MSM) at the national and regional levels.

Research objective:

- to collect information in order to estimate the size of risk groups and bridge groups with the use of sociological methods;
- to identify possible sources of additional information on quantitative indicators of the size of risk groups, to check their reliability, objectivity and sustainability;
- to single out indicators (questions in the questionnaires that were used in behavioural surveys among the representatives of risk groups), which can be used to apply the coefficient method to existing data;
- to determine the estimated size of populations most-at-risk for HIV infection (IDU, CSW, MSM) and representatives of bridge groups at the national and regional levels;
- to determine the estimated size of risk groups (IDU, FSW and MSM) aged 10 to 17 years;
- to coordinate estimates of the size of risk groups, obtained with the use of different methods at the national and regional levels;
- to develop recommendations on improvement of the methodological approaches to the estimation of the size of risk groups and bridge groups, as well as of tools for the collection of data related to the representatives of risk groups and bridge groups.

Identification of key target groups

Generally, there are no single internationally established criteria for attributing individuals to key populations most-at-risk for HIV infection (IDU, FSW and MSM). As a rule, the inclusion criterion is based on a certain frequency of risk behaviours, which is determined in accordance with the goals and objectives of the study. In other words, the key criteria to ascribe an individual to a risk group in the context of HIV/AIDS epidemic response is the level of potential risk to be infected or to transmit infection to another person.

IDU – injecting drug users. From the point of view of HIV epidemic spread, key representatives of this group are people, who more or less regularly inject drugs. In order to single this group out, such indicator as the duration of drug use (a year, 6 months or 30 days) is used. For specific purposes one can use the frequency of drug use indicator, e.g., 'people who inject drugs at least once a week'.

Estimation of the size of injecting drug users in the course of this research was made with the use of social network scale-up method. Additionally, the number of IDU was calculated on the basis of coefficient method with the use of statistical data on hospitalization of drug users to the in-patient clinics, annual coverage of IDU with prevention services and results of behavioural surveys among the IDU.

CSW– commercial sex workers. This group includes females (FSW) and males (MSW), who use sex as the source of income (permanent or temporary). Generally, this group also includes people, who provide sexual services to achieve certain goals (e.g., to be promoted). However, from the point of view of involvement in the spread of HIV infection, it is considered that key representatives of this group are people, for whom provision of sex services is their main occupation (or one of key sources of income) and who are involved in sex business for some time (i.e., it is not a one-time experience).

In this research the size of CSW group was estimated separately for men and women, who provide paid sexual services, with the use social network scale-up method. In addition to the calculations made with the use of social network scale-up tool, the calculation of the number of adult FSW was also made with the use of coefficient method based on the identification of the overlapping of IDU and FSW populations (belonging to both risk groups: prevalence of provision of paid sexual services among IDU and practice of injecting drug use among FSW).

MSM – men who have sex with men. This group also includes men who provide sexual services to other med for money. Experience of homosexual relations during life time or last 12 months was often used as the criteria to ascribing individuals to MSM group. From the point of view of HIV infection risk, it is expedient to include men, who practice same-sex relations with a certain periodicity (not as a one-time experience) to the MSM group. In general, the question about the duration and frequency of such relations and forced relations still remains open.

Estimation of the size of the MSM group, as with all other groups, was made with the use of social network scale-up method. Also, the size of MSM group at the national level was estimated on the basis of general population survey conducted in Ukraine in 2004. In addition to direct estimates of the size of MSM group, additional information was collected on the estimates size of MSM populations in other countries of the world.

Bridge groups – groups of people, who are closely related to the groups most-at-risk for HIV infection and who can serve as a "bridge" for the transmission of virus into the general population. The following bridge groups were identified from the point of view of infection risk: 1) sexual partners of IDU, 2) clients of FSW and 3) women – sexual partners of MSM. In addition to them, truck drivers, labour migrants, train conductors and employees in the sphere of entertainment or recreation are also often considered as bridge groups. However, these populations were not the object of estimation in this research.

According to the Ukrainian AIDS Prevention Centre at the MoH of Ukraine, in recent years the share of sexual transmission of HIV has been growing. In 2009 the share of people infected through sexual intercourse grew to 44%[28]. Experts of the Centre consider that most of people, who were sexually infected with HIV, were sexual partners of IDU, that is, representatives of bridge group, which can indicate the trend towards generalization of the epidemic and hence requires the

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[28] IInformation Bulletin "HIV Infection in Ukraine", 2010.

[29] http://ukraids.org.ua/ipsh

enhanced activities to prevent sexual transmission of HIV[29]. That is why one of the goals of this research was to estimate the size of bridge groups through which HIV and other sexually transmitted infections penetrate from the key risk groups to the general population.

As well as the estimation of key populations most-at-risk for HIV infection (IDU, FSW and MSM), the estimation of the size of bridge groups related to these risk groups was conducted with the use of social network scale-up method. Additional estimates of the size of bridge group were made with the use of coefficient method on the basis of the aligned regional estimates of the size of IDU, FSW and MSM.

General research methodology

General methodology of the conducted research is characterized by a comprehensive approach and is based on the use of various sources of information, on secondary analysis of available information (cabinet research) and on special surveys, triangulation and verification of results during analysis of the obtained results.

The basic method used in the research was "The network scale-up method" that was implemented by Kyiv International Institute of Sociology (senior researchers – V.I. Paniotto, Ph.D. in Sociology, and T.V. Petrenko, M.A. in Sociology) with the financial support from ICF International HIV/AIDS Alliance in Ukraine. The network scale-up method was first offered for use by the international group of researchers to estimate the size of hard to reach groups in 1986[30], and was consequently repeatedly used in the USA to estimate the size of such groups as HIV positive people, heroine users, homeless people and other groups. The idea of this method is based on the search of representatives of the target groups among the familiar respondents – in their social networks. Unlike other methods of estimation of the size of hard to reach groups, this method does not require having representative samplings of the researched groups, but instead is based on the interviewing of the representative sampling of the general population. This method was used by Kyiv International Institute of Sociology within the All-Ukrainian representative social survey, which became the first survey in Ukraine conducted with the use of network scale-up process. The research tools were examined by Chris McCartney and Russel Bernard, members of research group on the 'network scale-up' method, which included authors of the method and researchers, who are most actively involved into its development. With the application of the network scale-up method, the estimation of the size of the following groups was conducted:

- risk groups – IDU, CSW, MSM and bridge groups – sexual partners of IDU, clients of FSW and female sexual partners of MSM at both national and regional (oblast) levels;
- separate risk groups – IDU, CSW, MSM – in the age categories 10–14 years and 15–17 years.

30   Bernard, H.R., Johnsen, E.C., Killworth, P.D. and Robinson, S. Estimating the Size of Average Personal Network and of an Event Subpopulation. In M. Kochen (Ed.), The small world (pp. 159–175). – Norwood : Ablex Publishing Co.

In order to receive additional national and regional estimates of the size of IDU, FSW, MSM and bridge groups the calculations based on the coefficient method were made. In order to estimate the size with the use of this method, the researchers used the available government statistics data, behavioural survey data among the representatives of risk groups (IDU, FSW), government statistic data and registration data of non-governmental organizations working in the area of HIV prevention among vulnerable groups.

In order to calculate the national estimates of the size of MSM group the researchers used secondary analysis and extrapolation of data from the national Ukrainian representative behavioural surveys of young people aged 14-24 years and adults ages 25-49 years, conducted in 2004 by the State Institute for Family and Youth Affairs (SIFYA) and Ukrainian Institute for Social Research (UISR) with the financial support from ICF International HIV/AIDS Alliance in Ukraine.

In addition, in order to verify the estimates of the size of risk groups, obtained with the use of other methods, Kyiv International Institute of Sociology conducted a research with the use of "imagined friend" method suggested by the Institute specialists. The research was implemented in Donetsk oblast as one of priority regions for HIV/AIDS response. This research made it possible to obtain estimates of the size of IDU, FSW and MSM groups.

National and regional estimates of the size of key populations most-at-risk for HIV infection, calculated with the use of different methods, were submitted for review to the intersectoral Working Group on Monitoring and Evaluation of Efficiency of Programme Activities of HIV/AIDS Response. This Working Group included the leading national experts in epidemiology, narcology, sociology and social work. On the basis of the expert panel discussions, decisions were made on which of the estimates received with the use of different methods reflect the real situation in Ukrainian society best of all. The national estimates of the size of key risk groups (IDU, FSW and MSM) were preliminarily approved. The regional estimates of the size of IDU, FSW and MSM were submitted for review and approval to the representatives of regional institutions dealing with HIV/AIDS issues. Estimates approved at the national and regional levels can be found in the section 'Key Results of Estimation of the Size of Populations Most-at-Risk for HIV Infection in Ukraine in 2009" in this publication.

Empirical base of research

- Sociological survey of the population with the use of the network scale-up method conducted in December 2008 – January 2009 by Kyiv International Institute of Sociology with the financial support from ICF International HIV/AIDS Alliance in Ukraine. Total, individual interviews in the household were conducted with 10,866 respondents in 478 settlements of Ukraine (194 cities, 103 towns and 181 villages). The sampling used is representative for the population aged 14 years both for Ukraine and for each of 24 oblasts, AR Crimea, Kyiv and Sevastopol cities.

- Statistical data of the MoH of Ukraine at the national and regional levels: report on the population and treatment of people with mental or behavioural disorders caused by the use of psychoactive substances including opiates (by 01.07.2008); data on hospitalization of drug addicts to drug and mental in-patient clinics (reporting period – 2007).

- Statistical data of to the MIA of Ukraine on the national and regional levels: data about registration of people, who practice non-medical use of narcotic drugs, psychoactive substances and their analogues (by January 1 2009).

- Results of the research "Verification of the data of medical drug registration in Ukraine" conducted by the Ukrainian Institute of Public Health Policy with the financial support from the WHO Office in Ukraine and ICF International HIV/AIDS Alliance in Ukraine. The research was conducted in December 2008 – January 2009 in the cities of Dnipropetrovsk, Donetsk, Kyiv, Lviv, Mykolayiv, Odessa, Poltava and Kherson. Information was collected about 13,306 people under narcological check-up due to the narcotic drug use (not alcohol).

- Sociological survey among IDU within the project "Behaviour Monitoring among Injecting Drug Users, as a Component of Second Generation Sentinel Surveillance". Overall 3,711 IDU were polled in June – October 2008 in 16 cities of Ukraine (Dnipropetrovsk, Donetsk, Kirovograd, Luhansk, Lutsk, Lviv, Mykolayiv, Odessa, Poltava, Simferopol, Sumy, Kharkiv, Kherson, Khmelnitsky, Cherkassy and Kyiv). Implementers – Centre of Social and Political Studies "SOCIS-CSPS" with the financial support from ICF "International HIV/AIDS Alliance in Ukraine" within the program "Overcoming HIV/AIDS Epidemic in Ukraine", supported by the Global Fund to Fight AIDS, Tuberculosis and Malaria.

- Sociological survey among FSW within the project "Behaviour Monitoring among Women, who Provide Commercial Sex Services, as a Component of Second Generation Sentinel Surveillance" in 16 cities of Ukraine that was conducted by Kyiv International Institute of Sociology in cooperation with Ukrainian AIDS Prevention Centre by the commission of ICF International HIV/AIDS Alliance in Ukraine. Overall 1,619 women over 14 years of age were interviewed. The survey was conducted in March-December 2008 in the cities of: Dnipropetrovsk, Donetsk, Kirovograd, Kyiv, Luhansk, Lutsk, Lviv, Mykolayiv, Odessa, Poltava, Simferopol, Sumy, Kharkiv, Kherson, Khmelnitsky, and Cherkassy.

- Sociological survey among MSM within the project "Behaviour Monitoring among Men, Who Have Sex with Men" funded by ICF International HIV/AIDS Alliance in Ukraine within the program "Overcoming HIV/AIDS Epidemic in Ukraine", supported by the Global Fund to Fight AIDS, Tuberculosis and Malaria was conducted in 2007 by Ukrainian Institute for Social Research named after Olexander Yaremenko in the cities Dnipropetrovsk, Donetsk, Ivano-Frankivsk, Kyiv, Kryviy Rih, Luhansk, Mykolayiv, Odessa, Simferopol, Kherson, Cherkassy and Yalta. Respondents were recruited by the RDS (respondent driven sampling) method. Total number of respondents was 1,764 people.

- Sociological research with the use of 'imagined acquaintance' method in Donetsk oblast. The research was conducted by Kyiv International Institute of Sociology in May-June 2009 in Donetsk oblast as one of priority regions in terms of HIV/AIDS response in order to clarify the estimates of the size of risk groups obtained with the use of other methods. The research provided estimates of the size of IDU, FSW and MSM.

- Sociological survey among youth, aged 14-24, within the project "Behaviour Monitoring of Youth, as a Component of Second Generation Sentinel Surveillance". Overall 2,501 respondents were polled in October-November 2004 in all oblasts of Ukraine, Autonomous Republic of Crimea and the city of Kyiv. Sampling total is multi-staged, territorial and settlement-based, stratified, and representative of the population of Ukraine aged from 14 to 24 years split by: type of settlement, gender, age and oblast. Implementers – SIFYA and Ukrainian Institute for Social Research, funded by ICF „International HIV/AIDS Alliance in Ukraine" within the program "Overcoming HIV/AIDS Epidemic in Ukraine", supported by the Global Fund to Fight AIDS, Tuberculosis and Malaria;

- Sociological survey among adult population of 25-49 years of age "Attitudes and Behavioural Orientations of Adult Population towards HIV/AIDS Problem and towards People, who Live with HIV/AIDS". Overall 2,017 respondents were polled in November-December 2004 p. in all oblasts of Ukraine, Autonomous Republic of Crimea and the city of Kyiv. Sampling total is multi-staged, territorial and settlement-based, stratified, and representative of the population of Ukraine aged from 25 to 49 years split by: type of settlement, gender, age and oblast. Implementers – SIFYA and Ukrainian Institute for Social Research, with support and financial assistance of the Ministry on Family, Youth and Sports of Ukraine;

- Population survey within the project Demographic and Health Survey of the Population of Ukraine. Overall, 6,841 women and 3,178 men were polled in July-November 2007 in all oblasts of Ukraine, AR Crimea and Kyiv City. Information was collected by Ukrainian Centre for Social Reform with administrative support provided by the State Statistics Committee of Ukraine.

ESTIMATING THE SIZE OF GROUPS AT RISK FOR HIV AND BRIDGE GROUPS USING THE METHOD OF SOCIAL NETWORK SCALE-UP

General idea of the method

Unlike other methods used to estimate the size of risk groups, social network scale-up methodology does not require representative samples of groups under study; rather, it focuses on results of surveys of statistically representative sample of the general population, which makes obtaining the data easier.

The idea of the method is to find representatives of target groups, in this case – groups at risk for HIV – among people known to respondents within their social networks. It is difficult to obtain adequate estimates of the size of stigmatized groups based on answers to the direct questions to respondents because of "sensitive" nature of such questions. Instead, especially if anonymity is preserved, it is much easier for respondents to give answers to questions like "How many people do you know who inject drugs?" However, it should be noted that such data will likely be understated, because even this wording of the question remains "sensitive"[31].

It should be added that in contrast to other definitions of the social networks, found in relevant sources[32] (for example, "support network", "network of closest people"), the definition used by the method of social network scale-up distinguishes so-called "active network" (individuals, with whom a respondent maintained contacts during the last two years) from the "general network" of acquaintances (all people whom a respondent ever knew)[33]. The established variant of the definition of acquaintances, used by this method, looks as follows: "individuals, who mutually recognize each other by sight or name, can be contacted, and have had contact within the last two years, either in person, or by phone or e-mail".

In addition to populations, whose size we need to calculate using the results of the study, the questionnaire, used by the method of scaling-up of social networks, should include about 20–30 groups (but no less than 6 groups) of population, the size of which is know to the official statistics. Respondents are asked whether they know representatives of the number of groups (e.g. men named Paul, women who gave birth to a child in 2008, and so on). Using respondents' answers regarding these "known" groups, the method allows to calculate first the number of acquaintances in the respondent's "active network" (c) (maximum likelihood estimation is calculated[34]) using the following formula:

[31] Killworth, P. D., Johnsen, E. C., McCarty, C., Shelley, G. A., Bernard, H. R. A social network approach to estimating seroprevalence in the United Stated. Social Networks 20 (1998), pp. 23–50.

[32] Marsden P.V. Recent Developments in Network Measurement. In Carrington, P.J., Scott, J., Wasserman, S. Models and methods in social network analysis. – Cambridge University Press, 2005.

[33] Killworth, P.D., Johnsen, E.C., McCarty, C., Shelley, G. A., Bernard, H. R. A social network approach to estimating seroprevalence in the United Stated. Social Networks 20 (1998), pp. 23–50.

[34] Maximum likelihood estimation.

$$c_i = t \bullet \frac{\sum_{j=1}^{L} m_{ij}}{\sum_{j=1}^{L} e_j}$$

where "t" is the size of general population, in which we search the size of unknown groups (for example, among the population of Ukraine, or among the population of specific oblasts of Ukraine);

"m" – the number of acquaintances of every respondent in a specific "known" group "j" (may have value from 1 to "L").

Further on, using calculated number of acquaintances, the method makes it possible to obtain estimates of the size of risk groups under study, whose numbers are unknown (e)[35].

$$e = t \bullet \frac{\sum_{j=1}^{L} m_{ij}}{\sum_{i=1}^{N} c_i}$$

Key assumption of the method is that the larger is the size of a specific category (group) of population, the more frequently its representatives will be mentioned by respondents of the study as their acquaintances. In other words the share (p) of each category of the population of the size of (e) among the general population (t) (p = e/t), can be applied with certain likelihood to each individual social network (c). That is, social networks of people reflect distribution of these categories in the society [5].

Such assumption can be described by the formula:

$$\frac{m}{c} = \frac{e}{t}.$$

where "m" is the number of people of certain category within the social network of a respondent (c).

The method is also based on the following three assumptions[36]:

- Every one has a sufficient level of knowledge about his/her acquaintances (the absence of information "transmission error"). The method of social network scale-up implies that respondents have enough information about characteristics of their contacts, who are being asked about during the study.

- All people have equal chances to know someone from populations under study (e) – the absence of "barrier effect". For example, it is assumed that all citizens of Ukraine have equal chances to know someone with diabetes. And these chances increase proportionally

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[35] In addition, estimated sizes of groups can be obtained on the basis of analysis of sampled mean numbers of acquaintances within groups, and mean sample size of the social network (our experience of application of this method shows that results, obtained using these two methods are very similar).

[36] McCarty, C., Killworth, P. D., Bernard, H. R., Johnsen, E.C., Shelley, G. A. Comparing Two Methods for Estimating Network Size. Human Organization; Spring 2001; 60, 1; ABI/INFORM Global, p. 28.

if the category is expanding. This assumption would be true only as a specific trend, because there exist certain groups, for which this assumption will never be true (for example, chances to have Crimean Tatars among their acquaintances are much higher for inhabitants of Crimean Peninsular, than for residents of other regions of Ukraine).

- During the limited timeframes of the interview respondents are still able to provide rather precise calculations (or estimations) of the number of their acquaintances representing certain category (doctors, men over 70 years, etc.). Problems with recalling and approximate nature of estimations may distort the accuracy of data, obtained via this methodology.

This list can also include the fourth assumption, common for all methods working with "sensitive" aspects of behaviour:

- Sincerity of answers of respondents. Validity of this assumption raised certain doubts when respondents are asked to answer "sensitive" questions. When the issue concerns stigmatized groups, the effect of "social desirability" may come into force.

The main advantage of the method of social network scale-up is its mathematical and statistical validity. By using formulas to calculate the size of the network, the method makes it possible to predict the size of target groups. If there are no systematic deviations in method's established assumptions, estimations of the size of populations can be made with high accuracy. Moreover, the accuracy of estimated size can be verified by the evaluations of the size of groups with reliable statistical data regarding their size. Accordingly, if predictions regarding the size of statistically known groups are successful, it is possible to assume that the size of target groups would also be valid. This method is quite user-friendly, because it does not require reaching representatives of target groups under study in person.

History of the method and overview of completed studies

The method of scaling up of social networks was first introduced by Russell Bernard, Peter Killworth, Eugene Johnsen and Scott Robertson to estimate the size of difficult-to-reach populations in 1986, in particular, to estimate the number of victims of the earthquake in Mexico City[37]. In the following years the method was used in the number of studies, conducted in the United States, to estimate the size of such groups as HIV positive individuals, heroin users, victims of rape and homeless people[38].

[37] Bernard, H. R., Johnsen, E.C., Killworth, P.D., and Robinson, S. Estimating the Size of Average Personal Network and of an Event Subpopulation. In M. Kochen (Ed.), The small world (pp. 159–175). Norwood: Ablex Publishing Co.

[38] Killworth, P. D., McCarty, C., Bernard, H. R., Shelley, G. A., and Johnsen, E. C. Estimation of Seroprevalence, Rape, and Homelessness in the United States Using a Social Network Approach. 1998. Evaluation Review 22:289–308. Published by SAGE Publications, http://sagepublications.com

[39] Killworth, P.D., Johnsen, E.C., McCarty, C., Shelley, G. A., Bernard, H. R. A social network approach to estimating seroprevalence in the United Stated. Social Networks 20 (1998), pp. 23–50.

