"Programme of Assistance for the
Prevention of Drug Abuse and Drug Trafficking in the
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Estimating the Prevalence of Injection Drug Use in Five Cities of Georgia

2009

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The opinions expressed herein are those of the authors' and do not necessarily reflect the views of EU

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ACRONYMS

AIDS – Acquired Immune Deficiency Syndrome
AIDS Center – Infectious Diseases, AIDS & Clinical Immunology Research Center
BPU – Bemoni Public Union
BSS – Behavioral Surveillance Survey
CI - Confidence interval
CIF – Curatio International Foundation
ELISA – Enzyme Linked Immunosorbent Assay
EMCDDA – European Monitoring Center for Drugs and Drug Addiction
EU – European Union
FGD - Focus Group Discussion
GEL – Georgian Lari (exchange rate of 1.66GEL = 1USD at the time of this report)
GFATM – Global Fund to Fight AIDS, Tuberculosis and Malaria
GoG – Government of Georgia
GRIA– Georgian Research Institute on Addiction
HIV – Human Immunodeficiency Virus
ICD-10 – International Statistical Classification of Diseases and Related Health Problems, 10th revision
IDUs – Injecting Drug Users
IEC – Information, Education, Communication
MARP - Most at risk population
MoIA - Ministry of Internal Affairs of Georgia
MoLHSA – Ministry of Labor, Health and Social Affairs of Georgia
NCDC - National Center for Disease Control and Public Health
NGO – Non-Government Organization
PCR - Polymerase Chain Reaction
RDS – Respondent Driven Sampling
RDSCM - Respondent Driven Sampling Coupon Management
RDSAT - Respondent Driven Sampling Analysis Tool
RPR – Rapid Plasma Reagent
SCAD – South Caucasus Anti-drug Programme
SHIP – STI/HIV Prevention
SPSS – Statistical Package for the Social Sciences
STI – Sexually Transmitted Infections
TPHA – *Treponema pallidum* Hemaggultination Assay
UNAIDS – The Joint United Nations Programme on AIDS
UNDP – United Nations Development Program
UNODC - United Nations Office on Drugs and Crime
USAID – United States Agency for International Development
WB – Western Blot Test
WHO – World Health Organization
VCT – Voluntary Counseling and Testing

DEFINITIONS

Population: the entire group of individuals or items of interest in the study.

Target population: the population from which representative information is desired and to which inferences will be made.

The **prevalence** of a certain social attribute is defined as the proportion of people possessing that attribute. It is often expressed as a percentage, or sometimes as "per thousand" or even "per million" of the total population. The actual number of individuals is sometimes used instead of the prevalence, however without information on the baseline population, this number may be meaningless.

Prevalence is a measure of how many drug users there are in a community or country and how they are distributed across the population e.g. by age, gender, geographical location or type of drug use.

The term "**Lifetime Prevalence"** refers to: the proportion of the population who have used a particular drug at least once, whereas "**Current Prevalence"** refers to those who have used a particular drug in a specific period of time such as the last month/week.

According to EMCDDA[1] definition, **Problem drug use (PDU)** is defined as "Injecting drug use or long duration/regular use of opioids, cocaine and/or amphetamines". Amphetamines include both amphetamine and methamphetamine, but not ecstasy. Opioids include any legal or illegal use of any opioids (e.g. methadone, buprenorphine, slow release morphine).

Injecting drug use (IDU) is defined as "Injecting for non-medical purposes".

Indicators are data which give pointers or act as tools in the estimation of prevalence e.g. data collected routinely by government agencies such as arrest data, drug treatment data and mortality data. The data reflects only those who have come into contact with services and not all users of illicit drugs.

Estimation methods are the range of methods which can be used to estimate the prevalence of illicit drug use.

Routine data sources - statistics that are collected routinely i.e. in the course of duty.

Non-routine data sources - statistics that are not routinely collected but are "once-offs" such as the results of studies of drug use in the general population or in a specific group. These can be gathered for research or planning purposes.

BSS is the ongoing systematic collection, analysis and interpretation of HIV/AIDS data and the dissemination of information to those who need to know so that actions may be taken.

Sampling is the process of selecting a portion of a population in order to make inferences about the larger population from which the sample was drawn. Sampling is of crucial importance in measuring trends over time. Sampling strategies should therefore be systemic and replicable over time.

[1] European Monitoring center on Drugs and Drug Addiction

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EXECUTIVE SUMMARY

Drug abuse and related health, social and economic consequences are a critical problem facing Georgia today. There are presently no valid data on the prevalence and incidence of drug abuse among the general population of Georgia. It is difficult to overestimate the importance of obtaining accurate information on the prevalence of illicit drug use.

A variety of methods are available for estimating the prevalence of heavier or more problematic patterns of illegal drug use. Of all the methods of indirect estimation the multiplier-benchmark approach is probably the easiest to implement and probably the one with the longest history of use in the field of drug epidemiology.

This is the first time the multiplier/benchmark method has been applied to estimate an Injection Drug Use (IDU) population in Georgia. For the purpose of this study, we regarded any person who has used any psychoactive drug through injections in a non-medical context.

Study Design and Methods

The aim of the present study is to estimate the prevalence of Injection Drug Use (IDU) in Tbilisi (the capital) and 4 main cities (Batumi, Telavi, Gori and Zugdidi) of Georgia and provide IDU prevalence estimate throughout the Country.

There are five stages of prevalence estimation method that had been used in this study.
Stage 1: Data collection of IDUs (gaining the benchmark data - B) - all available data on injection drug use in Georgia were reviewed. Data of IDUs are recorded under the current system for the year 2007 (details see below in chapter "Benchmark Data Collection").
Stage 2: Estimation of the value of multiplier (M) - the proportion of the target population in the benchmarks is obtained from research studies using nomination techniques (study using the Respondent Driven Sampling (RDS) methodology based on appropriate eligibility criteria and accurate sample size calculations was conducted). The survey collected the data among IDUs using nomination method/questionnaire developed by SCAD epidemiology experts.
Stage 3: The derivation of multiplier - **t**his stage involves two steps: a) Estimation of the **percentage (P)** of IDUs recorded from Stage 2. Separate estimates for different benchmarks were made in each city. b) **Multiplier (M)** is estimated for each benchmark by the inverse of percentages (Pisani, 2002). The formula **M = 100/P**
Stage 4: Estimate the number of drug injectors - numbers of IDUs estimates for each benchmark are obtained by multiplying the recorded number of IDUs (collected from the available data source) by an appropriate multiplier (The formula **E = BxM**).
Stage 5: Calculation of a prevalence of drug injection for each city - it was based on data on population distribution (State Department of Statistics of the Ministry of Economic Development of Georgia). Census data gave the population for urban areas. The population between 18 and 65 was used as the denominator for the prevalence based estimate. The appropriate estimates of injecting drug use were then applied to that adult population. An upper and lower limit is provided by statistical means.
Additionally, the first attempt to ***derive the national estimate for the percentage of injection drug users in Georgia using the Multiple Indicator Method*** (MIM) had been carried out.