In 1993–1994 the method was applied to estimate the size of HIV positive people in Florida, USA[39] Representative sample of the residents of Florida (1,524 respondents) was surveyed via the telephone. In order to estimate the size of social network, 25 categories of the population were used with known official statistics. Selected categories included the presence of specific diseases (both stigmatizing and non-stigmatizing); involvement in different sports and other visible activities, such as piloting. Respondents were also asked if they knew anyone with 14 names, used in the study. Average size of the social network of residents of the state of Florida was 108 persons; the number of HIV positive people was estimated as 1.6 million. This estimation of HIV positive people exceeded other evaluations obtained via different methods (it should be noted that estimates received using other methods are not accurate as well because of the number of systematic errors). Among the factors, which could lead to overstatement of estimations (inclusion of HIV negative individuals to the group of PLWH because of lack of knowledge about acquaintances, and ungrounded conclusions based on possible symptoms – the transmission effect; duplication of contacts due to close nature of social networks of HIV positive people and greater chances to know other HIV positive individuals), the researchers singled out limitations of the sample, which included only Florida residents, while this limitation was not applied to "acquaintances" of the respondents (question regarding acquaintances generally related to "individuals, who mutually recognize each other by sight or name, can be contacted, and have had contact within the last two years, either in person, or by phone or e-mail").

Another study using the social network scale-up approach was carried out in 1994 to estimate the size of HIV positive population, homeless people and female victims of rape in the United States[40]. The study was based on the nationally representative sample of 1,554 respondents, surveyed via the telephone. The size of individual social networks of respondents was estimated on the basis of the number of acquaintances representing 29 categories, which included: women who gave birth during the last 12 months; women who adopted a child in the past 12 months; widowed persons; individuals on kidney dialysis; postal service workers; commercial pilots; members of certain organization; people with diabetes; individuals who started up their own business in the past 12 months; individuals having twin brother or sister; licensed gun dealers; AIDS patients; male prisoners; homicide victims in the past 12 months; individuals who committed suicide in the past 12 months; persons who died in motor accidents during the last 12 months; as well as 6 female and 6 male names. Average size of the social network of respondents was 286. Using these estimates, the authors of the study calculated the size of three populations of unknown size. Maximum likelihood values and 95% confidence intervals are found for seroprevalence – 800,000 +/- 43,000; for homeless – 526,000 +/- 35,000; and for women raped in the last 12 months – 194,000 +/- 21,000. The estimate for HIV positive people agrees strikingly with medical estimates; the homeless estimate is well within the published estimates; and the authors' estimate lies in the middle of the published range for rape victims.

In 1997–1999 the method of social network scale-up was applied to estimate the size of heroin users as a part of the evaluation of a nationwide, community-based drug and alcohol prevention programme in the United States[41]. The design of the study using the network scaling-up methodology included the telephone su-

[40] Killworth, P. D., McCarty, C., Bernard, H. R., Shelley, G. A., and Johnsen, E. C. Estimation of Seroprevalence, Rape, and Homelessness in the United States Using a Social Network Approach. 1998. Evaluation Review 22:289–308. Published by SAGE Publications, http://sagepublications.com

[41] Kadushin, Ch., Killworth, P. D., Bernard, H. R., Beveridge, A.A. Scale-up Methods as Applied to Estimates of Heroin Use. Journal of Drug Issues 0022-0426/06/02, pp. 417–440.

rvey of 5,892 respondents aged 16–44 years in 14 sites. Estimates of the number of heroin users were calculated separately for each site. The sample in the sites ranged from 197 to 1,029 respondents. Questions regarding contacts from six categories of population were included in the study to calculate the size of individual social networks of respondents. These categories include: 1) victims of robbery; 2) victims of assault; 3) victims of burglary; 4) victims of auto-theft; binge drinkers; and 6) marijuana users. It should be noted that "controlled" size of "known" populations, which was used to compare estimated sizes of these groups using the social network scale-up method, was obtained within the framework of the same study on the basis of direct questions to respondents regarding their belonging to this or that population. The average ratio between the known populations and the estimates is 0.943. Estimated numbers of heroin users seems adequate for sites with comparable data, obtained via other estimation methods. Average size of the social network of respondents in this study is 55 persons. Authors believe that such limited size of the social network (c) result from the fact that populations, which were used to calculate c, are rather specific; the data on them may be distorted due to poor information transmission and barrier effect, as in case of heroin users. If we assume that the c estimates in this study are understated, then estimates of the size of the heroin users group should be considered as overstated.

So, the method of social network scale-up has demonstrated promising results in terms of estimation of the size of vulnerable populations. However, it should be noted that applicability if the network scale-up methodology to estimate the size of groups at risk for HIV infection and "bridge" populations is not universally approved and it still required additional studies. This method was not previously used to estimate the size of FSW, MSM and "bridge" populations.

Setting up the study using the method of scaling-up of social networks

In this section we will review requirements to the design of the study using the method of scaling-up of social networks. These requirements can be divided into two groups:

- Requirements towards sample;
- Requirements towards questionnaire.

Collection of data for the method of social network scale-up can be performed differently – both through personal interview or telephone and postal survey. While selecting the data collection methodology, it is worthwhile to consider the geography of the study, taking into account such objective factor as the level installation of telephones in households, as well as "response rate", offered by this or that data collection method.

Requirements towards sample. Requirements towards sample are set by the definition of the general totality, which it should represent, as well as desirable range of confidence interval of the estimation.

The general totality, which is to be represented by the sample, is defined by the objectives on estimation of the size of populations under study. If researchers seek the national estimates, the sample should be nationally representative. If it is necessary to calculate estimates at the level of individual regions, the sample should be regionally representative.

The structure of the questionnaire. The questionnaire should include the follo-wing sets (blocks) of questions:

- questions to estimate the number of contacts, whom respondent knows among populations to be estimated;
- questions to estimate the size of individual social networks of respondents – questions regarding the number of people, whom respondent knows among populations with statistically known sizes;
- social and demographic information about the respondent.

So, the size of the questionnaire basically depends on the number of groups, whose size needs to be estimated, as well as on the number of groups, necessary to identify the size of social networks (c). Authors of publications regarding application of this method recommend to use 20-0 "known" groups to estimate the size of the network: the more groups are involved in the analysis, the less is the standard deviation in the estimation of the size of social network[42]. At the same time, if the number of groups is less than 20, estimates of the size of populations under study would be biased. On the other hand, it was statistically confirmed that 6-7 groups also provide unbiased estimates[43]. In one of recent works on the method of scaling-up of social networks[44], its authors demonstrated that the higher is the overall fraction of "known" groups among the general population, the lower is the standard error of estimation of the size of social network. At the same time, the highest reduction of the standard error was observed at gradual increase of variable to 0.2; after this value was reached, the standard error shows no significant reduction with the increase of the number of "known" groups. This is also true for 6, 12 and 18 "known" groups.

Definition of acquaintances. Questions regarding the number of respondent's acquaintances belonging to this or that population require precise definition of those who can be included in the category of "acquaintances" (contacts) within this study. Generally accepted definition of acquaintances, used in the method of scaling-up of social networks, was already mentioned in this Report[45]. In every specific study the "geography" of this definition should be specified according to the goals of the study: if the study design envisages estimation of the size of populations at the national level, the definition of acquaintances should include those living in Ukraine; if it is necessary to make estimations at a specific region (e.g. oblasts), the definition should mention people living in this region.

Selection of groups with known size. Selection of "known" populations from open sources requires observance of several principles:

First, these categories should be defined by characteristics, which are obvious for the respondent – while thinking about their contacts during an interview, respondents should be able to easily define the belonging of their acquaintances

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[42] Kadushin, Ch., Killworth, P. D., Bernard, H. R., Beveridge, A.A. Scale-up Methods as Applied to Estimates of Heroin Use. Journal of Drug Issues 0022-0426/06/02, pp. 417–440.

[43] Killworth, P.D., Johnsen, E.C., McCarty, C., Shelley, G. A., Bernard, H. R. A social network approach to estimating seroprevalence in the United Stated. Social Networks 20 (1998), pp. 23–50.

[44] McCormick, T.H., Salganik, M.J., Zheng, T. How many people do you know?: Efficiently estimating personal network size. September 16, 2008.

[45] Respondents are offered the following definition of acquaintances/contacts: "Individuals, whom you mutually recognize by sight or name, who can be contacted, and have had contact within the last two years, either in person, or by phone or e-mail".

to these groups on the basis of these characteristics. Names are good example of easily identifiable characteristics.

Second, the groups should be selected on the basis of heterogeneity. Inclusion of populations of only one type – only ethnic groups or individuals with certain diseases – can lead to barrier errors[46].

Third, the groups should vary in terms of their size. Inclusion of only large populations (e.g. "men in the age of 20-30 years" or "women above 70 years of age") may cause many biases, because it is difficult for respondents to estimate the size of their contacts in large categories[47]. The use of small-sized groups only is also inadequate, because it leads to estimation errors, caused by the fact that the sample main contain extremely limited number of people who have acquaintances of this kind. Authors of the method of social network scale-up recommend selecting groups with the size from 0.1% to 4% of the general population[48].

It is also expedient to include "known" populations, which are close to groups under study in terms of the size, geographic localization and/or stigmatization.

While selecting the group, one should try to estimate (at least qualitatively) the magnitude of transmission and barrier errors, which can be associated with this or that population.

Selection of the categories with known size for the purpose of the study is limited to available official statistics. Many groups of interest to a researcher cannot be covered by the statistical records. At best, selected groups should be the subject of regular monitoring by the state statistics authorities – it will make it possible to perform additional studies using similar methodology to track changes in the size of the populations in time.

Definition of groups at risk for HIV infection for respondents. Definition of the "risk group" for respondents requires special attention. Definitions of these populations, accepted in the scientific sources, are not always appropriate for respondents. For example, many respondents are not familiar with such terms as "people living with HIV", "injecting drug users", "female sex workers" and "MSM". It is obvious that researchers need to speak the language of respondents. However, speaking about stigmatized groups, the public became used to apply either offensive names – "drug addicts", "homosexuals", "prostitutes", or incorrect definitions, such as "AIDS patients". The use of such names in the questionnaire will likely increase sensitivity of questions and insincerity of answers. As for answers regarding "AIDS patients", it will be extremely difficult to interpret them (some respondents may correctly identify these people as individuals having AIDS; the other respondents may speak about all people living with HIV). This is why a researcher should use clear and understandable definitions, and maintain their neutrality.

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[46] Christopher McCarty and H. Russell Bernard. University of Florida. How to conduct a network scale-up survey. Presentation to UNAIDS, New York, NY September 3, 2008.

[47] Results of focus groups, organized by American researchers, as well as outcomes of cognitive interviews, conducted by KIIS during the pre-test of tools for the Ukrainian study have shown that while answering the question on the number of contacts in small groups, respondents tent to count their acquaintances. As for the large groups, respondents tend to give estimates, which seem to them more or less close to real number of their contacts in this group.

[48] Christopher McCarty and H. Russell Bernard. University of Florida. How to conduct a network scale-up survey. Presentation to UNAIDS, New York, NY September 3, 2008.

Limitations of the method of scaling-up of social networks

There exist three key factors which affect the accuracy of estimates obtained through the social network scale-up methodology:

- information transmission effects;
- insincerity of respondents' answers;
- barrier effects.

The barrier effect may manifest itself in the fact that stigmatized populations – IDU, FSW and MSM – are unevenly localized throughout the territory of Ukraine. For example, residents of the cities are more likely to know some drug users as compared to villagers[49]. However, if the sample is representative for urban and rural areas, the barrier effect should not emerge. In any case, we can only assume the influence of specific barrier effects, but evaluation of their impact requires additional specialized study.

Much stronger for these risk groups are the effects of transmission of information within social networks, and the effect of insincerity of respondents' answers. Very often risk groups are stigmatized in Ukraine, so representatives of these populations may conceal their behaviours from their acquaintances; on the other hand, respondents may be unwilling to admit knowing such people. The question regarding knowing people from stigmatized "risk groups" is considered "sensitive", especially in the course of individual interview (when a respondent has to give his/her answer to the interviewer). It is known that in case of "sensitive questions" respondents may choose to give "socially desirable" answers.

Information on the study, carried out in Ukraine

Minimum age of representatives of risk groups, subject to size estimation, was specified by the client (ICF International HIV/AIDS Alliance in Ukraine) – 10 years of age. Lower age qualification of 14 years was established for sampled population for several reasons. First, for reasons of ethics, questions regarding groups at risk for HIV may have negative impact on children under 14 years of age. Second, the essence of questions would be more difficult for children of 10-13 years to understand, as compared to the rest of respondents: otherwise we would receive large numbers of answers "I don't know" or "Difficult to say" to key questions. Third, it is generally accepted practice to use the form of informed consent for surveying children, which should be read and approved by the child's parents prior to his/her participation in the study. Sensitive nature of questions, especially regarding individuals who provide sex services or use drugs, would lead to significant number of refusals on the part of the parents.

Research tools. Peculiarities of the questionnaire

Respondents were asked two questions regarding the number of representatives of various groups among their contacts. According to the research objectives – to estimate the size of risk groups (IDU, CSW, MSM) and "bridge" populations at the national and regional level – the respondents were asked about overall number of acquaintances of a certain category living in Ukraine, and as a separate

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[49] According to the study, implemented using the scaling-up of social networks method, residents of the cities know more IDU than rural residents by 2.5 times.

question – on the number of those living outside oblast (for Kyiv and Sevastopol – outside these cities). The idea was to calculate the number of acquaintances living within oblast (city) limits during the analysis of regional data.

Together with questions regarding the number of acquaintances belonging to specific groups of population, respondents were asked to evaluate the level of respect of the general public towards these groups. These data were used to estimate the level of concealment by the respondents of the number of their contacts in the groups of low respect (these include both groups at risk for HIV infection and "bridge" populations).

"Statistically known" groups of population. The list of populations with the known size, used in the study, included 22 groups:

- Men aged 20-30 years
- Men aged 15-17 years
- Men over 70 years of age
- Women aged 20-30 years
- Women aged 15-17 years
- Women over 70 years of age
- Children (boys and girls) in the age of 10-13 years
- Moldavians
- Romanians
- Poles
- Jews
- Roma
- Individuals of the I group of disability[50]
- Doctors of any specialty
- Individuals who died in 2007
- Men named Paul
- Men who were incarcerated in 2007
- Men who officially divorced in 2007
- Women who gave birth to a child in 2007
- Doctors and candidates of sciences, who received their degrees in Ukraine during the last 15 years
- Nurses, hospital attendants and other paramedic staff
- Police officers

Some groups were limited to the data for 2007 (deceased; women who gave birth to children; men who officially divorced; men in penitentiary facilities) because of the lack of statistical data on their size in 2008. Questions regarding these groups also concerned 2007 data.

Statistical data on the size of ethnic groups was obtained from the All-Ukrainian Census due to the absence of more recent official data from institutions, responsible for its collection and calculation. We should note that the size of eth-

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[50] Individuals of the I group of disability are persons with pronounced and obvious limitations of vital functions, preconditioned by the disease, injuries, congenital defects, which lead to social de-adaptation through inability to study and communicate; associated with difficulties in space orientation, control over one's own behaviour, difficulties with transition/movement and self-serving, participation in working activities; and if these disorders require permanent external support and care. All respondents received relevant explanation.

nic and national groups includes people younger than 10 years; however, it was impossible to disaggregate statistical data on these groups by age. At the same time we can assume that this produces only minor deviations regarding the size, which can be generally ignored.

The group of "doctors and candidates of sciences, who received their degrees in Ukraine during the last 15 years" was initially introduced as "doctors and candidates of sciences", but the absence of official statistical data on the overall size of this population forced the researchers to change the definition.

The number of police officers was defined on the basis of the special Law of Ukraine. Most recent changes to this law were introduced on May 18, 2004, so we can assume that the size of this group did not change since that date.

The ratio of "known" groups among the general population is 0.47.

Evaluation of effect of insincerity of respondents' answers, realized in the study

How sincere were the answers of respondents regarding their acquaintances in the risk groups within this study? In order to answer this question, the researchers performed additional analysis of the data, obtained in the course of the study.

Evaluation of the level of social respect towards representatives of risk groups may serve as a measurement of stigmatization of the social group. At the same time, the evaluation of respect may indirectly estimate the sincerity of respondents' answers regarding the number of contacts representing risk groups.

Using the findings of the study, the researchers analyzed the number of acquaintances in the risk groups, as reported by the respondents, depending on the evaluation of respect towards this group (Tables 4 and 5). This analysis revealed the following interdependence: the lower is the evaluation of social respect towards specific group, the fewer number of contacts was reported by the respondents. This pattern gets broken only in several cases – when the number of respondents indicating high or very high social respect is less than 60 persons (this data becomes statistically unreliable; theoretical sample error exceeds 15%).

So, adjustment of estimates of the respondents to the level of respect may be based on the assumption that the lowest deviations are observed in the estimates of the size of acquaintances from risk groups, which were evaluated by the respondents as "average", that is, provided neutral evaluation.

In order to adjust the evaluations of respondents for every group by the level of trust, the following scales can be used:

$$Wi = Mi/M3 ,$$

where Wi is the weight of each group by the level of respect ("i" alters from 1 to 5, that is these are groups of respondents, who gave "very low", "low", "average", "high" and "very high" evaluation of respect towards a specific risk group under consideration);

Mi is the average number of contacts from the specific risk group in the "i" group of respondents by the level of respect;

$M3$ is average number of contacts in the group of respondents, who evaluated respect as "average".

Table 1

IDU, FSW, MSM – average estimates of the number of contacts in risk groups by the level of respect

The level of respect *	IDU		FSW		MSM	
	Average number of contacts	n – sample size*	Average number of contacts	n – sample size	Average number of contacts	n – sample size
Very low	0.382	7,094	0.107	5,673	0.022	7,857
Low	0.380	2,606	0.129	3,208	0.059	1,733
Average	1.486	461	0.351	919	0.059	405
High	0.055	58	0.414	142	0.122	47
Very high	0.000	11	0.260	29	0.216	25
Total in the sample	0.429	10,229	0.141	9,971	0.0305	10,068

* Options "Difficult to say; I don't know" in the evaluation of the level of social respect were not considered in the analysis.

Table 2

Male CSW, sexual partners of IDU, clients of FSW – average estimates of the number of contacts in groups by the level of respect

The level of respect *	Male CSW		Sexual partners of IDU		Clients of FSW	
	Average number of contacts	n – sample size*	Average number of contacts	n – sample size	Average number of contacts	n – sample size
Very low	0.008	6,802	0.078	6,490	0.129	5,786
Low	0.010	2,539	0.084	2,543	0.212	2,271
Average	0.016	510	0.139	574	1.234	1,172
High	0.170	81	0.141	73	3.221	118
Very high	0.000	24	0.061	25	2.899	30
Total in the sample	0.010	9,956	0.08329659	9,705	0.3353	9,378

* Options "Difficult to say; I don't know" in the evaluation of the level of social respect were not considered in the analysis.

These scales should be applied to "average" in appropriate groups.

ESTIMATING THE SIZE OF IDU POPULATION

Within this study IDU are defined as individuals of 10 years and older, who injected drugs during the last 12 months. In the study the size of IDU group was estimated separately for age groups of 10-14 years and 15-17 years. Below are the questions, offered to the respondents.

Question from the questionnaire:

"Do you know people aged 10 years and older who injected drugs in the last 12 months? How many of them do you know?

How many of them are younger than 15 years?

How many of them are in the age of 15-17 years inclusive?" [51]

Table 3

Estimations of the size of IDU at the national level, calculated through the method of scaling-up of social networks[52]

Group	Estimated size	Confidence interval (95%)[53]
Individuals who injected drugs during the last 12 months	103,000	85,000–112,000
Younger than 15 years	7,700	4,800–9,700
15–17 years of age	17, 000	14,000–20,000

How accurately these estimates reflect real size of IDU population in Ukraine? In order to find it out, it is necessary to compare these data with estimates obtained through other methods (see below), or with statistical data.

Statistical data for IDU population as of January 1, 2009 (the number of persons registered by the internal affairs bodies (IAB) in connection with substance use) makes up 174,110 individuals. As of mid-2008, health care bodies (HCB) registered 166,659 persons in connection with the substance use. Even though the data for IDU population cannot be considered valid or reliable – both because of peculiarities of registration and because of the fact that neither IAB nor HCB distinguish injecting drug users from the group of drug addicts[54] – Ukrainian experts, who work with these populations in the area of HIV/AIDS prevention believe, that estimates of the size of injecting drug users group, obtained using the method of scaling-up of social networks, is understated.

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[51] We should remind that "acquaintances" in this study are defined as "individuals, who live in Ukraine; who have mutual recognition with respondents by sight or name; who can be contacted, and have had contact within the last two years, either in person, or by phone or e-mail.

[52] Detailed description of methodology of calculation of estimated size of populations under study is provided in preceding subsection of this Report.

[53] Calculated for fixed estimates of sizes of social networks "c".

[54] It is possible that the data on the size of IDU population, obtained through the method of scaling-up of social networks may also include the data on the users of other types of drugs – respondents may find it difficult to distinguish, how exactly their acquaintances use drugs (especially if it concerns people whom they don't know too good).