Since 2008, program entitled "Establishment of Evidence-based Basis for HIV/AIDS National Program by Strengthening Surveillance System" is being implementing within the framework of the Global Fund Project to Fight AIDS, Tuberculosis and Malaria (GFATM) by Curatio international

Foundation (CIF) in cooperation with AIDS and Clinical Immunology Research Center, National Center for Disease Control and Public Health (NCDC) and local NGOs Bemoni and Tanadgoma. Under this project Bemoni proposed to conduct Behavioral Surveillance Surveys (BSSs) with a Biomarker Component among injecting drug users (IDUs) in five main cities of Georgia: Tbilisi, Gori, Telavi, Zugdidi, and Batumi. It was decided to use this opportunity and incorporate the nomination study for estimating the size of the injecting drug user (IDU) population into the above mentioned BSSs.

Key Findings

Calculation of the Size of IDU Population. Multipliers were derived from the RDS survey of 1127 IDUs recruited from across 5 cities. Participants' responses to the questionnaire were used to produce a final series of IDU size estimates, including 95% confidence intervals.

The population size estimate for IDUs was the mean of six multiplier estimations in Tbilisi, 5 in Batumi, 3 in Gori and Zugdidi and 2 in Telavi. This study suggests using the statistical lower and upper limits (at 95% confidence interval) to reflect the minimum and maximum ranges.

Calculation of the estimated size of the IDU population in the surveyed cities revealed these figures (mean estimates): **Tbilisi - 27 107 (23 694-31 532); Gori – 2 989 (2 537-3 570); Telavi – 557 (358-941); Zugdidi - 4 855 (3 945-6 089); Batumi – 5 937 (5 008-7 162).**

Estimation of the prevalence of injection drug use. Prevalence estimates for the injection drug use were produced for 5 cities of Georgia. Census data gave the population between 18 and 64 for urban areas across the country. The statistical lower and upper limits (at 95% confidence interval) were used to reflect the minimum and maximum ranges.

Calculation of the IDU prevalence estimation in the surveyed cities revealed these figures (mean estimates): **Tbilisi – 4,03 (3,98-4,09); Gori – 3,61 (3,47-3,75); Telavi – 1,30 (1,19-1,42); Zugdidi: 4,63 (4,37-4,76); Batumi – 7,97 (7,79-8,15).**

Extrapolation from Local to National Prevalence Estimates

Local estimates using multiplier-benchmark methods give important information on extent of drug problem. However, they are employed in studies of drug use on a smaller, geographically local scale. Nonetheless, there is still very often a need for overall national estimates to be made, and one way of doing that is to extrapolate from local prevalence studies to an overall picture. The extrapolation methods are based on statistical regression techniques.

The Multivariative Indicator Method (MIM) had been used to derive national prevalence estimates. The aim of this method is to estimate the number of injection drug users in the population by combining information on prevalence that is available only in a few areas (the calibration population, or anchor points) and indicators or predictors of drug use that are available in all areas.

Two separate national estimations were produced: at first, national IDU prevalence was calculated using ***demographic indicator such as population density*** and the second method used ***the drug injection prevalence rate coefficient*** for each city.

National prevalence estimates for the injection drug use were produced for 65 cities of Georgia. Calculation of the IDU prevalence estimation nationwide revealed these figures: estimation method

N 1, using demographic indicator (population density) – **1,46% (estimated number of IDUs equals 39 152)** estimation method N 2, using prevalence rate coefficients - **1,53% (Number of IDUs – 41 062).**

Conclusion

In this report we have provided the first ever estimates of the prevalence of injection drug use within Georgia. We have shown that injection drug use is occurring in all selected cities of Georgia and that, on average, from 1, 30% to 7, 97% of the population aged between 18 and 64 has used these drugs within the year 2007. Since this is the first time that an estimate of this kind has been produced there is no previous figure with which to make comparisons. The current study has demonstrated that it is feasible to apply the multiplier-benchmark method to the task of estimating the size of IDU population in Georgia.

The recording of information on problem drug use should be improved. The treatment monitoring system should not only provide figures of drug users seeking treatment categorized by main substance groups, but should also be able to avoid double counting.

Establishment of the Unique Identifier Code (UIC) system of anonymous client registration and tracking service is required. Therefore the actual time and effort spent collecting data will be reduced and this would further minimize the costs of a prevalence estimation exercise in the future. Thus when sufficient data have been collated, methods such as the truncated Poisson method or the capture-recapture method can be used to provide prevalence estimations.

The best results were found for police multiplier and treatment coverage (both detoxification and substitution) multiplier methods. They offer rather stable estimates. The police multiplier method is based on the number of individuals registered as drug offenders. The treatment coverage multiplier is based on the number of individuals treated for addiction problems that had in contact with treatment services in a given year period. Despite the perception that the estimate derived from HIV testing data within a multiplier method may be an underestimate, this method appears to be the most suitable for estimating the size of injecting populations in Georgia, since this indicator is available across the country.

The multiple indicator method to derive national prevalence estimates is cost-effective, as it does not require new data collection, unless separate studies are needed to estimate new anchor points. Local estimation methods should be used and further developed to produce regional anchor points for the multivariative indicator method. The current study suggests that a more differentiated response to the problem of drug abuse may be possible, although more work is required to provide more detailed breakdowns in terms of drug-related and demographic indicators.

Finally, this research has shown that it is possible to provide estimates of the prevalence of problematic drug use at both a national and local level within Georgia. It will be important to build upon this work so that over time we have a much clearer picture of the extent to which the drug problem in Georgia is changing. We also have to recognize that the problem of illegal drugs within the country can change rapidly. This indicates the importance of developing accurate on-going monitoring systems to identify rapid changes in the behavior of drug users within Georgia. Similar studies should be conducted on the regular basis. Since, the technical expertise for conducting such exercises is limited in the country at this moment; there is a need to develop pool of experts at the national level.

Figure 1. Estimated Prevalence of IDUs in Urban Areas of Georgia

INTRODUCTION

Overview of Drug Situation in Georgia

Georgia's population is estimated to be approximately 4.4 million in a geographical area of 70,000-sq. km., bounded by the Black Sea, Russia, Azerbaijan, Armenia and Turkey. Drug abuse and related health, social and economic consequences are a critical problem facing Georgia today. Drug addiction has escalated in Georgia since 1990. On the one hand, the collapse of the Soviet Union was followed by a breakdown of the anti-drug system specific for the totalitarian state that was mainly based on prohibitive measures. On the other hand, the social, political and economic events unfolding in the country gave rise to a series of incentives for intensive abuse of drugs. In particular, uncontrolled territories, unprotected frontiers, a sharp deterioration in the criminal situation, and corruption all widened access to drugs. At the same time, the social-economic collapse, a crisis of value in the society, social pessimism, and unemployment promoted increased drug abuse. Although recent years have witnessed economic development and reduction of crime, illicit sale and abuse of drugs are still on the increase.

The situation is worsened by the geographic location of Georgia, turning the country into one of the important routes for transiting drugs from Asia to Europe. In this respect, Georgia have appeared as an immediate link between the routes through which drugs flow from Afghanistan and Central Asia to Europe. Part of the drugs remains in Georgia, facilitating their increased abuse in the country. Recent years have seen a sharp rise in the smuggling of drugs from Europe, particularly in respect of Subutex® (buprenorphine) the abuse of which in Georgia reached alarming dimensions in 2004-2005. This medical product, used for the purpose of substitution therapy by means of sublingual administration, is basically used through injections in Georgia.[2]

According to the information of the Research Institute on Addiction, the number of officially registered drug abusers and drug addicts increased 9-fold from 1990 to 2004. Cannabis (marijuana, pot) is on top of the list of non-injection drugs in the country, which is suggested by the data contained in the republican database till 2005, and youth survey results, conducted in 2005 by Georgian Research Institute on Addiction.[3] According to survey results, the most frequently consumed drug, both for experimental and recreational purposes, is marijuana. 52.6% of male respondents took marijuana at least once or twice in their lifetime.