If it is true, than what is the cause of such underestimation of the risk groups? On the one hand, underestimated size of IDU population can be explained by the barrier effect – risk groups, such as IDU, are unevenly localized throughout the territory of Ukraine. The barrier effect may also affect the fraction of IDU, who can limit themselves to communication exclusively with other drug users (we mean joint living and shared drug use). In this case, drug users themselves, their relatives and neighbours are those who would probably know much about them. In other words, the size of this part of IDU within this stuffy can be estimated only by words of drug users themselves, their cohabitants and neighbours. Due to insufficient representation of such respondents in the sample, it can lead to understatement of the overall estimation of IDU group.

In any case, we can only assume the influence of specific barrier effects, but evaluation of their impact requires additional study.

On the other hand – and it seems more important –understatement of estimated size of IDU may be explained by insincerity of respondents' answers. Injecting drug users are stigmatized in Ukraine, and this may affect the sincerity of answers of respondents in the evaluation of the number of known IDU. The evaluation of social respect towards this population may serve as one of measures of this group's stigmatization. Assuming that evaluation of social respect may serve as indirect estimation of the sincerity of respondents' answers on the number of contacts representing risk groups, the researchers adjusted estimates of the number of IDU, known to respondents, using the data on the level of respect towards IDU, collected within this study.

Adjusted estimates of the size of IDU are as follows:

Table 4

Estimations of the size of IDU at the national level after adjustment to insincerity bias in the respondents' answers

Group	Estimated size	Confidence interval (95%)
Individuals who injected drugs during the last 12 months	358,000	285,000–389,000
Younger than 15 years	28,000	17,000–34,000
15–17 years of age	59,000	49,000–69,000

So, according to the study using the method of scaling-up of social networks, IDU aged 10–15 years make up 8% among all IDU; 24% of IDU are under-age.

Regional estimations of the size of IDU using this method reflect the number of IDU aged 10 years and above. For certain regions estimates are calculated among the entire population – for both urban and rural residents.

Table 5

**Regional estimations of the size of IDU calculated through the method
of scaling up of social networks after adjustment to insincerity bias
in the respondents' answers**

AR Crimea/ Oblast/ City	Estimation – the size of IDU	CI 95%, low margin	CI 95%, upper margin
AR Crimea	33,100	17,700	48,400
Kyiv City	29,200	11,600	46,800
Kyiv	15,200	7,800	22,600
Vinnytsia	10,500	4,600	16,300
Volyn	5,600	1,400	10,000
Dnipropetrovsk	54,900	30,100	79,800
Donetsk	18,000	5,800	29,900
Zhytomyr	7,100	3,700	10,600
Zakarpattya	600	0	1,500
Zaporizhja	38,900	25,800	51,900
Ivano-Frankivsk	3,900	600	7,200
Kirovograd	11,800	2,600	20,900
Luhansk	23,000	7,100	38,900
Lviv	13,600	5,900	21,300
Mykolayiv	9,100	3,800	14,500
Odessa	8,100	2,500	13,600
Poltava	10,600	3,500	17,800
Rivne	2,800	900	4,600
Sumy	6,000	2,400	9,600
Ternopil	3,100	1,300	4,900
Kharkiv	16,600	5,100	28,100
Kherson	9,400	4,700	14,200
Khmelnitsky	11,900	6,800	17,700
Cherkassy	7,400	2,400	12,300
Chernivtsi	1,400	300	2,700
Chernihiv	12,000	6,200	17,900
Sevastopol City	8,100	3,500	12,700

ESTIMATION OF THE SIZE OF CSW

For the purpose of this study the CSW size was estimated separately for men and women who trade sex services for money (aged 10 and older) and who had this experience for the previous 12 months. In this study the size of male and female CSW was estimated separately for age groups 10-14 and 15-17 years of age. Below are the questions the survey respondents were asked.

Female CSW (FSW). Question:

"Do you know any women (girls) aged 10 who in the last 12 months traded sex for money? How many of them do you know?

How many of them are under 15?

How many of them are 15 to 17?"

Table 9

Estimation of the Size of FSW on a National Level by the Social Network Scale-up Method

Group	Size Estimates	Confidence interval of the estimation (95%)
Women (girls) who in the previous 12 months traded sex for money	34,000	27,000 – 39,000
Under 15	1,600	940–2,200
Aged 15–17	7,800	5,200–10,000

How close are these estimates to the real size of FSW in Ukraine? To determine this it's necessary to have relevant alternative estimates for comparison – estimates received through other methods (will be provided below) or taken from official statistical sources. It's worthwhile mentioning that there's no official statistics collected for the FSW group in Ukraine. At the same time, Ukrainian experts working with FSW in the area of HIV/AIDS prevention believe that the size of FSW calculated by the social networks scale-up method is underestimated.

What could be the reasons for underestimating the size of FSW by social networks scale-up method? It can be assumed that one of the reasons is barrier effect. Thus, in summertime lots of FSW migrate to the Crimea as it becomes the largest resort area in Ukraine in this time of the year. But this phenomenon cannot be considered a barrier effect for the purpose of this study as our respondents consider the period of 2 years when answering questions about their close ones, and this migration has a seasonal nature.

On the other hand, barrier effect is possible if part of FSW group (those providing sex services at the place of their residence) live where they work and have no opportunity to have any social links except "through work" with other FSW, pimps and clients. This might mean that we may find out about this part of FSW in the study only if mentioned by their clients, pimps or neighbors included into the study sample. In case these groups are underrepresented in the sample due to their small size this might lead to underestimation of the size of FSW providing sex services in their own apartments, and as a result – to overall low estimates of the size of FSW in the country.

Another possible problem is failure to reach those who are more likely to know FSW, their clients. It's likely that this study does not reach such segment of FSW clients as truckers who are clients of so called highway FSW. These people might spend most of their time on the road doing business, and it's hard to reach them with household-based surveys. If this is true, it's only one segment of clients of FSW, however, its size cannot be estimated within this study.

One of the main reasons for underestimating the size with this method could be bias due to insincere respondents answers. FSW group is largely stigmatized in Ukraine, its members may not disclose their behaviors to their close ones, and the latter may not want to admit they know such people. An indirect measurement of respondents sincerity in mentioning the number of people belonging to risk groups might be an assessment of public respect towards such groups. Thus, based on the study data regarding level of public respect toward FSW (based on respondents assessments) FSW size estimates can be adjusted for insincerity of respondents answers.

The adjusted values for FSW group are as follows:

Table 10

Estimates of the Size of FSW on a National Level by the Social Network Scale-up Method after Adjusting for Insincere Response Bias

Group	Size Estimates	Confidence interval (95%)
Women (girls) who in the previous 12 months traded sex for money	81,000	65,000–93,000
Under 15	3,800	2,200–5,300
Aged 15–17	17,000	12,000–24,000

Thus, according to the estimates of this study 26% of FSW are underage..

Regional Estimates

Regional estimates of the size of FSW using this method define the number of FSW aged 10 and older. For the individual Oblasts the numbers are estimated for the total population of the regions, both urban and rural areas.

Table 11

Regional Estimates of the Size of FSW by the Social Network Scale-up Method Adjusted for Insincere Response Bias

AR Crimea/ Oblast/ City	Estimated size of FSW	95% CI, lower limit	95% CI, upper limit
AR Crimea	9,100	3,700	14,600
Kyiv City	2,000	100	4,100
Kyiv	2,100	700	3,600
Vinnytsia	4,000	500	7,800
Volyn	500	0	1,200
Dnipropetrovsk	4,700	1,400	8,600
Donetsk	9,500	1,700	18,500
Zhytomyr	2,500	200	4,800

AR Crimea/ Oblast/ City	Estimated size of FSW	95% CI, lower limit	95% CI, upper limit
Zakarpattya	1,500	400	2,600
Zaporizhja	13,600	7,900	19,200
Ivano-Frankivsk	1,100	300	2,100
Kirovograd	2,300	900	3,600
Luhansk	9,200	3,200	15,000
Lviv	3,200	1,700	4,800
Mykolayiv	1,400	400	2,300
Odessa	2,200	0	4,900
Poltava	2,600	600	5,000
Rivne	600	200	1,000
Sumy	1,800	500	3,300
Ternopil	300	0	600
Kharkiv	5,900	2,600	9,400
Kherson	4,000	0	11,200
Khmelnitsky	2,000	1,000	3,100
Cherkassy	2,900	0	5,800
Chernivtsi	1,000	200	1,900
Chernihiv	500	0	1,500
Sebastopol City	500	200	800

Male CSW. Survey questions:

"Do you know any men (boys) aged 10 who in the last 12 months traded sex for money? How many of them do you know?

How many of them are under 15?

How many of them are 15 to 17"

Table 12

**Estimation of the Size of MSW on a National Level
by the Social Network Scale-up Method**

Group	Size Estimates	Confidence Interval (95%)
Men (boys) who in the previous 12 months traded sex for money	2,400	1,800–3,400
Under 15	443	0–1,200
Aged 15–17	292	107–512

Considering that basic estimates of the FSW obtained by this method are not adequate, it is reasonable to do adjustments for insincere answers from the respondents also for the group of MSW. Below are the size estimates adjusted for insincere answers bias due to public stigmatization of male CSW.

Table 13

**Estimation of the Size of MSW on a National Level by the Social
Network Scale-up Method Adjusted for Insincere Response Bias**

Group	Size Estimates	Confidence Interval (95%)
Men (boys) who in the previous 12 months traded sex for money	3,700	2,800–5,200
Under 15	700	0–800
Aged 15–17	500	200–800

Considering the small estimated size of male CSW group on a national level, and thus, unreliability of data for individual regions, the size of male CSW by the social network scale-up method on a regional level was not estimated.

ESTIMATION OF THE SIZE OF MSM

In a study conducted using a social network scale-up method an MSM group was defined as a group of men aged 10 and older who had sex with men in the previous 12 months. MSM group size was separately estimated for age groups 10–14 and 15–17 years of age.

At the study planning phase it was called into question whether it's possible to adequately estimate the size of such a closed group as MSM is. Due to considerable closeness of this group sexual behaviors of men having sex with men might not be well known to their close ones (those who are not MSM) that's why this method of estimating MSM size may be less appropriate then for the other studied groups. However, in cases when a responder belongs to a MSM group he most definitely knows quite a number of people like himself, and so, it's possible to get at least some estimates of the MSM group size with the social network scale-up method.

Below are the questions the survey respondents were asked.

Survey questions:

"Do you know any men (boys) aged 10 who in the last 12 months had sex with men? How many of them do you know?

How many of them are under 15?

How many of them are 15 to 17"

Table 14

Estimation of the size of MSM on a National Level by the Social Network Scale-up Method

Group	Size Estimates	Confidence Interval (95%)
Men (boys) who in the previous 12 months had sex with men	7,200	5,300–9,100
Under 15	258	0-540
Aged 15–17	198	107-314

It's quite obvious the MSM group size is very much underestimated by social network scale-up method. What could be the reason for such an underestimation with this method? The most probable reason seems to be significant stigmatization of an MSM group in a Ukrainian society[55], and, accordingly, MSM concealing their sexual behaviors even from their closest ones. This study studied the level of public respect in Ukraine as assessed by the respondents.

Assessment of public respect level might be considered an indirect measurement of the level of respondents sincerity – it's logical to assume that significant stigmatization of this social group naturally urges the respondents to hide the fact that they might know such people personally, and thus, negatively affect the level of sincerity of the responses. Keeping that in mind MSM size estimates were adjusted for insincere responses bias.

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[55] According to KIIS, in 2006 29% of adult population (compared to 35% in 1991) objected to homosexuals being treated by the society just like any other people, another 16% (compared to 9% in 1991) somewhat objected and somewhat agreed at the same time.

Adjusted MSM size estimates are as follows:

Table 15

**Estimation of the size of MSM on a National Level Adjusted
for Insincere Response Bias**

Group	Size Estimates	Confidence Interval (95%)
Men who in the previous 12 months had sex with men	14,000	10,000–17,000
Under 15	*500*	*0–1,000*
Aged 15–17	*400*	*80–600*

However, even with this adjustment the estimated MSM size is not adequate for the country.

Besides possible respondents' insincerity it also has to be taken into account that unlike IDU or even FSW, risk behaviors of MSM – which is their sexual behavior – might be less "obvious" to people around them, it might not occur to them and they might find out about it only if MSM tell them about it. Thus, if social networks scale-up method is applied to estimate an MSM group size so called "transmission bias" might occur as this group is hidden and invisible. Men having sex with men might keep their behavior a secret even from the closest people due to stigmatization and fear of discrimination.

"Transmission bias" and insincere response bias do not overlap as the latter was assessed and adjusted for in this study on the basis of assessment of the level of public respect. If a person is not respected for belonging to this group it means that people know that this person is MSM, and vice versa, if people do not know about this they cannot respect or disrespect for affiliation with MSM. In other words, the correct estimation of the size of MSM group should equal the estimates obtained as a result of social networks scale-up method application plus those MSM that were not included by the respondents due to disrespect and plus those MSM that were not included due to ignorance (transmission bias). Overall adjustment for those two biases shall be the derivative of the two adjustment ratios or, in other words, visibility adjustment has to be applied to the estimates that were already adjusted for respect.

Within this study there was an attempt made to estimate possible value of transmission bias in a supplemental express qualitative study of MSM. Also we performed search of relevant data in the other MSM studies conducted in Ukraine. As long as this supplemental study was qualitative the results yielded may not be considered reliable. Besides, there is certain caution regarding validity of the study data because it was not possible to put the survey questions to the members of respondents social networks.

MSM were interviewed on March 7–9, 2009. 108 of MSM were interviewed in Kyiv, Donetsk, Odessa and Lviv. Responders were recruited by NGO social workers working with risk groups. Representatives of risk groups out of the HGO clients were involved to participate in the study. Except demographic quotas a mandatory requirement for responder recruitment was having experience of risk behaviors in the previous 12 months (sex with men). Data collection methods included a combination of personal and telephone interviews and responder had to fill out a survey form. Interviews were conducted by social workers of partner organizations of ICF HIV/AIDS Alliance in Ukraine. A standardized survey form was used.

In this study respondents were asked to take their time to prepare a complete list of people they know who match the definitions used in the representative survey conducted using the social network scale-up method. The number of people on the lists was stated during the interview. Then the responder was asked a general question about how many people from the list know that he/she belongs to the risk group. Responders also were asked to break the list down into subgroups (family, friends, acquaintances, colleagues, neighbors etc.) and state how many people each group consists of, and how many of them know about responder having sex with men.

Considering the fact that social networks of clients of NGOs who were respondents for this survey include social workers of these organizations as well as other MSM who might know that respondents belong to risk groups, the respondents were asked not to include these people into their lists (at the end of the survey form separate questions about such people were asked).

This study demonstrated (see Table 16 below) that only 24% of MSM close ones know that they belong to this group while the majority (76%) don't[56]. Thus, it can be assumed that in the general study using the social network scale-up method estimates of the size of MSM group are based only on the data provided by the 24% of people, the rest of 76% did not mention any MSM among their close ones due to transmission bias. Correspondingly, the adjustment ratio for the data received taking into account transmission rate should be 4.17.

Table 16

Estimation of the Number of People in Social Networks of MSM Who Know/Don't Know About Their Risk Behaviors

Group	# Surveyed	% of People on List Knowing About Risk Behavior	% of People Not Knowing	Adjustment Ratio
MSM	108	24%	76%	4.17

As mentioned before the received data are not reliable due to too small and unrepresentative samples. Besides, the number of people who know is underestimated as it's not adjusted for spreading the information through the respondents network.

Search for relevant data in the other studies conducted among the risk groups in Ukraine allowed to obtain additional and more reliable data for MSM group (see Table 17–19). However, their validity to measure transmission bias is questionable.

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[56] It's worthwhile mentioning that these estimates were obtained personally from MSM, and they do not account for secondary spread of information within the social network (some people might find out about sexual behaviours of MSM not from MSM themselves but from other common acquaintances, and MSM may not know about it), and the real number of people within the network who know about sexual behaviour of MSM might be higher.

Table 17

Ukrainian Survey of MSM : web site qguys.ru, 2009

"Who knows about you being a gay (bisexual)?"	#	% of surveyed MSM
I do not hide it	1,300	10%
It's obvious without telling	251	2%
Close friends	6,478	50%
Family	1,424	11%
Colleagues	478	4%
Nobody knows about me	4,399	34%
TOTAL	**12,829**	**112%**

As mentioned by experts working with MSM community in Ukraine this web site is very popular with the target group in Ukraine but at the same time those who are registered there represent a more active part of MSM community.

Analysis of the pulled data of web survey show that item "Nobody knows about me" includes 5% of those who checked other items too. Besides, as "Our World" study data show (see Table 17) this answer most likely means "Nobody except a small circle of other MSM " because when a list of answers contains this option only 4% of MSM remain completely closed.

Table 18

MSM Survey: "Our World", 2005[57] (survey by mail using database of clients of organization; snowball method)

Openness of MSM	#	% of MSM surveyed
Open to everyone	85	10%
Open to a broad circle of friends	153	18%
Open to family and close friends	230	27%
Open to a small circle of other MSM	348	41%
Closed for all	34	4%
TOTAL	**850**	**100%**

Alternative estimates are yielded by data obtained in a study of 800 MSM conducted by the Center of Social Expertise, Institute of Sociology NASU (see Table 19 below) in 7 Oblast capitals using a snowball sampling.

Table 19

MSM Survey: Center of Social Expertise, Institute of Sociology NASU, 2004 (800 Surveyed in 7 Oblast Capitals, Snowball Sampling

Signs of Internal Discrimination	% of Those Who Agreed with Statement
I try to do everything possible for people not to find out that I have sex with men, and I am afraid of disclosure	57%

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[57] Gay Rights are Human Rights. Report about discrimination on the grounds of sexual orientation in Ukraine. Nash Mir (Our World) Gay and Lesbian Center. Kyiv, 2005.

Thus, the ratio to adjust for transmission bias when estimating the size of MSM group that was obtained in the express qualitative study may be refined using other studies data. Table 20 pulls data of all evaluated studies as well as calculates additional values estimating transmission of information in MSM acquaintances networks, namely: included are networks of those MSM who partially (to some degree) disclose their status to people they know (knowing in such networks is estimated as 50%).

Table 20

Pulled Data From All Evaluated Studies to Adjust the MSM Size Estimates for Transmission Bias and Possible Adjustment Ratios

	Know	Know Something	Don't Know	Don't Know (+50% of Know Something)
Qualitative Assessment	24	0	76	76
qguys.ru	16	55	29	57
Our World	28	68	4	38
Center of Social Expertise	43	0	57	57

If we suppose that 57% of MSM close ones do not know about their sexual behavior (and 43% know) then the adjustment ratio to estimate the size of MSM shall be K=100/43=2,3.

Appropriate adjustment to estimate the size of MSM by social networks scale-up method with initial adjustment for insincere response bias shall yield the following results for risk groups:

Table 21

Estimation of the Size of MSM on a National Level Adjusted for Insincere Response and Transmission Bias

Group	Size Estimates	Confidence Interval (95%)
Men who in the previous 12 months had sex with men	32,000	23,000–39,000
Under 15	258	0–540
Aged 15–17	198	107–314

Nevertheless, Ukrainian experts working with MSM in the area of HIV/AIDS prevention believe that even after two adjustments the obtained number of 23,000 – 39,000 people in general is significantly underestimated.

It might be assumed that there are barrier effects for the youngest part of MSM who live in the street (homeless) and provide sex services to men to earn their living. In this MSM subgroup relations with their close ones are much stronger within the group itself rather than with the outer society. But the size of this subgroup should not be large, thus, such barrier effects can only partially explain the overall underestimation in this study.

Anyway, in this study we might just assume certain barrier effects but we have no instruments to assess their impact. The search for the reasons of significant underestimation of MSM group size using social network scale-up method needs further special studies.

Regional Estimates

Regional estimates of the size of MSM using this method provide data about the size of MSM group aged 10 and older. For individual Oblasts numbers are estimated for the whole population of Oblast – both urban and rural populations.

Table 22

Regional Estimates of the Size of MSM Using Social Network Scale-up Method Adjusted for Insincere Response and Transmission Bias

AR Crimea/ Oblast/ City	Estimated Size of MSM	Confidence Interval (95%)
AR Crimea	6,200	3,200–9,100
Vinnytsia	700	0–1,700
Volyn	0	
Dnipropetrovsk	2,800	0–6,100
Donetsk	1,200	0–3,100
Zhytomyr	600	0–1,800
Zakarpattya	500	0–1,100
Zaporizhja	2,200	200–4,200
Ivano-Frankivsk	400	0–900
Kyiv	500	0–1,000
Kirovograd	1,000	0–2,000
Lugansk	800	0–1,800
Lviv	4,100	0–9,200
Mykolayiv	200	0–500
Odessa	400	0–900
Poltava	1,100	0–1,500
Rivne	700	0–2,000
Sumy	100	0–300
Ternopil	600	0–1,600
Kharkiv	4,300	700–7,900
Kherson	700	0–1,500
Khmelnitsky	0	
Cherkassy	1,000	200–1,900
Chernivtsi	300	0–900
Chernihiv	200	0–600
Kyiv City	600	0–17,200
Sevastopol City	800	0–1,500

ESTIMATING THE NUMBER OF SEXUAL PARTNERS OF IDU

At the planning stage of the study the researchers questioned the possibility of adequate evaluation of the group of "sexual partners of IDU". Individuals may know that their acquaintances inject drugs or buy sex services, but it is less likely that they would be aware of such details as the number of sexual partners. This is why this study could expect to receive only minimal estimation of the size of this group.

Within this study sexual partners of IDU are defined as individuals of both sexes over 10 years of age. Presented below is the question from the questionnaire, offered to the respondents.

Question from the questionnaire:

"Do you know any sexual partners of injecting drug users? How many of them do you know?"

Table 23

Estimation of the number of sexual partners of IDU, calculated through the method of scaling-up of social networks

Group	Estimated size	Confidence interval (95%)
Sexual partners of IDU	19,000	16,000–23,000

Taking into account the fact that baseline estimations of the size of IDU group, calculated through the method of scaling-up of social networks, are considered by the national experts as significantly understated (and this required subsequent adjustment to insincerity bias in the respondents' answers), similar adjustment was also applied to the estimation of the number of sexual partners of IDU, based on the study of the level of social respect towards sexual partners of IDU. The adjustment was based on the assumption that during estimation of the number of acquaintances representing stigmatized risk groups, respondents may give insincere answers and seek to reduce this estimation (including up to "0"). It is possible to evaluate the stigmatization of the group and consequently – to assess insincerity in the answers of respondents regarding the number of their contacts in the risk group through the evaluation of the level of social respect towards sexual partners of IDU, which was studied within this research.

Estimation of the number of sexual partners of IDU, adjusted to insincerity bias in the answers of respondents, looks as follows:

Table 24

Estimation of the number of sexual partners of IDU, calculated through the method of social network scale-up after adjustment to insincerity bias in the respondents' answers

Group	Estimated size	Confidence interval (95%)
Sexual partners of IDU	32,000	27,000–39,000

However, even after adjustment to insincerity bias in the answers of respondents, experts believe that the estimated number of the sexual partners of IDU remain understated. In this report we already mentioned limited visibility of these groups in social circles. Respondents may be aware of only permanent partners of IDU.

Table 25 below provides regional estimations of the number of sexual partners of IDU.

Table 25

Regional estimation of the number of sexual partners of IDU calculated through the method of social network scale-up after adjustment to insincerity bias in the respondents' answers

AR Crimea/ Oblast / City	Estimation –sexual partners of IDU	CI 95%, low margin	CI 95%, upper margin
AR Crimea	6,000	2,100	10,000
Kyiv City	1,500	100	2,800
Kyiv	1,200	100	2,200
Vinnytsia	3,100	900	5,300
Volyn	600	0	1,200
Dnipropetrovsk	7,000	3,900	10,000
Donetsk	2,200	100	4,300
Zhytomyr	300	0	500
Zakarpattya	100	0	200
Zaporizhja	400	0	900
Ivano-Frankivsk	300	0	600
Kirovograd	1,500	500	2,500
Luhansk	1,600	0	3,200
Lviv	1,700	700	2,800
Mykolayiv	1,000	400	1,700
Odessa	1,900	600	3,300
Poltava	1,200	100	2,300
Rivne	400	21	700
Sumy	200	0	500
Ternopil	700	37	1,300
Kharkiv	900	0	2,200
Kherson	400	0	800
Khmelnitsky	700	100	1,300
Cherkasy	1,100	0	2,400
Chernivtsi	300	28	600
Chernihiv	900	0	2,700
Sevastopol City	600	0	1,700

ESTIMATING THE NUMBER OF CLIENTS OF FSW

Within this study, clients of female sex workers are defined as a group of males over 10 years of age, who received sex services from women for money. Presented below is the question from the questionnaire, offered to the respondents.

Question from the questionnaire:

"Do you know any men who received sex services from women for money? How many of them do you know?"

Table 26

Estimation of the number of clients of FSW, calculated through the method of social network scale-up

Group	Estimated size	Confidence interval (95%)
Clients of FSW	77,000	67,000–87,000

How adequate is the estimation of the number of clients of FSW for Ukraine? This estimation is considered understated, taking into account the fact that the latest adjusted data for FSW, calculated using the method of scaling-up of social networks, reach the levels of 65 – 93 thousand persons in Ukraine, so it is logical to assume that the number of their clients will be larger. We assume that the use of commercial sex services is considered stigmatized behaviour in Ukraine, so estimates, received during the study, should be understated due to insincerity of respondents' answers. The evaluation of social respect towards clients of FSW, received within this study, may serve as indirect estimation of the sincerity of respondents' answers. So, estimation of the number of clients of FSW can be adjusted to insincerity bias in the respondents' answers, evaluated on the basis of data regarding social respect towards clients of FSW.

Adjusted estimation of the size of clients of FSW is as follows:

Table 27

Estimation of the number of clients of FSW, calculated through the method of social network scale-up after adjustment to insincerity bias in the respondents' answers

Group	Estimated size	Confidence interval (95%)
Clients of FSW	285,000	248,000–322,000

Table 28 below provides the data on the size of clients of FSW in specific regions.

Table 28

Regional estimation of the number of clients of FSW, calculated through the method of social network scale-up after adjustment to insincerity bias in the respondents' answers

AR Crimea/ Oblast / City	Estimation – clients of FSW	CI 95%, low margin	CI 95%, upper margin
AR Crimea	12,000	7,000	17,100
Kyiv City	21,500	5,900	37,100
Kyiv	5,100	1,700	8,400
Vinnytsia	36,300	23,900	48,700
Volyn	0	0	0
Dnipropetrovsk	13,400	7,400	19,400
Donetsk	15,500	6,000	25,000
Zhytomyr	2,400	700	4,100
Zakarpattya	1,600	300	2,800
Zaporizhja	28,100	7,200	49,100
Ivano-Frankivsk	4,300	500	8,200
Kirovograd	1,600	0	3,500
Luhansk	43,100	19,100	67,100
Lviv	5,000	1,600	8,400
Mykolayiv	8,500	4,300	12,800
Odessa	16,200	4,900	27,400
Poltava	1,400	0	3,600
Rivne	3,400	1,300	5,500
Sumy	1,000	100	1,900
Ternopil	3,100	1,100	5,200
Kharkiv	25,800	15,200	36,400
Kherson	1,200	0	2,900
Khmelnitsky	12,800	7,300	18,200
Cherkassy	1,100	0	2,600
Chernivtsi	5,200	2,400	8,000
Chernihiv	400	0	900
Sevastopol City	4,300	800	7,700

ESTIMATIMG THE NUMBER
OF FEMALE SEXUAL PARTNERS OF MSM

In order to estimate the number of female sexual partners of MSM within the study with application of social network scale-up method, researchers used indirect question on the number of familiar MSM, who also have sex with women (basically this is estimation of the size of bisexual group). Obviously, such question can only provide minimum estimation of the group size.

At the planning stage of the study the researchers questioned the possibility of adequate evaluation of the group of "female sexual partners of MSM". Individuals may know that their acquaintances have sex with men or buy sex services from women, but it is less likely that they would be aware of such details as the number of sexual partners and their gender.

Taking into account the abovementioned limitations, the researchers used indirect way to receive minimum estimation of the size of group "female sexual partners of MSM" through the question on the known MSM, who also have sex with women.

Presented below is the question from the questionnaire, offered to the respondents.

Question from the questionnaire:

"Do you know men (boys) over 10 years of age (who had sex with men during the last 12 months) and who also have sex with women? If yes, how many of them do you know?

Table 29

**Estimation of the number of female sexual partners of MSM,
calculated through the method of scaling-up of social networks**

Group	Estimated size	Confidence interval (95%)
Sexual partners of MSM (females)	1,455	–

As we can see in the Table 29, estimated size of female partners of MSM, calculated on the basis of social network scale-up methodology, is unacceptably low. As in case of other risk groups, this group also requires adjustment of obtained data to insincerity bias in the answers of respondents. Sexual partners of MSM may also face stigma in the Ukrainian society; as a result it may force respondents to conceal the fact of having contacts of this kind. Evaluation of social respect towards female partners of MSM, obtained within this study, may also serve as one of evaluations of this group's stigmatization in the society. Inclusion of insincerity bias in the answers of respondents on the basis of data on the social respect towards this group makes it possible to receive adjusted estimated size of female sexual partners of MSM, which makes up 2,700 persons (Table 30).

Table 30

**Estimation of the number of female sexual partners of MSM,
calculated through the method of social network scale-up after adjustment
to insincerity bias in the respondents' answers**

Group	Estimated size	Confidence interval (95%)
Sexual partners of MSM (females)	2,700	–

Such estimation of the number of female sexual partners of MSM remains excessively low. This report already mentioned limited visibility of MSM group within social circles – perhaps bisexuals conceal their sexual behaviour from their acquaintances even more than other MSM.

Table 31 below provides regional estimates of the size of the group "female sexual partners of MSM". Significant number of zero estimates for several oblasts is explained by the fact that sample failed to include individuals, who know men who have sex with both men and women – this is correlated with generally small size of this group, calculated at the national level.

Table 31

**Regional estimation of the number of female sexual partners of MSM,
calculated through the method of social network scale-up after adjustment
to insincerity bias in the respondents' answers**

AR Crimea/ Oblast / City	Estimation – bisexuals	CI 95%, low margin	CI 95%, upper margin
AR Crimea	3,100	1,600	4,700
Kyiv City	0	0	0
Kyiv	0	0	0
Vinnytsia	200	0	500
Volyn	0	0	0
Dnipropetrovsk	200	0	600
Donetsk	400	0	1,200
Zhytomyr	0	0	0
Zakarpattya	0	0	0
Zaporizhja	300	0	800
Ivano-Frankivsk	100	0	300
Kirovograd	100	0	300
Luhansk	0	0	0
Lviv	1,300	0	3,100
Mykolayiv	0	0	0
Odessa	200	0	500
Poltava	200	0	700
Rivne	100	0	200
Sumy	0	0	0
Ternopil	300	0	800
Kharkiv	0	0	0
Kherson	600	0	1,400
Khmelnitsky	0	0	0

AR Crimea/ Oblast / City	Estimation – bisexuals	CI 95%, low margin	CI 95%, upper margin
Cherkasy	0	0	0
Chernivtsi	100	0	200
Chernihiv	0	0	0
Sevastopol City	100	0	300

Application of additional adjustment coefficient related to data transmission error within social networks (caused by poor social visibility of the group), which was calculated within this study for the entire MSM group (K=2.3), makes it possible to receive higher estimates of the number of female sexual partners of MSM (see Table 32).

Estimation of the number of female sexual partners of MSM, calculated through the method of social network scale-up after adjustment to insincerity bias in the respondents' answers and transmission error

Group	Estimated size	Confidence interval (95%)
Sexual partners of MSM (females)	6,200	–

Table 33 below provides regional estimates of the number of female partners of MSM, calculated after application of additional coefficient to adjust transmission error.

Regional estimation of the number of female sexual partners of MSM, calculated through the method of social network scale-up after adjustment to insincerity bias in the respondents' answers*

AR Crimea/ Oblast / City	Estimation – bisexuals	CI 95%, low margin	CI 95%, upper margin
AR Crimea	7,100	3,700	10,800
Kyiv City	0	0	0
Kyiv	0	0	0
Vinnytsia	500	0	1,200
Volyn	0	0	0
Dnipropetrovsk	500	0	1,380
Donetsk	900	0	3,000
Zhytomyr	0	0	0
Zakarpattya	0	0	0
Zaporizhja	700	0	1,800
Ivano-Frankivsk	200	0	700
Kirovograd	200	0	700
Luhansk	0	0	0
Lviv	3,000	0	7,100
Mykolayiv	0	0	0

AR Crimea/ Oblast / City	Estimation – bi-sexuals	CI 95%, low margin	CI 95%, upper margin
Odessa	500	0	1,200
Poltava	500	0	1,600
Rivne	200	0	500
Sumy	0	0	0
Ternopil	700	0	1,800
Kharkiv	0	0	0
Kherson	1,400	0	3,200
Khmelnitsky	0	0	0
Cherkasy	0	0	0
Chernivtsi	200	0	500
Chernihiv	0	0	0
Sevastopol City	200	0	700

* Values rounded to 100.

ESTIMATING THE SIZE OF GROUPS AT RISK FOR HIV INFECTION IN THE DONETSK OBLAST, CALCULATED BY THE METHOD OF "IMAGINED ACQUAINTANCE"

The "imagined acquaintance" method was originally applied in Ukraine by KIIS in 1996 during the study of informal employment[58]. At that time this method was suggested by KIIS researchers to be used in the Ukrainian study as a way to increase sincerity of respondents' answers to sensitive questions, including those related to informal economic activities. The idea of the method was to ask a respondent to "imagine" some acquaintance (it could be respondent himself, a family member, a colleague, a friend, an enemy) – any person, more or less familiar to a respondent. This method proved to be effective within the study, making it possible to evaluate the spread of informal employment (the data was quite similar to findings, received via other research methods). This method was also successfully applied in another study of informal employment[59].

In 2005, within the framework of comprehensive national study to estimate the size of populations at risk for HIV, which was funded by ICF "International HIV/AIDS Alliance in Ukraine", KIIS suggested and applied modified version of the "imagined acquaintance" method within the all-Ukrainian representative study to estimate the size of most-at-risk groups – IDU, FSW and MSM. Data, obtained via this method for IDU and FSW groups were quite similar to estimates, made with the help of other methods (e.g. coefficient method and others). Estimation of the size of relatively small risk groups in the society requires large samples and surveys in order to receive relatively accurate estimates. So, to reduce the size of necessary sample, in 2005 it was suggested to modify the method: questions from the questionnaire concerned not just one contact, but 10–15 individuals.

Estimation of the size of specific populations using "imagined acquaintance" method is based on the data of representative survey of the general population. The idea behind "imagined acquaintance" method is to ask respondents to make up a short list of people, whom they know very well. Interviewer guarantees that he/she will not ask about their identities, and the respondent will keep the list. Focusing at the small group of contacts – "core of the social network", or people whom respondents know the best, makes it possible to reduce the "transmission" error, which occurs due to incompleteness of information that people usually have about their acquaintances. It is assumed that this error would be lower if related to the immediate circle of friends/acquaintances of respondents, and it tends to increase while moving from the "centre" to the "periphery" of social networks[60]. At the same time, it remains unknown, what guides respondents in formulating their lists[61],

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[58] Rapid Appraisal Study «Household Income and Expenditures in Ukraine», 1996, on request of the World Bank.
[59] NAJMAN B. [1997], «Informal Economy in Ukraine», French Centre for the Foreign Trade (CFCE), Paris, October, p. 51.=
[60] In contrast to "imagined acquaintance" methodology, the "scale-up" method analyzes social networks in broader sense, taking into account the "active network" – all acquaintances, who live at the specific territory, and with whom a respondent contacted during the last two years. More precise definition of the "scale-up" method can be found in the report on the national study with the use of "scale-up" method.
[61] As shown by Brewer in his work (cited in "Marsden P. V. Recent Developments in Network Measurement. In Carrington, P. J., Scott, J., Wasserman, S. Models and methods in social network analysis. Cambridge University Press, 2005"), respondents' recalling of their acquaintances depends on proximity of relations with them – respondents tend to remember their closest friends the best.

and how to draw a borderline between immediate and distant circle of contacts. This is why this list of acquaintances cannot be considered as random sample that represents close friends and acquaintances of the respondent.

During the interview respondents are asked to answer the questions on the presence of various social categories among contacts, included in the list (in the second part of the interview they are asked to clarify the situation with the remainder of acquaintances, who weren't included in the list): both groups of population with available statistical data (control groups to evaluate the performance of the model) and groups, at risk for HIV, etc. Estimation of the size of unknown groups is based both on the data about the immediate circle of acquaintances (people included in the list), and on the entire social network (these estimates require knowledge on the size of respondents' social networks).

More specifically the methodology of calculations is provided in Table 34.

Codes to estimate the size of the risk group

	Arithmetical mean of networks	Ratio as regards the length of the list	Estimated size	Statistics	Correlation between estimated size and statistics
Known groups					
Number of people in the list	T				
Known group 1	L1	P1	M1	N1	K1
Known group 2	L2	P2	M2	N2	K2
…					
Known group m	Lm				
Risk groups					
Risk group 1	r1	Pr1	Mr1	-	Kr1 – ?
Risk group 2	r2	Pr2	Mr2	-	Kr2 – ?
…					

Let's consider "ti" as a number of people, named by respondent "i" in response to the question "How many people did you include in the list?" (that is, the length of the list). Thus "t" would be the mean length of the list:

$$t = \frac{1}{n} \sum_{1}^{n} t_i$$

, where "n" is the number of individuals questioned during the study.

Similarly, let 11, 12,… constitute mean number of persons, named by the respondents in response to the question about the first, second and subsequent known groups, while r1, r2, … – the same for risk groups.

The ratio of every group among all named for known groups P1= l1/t (for the first group), P2= L2/t (for the second group) and so on; for the risk groups, Pr1= r1/t, Pr2= r2/t and so on.

This data makes it possible to estimate the number of both known and unknown groups (at the same time we assume that mean probability of representatives of either group to be included in respondents' lists is proportional to the size of this group within the population).

Let's assume that "N" is the population of Ukraine of relevant age; in this case the size of M1 of the first known group would be M1=P1*N; of the second known group – M2=P2*N, and so on. Size of the first risk group would be Mr1= Pr1*N; of the second risk group – Mr2=Pr2*N, and so on.

During the study, conducted in the Donetsk oblast, respondents were asked if among their contacts (both in the list of 20-30 acquaintances that they had to make at the beginning of the interview, and among the rest of acquaintances[62]) they knew individuals above 10 years of age, who injected drugs; knew women who provided commercial sex services; and knew men who had sex with men during the last 12 months. Respondents were then asked if their lists included acquaintances, who represented other categories of population, the size of which in the Donetsk oblast is known to the official statistics – men and women of specific age and names[63]; persons with the I group of disability; men who stayed in penitentiary facilities in 2007; women who gave birth to a child in 2007[64] (so-called "control groups", necessary to verify the model's performance). Questions in the questionnaire contained preambles, aimed to overcome potentially biased and negative attitudes of respondents towards questions regarding representatives of risk groups among people they know.

A combination of methods was used in this study to collect the data – individual interview method and questionnaire (respondents had to fill the questionnaire in independently; it contained the most sensitive questions regarding acquaintances representing groups at risk for HIV and regarding attitudes towards these groups). The sample size of the study was 410 respondents in the age of 14 and older.

This study also used special methodology to increase the sincerity of answers, called "the secret ballot" (respondents answered sensitive questions regarding risk groups independently; then they had to put their questionnaires in the unmarked envelope, seal it and hand it over to the interviewer). The use of the "imagined acquaintance" method in the Donetsk oblast made it possible to obtain estimated size of IDU, FSW and MSM groups, which were quite similar to final adjusted estimates, calculated by the method of social network scale-up (Table 35).

Table 35

Estimating the size of IDU, FSW and MSM populations through the use of "imagined acquaintance" method and the use of social network scale-up method in the Donetsk oblas

	"Imagined acquaintance" method	"Scaling-up of social networks" method
Group	Estimated size	Estimated size
Individuals who injected drugs in the last 12 months	32,000	18,000 [5,800–29,900]*
Women, who provided commercial sex services in the last 12 months	8,000	9,500 [1,700–18,500]
Men who had sex with men in the last 12 months	3,000	1,200 [0–3,100]

* Interval evaluations (CI 95%).

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[62] Here we use the definition of the "active" social network, used in the scaling-up of social networks method.

[63] For the purposes of this study, names were selected on the basis of their prevalence (for it to be varied and close to the size of risk groups under study, which are not considered numerous according to other studies).

[64] The year of 2007 was selected due to the presence of available statistical data, which is necessary to verify accuracy of estimates.

ESTIMATING THE SIZE OF GROUPS AT RISK FOR HIV INFECTION AND "BRIDGE" POPULATIONS THROUGH THE COEFFICIENT METHOD

General idea of the method

The coefficient method was used in this study as an additional methodology to calculate and to obtain the estimates of the size of risk groups and "bridge" populations. Results of the behaviour surveys among representatives of risk groups (IDU, FSW)[65], as well as the data of the official statistics and records of non-governmental organizations working in the area of HIV prevention among MARPs were used as a baseline data for the method of coefficients. Findings of behaviour surveys make it possible to identify the ratio of representatives of target groups, registered by various organizations, both governmental and non-governmental. Through multiplying the number of registered representatives of this group by coefficient, calculated on the basis of this ratio, we obtain the estimated size of the group under study. The accuracy of estimation significantly depends on the validity of statistical data, adequacy of sampling methodology and reliability of the research data. In general, the coefficient method can be applied to any comparable sources of data regarding one and the same totality.

Since the coefficient method is easy and simple in application, it is being widely used to estimate the size of different groups. However, in publications it is hard to find any specific discussions of results, received through this methodology. Authors of "Estimating the Size of Populations at Risk for HIV. Issues and Methods", one of the most popular methodological guides on estimation of the size of risk groups, believe, that it is preconditioned by its simplicity, absence of any "mystics", complex mathematics and the "shine of high science"[66]. In most cases researchers present the results of estimates, received through the use of this method, in the form of short presentations, developed for specialized thematic conferences and workshops.

In this section we will consider peculiarities of baseline data, which is used to calculate the estimated size of target populations. The procedure of calculation will be presented in detail in the sections, dedicated to results of estimation.