In recent years, the abuse of the marijuana has covered the entire territory of Georgia. Georgian climate favours the growth of Cannabis, which is one of the factors conducive to the rise in consumption. Locally manufactured marijuana is easy to procure, and it is cheap. Besides, recent years have seen indirect promotion of marijuana by certain representatives of media and the show business, which stimulates young people's interest to marijuana, creates positive disposition and blunts caution.[4] Injection drugs are more available in large cities and locally cultivated pot is particularly widely spread in villages.

The abuse of Ecstasy by young people also draws attention, particularly in large cities. The high level of sniffing various volatile substances of drug effect has reached alarming scales among children and adolescents, particularly children devoid of parental care. According to the Youth Survey, Ecstasy (4.5%) ranks first after marijuana, followed by heroin (3.9%), Tramadol (2.6%) and inhalants (2.6%).[5]

[2] Drug Situatuion in Georgia, Annual Report 2005, SCAD
[3] Drug Situatuion in Georgia, Annual Report 2004, SCAD
[4] Drug Situatrion in Georgia, Annual Report 2003, SCAD
[5] Drug Situatuion in Georgia, Annual Report 2005, SCAD

The use of cocaine and amphetamine is insignificant, as they are not actually available on the black market. Ephedrine and pervitine (methamphetamine), which are usually prepared through chemical refinement of medicines used against respiratory disorders and are available from drugstores without any prescription, have also appeared in the black market. The number of females constituted 1% of the overall number of registered drug users. In terms of age, most illicit drug users are 21 to 35 (Gamkrelidze et al., 2005). [6]

The gamut of drug abusers in terms of age, social and geographic belonging has also widened. On the one hand, there is an upward trend in the rejuvenation of the age of the first abuse of drugs, including injection ones. On the other hand, the age range of drug abusers has widened from children to the elderly. Drugs are abused in almost all social classes.[7]

Although on account of cultural and traditional specifics, the abuse of drugs by women is not as intensive as it is in some other countries (e.g. Russia, Ukraine, some European countries, etc), experts point out that the number of drug abusing women and girls has significantly increased in recent years.

Drug usage and addiction is the primary driver of the HIV/AIDS epidemic in Georgia. Low awareness of HIV/AIDS, high levels of unsafe injecting coupled with unsafe sexual behaviour as well as high transmission rates of other sexually transmitted infections indicate a real danger for the rapid transmission of HIV among IDUs and to the wider community.[8] Number of known HIV/AIDS cases remains relatively low, but its rise shows signs of acceleration recently. As of December 31, 2007 a total of 1500 HIV cases have been registered in Georgia historically; among them 1142 were males, and 358 – females; 621 patients developed AIDS and 315 persons died. The vast majority of people living with HIV/AIDS were aged 29-40-years at the time of diagnosis. Total number of newly registered cases was 344 in 2007[9]. Georgia's HIV cases are mostly concentrated among the injecting drug users so far. Among the cumulative HIV cases with a known route of transmission, 60.2% were infected through injecting drug use in 2007. The worst affected areas were Tbilisi, the capital city and Black Sea coastal regions of Georgia (Samegrelo and Adjara).

How many IDUs are there in the country?

There are presently no valid data on the prevalence and incidence of drug abuse among the general population of Georgia. According to the last available information source, 24,000 people were registered in the country at the end of 2004, 14,400 of them—injecting opioid users. Until 2005, the national database of known / institutionalised drug users (Narcologic Register) was maintained by the Georgian Research Institute on Addiction under the control of the Ministry of Health, Labour and Social Affairs and also sent to the Ministry of Internal Affairs. The Central Information Bank served as the database that contained information on all the registered drug users and registered drug dependent persons across the country.

In May 2005, the database was transferred to the Ministry of Justice's Bureau of National Expertise (NFB), and later, in November 2006, to the Ministry of Internal Affairs. The NFB and the MOIA are not required to send the information to the Central Information Bank, which consequently lost its active function and is now limited to the "frozen" data collected prior to May of 2005.[10] Following the transfer, the database was not updated. No figures of registered drug users are available.

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[6] Drug Situatuion in Georgia, Annual Report 2005, SCAD

[7] Anti-drug Strategy of Georgia, 2007

[8] UNGASS Country report Georgia, 2006

[9] Infectious Diseases, AIDS and Clinical Immunology Research Center, Annual Report, 2007. Unpublished.

[10] The system of registration and follow-up of drug users in Georgia, 2008, *David Otiashvili & Nino Balanchivadze,* Addiction Research Center Alternative Georgia

US Department of State International Narcotics Control Strategy Reports (2005, 2006, 2007, 2008), released annually by the Bureau of International Narcotics and Law Enforcement Affairs show the drug use trends in Georgia:

2005 – "Independent and official sources indicate that there were at least 275,000 drug users in Georgia during 2004. The increase in the number of drug addicts and drug consumption in comparison with last year's figure of 150,000 is mainly caused by the import and illegal sale of Subutex. This drug is not registered in the Georgian health care system and is imported illegally mainly from Europe. The price for one tablet of Subutex is approximately $100. The tablet is dissolved into an injectable solution for three or four people at $25-$30 cost per user."

2006 – "There are no widely accepted figures for drug dependency in Georgia. Press reports indicate at least 350,000 drug users in Georgia during 2005; the government puts the number at 240,000. Any increase in drug consumption is probably due to the growing popularity of Subutex."

2007 – "There are no widely accepted figures for drug dependency in Georgia, and more generally, statistics are poorly kept. Some sources put the number of drug users between 240,000 and 350,000. Such calculations are, however, at best, a guess. They result from multiplying known users by a coefficient to account for the covert, hidden nature of the problem and poor record keeping.

The GoG has just restarted a national register on drug abusers, which at the end of 2004 numbered 24,000. The register had fallen into disuse after mandatory drug testing was moved from the Ministry of Health to the Ministry of Justice. There were 1488 new registered drug abusers between May-December 2005, with another 4380 registered from January 2006 through mid-October 2006. New figures for 2005 and 2006 are, however, for Tbilisi only. All figures include both hard-core addicts as well as other users."

2008 – "There are no widely accepted figures for drug dependency in Georgia, and more generally, statistics in this subject area are poorly kept. Some sources put the number of drug users between 240,000 and 350,000. Such calculations are, however, at best, a guess. They result from multiplying known users by a coefficient to account for the covert, hidden nature of the problem and poor record keeping. The Ministry of Justice's National Forensic Bureau maintains annual statistics on persons tested for drug abuse. In the first 9 months of 2007, the number jumped to 9,581 persons, compared to a total of 5,779 in 2006."

Another source of information regarding drug situation in Georgia is **Drug Annual Reports prepared by the South Caucasus Anti-drug programme (SCAD programme).** The South Caucasus Anti-Drug (SCAD) Programme is the response of the United Nations Development Programme (UNDP), the European Union (EU) and national governments of the South Caucasus to reinforce drug control capacities in the region:

"The latest information reflects up to 24 000 drug users registered in the Narcologic Register by the end of 2004. Out of those, up to 14 400 were injected opioid users. To get a relatively accurate description of the situation, the existing officially registered data were usually multiplied by a certain index, differently by different experts (the value of index ranging from 8 to 10). As a result, the number of drug users for 2004 was estimated as 200 000 - 240 000.

The year 2005 showed an increase in the demand for treatment of drug dependent individuals (by 99% for detoxification of opioid-type drugs addicts). This is demonstrated by a sharp increase in the

number of treated cases compared to the previous years: namely, 603 patients versus 300 treated in 2004 and 320 treated in 2003. Another interesting trend observed in 2005 was that long queues of patients started to form to register in advance for treatment in the in-patient hospitals, which had never happened before.

In the recent period the death cases caused by drug use are not actually registered by the relevant agencies in the country; to fill in this gap, a special research was implemented in 2005 in the framework of SCAD programme directed on estimation of mortality of drug users. The research revealed, that for the year 2003, mortality of drug user men of reproductive age represented 6 persons per 1000 people, which two times exceeds the mortality rate for the total population of males in 2003 (3 persons per 1000 individuals)."[11]

Brief overview of size estimation methods

It is difficult to overestimate the importance of obtaining accurate information on the prevalence of illicit drug use. Such information is valuable both in terms of monitoring the impact of drug misuse at both national and local levels as well as in assessing the effectiveness of drug prevention efforts.

It should therefore be remembered that, no matter what approach to prevalence estimation is taken, the picture produced by this process can only ever be an imperfect approximation of the real state of affairs. As a result, our knowledge of the world of illicit drug use and our ability to estimate the number of people using illicit drugs within a locality is less complete than we may judge to be desirable.

A variety of methods are available for estimating the prevalence of heavier or more problematic patterns of illegal drug use, for example drug dependence. These include: population-based surveys (although, these are often unreliable for rarer, stigmatized and hidden patterns of drug use); case-finding studies; capture-recapture estimates; multiplier techniques; nomination techniques, including snowball sampling; synthetic estimates, based on social or demographic variables assumed to correlate with drug prevalence; and a variety of more sophisticated statistical modeling approaches.

The above mentioned methods for estimating the prevalence of drug use can be broadened in two wide categories:

- ⇒ DIRECT METHODS - enumeration (counting) of known drug users and conducting surveys (such as Enumeration of known drug users, population surveys, school-age surveys);
- ⇒ INDIRECT METHODS - estimating numbers from samples of known drug users (capture-recapture, multiplier method)[12].

Direct methods are relatively well equipped for estimation of the overall extent of drug use (of any kind and pattern) in the population; however, they fail to estimate within any acceptable margin of error more rare (low-prevalent) modes and patterns of drug use, such as injection drug use and problem drug use.

Why is it necessary to be concerned with the methodological issues of estimating drug problems? Difficulties in describing the extent, nature and impact of substance use and misuse present considerable scientific challenges. Drug use is usually illicit and hidden and subject to rapidly changing fashions. Routine surveillance sources remain only partially validated, are of changing and, in general, unknown coverage, and measure only a part of the phenomenon. Research

[11] Report to the UNDP and EMCDDA by the SCAD National Focal Point, Georgia Drug Situation 2005
[12] Approaches to Estimating Drug Prevalence in Ireland: An Overview of Methods and Data Sources, 2003

studies are usually conducted in selected populations of unknown representativeness, and with little opportunity for methodological development or collection of time-trend data.

Using multiplier-benchmark methods

Of all the methods of indirect estimation the multiplier-benchmark approach is probably the easiest to implement and probably the one with the longest history of use in the field of drug epidemiology. There is a flexibility in how it is applied that makes it useful in many circumstances. In the standard application, it uses information about the known size of an identifiable subsection of the target population of drug users, and generalizes from that subsection to give an estimate of the complete target population by applying a multiplying factor.

In multiplier-benchmark studies, the research makes use of preexisting data for some behaviour or event that is common in the target population of problem drug-taking, for example, police arrest data for drug use or possession, accident and emergency ward data and, more directly, drug treatment data and data on drug-related deaths. Such pre-existing information, which can be simply an anonymous count of the key behaviour over a fixed time period, is called **the benchmark information**. Along with that national data set is required an estimate of the proportion of the target population who have experienced the event, that is, who have been arrested, who have died etc.; the inverse of that proportion is called **the multiplier**. Estimating the associated multiplier requires, usually, a small, separate sub-study using **nomination technique** and again, usually, anonymous records are sufficient.

An early paper by Hartnoll and others ("Estimating the prevalence of opioid dependence", *Lancet*, vol. 338 (1985), pp. 203-205) illustrates the application of the simplest technique, using deaths amongst drug users. To apply the multiplier procedure to estimate the number of drug users in a given year, he uses two things:

- ⇒ The number of deaths to drug users in that year, say 3,000; that acts as the fixed benchmark in the calculation;
- ⇒ The death rate amongst drug users in that year, say 2 per cent, or 1 in 50 dying in the year; that provides the multiplier in the calculation.

The estimate of the number of drug users in that year is calculated from those two figures as the population size required for a 2 per cent death rate to result in 3,000 deaths. If 1 in 50 die, then the overall population must have been estimated for approximately 3,000 x 50 = 150,000. The calculation is notable for its simplicity and directness.

Relative trends inferred from routine information systems and agency data

Before looking at estimation methods, it is useful to consider the uses of data from *routine information systems*. Although such sources of data of themselves do not provide the actual number of drug injectors in a population, they are often used in providing *relative trend data*.

An example of routine information systems could be data from drug treatment agencies. This kind of data is often considered to be reflective of the larger unknown population. For example, it is sometimes assumed that if the number of injectors coming to treatment has increased, then this reflects an increase in the number of injectors in the population – other things being equal.

Trends can often be inferred from existing sources such as:

- ⇒ data from health centres and treatment clinics - including characteristics of drug injectors such as age, sex, type of drugs used, route of drug administration, and prevalence of hepatitis, and HIV/AIDS
- ⇒ data from enforcement agencies - such as the range of available drugs, their purity, street prices, drug trafficking routes, and localities of drug use

- ⇒ data from hospitals and emergency units: such as the number of cases treated, trends in infectious conditions such as hepatitis, HIV/AIDS, and the number of reported overdoses
- ⇒ data from national health surveillance systems and disease registers: such as the incidence and prevalence of hepatitis, and HIV/AIDS

The proportion of the target population in the benchmark may be obtained separately and independently by interview/questioning or by other specific studies. Sometimes it is possible to use figures from already published data, if they are appropriate for the target population, or even from a general population survey itself, if it contains a high number of drug user respondents from the target population. There are a range of different types of multiplier study that can be carried out, including nomination studies.

Nomination techniques

The use of nomination methods as a means of obtaining information about difficult to-reach populations dates back many years having enjoyed a certain amount of fame and notoriety in the 1970s. Interest in these methods is now developing again in drug use epidemiology, its main virtue being its usefulness in dealing with relatively rare events. *Nomination techniques* are estimation methods based on information which individuals in a sample provide about their acquaintances. It is similar to the multiplier technique, and prevalence is estimated using the benchmark/multiplier approach. It differs in that it gets its multiplier from information gained from informants who are interviewed.

Broadly put, sample members are asked to name or *nominate* drug-using acquaintances and to say whether these acquaintances have been in touch with drug treatment centres, health services or any other similar body, within a stipulated time period. The proportion of treatment attendees nominated by the sample is then used as a multiplier as described above, in conjunction with the benchmark of known attendance figures at the drug treatment agencies, to give an estimate of the total number of drug users.