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Statistical Data, Used to Calculate the Estimated Size of Groups at Risk for HIV Infection in 2009

Health statistics. As of mid-2008, health care bodies (HCB) have registered 166,659 individuals in connection with the substance use; of them 80,984 persons remained under the dispensary supervision (with diagnosed dependence) and 35,675 – under prevention supervision (irregular drug use)[67]. Unfortunately, health statistics, available in Ukraine until recently, did not sort out categories of injecting drug users from the general list of individuals, registered in connection with the

[65] Data of the surveys "Behaviour monitoring of IDU as a component of second generation surveillance" and "Behaviour monitoring of FSW as a component of second generation surveillance", , 2008.

[66] Estimating the size of populations at risk for HIV. Issues and Methods updated July 2003. Family Health International – C.20

substance use. Only beginning from 2009, the "Report on Diseases of Individuals with Mental and Behavioural Disorders Due to the Substance Use" will record the number of persons "with mental disorders due to the intravenous use of narcotic drugs" among those included in dispensary narcology registers.

In this study, in order to calculate the estimated size of the IDU group using the coefficient method, the researchers used the health statistics indicator "Hospitalization of drug addicts to drug abuse and psychiatric in-patient facilities". Obviously, the hospitalization statistics also does not distinguish the group of injecting drug users; however, this is group that usually requires in-patient treatment due to the gravity of consequences of the drug use of this type. So, the use of the drug addict hospitalization indicators to calculate the overall size of the IDU group is based on the assumption that it is IDU who usually require in-patient treatment, related to drug dependence. This assumption was confirmed in the course of the study "Verification of the Medical Drug Registration Data in Ukraine"[58], which has found that 98% of persons, registered and hospitalized due to the drug addiction, are the users of opiates, stimulants or combinations of several drugs. In addition we should note that the hospitalization indicator was also used to estimate the size of IDU group in 2005, while the estimation results (in some cases) were very similar to those received via other methods and expert evaluations[69].

The study on verification of the medical drug registration data in Ukraine. Generally speaking, no one questions the fact that official health statistics does not demonstrate actual prevalence of drug addiction in Ukraine. Primary reason for that is that drug users, to the extent possible, tend to avoid registration, which is not anonymous in Ukraine. In addition to incapability to reach all drug users, the system of drug registration in Ukraine is characterized by a number of specific features, which undermine the reliability of health statistics. Such features include:

1) Every rayon (district) has its own form of registration, which is carried out by the leading narcological facility;

2) Locally collected data is summarized at the rayon (oblast) level and submitted to the Centre of Health Statistics of the Ministry of Health of Ukraine in the form of generalized oblast (regional) reports;

3) Specific sections of the registration system include "Dispensary registration" (individuals with diagnosed dependence), and "Prevention registration (individuals, who use drugs irregularly and did not develop drug dependence);

4) In the general group of individuals, registered in connection with the substance use, statistics does not distinguish separate group of injecting drug users;

5) Standard established term of registration is extended for the patients with relapse and for those who did not contact territorial drug abuse facility in timely manner;

6) Removal of the person from the drug use register occurs only after health workers receive objective data about this individual (non-use of drugs during the established period of time; change of residence; death), but in many cases such information does not reach health workers or comes with significant delays.

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[67]   Health statistics data is provided in Annex 1.

[68]   Detailed description of the study "Verification of the Medical Drug Registration Data in Ukraine" is provided in the following subsection.

[69]   "Evaluation of the Size of Most-at-Risk Populations Vulnerable to HIV Infection in Ukraine" / [O. M. Balakireva et al.]. – Kyiv, ICF "International HIV/AIDS Alliance in Ukraine", 2006.

Bearing in mind everything, described above, it can be concluded that the quality of health statistics regarding the drug use is significantly affected by both external (social) and internal (procedural) factors.

In order to verify the comparability of the official statistical data regarding the drug use and the results of various studies among IDU with the goal to estimate the size of IDU population in Ukraine, it was necessary: first, to evaluate the level of relevance of current register of drug users; and second, to determine the share of registered drug users, who inject drugs.

Verification of the drug registration took place in 8 cities of Ukraine with different epidemiological situation regarding HIV and IDU: Dnipropetrovsk, Donetsk, Lviv, Mykolayiv, Odessa, Poltava, Kherson and Kyiv. The project was organized and coordinated by the members of Ukrainian Institute on Public Health Policy. The data collection was made by the staff members of oblast drug abuse clinics (narcology dispensaries – OND). The data was gathered only by the staff of OND, thus ensuring confidentiality of information.

In order to obtain information on registered persons, the researchers used standard methods, which are generally applied in the routine work of visiting nurses and serve as basis for continuation or discontinuation of dispensary supervision (telephone contacts with the subject; telephone contacts with authorized representatives of the subject; patronage visits; the use of data of the most recent medical examination, if it occurred during 30 days prior to the data collection process). In other words, this study can be viewed as extraordinary check-up of registered drug users.

Researchers identified the status of every individual, included in the sample, in terms of his/her history of injecting drug use during 3 different periods – during entire life; during 2008; and during the last 30 days. The status was considered "confirmed", if the subject him/herself, or his/her representative, or authorized medical worker confirmed the fact of the drug injection during the period. The status was "unconfirmed", if the fact of the drug use was denied in the similar manner. The status was "unknown", if researchers did not receive solid and reliable answer, or if they failed to establish the contact with the drug user or his/her representative due to change of residence, imprisonment and other reasons.

Due to large numbers of registered drug users in some cities and time constraints, the collection of data was made on the random basis[70]. The sample was developed by means of staged selection from the alphabetic list of individuals with dispensary registration.

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Injecting drug use during the last 30 days was confirmed with significant differences between the regions – from less than 1% in Kherson to 40% in Odessa. The share of those who denied injecting drug use in the last 30 days was significantly higher, but regional differences were also considerable – from 40.6% in Poltava to 86.2% in Kherson. Percentage of those, whose personal information remained unavailable for researchers, was also high in the majority of sites (up to 53.5% in Donetsk).

Similar picture can be observed regarding injecting drug use in 2008. In contrast to the last 30 days, more individuals confirmed the fact of drug use, but differences between the regions remain exceptionally high.

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[70] Randomized study was carried out in Kyiv, Dnipropetrovsk and Odessa.

Table 36

Status regarding injecting drug use among individuals, registered with drug abuse clinics, established in the course of verification

City	Confirmed fact of injecting drug use during 30 days prior to the contact			Confirmed injecting drug use during 2008		
	Yes	No	Unknown	Yes	No	Unknown
Poltava	28.1%	40.6%	31.3%	31.6%	13.8%	54.6%
Donetsk	2.1%	44.4%	53.5%	8.2%	36.1%	55.6%
Dnipropetrovsk	37.6%	45.0%	17.3%	44.4%	38.1%	17.5%
Odessa	40.0%	46.6%	13.4%	41.4%	14.9%	43.7%
Kyiv	5.9%	52.6%	41.5%	14.3%	41.9%	43.8%
Lviv	4.4%	68.2%	27.4%	17.0%	56.8%	26.2%
Mykolayiv	2.6%	78.8%	18.6%	12.0%	67.2%	20.8%
Kherson	0.6%	86.2%	13.2%	14.9%	71.8%	13.2%

So, significant regional variations in the confirmation of the fact of injecting drug use by the registered individuals prove the existence of essential differences in the practices of maintenance of dispensary registration, supervision and removal from registration. Such differences make it impossible to use the drug registration data as a reliable and universal source of information to estimate the size of IDU groups in the regions.

Statistics of the Ministry of Internal Affairs (MIA). In the course of the study the researchers also considered the possibility to calculate the size of IDU populations by means of coefficient method, using the data on drug users, registered by the internal affairs bodies (IAB). According to the Order "On Approval of Guidelines on Procedures of Identification and Registration of Individuals, Who Illegally Use Narcotic Drugs and Psychotropic Substances", IAB register all persons, who were proved to illegally use narcotic drugs and psychotropic substances, with the exception of individuals, who applied for medical assistance and follow all recommendations of the physician. Grounds for registration of such individuals include diagnosed "drug addiction", "solvent abuse" and drug intoxication. Only competent doctor, responsible for medical examination (check-up), may confirm the condition of drug intoxication; the diagnosis "drug addiction" can be established only by the medical consultation commission[71]. The logic behind the procedure of registration of drug users presupposes that the number of persons, registered by IAB, should be lower than the number of individuals, registered in HCB. However, as of January 1, 2009, there were 174,110 individuals[72], registered by the internal affairs bodies, who committed non-medical use of narcotic drugs, psychotropic substances and their analogues. As we see, this number significantly exceeds the number of persons, registered with HCB. In addition, according to the Department on Combating Illicit Drug Trafficking (DCIDT), additional 41,742 individuals were registered by HCB alone at that period. Unfortunately, such differences in the registration data reveal significant procedural inconsistencies in the functioning of

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[71] The Law of Ukraine "On Measures of Prevention of Illicit Circulation of Narcotic Drugs, Psychotropic Substances and Precursors, and their Use".

[72] Statistics of IAB is provided in Annex 1.

bodies, responsible for the control and combating of illicit use of drugs in Ukraine. In addition, registration of drug users in IAB also does not provide for identification of IDU from the general population of drug users.

Taking into account the information above, we can conclude that such statistical information cannot be used to estimate the size of IDU population, while the data, essential for calculation of the coefficient, was obtained in the course of behaviour surveys among IDU.

Registration data of clients of prevention programmes. Beginning from 2005 the ICF "International HIV/AIDS Alliance in Ukraine" uses a single system fro registration of clients of prevention programmes – the "SyrEx" database. This database was developed with the goal to monitor and analyze the data on the number of covered clients, volumes of disbursed prevention measures, and the number services, provided to representatives of various populations at risk for HIV. As of the end of 2008 the Alliance-supported prevention programmes reached 248,577 representatives of most-at-risk groups[73].

Table 37

Indicators of coverage of representatives of most-at-risk groups with prevention programmes, supported by the ICF "International HIV/AIDS Alliance in Ukraine"

MARP	Number of individuals, covered by the services of prevention programmes	Number of regions, covered by the prevention programmes	Number of organizations implementing prevention measures within programmes
IDU	195,379	27	90
FSW	33,449	26	39
MSM	17,749	16	15

As we see in the Table 37, the level of coverage of IDU at the beginning of 2009 by the services of prevention programmes is sufficient enough to use the registration data about the clients to calculate estimated size of the group.

Results of behaviour surveys that were used to calculate estimated size of populations at risk for HIV infection in 2009

The national system of monitoring and evaluation of the effectiveness of measures in response to HIV/AIDS epidemic provides for the behaviour monitoring of MARPs, "bridge" populations and the general population as a component of second generation surveillance. Linked monitoring studies among representatives of key most-at-risk groups are conducted on annual basis. These studies combine two essential components: behaviour monitoring and surveillance for HIV and other sexually transmitted infections[74].

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[73] "International HIV/AIDS Alliance in Ukraine", 2008 Annual Report.

[74] Analytical reports on the results of monitoring surveys can be found at the Alliance's web-site on the page "Publications of the HIV/AIDS Alliance in Ukraine".

Since groups of people with behaviour, which puts them at risk to HIV infection (IDU, CSW, MSM), tend to be hidden and difficult-to-reach, special sampling methods are used in Ukraine in recent years in order to reach sufficient numbers of target group representatives with behaviour surveys. The data, received as a result of surveys of IDU and FSW in 2008, was obtained by means of RDS[75] and TLS[76] methodologies.

Application of such sampling techniques makes it possible to receive information on the characteristics of general totality. In calculation of indicators within this study, the researchers used the data array from IDU and FSW surveys, weighed according to the method of sampled population development.

In 2008 the survey of IDU and FSW within the framework of behaviour monitoring of populations at risk for HIV infection, was conducted in 16 cities – oblast centres of Ukraine. In situations, when the sample is not representative for the region, there emerges logical question regarding the possibility of extrapolation of the results from the oblast centre to the entire region and even to the national level. In every specific case, when calculations of regional estimates were based on 2008 data, obtained in the course of behavioural monitoring of MARPs, the researchers performed additional analysis of this information and the data, collected in previous years.

For example, previous behaviour studies among IDU, conducted in Ukraine, show that opportunities of injecting drug users to receive medical assistance in small towns and rayon centres are limited[77]. Analysis of the data, received during the 2006 survey of IDU, confirmed that residents of oblast centres received treatment in drug abuse clinics (dispensaries) much more often than inhabitants of other settlements in the oblast[78]. So, while calculating the hospitalization coefficient, it would be logical to take into account differences in figures at the oblast level and at the level of oblast centre: it would lead to the reduction of the coefficient value, calculated on the basis of data, collected in the large city. It was found, however, that respondents, who participated in the 2008 survey, found it difficult to provide full information on the cases of hospitalization during 2007. As a result, respondents' responses to the question regarding cases of hospitalization to in-patient clinics to treat drug dependence were oftentimes incomplete or even remained unanswered. So, it is possible to expect that calculated share of IDU,

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[75] RDS (respondent-driven sample) is the most effective method to involve individuals from hidden social groups in the study. RDS is based on the principle, according to which members of the target group are better positioned to identify and to engage (recruit) other members of the group in the study. This technology combines a "snowball" method of involvement of respondents (when primary respondents recruit new survey participants) and mathematical model, which allows compensating the fact that the sample, developed in this way, is not random. The methodology is based on the Markov chains theory and the theory of small networks in order to identify the probability of inclusion of every respondent in the sample, which makes this sample probabilistic. The data is processed with the RDSAT software package, which allows building indexes, or "scales", applied to every variable data array.

[76] In some cities, where FSW were surveyed, the researchers used the TLS sample (time-location sampling), which is one of the best methods to study groups, geographically concentrated in certain locations. This sampling method means that the selection of respondents occurs at specific territories ("spots" or places frequented by the representatives of the target group) at certain time periods. TLS may be randomized probabilistic sample (if the sampling frame is accurate and includes all "spots" and size of the target groups, which visit them).

[77] Evaluation of possibilities to develop HIV prevention programmes in the environment of injecting drug users / O.M. Balakireva, M.Y. Varban, O.O. Yaremenko and other. – Kyiv, Ukrainian Institute for Social Research, 2003.

[78] Data of the survey "Behaviour monitoring of IDU as a component of second generation surveillance", 2006.

who received a course of treatment in 2007, would be significantly lower than real figures. Taking into account this data-related peculiarity, the decision was made not to adjust coefficient, calculated on the basis of data, collected in large cities, during its extrapolation to the oblast level.

In addition, the researchers re-examined the nature of distribution of female respondents' answers regarding the practice of injecting drug use, received in the course of FSW survey in 2007. Results have shown statistically insignificant differences in answers of women, surveyed in the oblast centre and of those questioned in other settlements. This is why in subsequent studies the survey results, received in the oblast centre, are considered to be characteristic of the oblast-level totality.

CALCULATING ESTIMATED SIZE OF IDU POPULATION

While calculating the estimated size of injecting drug users using the coefficient method, the researchers used the data of surveys of IDU within the framework of the study "Behaviour monitoring of IDU as a component of second generation surveillance", implemented in 2008. Criterion for inclusion of individuals in the target group was the fact of injecting drug use during the last 30 days prior to the survey.

Calculations based on the hospitalization indicator

The following information was used as a baseline data for the calculation of estimated size of IDU group on the basis of hospitalization indicator:

1. Statistical index "Indicator of hospitalization of drug users in narcology and psychiatric in-patient clinics. Reporting year – 2007. In absolute numbers"[79].

2. Respondents' answers to the question "Did you receive the following types of treatment in connection with substance use (EXCLUDING alcohol) during 2007?"[80] Speaking about every listed type of treatment (in-patient – detoxification; in-patient – rehabilitation; daily in-patient treatment; out-patient treatment; substitution therapy), the respondent had to indicate the number of treatment courses during 2007; the type of substance which led to treatment; and the year when he/she received the treatment of this kind for the first time.

Since respondents' answers were not always full and complete, the researchers accepted the following answers as statements confirming the fact of hospitalization to the in-patient clinic during 2007:

- Respondent indicated the number of cases of hospitalization and/or the substance which led to the treatment (excluding cases where 2008 was indicated as the year of the first episode of treatment);
- Respondent mentioned 2007 as the year of the first episode of treatment (if respondent failed to indicate neither the number of episodes of treatment, not the substance, which has led to treatment).

During the analysis experts rejected the data, collected in the city of Sumy, because the available volume of meaningful answers was not sufficient enough to perform statistical analysis. As a result, in subsequent calculations the researchers similarly rejected the Kharkiv data, because obtained estimated number was unrealistic (over 200 thousand persons). This is evidence of serious error in the research data.

The technology to calculate the estimated size of IDU population using the coefficient method on the basis of hospitalization indicator was as follows:

1. For every oblast of Ukraine the researchers collected available medical statistics data regarding hospitalization of drug users in narcology and psychiatric in-patient clinics during 2007 (Ni).

2. For every oblast, where the survey was conducted, the researchers calculated the rate of IDU respondents, who received in-patient treatment course in

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[79] Official statistical data on hospitalization was provided by the Ukrainian Medical and Monitoring Centre on Alcohol and Drugs at the Ministry of Health of Ukraine.

[80] Research data of "Behaviour monitoring of IDU as a component of second generation surveillance", 2008.

connection with the drug dependence during 2007 (Pi), and calculated the coefficient to estimate the size of IDU population (Ci = Pi / 100).

3. The researchers calculated estimated size of IDU in each oblast (Vi = Ni / Pi) and verified each regional estimation in terms of "realism" (see the estimation results in Table 38).

4. The number of IDU in every oblast was calculated as the sum of estimated values in all 14 regions.

5. Having assumed that the ratio of calculated cumulative number of IDU in 14 regions among the overall number of IDU in the country is roughly the same as the ratio of registered IDU in these regions among the overall number of IDU registered in the country, the researchers calculated the coefficient (K) to extrapolate the estimation to the national level (the sum of regional values in 14 oblasts, divided by the national indicator).

6. The researchers calculated the estimated size of IDU population in Ukraine using the coefficient, which was obtained to extrapolate indicators to the national level (see Table 39).

7. In order to calculate estimates of the size of IDU in oblasts, where behaviour surveys were not conducted (including Sumy and Kharkiv oblasts), the researchers used the general indicator, based on the results of the survey in 14 oblasts (see Table 40).

<div align="right">**Table 38**</div>

Calculation of estimated size of IDU population in 14 oblasts on the basis of indicators of hospitalization to narcology and psychiatric clinics

AR Crimes / Oblast/ City	Persons, hospitalized to in-patient clinics	Coefficient, calculated on the basis of share of those who received in-patient treatment[81]	Estimation of the overall number of IDU, persons
	A	B	C= A / B
	MOH statistics	Survey results	Estimated data
AR Crimea	553	0.05	12,146
Volyn	212	0.20	1,061
Dnipropetrovsk	2,740	0.14	19,352
Donetsk	1,490	0.02	75,320
Kirovograd	400	0.11	3,497
Luhansk	1,195	0.16	7,442
Lviv	198	0.04	4,626
Mykolayiv	512	0.06	7,885
Odessa	636	0.01	46,287
Poltava	838	0.14	5,812
Kherson	1,340	0.22	6,132
Khmelnitsky	411	0.09	4,592
Cherkasy	502	0.11	4,418
Kyiv city	1,875	0.02	77,932

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[81] Hereinafter rounded coefficients are provided. To perform direct calculations, the researchers used more precise indicator values.

Table 39

**Calculation of estimated size of IDU population at the national level,
based on estimates of 14 oblasts (on the basis of indicators of hospitalization
to narcology and psychiatric clinics)**

Persons, hospitalized to in-patient clinics (MOJ statistics)		The coefficient, calculated to extrapolate the sum of regional estimates to the national level	Estimates size of IDU population, persons	
Overall in 14 oblasts	Overall in Ukraine		Overall in 14 oblasts	Overall in Ukraine
A	B	C = A / B	D	E = D / C
12,902	16,655	0.76	276,501	356,931

Table 40

**Calculations of estimated size of IDU population at the regional level
on the basis of indicators of hospitalization to narcology and psychiatric clinics**

AR Crimea/ Oblast/ City	Estimated size of IDU	CI (95%)
AR Crimea	12,146	7,126–41,269
Vinnytsia	1,789	1,600–2,026
Volyn	1,061	786–1,631
Dnipropetrovsk	19,352	13,029–37,586
Donetsk	75,320	42,090–363,415
Zhytomyr	5,987	5,356–6,781
Zakarpattya	2,783	2,490–3,152
Zaporizhja	12,254	10,962–13,881
Ivano-Frankivsk	1,929	1,726–2,185
Kyiv	1,275	1,140–1,444
Kirovograd	3,497	2,433–6,211
Luhansk	7,442	5,584–11,147
Lviv	4,626	2,619–19,800
Mykolayiv	7,885	5,300–15,515
Odessa	46,287	24,091–578,182
Poltava	5,812	4,289–9,011
Rivne	1,462	1,308–1,656
Sumy	1,473	1,318–1,669
Ternopil	1,239	1,109–1,404
Kharkiv	8,466	7,573–9,589
Kherson	6,132	4,878–8,256
Khmelnitsky	4,592	3,118–8,708
Cherkasy	4,418	3,022–8,203
Chernivtsi	877	785–993
Chernihiv	1,555	1,391–1,762
Kyiv City	77,932	42,135–520,833
Sevastopol City	2,795	2,500–3,166

Generally speaking, the estimated size of IDU, obtained through the coefficient method on the basis of hospitalization indicators at the national level should not be considered as absolutely reliable because of significant defects of the baseline data. However, it provides general idea on the trends that exist in the country. It should be added that calculation of the number of IDU at the oblast level contains serious risk of data distortion, because sampled populations, developed during the monitoring survey of IDU, lack representativeness. This is why regional estimations of the size of IDU population, calculated through the coefficient method on the basis of hospitalization indicators, cannot be viewed separately as self-sufficient estimates. These should be considered as additional values to estimates, obtained through other methods or on the basis of other indicators.