There are four steps in using a multiplier/benchmark method to **estimate the prevalence** of behavior or characteristic amongst the total population:

- ⇒ *Select a benchmark* where data are available and you are confident in the data provider, or ask the appropriate questions during the rapid assessment.
- ⇒ *Select a multiplier* - using data from research studies (It is recommended that, whenever possible, the researcher should conduct a sample survey of the target population - injectors or problem drug users - as part of the prevalence estimation study, e.g. survey using nomination technique).
- ⇒ Calculate the number of cases by multiplying the benchmark by the multiplier. This will give the *estimated number of cases*.
- ⇒ A further step can be an *estimate of the absolute prevalence* of that behaviour or characteristic amongst the total population.

Respondent-driven Sampling (RDS) as a Strategy to Reach Hard-to-reach Populations

The problem of collecting accurate information about the behavior and composition of social groups arises in many areas of research. In most cases, standard sampling and estimation techniques, developed over the past years, provide a means for collecting such information. However, there are a number of important groups for which these techniques are not applicable. Traditional probability-based sampling methods require the development of a sampling frame, which is challenging for hard-to-reach or “hidden” populations (Robinson et al. 2006).

To minimize selection bias, researchers have started using a new sampling alternative among populations such as MSM, commercial sex workers, and injection drug users. This sampling method, respondent driven sampling (RDS) (Heckathorn 1997, 2002), is a type of chain-referral sampling, or snowball sampling, and "is based on the recognition that peers are better at locating and recruiting other members of a hidden population than outreach workers and researchers" (Semaan et al. 2002).

This method combines "snowball sampling" (getting individuals to refer those they know, who in turn refer those they know and so on) with a mathematical model that weights the sample to compensate for collecting it in a non-random way. A dual compensation system, whereby a respondent is compensated for participating in the study and for recruiting his/her peers, is used. Moreover, proponents of RDS claim that this sampling method can produce probability samples of the target population and reduce several sources of bias found in chain referral methods (Heckathorn 1997, 2002; Semaan et al. 2002). This approach reduces bias associated with the choice of initial participants, volunteerism and masking by using steering incentives for participation and recruiting participants. Thus, as a result of the successive waves of recruitment, it does not matter whether the initial sample is randomly drawn. The population-based estimates are based on a model that takes into account the network size of participants and recruitment patterns (Heckathorn 1997; Salganik and Heckathorn 2004; Thompson and Frank 2000).

There are several advantages to respondent-driven sampling. Among the primary features that distinguish RDS from snowball sampling is that 'seeds' are limited in the number of respondents they can recruit by the number of coupons they receive (e.g. three to four), thereby minimizing the influence of initial seeds on the final sample composition. Limiting the number of recruits in this way encourages long recruitment chains, thereby increasing the 'reach' of the sample into more hidden pockets of the population (Magnani et al. 2005). Next, the sample provides information about the people in the population and the network connecting them. Another desirable property is that sample data can be combined with institutional data to estimate the size of a hidden population. Previous methods for estimating the sizes of hidden populations did not allow for unbiased estimates of population composition. Respondent-driven sampling is also cheaper, quicker and easier to implement than other methods commonly used to study hidden populations.

Complementary Projects

Since 2008, program entitled "Establishment of Evidence-based Basis for HIV/AIDS National Program by Strengthening Surveillance System" is being implementing within the framework of the Global Fund Project to Fight AIDS, Tuberculosis and Malaria (GFATM) by Curatio international Foundation (CIF) in cooperation with AIDS and Clinical Immunology Research Center, National Center for Disease Control and Public Health (NCDC) and local NGOs Bemoni and Tanadgoma. Under this project Bemoni proposed to conduct Behavioral Surveillance Surveys (BSSs) with a Biomarker Component among injecting drug users (IDUs) in five main cities of Georgia: Tbilisi, Gori, Telavi, Zugdidi, and Batumi. It was decided to use this opportunity and incorporate the nomination study for estimating the size of the injecting drug user (IDU) population into the above mentioned BSSs. Under the framework of the Global Fund Project the main field work activities would be covered, this could allow saving time as well as financial and human resources for present study.

To avoid duplication of efforts and to promote complementary activities, discussions were held between the SCAD and the GFATM representatives, and subsequently with CIF, to harmonize objectives and research plans. As a result of these discussions, informal collaboration of the two projects was agreed.

METHODOLOGY

Objective of the Study

The aim of the study is to estimate the prevalence of Injection Drug Use (IDU) in Tbilisi (the capital) and 4 main cities (Batumi, Telavi, Gori and Zugdidi) of Georgia and provide IDU prevalence estimate throughout the Country.

Objectives:

1. to undertake population estimation studies using consistent methodologies;
2. to recommend methods for use in other sites across Georgia;
3. to provide an evidence base of estimates of the prevalence of injection drug use in Georgia;
4. To help establish a monitoring system that will track injection drug use trend data

Defining the Target Population

Problem Drug Use (PDU) is defined as injecting drug use or long term/regular use of opiates and/or cocaine-type drugs and/or amphetamine-type drugs[13]. Taking into the consideration the fact that within the framework of the Global Fund Project to Fight AIDS, Tuberculosis and Malaria BPU intends to conduct Behavioral Surveillance Surveys (BSSs) with a Biomarker Component among injecting drug users (IDUs) and we have the opportunity to incorporate the Study of estimating the size of the injecting drug user (IDU) population into the above mentioned BSSs, it should be mentioned that in this report we imply only injection drug users.

Thus, for the purpose of this study, we regarded any person who has used any psychoactive drug through injections in a non-medical context.

Inclusion criteria - to be eligible, each participant must meet the following criteria:

1. Aged 18 years or older
2. Lives in the participating city/district
3. Has not previously completed an interview under the current study
4. Able to complete the interview in Georgian
5. Arrives at the study site with a valid study recruitment coupon.
6. Currently injects drugs (this was identified by reported drug injection in the month prior the survey)
7. Has either:
   - ⇒ Physical evidence of recent injection (fresh track marks, scabs, or abscesses), OR
   - ⇒ Knowledge of drug prices, preparation, injection, and etc.

Stages of IDU prevalence estimation method to be applied for Georgia

There are five stages of prevalence estimation method that had been used in this study.

Stage 1: Data collection of IDUs (gaining the benchmark data - B)

All available data on injection drug use in Georgia were reviewed. Data of IDUs are recorded under the current system for the year 2007 (details see below in chapter "Benchmark Data Collection").

Stage 2: Estimation of the value of multiplier (M)

The proportion of the target population in the benchmarks is obtained from research studies using nomination techniques (study using the Respondent Driven Sampling (RDS) methodology based on appropriate eligibility criteria and accurate sample size calculations was conducted). The survey

[13] EMCDDA Recommended Draft technical Tools and Guidelines. Key Epidemiological Indicator: Prevalence of Problem Drug Use. EMCDDA/ July 2004

collected the data among IDUs using nomination method/questionnaire developed by SCAD epidemiology experts.