Calculations based on the indicators of coverage of IDU with prevention programmes

The following information was used as the baseline data to calculate the estimated size of IDU population on the basis of indicator of coverage with prevention programmes:

1. Statistical indicator "The number of IDU clients, who received free syringe within the framework of programmatic activities as indicated in subcontractor reports of the Global Fund projects and the project "Scaling-up the National Response to HIV/AIDS through Information and Services' (SUNRISE)". Reporting period – October 1, 2007 – September 30, 2008. In absolute numbers"[82].

2. Question of the questionnaire "Did you receive free condoms during the last 12 months (from the NGO representative, from medical worker, from volunteer, at the syringe exchange points, within the peer support programme, etc.)?" (Calculation of the number and the ratio of "yes" answers)[83].

The technology to calculate the estimated size of IDU population using the coefficient method on the basis of indicator of coverage with prevention programmes was as follows:

1. By using the information from "SyrEx" database regarding the clients of HIV prevention programmes, the researchers established a single data array containing reporting information on IDU clients for the period from October 1, 2007 through September 30, 2008.

2. Every client account from the "SyrEx" database for the abovementioned period was verified for its uniqueness because of possibility of one and the same individual's coming to several organizations within one city or location. To verify the uniqueness, the researchers used such criteria as place of residence; client's membership in a specific risk group; gender; year of birth and unique client code.

3. The researchers calculated the overall number of IDU clients of prevention programmes, who received free syringes during the established period.

4. Based on the 2008 IDU survey results, the researchers calculated the percentage of respondents, who reported receiving free syringes during the last 12 months (N), and calculated the coefficient to estimate the size of the IDU population (C=N/100).

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[82] Data of "SyrEx" single database on the clients of prevention programmes.

[83] Research data of "Behaviour monitoring of IDU as a component of second generation surveillance", 2008.

5. Obtained coefficient was used to calculate estimated size of IDU at the national level.

Table 41

Estimated size of IDU population at the national level, based on indicators of coverage of IDU with services, provided within prevention programmes, implemented with the support of Global Fund projects and the SUNRISE project

Number of IDU – clients of prevention progra-mmes, who received free syringes during the period of October 1, 2007 – September 30, 2008	Calculated coefficient to estimate the size of IDU population at the national level	Estimated size of IDU population, persons
A	B	C = A / B
85,065	0.38	225,583

As in the previous case, these estimates should not be considered as acc-urate and reliable, because: a) prevention activities in Ukraine are not limited to measures, funded by the Global Fund and SUNRISE project. As a result, reports of organizations, which receive funding from other sources, are not included in the "SyrEx" database; b) prevention work is yet to cover all settlements and locations in Ukraine, so large group of IDU has limited access to services, provided within the prevention programmes. So it is possible to expect that results of calculations, based on the data of MARPs coverage with prevention programmes, are som-ewhat understated. In other words, these estimates can be viewed as minimum estimated size of IDU population in Ukraine.

CALCULATING ESTIMATED SIZE OF FSW POPULATION

While calculating the estimated size of female sex workers using the coefficient method, the researchers used the data of surveys of IDU and FSW within the framework of the behaviour monitoring studies, implemented in 2008. Key criteria for inclusion of individuals in the target group within the study were: the fact of injecting drug use during the last 30 days prior to the survey – for IDU; and the fact of provision of commercial sex services during the last three months – for FSW.

Findings of behaviour studies demonstrate that injecting drug use practices are quite widespread among female sex workers. Similarly, certain part of female IDU tend to provide commercial sex services. Calculations of quantitative characteristics of the group, where both types of risk are prevalent, makes it possible to estimate the size of FSW population, if the general estimated size of IDU group is known.

In order to apply this approach, it is essential to control conformity with criteria of inclusion of representatives of IDU and FSW populations to sub-groups of IDU-FSW and FSW-IDU, which are being identified for further analysis. In order to distinguish subgroups with "prevailing" risky behaviours (injecting drug use or provision of commercial sex services), the researchers undertook additional analysis of IDU and FSW surveys. As a result, the category of FSW, who inject drugs more than once a day, was excluded from the FSW-IDU subgroup, because the nature of such risky practice characterizes them as IDU, rather than FSW. In addition, in the course of preliminary analysis of baseline data, the researchers excluded the data of FSW survey in the city of Kyiv, because the share of women, who inject drugs, turned out to be unrealistically high.

The following values were used as baseline data to calculate estimated size of FSW population on the basis of "double problem" indicators:

1. Estimated size of IDU population at the national level.

2. Question from the questionnaire for IDU "How many of your sexual partners, with whom you had sex during the last three months (90 days), are commercial sex partners, to whom you have paid for such services?" (among responses of female IDU, the researchers calculated the ratio of answers, when respondents reported having one or more partners of this kind)[84].

3. Question from the questionnaire for FSW: "How often did you inject drugs during the last month (30 days)?" (calculation of the share of FSW, who injected drugs at least once during the last month, but no more than once a day)[85].

[84] Research data of "Behaviour monitoring of IDU as a component of second generation surveillance", 2008.

[85] Research data of "Behaviour monitoring of FSW as a component of second generation surveillance", 2008.

[86] Research data of "Behaviour monitoring of IDU as a component of second generation surveillance", 2007 and 2008.

The technology to calculate the estimated size of FSW population using the coefficient method on the basis of "double problem" indicators was as follows:

1. Using the results of behaviour studies, the researchers calculated the general ratio of female and male IDU (approximately 1:3 ratio – average value for all localities under study), and identified the multiplier to calculate the share of female IDU among the general totality of IDU (0.26 – average index for oblasts, according to studies for two years)[86].

2. Using the general evaluation of the estimated size of IDU population, the researchers calculated the size of female IDU group.

3. Using the results of IDU survey, the researchers calculated the percentage of female IDU (8.1%), who reported providing commercial sex services during the last three months.

4. Estimated size of female IDU, who provide commercial sex services (IDU-FSW) was calculated.

5. Using the results of FSW survey, the researchers calculated the percentage of FSW, who injected drugs during the last 30 days, but no more than once a day (11.9%).

6. Estimated size of FSW group was calculated (see Table 42).

7. By applying similar scheme and using recommended regional estimations of the size of IDU population, calculated through the coefficient method, the researchers calculated regional estimated sizes of FSW (see Table 43).

In general, the procedure of calculation of estimated size of FSW population, based on the "double problem" indicators, can be depicted as formula:

$$\frac{M \times 0.26 \times \frac{8.1}{100}}{\frac{11.9}{100}}$$

, where "M" is estimated number of IDU.

Table 42

Estimated size of FSW population at the national level, based on "double problem" indicators (injecting drug use and provision of commercial sex services)

Estimated size of IDU population, persons	Estimated size of female IDU population, persons	The share of IDU-FSW in the general group of female IDU	Estimated size of IDU-FSW population, persons	The share of FSW-IDU in the general group of female IDU	Estimated size of FSW population, persons
A	B=A*0,26	C	D=(B*C)/100	E	F=(D/E)*100
225,583	58,652	8.1	4,753	11.9	39,931
357,931	92,802		7,517		63,168

Table 43

Regional estimations of the size of FSW population on the basis of "double problem" indicators (based on the estimated number of IDU population)

AR Crimea/ Oblast / City	Based on estimated size of IDU according to hospitalization indicator	Based on recommended regional estimates of the size of IDU population
AR Crimea	2,150	4,000
Vinnytsia	317	1,150
Volyn	188	619
Dnipropetrovsk	3,425	9,734
Donetsk	13,332	10,618
Zhytomyr	1,060	1,150
Zakarpattya	493	442
Zaporizhja	2,169	4,424
Ivano-Frankivsk	342	531
Kyiv	226	2,690
Kirovograd	619	2,124
Luhansk	1,317	4,070
Lviv	819	1,593
Mykolayiv	1,396	2,832
Odessa	8,193	7,079
Poltava	1,029	1,416
Rivne	259	531
Sumy	261	1,770
Ternopil	219	531
Kharkiv	1,498	2,301
Kherson	1,085	1,416
Khmelnitsky	813	1,416
Cherkasy	782	1,947
Chernivtsi	155	442
Chernihiv	275	1,150
Kyiv City	1,861	6,725
Sevastopol City	495	973
Total	44,778	73,674

Further elaboration of estimated size of FSW through the coefficient method at the regional level made it possible to make the national estimates more precise. As a result, adjusted national estimate (the sum of regional estimates) of the size of FSW population, calculated using the coefficient method, constituted the following: 45 thousand persons – estimate, based on the regional estimates of the size of IDU group according to hospitalization indicator; 74 thousand persons – estimate based on regional recommended estimated sizes of IDU population.

CALCULATING ESTIMATED SIZE OF MSM POPULATION

While calculating the estimated size of men who have sex with men (MSM) using the coefficient method, the researchers used the data of surveys of this group within the framework of the study "Behaviour monitoring of MSM as a component of second generation surveillance", implemented in 2007. Criterion for inclusion of individuals in the target group for this study was the fact of the same-sex sexual contacts during 6 months prior to the survey.

In the course of preliminary analysis of available data it was revealed that at the time of study there existed no sources of statistical data on the number of MSM, which would allow the experts to calculate the size of the group using the coefficient method.

The only source of information that would allow making at least approximate estimation of the size of MSM at the national level is the results of general population surveys, conducted in previous years. In 2004 behaviour studies of youth (14–24 years of age)[87] and adult population (25–49 years of age)[88] were conducted. These surveys included blocks of questions regarding sexual behaviour (including sexual relations of men with representatives of the same sex). To analyze this data, the researchers developed single data array for the age group of 15-19 years with relevant narrowing coefficients to ensure representativeness of the data for the identified age group.

The following information was used as baseline data to calculate estimated size of MSM population through the coefficient method on the basis of surveys of young people and adults:

1. Respondents' answers to the question "Did you ever have sexual relations with other man?" (calculation of the total ratio of men who gave positive answers regarding sexual relations with other men, and who refused to answer this question).

2. The number of permanent male population of Ukraine in the age of 15-49 years, according to the data of the State Statistics Committee of Ukraine (as of January 1, 2008)[89].

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[87] Sociological study within the framework of the project "Behaviour monitoring of youth as a component of second generation surveillance", State Institute for Family and Youth Development, Ukrainian Institute for Social Research, International HIV/AIDS Alliance. National representative survey; sampled population – 2,500 persons in the age of 14-25 years. The sample is national and representative for this age group.

[88] Sociological study "Attitudes and Behavioural Patterns of Adult Population regarding HIV/AIDS and People Living with HIV/AIDS", Ukrainian Institute for Social Research, State Institute for Family and Youth Development, "Social Monitoring" Centre. National representative survey; sampled population – 2,000 persons in the age of 25-49 years. The sample is national and representative for this age group.

[89] The State Statistics Committee of Ukraine. Disaggregation of the permanent population of Ukraine by gender and age.

Table 44

**Estimation of the size of MSM population at the national level according
to the general population surveys of 2004 and the data
of the State Statistics Committee on the size of male population in Ukraine**

The size of male population of Ukraine in the age of 15-49 years, persons	The share of men who reported having sexual contacts with other men, or refused to answer the question	Estimated size of MSM population, persons	Confidence interval (95%)
A	B	C = A / 100 * B	C ± 0,5%
Statistical data	Survey results	Calculated data	Calculated data
11,847,276	1.3	154,015	94,778–213,251

It is obvious that estimates, calculated using this methodology, have serious weaknesses. First, calculations made it possible to estimate the number of men, who had same-sex intercourse at least once in their lifetime, while the probability of HIV infection among members of MSM group should be defined on the basis of presence of particular recurrence of such relations. Second, it is arguable that men who refuse to answer the question about same-sex relations, are necessarily those who want to conceal such experience: it can be assumed that such refusals come from those who treat such questions as offensive (such experience in Ukraine is strongly stigmatized)[90]. In addition, it is more expedient to assume that MSM, who seek to conceal their homosexual experience, will insist on the fact that they never had such experience.

According to experts[91], the ratio of MSM in the male population in most all regions has no meaningful differences. This is why in order to calculate regional estimates of the size of MSM population they used the national indicator of 1.3% of the general male population in the age of 15-49 years, which was obtained on the basis of results of the 2004 general population survey[92].

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[90] According to KIIS data, the level of tolerance towards male homosexuals in the last 15 years virtually did not change. Minor differences occurred in the percentage of population who does not agree with the statement, that the society should treat homosexuals as all other people (from 34.9% to 28.5%). At the same time, the share of supporters of equal treatment did not change (from 33.7% to 33.3%). The share of those who state "both agree and disagree" somewhat increased – from 8.9% to 16.3%).

[91] Expert opinion of Mr. Maxim Kasianchuk, Cand. Sc., the head of executive council of "Donbas Sots-Project" NGO

[92] In 2004 behaviour studies of youth (14–24 years of age) and adult population (25–49 years of age) were conducted. These surveys included blocks of questions regarding sexual behaviour (including sexual relations of men with representatives of the same sex). To analyze this data, the researchers developed single data array for the age group of 15-19 years with relevant narrowing coefficients to ensure representativeness of the data for the identified age group.

Table 45

**Regional estimates of the size of MSM population according
to the general population surveys of 2004 and the data
of the State Statistics Committee on the size of male population in Ukraine**

AR Crimea / Oblast/ City	Male population in the age of 15-49 years	Estimated size of MSM population	Confidence interval (95%)
AR Crimea	501,029	6,513	4,008–9,019
Vinnytsia	406,434	5,284	3,251–7,316
Volyn	267,508	3,478	2,140–4,815
Dnipropetrovsk	868,794	11,294	6,950–15,638
Donetsk	1,137,412	14,786	9,099–20,473
Zhytomyr	326,184	4,240	2,609–5,871
Zakarpattya	333,423	4,334	2,667–6,002
Zaporizhja	463,270	6,023	3,706–8,339
Ivano-Frankivsk	363,075	4,720	2,905–6,535
Kyiv	444,270	5,776	3,554–7,997
Kirovograd	252,493	3,282	2,020–4,545
Luhansk	600,899	7,812	4,807–10,816
Lviv	679,647	8,835	5,437–12,234
Mykolayiv	308,473	4,010	2,468–5,553
Odessa	628,134	8,166	5,025–11,306
Poltava	379,346	4,931	3,035–6,828
Rivne	301,228	3,916	2,410 – 5,422
Sumy	296,765	3,858	2,374–5,342
Ternopil	278,949	3,626	2,232–5,021
Kharkiv	731,513	9,510	5,852–13,167
Kherson	284,243	3,695	2,274–5,116
Khmelnitsky	333,864	4,340	2,671–6,010
Cherkasy	319,241	4,150	2,554–5,746
Chernivtsi	233,959	3,041	1,872–4,211
Chernihiv	269,517	3,504	2,156–4,851
Kyiv City	739,548	9,614	5,916–13,312
Sevastopol City	98,058	1,275	784–1,765

Taking into account the global trends that reflect estimation of the size of MSM groups in different countries, it can be assumed that such estimation interval of MSM (even considering high levels of homophobia among the general population) is significantly understated.

CALCULATING ESTIMATED SIZE OF SEXUAL PARTNERS OF IDU

The following information was used as baseline data to calculate estimated numbers of sexual partners of IDU through the coefficient method:

1. Respondents' answers to the question "How many of your sexual partners, with whom you had sex during the last three months (90 days), are: permanent sexual partners; commercial sex partners, to whom you have paid for sex services; commercial sex partners, who paid you for sex services; casual and unfamiliar sexual partners?" (experts excluded from the analysis extremely unrealistic answers, e.g., 5 and more permanent partners)[93].

2. Adjusted estimates of the number of IDU.

Since results of behaviour studies among IDU show that female IDU have less sexual contacts as compared to male IDU, calculations of the group's size were performed separately for male and female injecting drug users.

The technology to calculate estimated size of the group of sexual partners of IDU was as follows:

1. The researchers calculated the total number of sexual partners of every IDU, who participated in the 2008 behavioural survey.

2. After that they calculated mean index of the number of sexual partners separately for female IDU and male IDU (1.8 and 2.1 correspondingly).

3. Using the results of behaviour studies, the researchers calculated the general ratio of female and male IDU (approximately 1:3 ratio – average value for all localities under study). To be more precise, behaviour studies of 2007 and 2008 have shown that the rates of men and women in the general group of injecting drug users were 74% and 26% correspondingly.

4. Using the general estimation of the size of IDU group, the size of female IDU and male IDU groups was calculated.

5. The researchers calculated estimated number of sexual partners separately for male IDU and female IDU (2.1 and 1.8 correspondingly). The sum of these estimates is viewed as the overall estimation of the number of sexual partners of IDU.

Regional estimates of the number of sexual partners of IDU, calculated using this method, make it possible to estimate the size of this group at the national level at the amount of 654 thousand persons. However, it would be interesting to know, what percentage of this group is represented by IDU themselves. Unfortunately, available data from the behaviour studies is not suitable to evaluate, how sexual practices of IDU are concentrated within the risk group, and how they spread to the general population. So it can be assumed that in this case estimation of the size of this "bridge" group is incorrect and extremely overstated.

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[93] Research data of "Behaviour monitoring of IDU as a component of second generation surveillance", 2008.

Table 46

**Estimates of the number of sexual partners of IDU using the coefficient method,
based on adjusted estimated size of IDU**

AR Crimea/ Oblast/ City	Adjusted estimated size of IDU population	Estimated number of sexual partners of male IDU	Estimated number of sexual partners of female IDU	Overall estimation of the number of sexual partners of IDU
	A	B=(A*0,74)*2,1	C=(A*0,26)*1,8	D = B + C
AR Crimea	22,600	35,120	10,577	45,697
Vinnytsia	6,500	10,101	3,042	13,143
Volyn	5,000	7,770	2,340	10,110
Dnipropetrovsk	17,000	26,418	7,956	34,374
Donetsk	60,000	93,240	28,080	121,320
Zhytomyr	7,500	11,655	3,510	15,165
Zakarpattya	500	777	234	1,011
Zaporizhja	18,000	27,972	8,424	36,396
Ivano-Frankivsk	3,000	4,662	1,404	6,066
Kyiv	15,200	23,621	7,114	30,734
Kirovograd	2,000	3,108	936	4,044
Luhansk	15,000	23,310	7,020	30,330
Lviv	9,000	13,986	4,212	18,198
Mykolayiv	10,109	15,709	4,731	20,440
Odessa	15,500	24,087	7,254	31,341
Poltava	8,000	12,432	3,744	16,176
Rivne	3,000	4,662	1,404	6,066
Sumy	10,000	15,540	4,680	20,220
Ternopil	3,000	4,662	1,404	6,066
Kharkiv	13,000	20,202	6,084	26,286
Kherson	8,000	12,432	3,744	16,176
Khmelnitsky	8,000	12,432	3,744	16,176
Cherkasy	11,000	17,094	5,148	22,242
Chernivtsi	2,500	3,885	1,170	5,055
Chernihiv	6,500	10,101	3,042	13,143
Kyiv City	38,000	59,052	17,784	76,836
Sevastopol City	5,500	8,547	2,574	11,121
Total	653,933			

CALCULATING ESTIMATED NUMBER OF CLIENTS OF FSW

Estimation of the size of the group of FSW clients on the basis of behaviour studies

The following information was used as baseline data to calculate estimated number of clients of FSW using the coefficient method on the basis of results of behaviour studies among FSW:

1. Respondents' answers to the question "How many sexual partners/clients did you have last week (workdays), from whom you received payment/reward (money or other)?"[94].

2. Adjusted regional estimates of the size of FSW population.

The technology to calculate estimated size of the group of clients of FSW was as follows:

1. Using the data, obtained in the course of behaviour study among FSW, the researchers calculated the indicator of the average number of clients of FSW during the last working week. This indicator constitutes 12 persons (further used as multiplier).

2. Adjusted estimated size of FSW for each region was multiplied by the indicator of the average number of clients of FSW during the last working week.

Table 47

Estimated number of the clients of FSW, calculated through the coefficient method, based on the adjusted estimated size of FSW population

AR Crimea/ Oblast/ City	Adjusted estimated size of FSW population	Estimated number of clients of FSW
	A	B = A * 12
AR Crimea	4,000	48,000
Vinnytsia	1,200	14,400
Volyn	1,000	12,000
Dnipropetrovsk	3,700	44,400
Donetsk	10,700	128,400
Zhytomyr	1,200	14,400
Zakarpattya	500	6,000
Zaporizhja	4,500	54,000
Ivano-Frankivsk	1,500	18,000
Kyiv	2,700	32,400
Kirovograd	230	2,760
Luhansk	4,100	49,200
Lviv	1,600	19,200
Mykolayiv	2,900	34,800
Odessa	8,000	96,000
Poltava	1,500	18,000

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[94] Research data from "Behaviour monitoring of FSW as a component of second generation surveillance", 2008.

AR Crimea/ Oblast/ City	Adjusted estimated size of FSW population	Estimated number of clients of FSW
	A	B = A * 12
Rivne	600	7,200
Sumy	1,800	21,600
Ternopil	600	7,200
Kharkiv	2,300	27,600
Kherson	1,500	18,000
Khmelnitsky	1,500	18,000
Cherkasy	2,000	24,000
Chernivtsi	500	6,000
Chernihiv	1,200	14,400
Kyiv City	6,800	81,600
Sevastopol City	1,000	12,000
Total	829,560	

Results, calculated using the coefficient method, reflect very sad findings: al-most 6% (or roughly 830 thousand) of male population of Ukraine in the age from 16 to 60 years play the role of potential carriers of HIV infection and other STI from the risk groups to the general population.

Estimation of the size of the group of FSW clients on the basis of general population survey within the project "Ukraine Demographic and Health Survey"[96]

In July – November 2007, during Ukrainian demographic and health survey (DHS) 6,841 women and 3,178 men were surveyed in all oblasts of Ukraine, in Autonomous Republic of Crimea and in the city of Kyiv. The data was collected by the Ukrainian Centre of Social Reforms with the administrative support of the State Statistics Committee of Ukraine. According to the study, percentage of men who reported paying for sex during the last 12 months, constituted 1.8%. In terms of the number of men of 15-49 years of age, the estimated size of the group of FSW clients makes up 219,717 persons.

The following information was used as baseline data to calculate estimated number of clients of FSW using the coefficient method on the basis of results of the general public survey:

1. The percentage of men in the age of 15–49 years who reported having paid for sex during the last 12 months[97].

2. The data of the State Statistics Committee of Ukraine regarding the size of male population in the age of 15–49 years living in Ukraine[98], as of January 1, 2007.

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[95] Distribution of permanent population of Ukraine by gender and age as of January 1, 2007; collection of statistical data, Kyiv, 2008.

[96] Ukraine Demographic and Health Survey – Kyiv, "Information and Analytic Agency", 2008.

[97] Demographic and health survey in Ukraine in 2007 was conducted by the Ukrainian Centre of Social Reforms with the support of the State Statistics Committee of Ukraine.

[98] Distribution of permanent population of Ukraine by gender and age as of January 1, 2007; collection of statistical data, Kyiv, 2008.

Table 48

Calculations of estimated number of clients of FSW on the basis of the data
of mass survey of youth and adult population, persons

Age group	The number of men of relevant age, who live in Ukraine	Percentage of men who paid for sex during the last 12 months (N=3178)	Estimated number of men who paid for sex during the last 12 months
A	B	C	D (B*C/100)
15–19	1,737,770	0.1	1,738
20–24	1,977,600	2.2	43,507
25–29	1,740,002	3.9	67,860
30–34	3,197,014	2.2	70,334
35–39			
40–44	3,297,945	1.1	36,277
45–49			
Total	11,950,331	(1.8)	219,717

These estimates are expectedly understated, because the question is quite intimate and private, leading to large numbers of insincere answers to the question regarding such risky behaviour.

CALCULATING ESTIMATED NUMBER OF FEMALE SEXUAL PARTNERS OF MSM

The following information was used as baseline data to calculate estimated number of female sexual partners of MSM using the coefficient method:

1. Respondents' answers to the question: "How many women did you have sex with during the last 6 months?"[99].

2. Adjusted regional estimates of the size of MSM population.

The technology to calculate estimated size of the group of female partners of MSM was as follows:

1. Among all responses the researchers found some answers containing extremely unrealistic numbers of female partners (e.g. 60 female sexual partners). In order to avoid any distortions in the overall indicator value due to responses of this kind, the experts excluded extreme minimum and extreme maximum values of the ranked list (0.5% of answers for each).

2. The researchers calculated average number of female partners of MSM for the last 6 months. This value makes up 0.37 persons (further used as multiplier).

3. Adjusted estimated size of MSM for every region was further multiplied by the average number of female sexual partners of MSM for the last 6 months.

Table 49

Estimated numbers of female sexual partners of MSM, calculated through the coefficient method, based on the adjusted estimated size of MSM population

AR Crimea / Oblast/ City	Adjusted estimated size of MSM population	Estimation of the number of female sexual partners of MSM
	A	B = A * 0,37
AR Crimea	4,000	1,480
Vinnytsia	3,300	1,221
Volyn	1,000	370
Dnipropetrovsk	7,000	2,590
Donetsk	9,100	3,367
Zhytomyr	2,600	962
Zakarpattya	2,700	999
Zaporizhja	3,700	1,369
Ivano-Frankivsk	300	111
Kyiv	3,600	1,332
Kirovograd	1,500	555
Luhansk	4,800	1,776
Lviv	5,400	1,998
Mykolayiv	2,000	740
Odessa	5,500	2,035
Poltava	3,000	1,110
Rivne	700	259

[99] Research data of "Behaviour monitoring of men who have sex with men", 2007.

AR Crimea / Oblast/ City	Adjusted estimated size of MSM population	Estimation of the number of female sexual partners of MSM
	A	B = A * 0,37
Sumy	1,200	444
Ternopil	2,200	814
Kharkiv	5,900	2,183
Kherson	2,300	851
Khmelnitsky	2,700	999
Cherkasy	2,600	962
Chernivtsi	1,900	703
Chernihiv	2,200	814
Kyiv City	14,000	5,180
Sevastopol City	800	296
Total	35,520	

So, the overall number of women, who can serve as a "bridge" for HIV infection between MSM (representatives of one of the populations, most vulnerable to HIV) and the general population, can be estimated at the size of approximately 36 thousand persons.

NATIONAL EVALUATION OF HIV/AIDS EPIDEMIC IN UKRAINE, 2009[100]

Baseline data

The size of the HIV/AIDS epidemic is steadily increasing. As of June 1, 2009 and since 1987, Ukraine has registered over 151 thousand persons with HIV infection. In 2008, 18,973 new cases of HIV were reported in Ukraine – the largest number ever reported, which is by 7.3% more than the number of new infections, reported in the previous year (2007). Only in 6 months of 2009 over 10 thousand new cases of HIV were diagnosed (as compared to 9.4 thousand new infections for the same period of 2008). It is possible to assume that by the end of 2009 this number will reach 20,000 new infections. Since the outbreak of the epidemic, 29,018 citizens of Ukraine were diagnosed with AIDS; 16,462 AIDS-related deaths were officially registered in the country.

It is generally recognized that the number of officially reported HIV infections understates the magnitude of HIV/AIDS epidemic in Ukraine, namely the real number of HIV positive individuals. Official statistics provides information only about individuals, who had HIV testing, who were diagnosed with HIV and who were included in the official national register of HIV infections. In reality, much more Ukrainians may be infected, but they are unaware of their HIV status, and this fact emphasizes the need to improve access to HIV counseling and testing services both for the general population and for representatives of most-at-risk populations.

At the beginning of 2009, 10,629 patients were on ART in Ukraine, including 1,123 children. Absolute majority of these patients – 9,960 individuals – received treatment at the expense of the State Budget; the remainder of expenditures was covered by the programme "Overcoming HIV/AIDS Epidemic in Ukraine", supported by the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM). According to 2007 national evaluation, the level of treatment coverage reached only 35% of the estimated number of patients in need of ART[101].

The process of development of new national estimates of HIV/AIDS

In May 2009 the UNAIDS/WHO Reference Group conducted a 3-day training workshop in Chisinau (Moldova), which brought together stakeholders from Eastern Europe and Central Asia. This workshop was the part of global educational events, carried out by UNAIDS and WHO with the goal to develop new national estimates using new and improved methodologies. Participants of the Chisinau

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[100] This comprehensive report was developed with participation of the Ukrainian AIDS Centre with the Ministry of Health of Ukraine, WHO Country Office in Ukraine, International HIV/AIDS Alliance in Ukraine, and Joint United Nations Programme on HIV/AIDS. Contacts for correspondence: Dr. Yury Kruglov, Ukrainian AIDS Centre; 5 Amosova St., Kyiv, Ukraine 03038; Email: ukraids@ukrpost.ua.

[101] Ukraine: National Report on Monitoring Progress towards the UNGASS Declaration of Commitment on HIV/AIDS. Reporting period: January 2006 – December 2007. Kyiv, 2008.

workshop had an opportunity to learn about the new HIV/AIDS estimation software tool for the countries with concentrated epidemic – Estimation and Projection Package (EPP), version Beta U, as well as updated version of "Spectrum" software (v.3.40) to develop more precise estimates of the epidemic development and needs in ART.

During 2008, upon commission of ICF "International HIV/AIDS Alliance in Ukraine" and with the support of Ukrainian AIDS Centre, a number of linked studies (survey plus blood testing for HIV) were conducted among IDU, MSM and FSW. Results of these studies, as well as the surveillance data from the previous years, were used to develop new estimates of the number of people living with HIV/AIDS, as well as those in need of antiretroviral therapy.

During May – September 2009 the number of stakeholder meetings was organized to present and to discuss new national estimates of HIV/AIDS epidemic in Ukraine as of the end of 2008. In particular, this information was discussed at the workshop/meeting of the chief physicians of regional (oblast) AIDS centres (Lviv, June 2009); at the meetings of the MOH working groups on HIV/AIDS treatment and monitoring and evaluation; meeting of the UN Theme Group on HIV/AIDS (September 2009), and the meeting of the National Council on TB and HIV infection/AIDS (September 10, 2009). In addition, obtained results were submitted to the UNAIDS Secretariat, WHO and UNAIDS/WHO Working Group on Global HIV/AIDS and STI Surveillance for expert examination; they received positive reviews. HIV/AIDS estimates will be used during the development of the next National Report on Monitoring Progress towards the UNGASS Declaration of Commitment on HIV/AIDS.

General methodology of evaluation of HIV/AIDS situation in Ukraine (as of the end of 2008)

Ukraine remains in the group of countries with concentrated HIV epidemic, which is primarily concentrated within most-at-risk populations. According to recommendations of the UNAIDS/WHO Working Group on Global HIV/AIDS and STI Surveillance regarding the application of the Estimation and Projection Package (EPP) software tool, the decision was made to select the following populations to develop national estimates on 2008 data: IDU, FW, MSM, male clients of FSW, prisoners and the general population.

In contrast to the "Workbook" methodology[102], which was used in the previous years, the EPP software offers a number of specific additional features, which make it possible to:

- produce not only the HIV prevalence data, but also information on HIV incidence, which is more sensitive indicator in terms of measurement of changes in the HIV epidemic development;
- take into account the turnover in the composition of populations, selected to evaluate current status of the epidemic, as well as the period of group membership and correlations between male and female populations;

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[102] The Workbook method is used to evaluate the HIV prevalence in countries with low-level or concentrated epidemic. This method envisages calculation of HIV prevalence at the national level and building of the epidemiological curve using Microsoft Excel software, and further processing of the data to be transferred to the "Spectrum" software. (http://data.unaids.org/pub/Presentation/2009/20090526_workbookmethod_2009_ru.pdf)

- take into account impact of ART on the spread of HIV while projecting the model of the national epidemic;
- calculate and demonstrate input of various subgroups in the HIV incidence and prevalence;
- build curves of HIV dynamics at the national level and separately for distinguished groups of population;
- transfer the data on HIV incidence (not HIV prevalence, as in the previous versions) to the "Spectrum" software.

By using estimates of the HIV incidence, developed through EPP, the "Spectrum" software allows to:

- calculate estimated number of PLWH among adults in different age groups; the number of new HIV infections; and projected number of AIDS-related deaths;
- estimate current and potential needs of the country in the area of HIV treatment.

Estimated data, used to evaluate the HIV/AIDS situation in the country

Key element of the evaluation process is the determination of the size of populations subject to analysis, as well as their demographic characteristics. Data on HIV prevalence in these groups allows more precise estimation of the total number of HIV positive people in the country, than it is provided by the data on official registration of HIV/AIDS cases[103].

In order to evaluate the HIV/AIDS situation in Ukraine, the following estimated and statistical data was used in 2009:

- estimated size of the IDU population (230–360 thousand persons);
- estimated size of FSW population (63–93 thousand persons);
- estimated number of male clients of FSW (234 thousand persons)[104];
- estimated size of MSM population (95 – 213 thousand persons of 15–49 years of age, who have experience of such relations);
- the number of prisoners (145 thousand persons)[105];
- the size of the general population (determined as the difference between the size of the general population of 15 years and older, and estimated size of groups at risk for HIV infection).

[103] Walker N, Stover J, Stanecki K, et al. The workbook approach to making estimates and projecting future scenarios of HIV/AIDS in countries with low-level and concentrated epidemics. Sex Transm Inf 2004;80 (Suppl 1) :110–113.

[104] The issue of the use of commercial sex services of FSW by male clients was initially studied in Ukraine within the framework of the specialized study, conducted in 2007. Using this data, it was agreed to consider that on average 2% of men in the age of 15–49 years use sex services of FSW during the last 12 months. Ukrainian Centre for Social reforms (UCSR), the State Statistic Committee (SSC) [Ukraine], Ministry of Health (MOH) [Ukraine], and Macro International Inc. 2008. Ukraine Demographic and Health Survey 2007. Calverton, Maryland, USA: UCSR and Macro International.

[105] The data of the State Department on Execution of Punishments of Ukraine http://www.kmu.gov.ua/punish/control/uk/publish/article?art_id=62580&cat_id=51096

Data on HIV prevalence and ART coverage

Beginning from 1999 the sentinel surveillance for the spread of HIV infection among different populations has been implemented in Ukraine. Since 2007, the serological monitoring was supplemented with linked studies (both biological and behaviour) among IDU, CSW and MSM. The studies are coordinated by the Ukrainian AIDS Centre and implemented in cooperation with regional AIDS centres and research institutions with the support of the International HIV/AIDS Alliance in Ukraine within the framework of the GFATM-funded programme "Overcoming HIV/AIDS Epidemic in Ukraine". According to EPP methodology, all results of sentinel surveillance studies among identified populations (beginning from 1999), as well as the data if routine surveillance for HIV prevalence among prisoners and pregnant women were included in the software package. The data on the spread of HIV in the latter subgroup was used as a proxy indicator for the population, categorized as the "general population".

According to the official reports of the Ukrainian AIDS Centre regarding the ART programme, relevant block of the EPP package included the data on annual numbers of patients, who received ART in 2004-2008 with specification of treatment regimen (first- and second line drugs). In addition, targeted data on the number of patients who would require ART through 2013, was included in EPP.

HIV incidence estimates, calculated in EPP software on the basis of the abovementioned data, were exported to the "Spectrum" software, which is the policy modeling system[106]. This made it possible to develop detailed evaluation of the HIV/AIDS situation in Ukraine as of the end of 2008, as well as to make projections for the period to 2015. Necessary information was added to the "Epidemiology" section of AIDS module (AIM) of the "Spectrum" software. Additionally, the following data and assumptions were included in this module:

- the number of pregnant women who received services to prevent mother-to-child transmission of HIV from 2000 through 2008; expected number of such women until 2015; duration of feeding and distribution by the types of feeding; the number of pregnancies that resulted in abortions; the number of children on ART. The rate of HIV transmission in the absence of MTCT prevention programmes was calculated as 20% (to 2000); in case of introduction of the three-drug preventive antiretroviral therapy this rate drops to just 2%;
- percentage of those on ART, who was still alive in the next year, is 86%;
- the model of "gradual progression of HIV" was used as a variable to calculate the rate, with which HIV positive individuals would die of AIDS if HAART is not available.

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[106] Spectrum Policy Modelling System, v. 3.40. Policy Project, 2009.

Generalized evaluation of HIV/AIDS situation in Ukraine as of the end of 2008, and projection indicators to 2015

Using the abovementioned data and assumptions, the researchers calculated the following outcomes regarding new and adjusted evaluation of HIV/AIDS situation in Ukraine at the end of 2008:

	2008	2009	2010	2013	2015
Total number of people living with HIV (adults over 15 years of age)	340,000	350,000	360,000	376,000	377,000
Men living with HIV (adults over 15 years of age)	231,000	238,000	244,000	254 000	255,000
Women living with HIV (adults over 15 years of age)	109,000	112,000	116,000	122,000	122,000
HIV prevalence (adults over 15 years of age, %)	0.83	0.86	0.89	0.96	0.97
HIV prevalence (adults of 15-49 years of age)	1.25	1.29	1.33	1.41	1.43
Estimated number of new HIV infections	34,000	33,000	32,000	27,000	23,000
Estimated number of AIDS-related deaths	21,000	21,000	21,000	22,000	22,000
Estimated number of patients in need of ART	80,000	86,000	92,000	113,000	126,000

Conclusions

In contrast to previous evaluations, new estimates are generally lower that estimates size of PLWH population in Ukraine, calculated at the end of 2007. One of the reasons for that lies in the fact that the new national evaluation of HIV/AIDS situation in Ukraine at the end of 2008 is based on more sophisticated software. It utilizes broader list of demographic data on the most-at-risk groups; more reliable data on the dynamics of the spread of HIV among these groups during relatively large period of time (from 1999, when sentinel surveillance for HIV was initially introduced) and at different territories; as well as the data on access to ART. On the other hand, lower estimated number of people living with HIV/AIDS does not mean that the epidemic is under control. Significant numbers of HIV positive Ukrainians remain unaware of their status (every 3 out of 4 individuals, affected by the infection), and this creates "favourable conditions" for the transmission of HIV from this group to their sexual partners and persons with whom they share drugs. Scaling up of antiretroviral therapy will lead to the increased survival thanks to the reduction of AIDS incidence and mortality; consequently, the number of people living with HIV will increase. HIV prevalence indicator among individuals over 15 years of age will grow together with projected reduction of the number of new HIV infections and stabilization of the number of AIDS-related deaths.

Limitations

Some data, used in this evaluation, reflect expert opinions of Ukrainian and international specialists, who participated in the process. Experts are aware of the fact that there exists certain overlapping between key populations, identified as main groups for evaluation; moreover, some of their demographic characteristics require specification. Effective approaches towards definition of the size of such groups remain underdeveloped. The quality of data seriously affects the reliability margins, which can be significant in the conditions of concentrated epidemic. This is why the use of estimates should be very careful, until more reliable and relevant data is available.

So, the data, provided above, is the most accurate evaluation of HIV/AIDS situation in Ukraine as of the end of 2008. **Authors will appreciate accurate and consistent use of these estimates and sources of data by all national and international partners working in the area of response to HIV/AIDS epidemic in Ukraine.**

DISCUSSION OF FINDINGS AND RECOMMENDATIONS ON FURTHER RESEARCH

If it deems possible, it is always expedient to address the issue of estimation of the size of risk groups (or "bridge" populations) within the framework of larger studies, aimed to achieve some other goals (e.g. behaviour monitoring of most-at-risk groups) – you can just add a set of relevant size estimation questions to the questionnaire. This will save you a lot of money and effort. For example, in order to estimate the size of IDU population in a certain city using the coefficient method, it would be enough to add just one question to the monitoring study (but only if the sample is representative for this particular city).

However, not all methods to estimate the size of the population, allow doing so. The method of social network scale-up requires short questionnaire (its size is predetermined by the number of categories subject to analysis), and it makes it possible to integrate it easily in other studies – for example, it can be a set of questions included in omnibus survey[107].

Results of the study, conducted using the method of scaling-up of social networks, have demonstrated that scaling up of social networks methodology requires further elaboration to become more applicable in estimating the size of risk groups.

First of all, it is necessary to utilize some special methodologies (additional address to respondents, the "secret ballot" methodology, etc) to increase the sincerity of answers of respondents.

One of weaknesses of the use of social network scale-up method is that it seeks to find the maximum size of the "active network", or people with whom a respondent contacted during the last two years. The problem is that such network may contain "weak" links – people, about whom a respondent is not very knowledgeable. If we use the concept of the circle[108] and the distance to respondent, then "active network" would consist of all people whom respondent have "seen" during the last two years – from close friends and relatives to people "far beyond horizon". Let us not forget about the transmission effect and the effect of insincerity of respondents due to stigmatization of the risk group, or biases, related to unawareness about specific characteristics of different acquaintances, and unwillingness to admit that some of respondent's close contacts belong to stigmatized groups. It is possible to formulate such patterns: the weaker are the links and the greater is the distance from a respondent to his/her contact, the higher is the "lack of knowledge" bias and the lower is the "bias of unwillingness to include in the network" (or stigmatization effect). For example, it is much easier to say, that you don't know this drug addict, than to say, that he is your friend. And vice versa, if the links are stronger and the distance is shorter, a respondent may have better knowledge about his/her friend's characteristics. In this case the "lack of knowle-

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[107] Omnibus survey is a regular multipurpose public opinion survey, conducted by sociological centres upon the request of several clients with different purposes, which co-finance such research (each client pays only for its section of the questionnaire).

[108] A. Pypych. Social Circles In the Light of Social Mediation Concept: Theoretical and Methodological Aspects / Anatoliy Pypych, Oksana Pypych // "Sociology: Theory, Methods, Marketing" – 2008. – # 4. – p. 148–165.

dge" bias will be lower, but a respondent will be less willing to admit that his/her friend or acquaintance belongs to stigmatized group.