Stage 3: The derivation of multiplier - this stage involves two steps:
a) Estimation of the **percentage (P)** of IDUs recorded from Stage 2. Separate estimates for different benchmarks were made in each city - percentage of IDUs tested by police for presence of illegal drugs in 2007; % of IDUS tested for HIV in 2007; % of IDUs considering entering the abstinence-oriented treatment in 2007; % of IDUs in substitution treatment in 2007; % of IDUs in substitution treatment waiting list in 2007; % of IDUs in the needle exchange and other low-threshold programs in 2007; % of IDUs deceased due to a fatal drug overdose in 2007.
b) **Multiplier (M)** is estimated for each benchmark by the inverse of percentages (Pisani, 2002). The formula **M = 100/P**

Stage 4: Estimate the number of drug injectors
Numbers of IDUs estimates for each benchmark are obtained by multiplying the recorded number of IDUs (collected from the available data source) by an appropriate multiplier (The formula **E = BxM**). For example, if this method is applied to in-treatment data then the benchmark is the total number of drug-users who underwent treatment in a given year, the multiplier is the in-treatment-rate (the proportion of treatment attendees nominated by the sample). Those two components—the known figure in treatment contact (the treatment benchmark) and the estimated proportion of abusers who were in treatment contact (giving the treatment multiplier) - are what gives the method its name.

Case study. Toronto multiplier study based on HIV tests *(Basic multiplier-benchmark calculation)*[14]
Archibald and others (2001) outlined a multiplier method of estimating the prevalence of injecting drug use, making use of information from laboratories of the number of HIV tests by injecting drug users and of data from surveys of the proportion of injecting drug users that had had an HIV test in a given year. The findings for one city in one year, Toronto in 1996, are presented below.

The example requires two elements. The first is a known benchmark figure. That figure, in the present case, is the number of HIV tests made on injecting drug users in Toronto in 1996, which was recorded in routinely collected information as 4,050. That represents the known part of the population of injectors. to find the total number of injectors, it needs to be determined what fraction of them are unknown to HIV testing records. The second element required by the method is therefore a multiplier that tells how many more injecting drug users in Toronto did not have HIV tests in 1996. That figure can be worked out simply if the proportion of drug users who did have HIV tests during the period is determined. In the example, the proportion of users tested for HIV was known from other studies to be 25 per cent, or 1 in 4. The calculation illustrated below (Table 1.) in is then made simply by noting that if 1 in 4 injectors have been tested, then the total number of injectors must be 4 x 4,050, or 16,200, people.

Table 1. Basic multiplier-benchmark calculation

Item	Applied Values	Estimates
Benchmark (B)	Number of HIV tests by injecting drug users in 1996	4050
	Proportion of injectors reporting getting an HIV test in the previous year (P)	25 per cent
Multiplier (M)	Multiplier calculated as 1.0/0.25 (i.e., 1 in 4)[15]	4,0
Population estimate	Benchmark times multiplier (B*M)	16 200

[14] Estimating Prevalence: Indirect Methods for Estimating the Size of the Drug Problem, Global Assessment Programme on Drug Abuse. UNODC, Vienna, 2003

[15] This is the same as 100/25 (M = 100/P)

Stage 5: Calculation of a prevalence of drug injection for each selected city
It was based on data on population distribution (State Department of Statistics of the Ministry of Economic Development of Georgia). Census data gave the population for urban areas. The population between 18 and 64 was used as the denominator for the prevalence based estimate. The appropriate estimates of injecting drug use were then applied to that adult population. An upper and lower limit is provided by statistical means.

Additionally, the first attempt to ***derive the national estimate for the percentage of injection drug users in Georgia using the Multiple Indicator Method*** (MIM) had been carried out.

Limitation of the study

No matter what method is used, all data are potentially biased for a variety of reasons. The multiplier methods is relatively straightforward to use, but will depend on good institutional record-keeping. The greatest difficulty in using multiplier methods correctly is finding data from institutions and populations that correspond with one another. To use institutional and survey data together to estimate the size of a population, the members of the population all have to have a chance of being included in both the survey and in the institutional data (for example because they have access to that service).

Multiplier methods using treatment, police, or mortality data are ad hoc methods. They are not based on statistical theory and no formula for the variation of the estimator can be derived. Benchmarks are usually collated on a national level. The corresponding multipliers are derived from local samples or expert ratings. Their validity for the total population is questionable due to regional and temporal variations. These methods are easy to apply and give only point estimates.[16]

Sources of information used for estimations may limit the generalisability of the final estimates. Here are some examples of how this happens:

- ⇒ Drug treatment programs typically attract chronic, long term IDUs at the conclusion of their drug using careers, under-representing newer drug users.
- ⇒ Jails and criminal justice settings will have fewer newer IDUs under-representing long-term users and those not involved in criminal activities to support their drug use.
- ⇒ Clinic settings will under-represent healthier drug users.
- ⇒ Methadone treatment programs will only yield information about opioid users, private programs will only include IDUs that can afford to be in treatment.
- ⇒ Low threshold agencies may collate the same standard of information on their clients as the more formal drug treatment agencies described above, and some clients may only be known by a forename or an assumed name.

Depending on the point of contact sources used, we may have to adjust estimates to reflect their relationship to a wider population of interest. It will be best to use as many sources as we can. City-wide service points of contacts or institutional data that are widely accessed by IDUs and covers the highest numbers (and types) of IDUs should be used for gaining benchmark data.

Decent data are often just partly available or not at all, but, once the importance of collecting reliable data is recognized on the political level this problem can be solved. Then, by means of good sampling, sound survey instruments and by means of good police registration techniques, prevalence and patterns (of different kinds) of drug use can be studied on a regular basis. And once treatment institutions are in place, reliable treatment registration can supply interesting data sets as well.

[16] Study to Obtain Comparable National Estimates of Problem Drug Use Prevalence for all EU Member States, Final Report. EMCDDA Project (CT.97.EP.04)

The prevalence estimation obtained in this study should be treated with caution, as the data are self-reported; underreporting or over-reporting of behaviors is possible yet difficult to ascertain. Another issue is that ideally multiple benchmark data sources (and hence a variety of multipliers) should be used in a prevalence estimation exercise. Unfortunately different numbers of benchmarks are available in different cities of Georgia. For example, only police and HIV testing data are available in Telavi.

RDS

Possible limitations to the study could have affected the results. The small numbers of women participating in the surveillance may indicate a strong desire to remain hidden, their limited numbers, or a reflection of poor recruiting.

Another study limitation for IDUs was related to the inclusion criteria adopted. Due to the need of parental consent for enrollment of those aged 15-17, this age group was not represented in the sample, especially in light of the fact that the results showed that 56.2% of survey participants in Tbilisi started injecting drugs in age 15-19.

Study Design

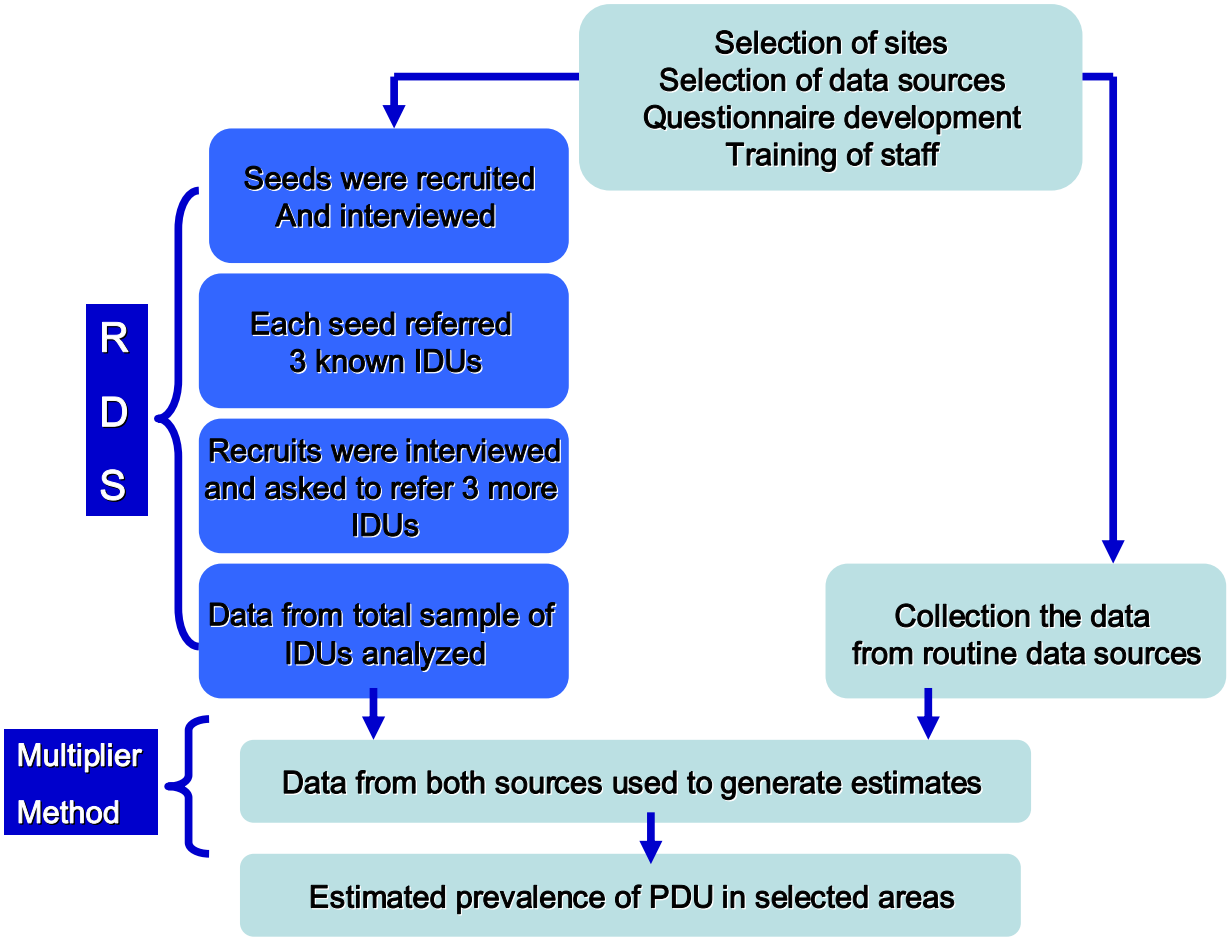


Figure 2. Study Design

Pre-study activities

Negotiating access to data sources

It is helpful when beginning a research study to have a very clear idea of what data and information sources are routinely available and which of those can be accessed for extracting information relevant to the study. A drug misuse prevalence study can only be undertaken with the co-operation of those who hold information on drug misuse. Each agency will have its own idea about the need or relevance of prevalence research, and each agency will have its own concerns about giving access to confidential data. Agencies which are not exclusively concerned with drug misuse may see requests for information on drug misuse as an additional burden which they may not be keen to take on. They may also be more political obstacles to collecting data from some agencies. The main issue which agencies see as a reason for not giving access to their data is confidentiality.

Expert Team Leader selected appropriate experts and established expert team in order to derive multipliers for predefined drug-using sub-population groups (the benchmarks). The experts had been hired from those institutions where data are available and Project team was confident in the data provider (Deputy Director of the Research Institute on Addiction, Director of the Drug Prevention Center within the National Center for Disease Control and Public Health (NCDC), representatives from the AIDS Center and Ministry of Internal Affairs).

Development of the nomination questionnaire

Nomination questionnaire was developed by SCAD programme epidemiological experts. The questionnaire had been translated and pre-tested with members of the target population. In this regard 3 pilot focus group discussions (FGD) were conducted in October 2008. The first two focus group discussions were attended by six male drug users each, and 7 male drug users participated in the third focus group. The initial version of the questionnaire was tested in the first and the second groups, and then updated and modified in view of the recommendations and comments of the group participants. The second version of the questionnaire, i.e. the one updated after the first two groups, was tested in the third group.

Training of the survey staff

Before the implementation of the study, the staff received 1-day training in study procedures, instruments, and interviewing process, conducted by Project Coordinator and SCAD Epidemiology Expert. Participatory nature of the training program ensured that all staff members understood their respective roles and responsibilities fully.

Geographical Scope

As it was mentioned above within the framework of the Global Fund Project to Fight AIDS, Tuberculosis and Malaria Bemoni conducted Behavioral Surveillance Surveys (BSSs) with a Biomarker Component among injecting drug users (IDUs) in five main cities of Georgia: Tbilisi, Gori, Telavi, Zugdidi, and Batumi. The Study of estimating the size of the injecting drug user (IDU) population had been incorporated into these BSSs. The map below (Figure 2.) shows the cities where survey was conducted.

Figure 3. Map of Georgia with Study Sites

Study sites and staff

The interviewing process took place at the:

- ⇒ Bemoni office in Tbilisi (November, 2008)
- ⇒ Station of blood transfusion in Gori (December, 2008)
- ⇒ Needle exchange Center in Telavi (February, 2009)
- ⇒ NGO "Tanadgoma" brach in Zugdidi (March, 2009)
- ⇒ NGO "Tanadgoma" brach in Batumi (April, 2009)

All sites were accessible to study participants by public transport. Participant flow at the study sites were designed to provide maximum privacy and minimize their exposure to any other study participants. The sites were open from 10am to 8pm (Monday to Saturday). Each office was supervised by the study coordinator and staffed at all times by field coordinator, addiction specialist, 3 interviewers, coupon manager, and social worker. Nearly all of them had previous experience working on similar research projects in the recent past.

Ethical Considerations

The study investigators are cognizant of the fact that the target groups for this study are at some risk for social harm should they be identified as part of the target groups. We have designed this study to maximally protect the participants balanced with the individual benefit and community benefits from this study. Specifically,

- ⇒ Initial identification of areas where sampling took place was done by NGOs currently working with and trusted by the populations.
- ⇒ Informed consent was taken in a staged manner.
- ⇒ No names had been recorded. All documentation is anonymous.

Given that parental consent is required in Georgia for individual below the age of 18, we did not recruit participants below this age for the survey.

Participation of all respondents in BSS and Estimating the Prevalence of Problem Drug Use surveys is strictly voluntary. Measures were taken to assure the respect, dignity and freedom of each individual participating. During the survey emphasis was placed on the importance of obtaining informed consent (orally), and avoiding coercion of any kind. Complete confidentiality of study subjects was also emphasized. Names of respondents were not be recorded anywhere on the questionnaires or other forms. Study documents, including RDS data and blood specimens, were identified using unique ID numbers for each participant to maintain confidentiality.

Steps in Data Collection

RDS

Recruitment of respondents was conducted using RDS. Based on sample size calculation in the framework of Behavior Surveillance Surveys sample size was defined as 300 IDUs in Tbilisi and 200 IDUs in each other selected city (Gori, Telavi, Zugdidi and Batumi).