This can be depicted as follows:

Dependence of biases on social distance
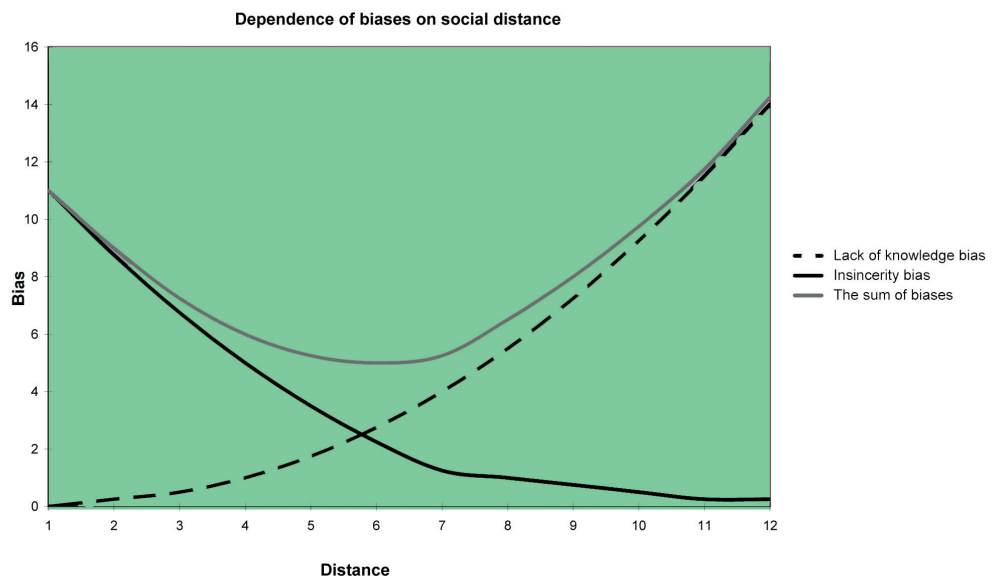
Summative bias would be minimal neither at a large distance nor at very close distance, but somewhere in between. This means that while using the social network scale-up method, it is advisable to seek the size of the network to reach optimal, rather than maximal (beyond the line of horizon) social distance.

This is why we believe that further development of social network scale-up method should include studies with separate block to measure social distance (strength of links), to identify the size of the network with links of various strengths, and to study the quality of projection for wide variety of known groups (especially known groups of low prestige).

Another approach to improve estimation of the size of risk groups is to use the "anonymous" (or "imagined") acquaintance with accumulation of information from different studies. What is the idea?

When we considered the issue of impossibility to estimate the size of risk groups within the framework of regular studies, we mentioned 1) the stigmatization of these groups and unwillingness of a respondent to admit his/her belonging to these groups, and 2) extremely low level of penetration, or low percentage of the size of these groups within the general population.

The first weakness can be addressed using the method of "anonymous friend" (or "imagined acquaintance"). The idea behind this method is to ask respondents to select one of his/her contacts, whom they know very well. Interviewer asks about certain aspects of life and activity of this contact, while guaranteeing not to ask about his/her identity and proximity to the respondent. This creates the sense of anonymity and allows respondent to speak about him/herself and his/her environment quite frankly. One specialized study has demonstrated that in most cases respondents speak about themselves; all other stories concern their close relatives. This means that the "lack of knowledge" bias is almost non-existent; the insincerity bias is minimized by the anonymity and by the fact that interviewer

remains unaware of the level of closeness of this "imagined acquaintance" to the respondent.

Another weakness is the fact that the share of representatives of MARPs in common national surveys with the sample of 2,000 respondents is less than 0.25%, or only 5 persons. Even in large research projects with over 10 thousand respondents, MARPs are represented by only 25 people – obviously, it is not enough to make reliable estimation. One of solutions for this problem is to accumulate the data of various studies conducted during a year. Fro example, KIIS carries out about 60-70 representative studies per year; if, for example, 50 studies contained several questions regarding membership of "anonymous friend" in the risk groups, we would receive information from the data array of 100,000 respondents, and our estimation would be relatively reliable (even if characteristics of these "anonymous friends" contained 7-10% error). Moreover, in addition to KIIS, some other institutions also conduct many sociological studies. Estimation of the size of one risk group using 50 studies would cost only about USD 12,000-15,000.

Analysis of available information, performed within this study, has demonstrated significant shortage of data, necessary to estimate the size of groups at risk for HIV infection using the coefficient method. On the one hand, the data on IDU is the only available statistical information; as for FSW and MSM, currently there are no statistical data, which could have been used to estimate their sizes. On the other hand, results of behaviour surveys are characterized by the number of serious limitations, and above all it concerns insufficient representativeness of sampled populations to make such calculations. In addition, special questions, aimed to obtain necessary information to estimate the size of MARP, were included only in questionnaires for IDU.

The issue of shortage of information can be addressed through the development of the list of indicators (questions in the questionnaire), fully compatible with the statistical indicators (if such exist), in order to include them in questionnaires for the behaviour surveys among the representatives of most-at-risk groups, "bridge" populations and the general population.

We should note that results of this study demonstrated (again!) that estimation of the size of MSM population requires particular attention, considering its hidden and closed nature. In the course of discussions regarding outcomes and prospects of further studies to estimate the size of this group, it was recommended for organizers of such studies to present research tools and protocols to the permanent reference group on LGBT communities via MSM.

As a future perspective, a decision was made to include a set of questions regarding sexual relations and practices with the people of same sex in behaviour surveys of the general population (while keeping the wording used in the studies among young and general population in 2004)[109].

In addition, it is expedient to develop a procedure and to carry out comprehensive study using the MSM nomination methodology (analysis of the data, posted on the popular dating sites) with further application of the coefficient method (based on the results of behaviour studies).

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[109]   Sociological study within the framework of the project "Behaviour monitoring of youth as a component of second generation surveillance", and sociological study "Attitudes and Behavioural Patterns of Adult Population regarding HIV/AIDS and People Living with HIV/AIDS".

Another serious problem today is the absence of common and established criteria for the inclusion of an individual to the risk group. Key inclusion criteria (period of the most recent practice, regularity, etc.) are defined separately for every study. Similarly, there exist no established criteria regarding differentiation of risk groups, even though the cases of "overlapping"[110] of risky behaviours are quite widespread.

Currently we are beginning to face the challenge of the lack of common and detailed methodological recommendations on the implementation of sociological studies to estimate the size of all groups at risk for HIV infection both at the national and the local levels.

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[110] For example, as in the case of widespread injecting drug use practices among FSW and provision of commercial sex services among IDU.

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ANNEXES

Annex 1. The data on the number of IDU in oblasts and selected cities

AR Crimea / Oblast / City	Health statistics data – drug use registration, as of June 30, 2008	Health statistics data – hospitalization, reporting year – 2007	Data of MIA of Ukraine as of January 1, 2009	Annual Alliance data (from October 1, 2007 through September 30, 2008)	Estimated size of IDU, calculated using the scaling-up of social networks method, 2009	Estimated size of IDU, calculated using the coefficient method based on "hospitalization" indicator, 2009	Estimated size of IDU, calculated using the coefficient method based on coverage with prevention indicator, 2009	Recommended regional estimates of the size of IDU	Adjusted regional estimates of the size of IDU
№	1	2	3	4	5	6	7	8	9
AR Crimea	4,084	553	9,298	3,963	33,100	12,100		22,600	22,600
Simferopol City		109		2,618		2,400	5,200		
Vinnytsia	1,136	153	3,267	1,072	10,500	1,800		6,500	6,500
Vinnytsia City		127		1,072		1,500	2,800		
Volyn	1,760	212	1,808	748	5,600	1,100		3,500	5,000
Lutsk City		51		748		300	1,200		
Dnipropetrovsk	10,251	2,740	21,901	12,198	54,900	19,400		55,000	17,000
Dnipropetrovsk City		521		2,250		3,700	19,400		
Dniprodzerzhynsk City				1,603			4,300		
Kryvyi Rih City				4,142			11,000		
Nikopol City				1,887			5,000		
Ordzhonikidze City				371			1,000		
Pavlograd City				1,945			5,200		
Donetsk	9,952	1,490	16,642	14,627	18,000	75,300		60,000	60,000
Donetsk City				2,730			6,400		
Horlivka City				2,868			7,600		
Kostyantynivka City				3,418			9,100		
Kramatorsk City				127			300		

Makiyivka City				1,634			4,300		
Mariupol City				2,200			5,800		
Slovyansk City				1,650			4,400		
Zhytomyr	1,508	512	5,698	0	7,100	6,000		6,500	7,500
Zhytomyr City		327		0		3,800			
Zakarpattya	238	238*	877	157	600	2,800		2,500	500
Uzhgorod city		77		157		900	400		
Zaporizhja	5,897	1,048	8,125	1,295	38,900	12,300		25,000	18,000
Zaporizhja City		514		1,295		6,000	3,400		
Ivano-Frankivsk	777	165	3,393	1,290	3,900	1,900		3,000	3,000
Ivano-Frankivsk City		118		1,290		1,400	3,400		
Kyiv	1,320	109	2,218	829	15,200	1,300		15,200	15,200
Bila Tserkva City				829			2,200		
Kirovograd	2,542	400	4,015	1,452	11,800	3,500		12,000	2,000
Kirovograd City		131		0		1,100			
Znamyanka City				1,452			3,900		
Luhansk	4,813	1,195	15,942	1,895	23,000	7,400		23,000	15,000
Luhansk City		825		1,534		5,100	14,300		
Pervomaysk City				361			1,000		
Lviv	1,066	198	5,135	0	13,600	4,600		9,000	9,000
Lviv City		58		0		1,400			
Mykolayiv	2,679	512	9,271	8,112	9,100	7,900		16,000	10,109
Mykolayiv City				8,112			15,100		
Odessa	6,706	636	16,014	10,581	8,100	46,300		40,000	15,500
Odessa City		235		10,228		17,100	57,800		
Kominternivske City				353			900		

AR Crimea / Oblast / City	Health statistics data – drug use registration, as of June 30, 2008	Health statistics data – hospitalization, reporting year – 2007	Data of MIA of Ukraine as of January 1, 2009	Annual Alliance data (from October 1, 2007 through September 30, 2008)	Estimated size of IDU, calculated using the scaling-up of social networks method, 2009	Estimated size of IDU, calculated using the coefficient method based on "hospitalizat-ion" indicator, 2009	Estimated size of IDU, calculated using the coefficient method based on coverage with prevention indicator, 2009	Recommended region-al estimates of the size of IDU	Adjusted regional estimates of the size of IDU
№	1	2	3	4	5	6	7	8	9
Poltava	2,147	838	4,489	960	10,600	5,800		8,000	8,000
Poltava City		448		960		3,100	1,400		
Rivne	1,128	125	1,981	949	2,800	1,500		3,000	3,000
Rivne City		59		949		700	2,500		
Sumy	1,120	126	2,708	1,363	6,000	1,500		10,000	10,000
Sumy City		94		1,363		1,100	10,300		
Ternopil	496	106	1,985	0	3,100	1,200		3,000	3,000
Ternopil City		50		0		600			
Kharkiv	2,130	724	5,797	953	16,600	8,500		13,000	13,000
Kharkiv City		327		953		3,800	4,100		
Kherson	2,567	1,340*	4,875	3,504	9,400	6,100		8,000	8,000
Kherson City		550		3,392		2,500	4,500		
Kakhovka City				112			300		
Khmelnitsky	2,016	411	2,963	589	11,900	4,600		8,000	8,000
Khmelnitsky City		181		589		2,000	1,400		
Cherkassy	1,937	502	4,328	4,630	7,400	4,400		11,000	11,000
Cherkassy City		354		3,555		3,100	8,500		
Smila City				235			600		
Uman City				840			2,200		

Chernivtsi	796	75	1,559	938	1,400	900		2,500	2,500
Chernivtsi City		54		938		600	2,500		
Chernihiv	1,916	113	5,671	0	12,000	1,600		6,500	6,500
Chernihiv City		68		0		800			
Kyiv City	9,105	1,875	11,762	12,960	29,200	77,900	37,400	38,000	38,000
Sevastopol City	897	239	2,388	1,345	8,100	2,800	3,600	5,500	5,500

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9. Adjusted estimates of the size of IDU, agreed at the meeting of Interregional M/E working group and oblast councils on TB and HIV/AIDS.

Annex 2. The data on the number of FSW in oblasts and selected cities

AR Crimea / Oblast / City	Annual Alliance data (from October 1, 2007 through September 30, 2008)	Estimated size of FSW, calculated using the scaling-up of social networks method, 2009	Estimated size of FSW, calculated using the coefficient method based on "double problem" indicator – regional estimates of IDU on "hospitalization" indicator, 2009	Estimated size of FSW, calculated using the coefficient method based on "double problem" indicator – recommended regional estimates of IDU, 2009	Recommended regional estimates of the size of FSW	Regionally adjusted estimates of the size of FSW
№	1	2	3	4	5	6
AR Crimea	697	9,100	2,200	4,000	4,000	4,000
Simferopol City	454		400			
Yevpatoria City	243					
Vinnytsia	264	4,000	300	1,200	1,200	1,200
Vinnytsia City	264		200			
Volyn	152	500	200	700	700	1,000
Lutsk City	152		100			
Dnipropetrovsk	1,671	4,700	3,400	9,800	9,800	3,700
Dnipropetrovsk City	387		700			
Dniprodzerzhynsk City	117					
Kryvyi Rih City	708					
Nikopol City	330					
Ordzhonikidze City	4					
Pavlograd City	125					
Donetsk	1,045	9,500	13,300	10,700	10,700	10,700
Donetsk City	366					
Horlivka City	144					
Kostyantynivka City	97					

City							
Kramatorsk City		2					
Makiyivka City		128					
Mariupol City		207					
Slovyansk City		101					
Zhytomyr		0	2,500	1,100	1,200	1,200	1,200
Zhytomyr City				700			
Zakarpattya		27	1,500	500	500	500	500
Uzhgorod city		27		200			
Zaporizhja		85	13,600	2,200	4,500	4,500	4,500
Zaporizhja City		85		1,100			
Ivano-Frankivsk		166	1,100	300	600	600	1,500
Ivano-Frankivsk City		166		200			
Kyiv		142	2,100	200	2,700	2,700	2,700
Bila Tserkva City		142					
Kiroivohrad		116	2,300	600	2,200	2,200	230
Znamyanka City		116		200			
Luhansk		205	9,200	1,300	4,100	4,100	4,100
Luhansk City		205					
Lviv		1,066	3,200	800	1,600	1,600	1,600
Lviv City		1,066		200			
Mykolayiv		3,845	1,400	1,400	2,900	2,900	2,900
Mykolayiv City		3,845					
Odessa		128	2,200	8,200	7,100	7,100	8,000
Odessa City		123		3,000			
Kominternivske City		5					
Poltava		99	2,600	1,000	1,500	1,500	1,500
Poltava City		99		600			

AR Crimea / Oblast / City	Annual Alliance data (from October 1, 2007 through September 30, 2008)	Estimated size of FSW, calculated using the scaling-up of social networks method, 2009	Estimated size of FSW, calculated using the coefficient method based on "double problem" indicator – regional estimates of IDU on "hospitalization" indicator, 2009	Estimated size of FSW, calculated using the coefficient method based on "double problem" indicator – recommended regional estimates of IDU, 2009	Recommended regional estimates of the size of FSW	Regionally adjusted estimates of the size of FSW
№	1	2	3	4	5	6
Rivne	256	600	300	600	600	600
Rivne City	256		100			
Sumy	153	1,800	300	1,800	1,800	1,800
Sumy City	153		200			
Ternopil	0	300	200	600	600	600
Ternopil City			100			
Kharkiv	846	5,900	1,500	2,300	2,300	2,300
Kharkiv City	846					
Kherson	217	4,000	1,100	1,500	1,500	1,500
Kherson City	217		400			
Khmelnitsky	93	2,000	800	1,500	1,500	1,500
Khmelnitsky City	93		400			
Cherkassy	527	2,900	800	2,000	2,000	2,000
Cherkassy City	409		600			
Smila City	43					
Uman City	75					
Chernivtsi	416	1,000	200	500	500	500
Chernivtsi City	416		100			
Chernihiv	0	500	300	1,200	1,200	1,200
Chernihiv City			100			

Kyiv City	738	2,000	13,800	6,800	6,800	6,800
Sevastopol City	652	500	500	1,000	1,000	1,000

Sources:

1. The data obtained from "SyrEx" database – the number of FSW clients, who received free condoms during the year within the programmatic activity as reported by subgrantees of the Global Fund projects and SUNRISE project.

2. Estimated size of FSW population, calculated through the method of scaling-up of social networks after adjustment to insincerity bias in the respondents' answers.

3. Estimated size of FSW population, calculated through the coefficient method considering the level of prevalence of "double problem" (results of behaviour surveys among IDU and FSW in 2008) on the basis of regional estimates of the size of IDU based on hospitalization indicators.

4. Estimated size of FSW population, calculated through the coefficient method considering the level of prevalence of "double problem" (results of behaviour surveys among IDU and FSW in 2008) on the basis of Recommended regional estimates of the size of IDU group, recommended by the members of Intersectoral Working Group on Monitoring and Evaluation of Effectiveness of Programmatic Measures in Response to HIV/AIDS.

5. Recommended regional estimates of the size of FSW group, recommended by the members of Intersectoral Working Group on Monitoring and Evaluation of Effectiveness of Programmatic Measures in Response to HIV/AIDS.

6. Adjusted estimates of the size of FSW, agreed at the meeting of Interregional M/E working group and oblast councils on TB and HIV/AIDS.

Annex 3. The data on the number of MSM in oblasts and selected cities

AR Crimea / Oblast / City	Estimated size of MSM, calculated using the scaling-up of social networks method, 2009	Estimated size of MSM, calculated using the coefficient method based on survey among general population results in 2004, 2009	Recommended regional estimates of the size of MSM	Regionally adjusted estimates of the size of MSM
№	1	2	3	4
AR Crimea	6 200	6 513	4 000	4 000
Vinnytsia	700	5 284	3 300	3 300
Volyn	0	3 478	2 100	1 000
Dnipropetrovsk	2 800	11 294	7 000	7 000
Donetsk	1 200	14 786	9 100	9 100
Zhytomyr	600	4 240	2 600	2 600
Zakarpattia	500	4 334	2 700	—
Zaporizzhia	2 200	6 023	3 700	3 700
Ivano-Frankivsk	400	4 720	2 900	300
Kyiv	500	5 776	3 600	3 600
Kirovograd	1 000	3 282	2 000	1 500
Lugansk	800	7 812	4 800	4 800
Lviv	4 100	8 835	5 400	5 400
Mykolaiv	200	4 010	2 500	2 000
Odessa	400	8 166	5 000	5 500
Poltava	1 100	4 931	3 000	3 000
Rivne	700	3 916	2 400	700
Symu	100	3 858	2 400	1 200
Ternopil	600	3 626	2 200	2 200
Kharkiv	4 300	9 510	5 900	5 900
Kherson	700	3 695	2 300	2 300
Khmelnitsk	0	4 340	2 700	2 700
Cherkasy	1 000	4 150	2 600	2 600
Chernivtzi	300	3 041	1 900	1 900
Chernigiv	200	3 504	2 200	2 200
Kyiv city	600	9 614	14 000	14 000
Sevastopol city	800	1 275	800	800

Sources:

1. Estimated size of MSM population, calculated through the method of scaling-up of social networks after adjustment to insincerity bias in the respondents' answers.

2. Estimated size of MSM population, calculated through the coefficient method on the basis of indicators obtained through surveys among youth (14-24) and adult population (25-49) in 2004.

3. Recommended regional estimates of the size of MSM group, recommended by the members of Intersectoral Working Group on Monitoring and Evaluation of Effectiveness of Programmatic Measures in Response to HIV/AIDS.

4. Adjusted estimates of the size of MSM, agreed at the meeting of Interregional M/E working group and oblast councils on TB and HIV/AIDS.

Annex 4. Sources of Statistical Information

1. Report on the number of special contingent in the facilities of the Department /F.1-UVP/ as of January 1, 2008/State Department for Execution of Penalties.

2. "Distribution of permanent population of Ukraine by gender and age on January 1, 2008", Kyiv, the State Statistics Committee of Ukraine, 2008.

3. "Distribution of permanent population of Ukraine by gender and age" – express-issue of the State Statistics Committee of Ukraine, No. 146 – 2008, June 18.

4. Statistical Yearbook of Ukraine for 2007 – Kyiv, the State Statistics Committee of Ukraine, 2008.

5. Data from the official website of the All-Ukrainian Census 2001 regarding the size of ethnic groups (www.ukrcensus.gov.ua/results/general/general/nationality).

6. Data of the territorial statistical bodies in 24 oblasts of Ukraine, AR Crimea and the cities of Kyiv and Sevastopol (www.ukrstat.gov.ua//work/regions.htm).

7. Current Law of Ukraine "On the General Structure and the Size of the Ministry of Internal Affairs of Ukraine", issued on May 12, 2002, with the most recent changes introduced on May 18, 2004.

8. Section "Statistical Information" of the official website of the State Statistics Committee of Ukraine (www.ukrstat.gov.ua).

9. Official letter of the head of Higher Attestation Commission of Ukraine "On the Number of Candidates and Doctors of Sciences, who received their degrees since 1992", as of December 12, 2008.

10. Official letter of the head of IT Department of the Ministry of Internal Affairs of Ukraine "Information on registration of persons, who exercise non-medical use of narcotic drugs, psychotropic substances and precursors as of January 1, 2009", issued on January 16, 2009.

11. The data of Ukrainian Medical and Monitoring Centre for Alcohol and Drug Abuse at the MOH Ukraine "Report on morbidity of individuals with mental and behavioural disorders in connection with substance use" for 2007 and 2008.