Sampling Procedure

1. The process starts with recruiting initial participants who are considered as 'seeds', who were selected non-randomly. The criteria for seed recruitment are: those who have different socio-demographic characteristics, at different locations, who have awareness of networks of target populations.

2. Selected seeds underwent eligibility checking: In order to ensure that authentic IDUs are recruited and not just individuals wanting money, a verification procedure was done by the experienced addiction specialist (narcologist). This verification procedure included a preliminary informal discussion regarding the street names of drugs and prices, familiarity with drug preparation and injection techniques and finally visual inspection for recent track marks. If the narcologist was satisfied with the recruit's responses, the interview was conducted.

3. After the eligibility check witnessed verbal informed consent for the interview was obtained (for confidentiality reasons, including legal and moral undertones, it is recommended that informed consent should only be elicited verbally) - those who were eligible and willing to participate in the study had to go through the informed consent procedures in a private area: the participant received information about the studies as well as the informed consent procedure and was asked to accept willingness of participation; after that 2 staff members signed the informed consent form on behalf of participant. Additional information was collected that was specifically required for RDS methodology: personal network size, relationships to recruiters, and the number of recruitment refusals encountered. Following the informed consent process, the field coordinator administered a face-to-face interview with the participant about the participant's personal network. After that participants completed the Interview. All interviews took place in private rooms with only the interviewer and subject present.

4. Interviewed seeds were given an incentive (20 GEL) for participation in the study. Once initial participants completed their interview each seed received three unique, non-replicable, recruitment coupons with a two-week expiration date to recruit their peers who also fit the eligibility criteria for the study. These peers are no longer considered 'participants' and are referred to as recruiters. (When a study participant is recruited by a recruiter, but has not yet enrolled in the study, that person is referred to as a 'recruit'.)

5. Seeds were offered incentives to recruit their peers into the same interview they have just completed; the recruiter was given 21 GEL for three recruited peers. The first wave of participants recruited for the study was brought in by 'seeds'. Thereafter, each person recruited for and enrolled in the study received personal ID and three recruitment coupons with which to recruit their peers into the study as well. Recruits should have to present for participation with coupon "in-hand". The limitation of three peers per recruiter was done to ensure that a broad

array of subjects have an opportunity to recruit. Respondents received compensation for participating in the study and for each of their recruits who subsequently enrolled in the study.

6. Each coupon is uniquely coded in order to link recruiters with recruits. Personal ID as well as the coupon ID numbers were carefully recorded in each questionnaire. Coupon numbers (received and given) become part of the information entered into the computer record for each respondent. Every recruit who visited study centers were marked on spreadsheets for coupon management.

7. All new recruits were offered the same dual incentives, as were the seeds. Everyone had been rewarded both for completing the interview and for recruiting his or her peers into the survey. We will perform this recruitment for six waves total or until the sample size is reached.

8. Three coupons continued to be distributed until sample sizes were attained, after which participants were warned that the study would be ending within a few days. However, participants were informed from the beginning that once sample sizes were reached, no more coupons would be honored.

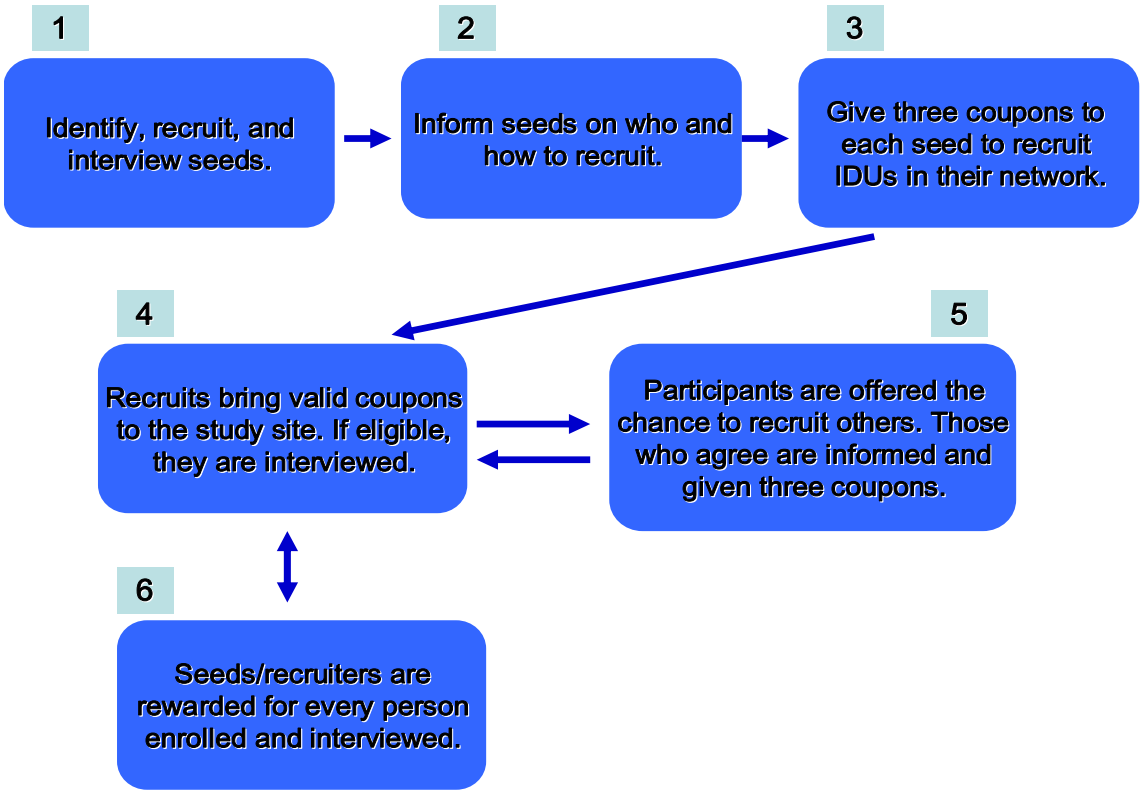


Figure 4. RDS Recruitment Methods

Sample Sizes

Participating organizations (Bemoni in Tbilisi and local service provider organizations in other cities) working with IDUs recruit 4 to 7 IDUs to serve as “seeds” (7 “seeds” in Tbilisi, 5 in Gori and Telavi, 4 in Zugdidi and 6 in Batumi had been recruited). All the 27 seeds were productive. One seed recruited one participant, four recruited two, and 2 recruited three participants in Tbilisi; two seeds recruited one participant and three recruited 3 participants in Gori; and in other cities all seeds recruited 3 participants. From these initial recruited participants, the recruitment chains were very different, as observed in Figure ?. The chains of these seeds are the first persons of the target

group to be contacted and the first to recruit peers and refer for interview. The diverse characteristics of the seeds are shown in Tables 2-6.

Table 2. Socio-demographic characteristics of seeds vs. total sample in Tbilisi

Tbilisi	Seeds		Sample		
	n= 7	%	n=307	SPSS (%)	RDSAT adjusted (%)
Age					
18-24	1	14.3	21	6.8	7.6
25-30	1	14.3	51	16.6	16.8
31-40	2	28.6	80	26.1	26.5
41-50	2	28.6	122	39.7	38.8
50+	1	14.3	33	10.7	10.3
Gender					
Male	6	85.7	304	99	99,3
Female	1	14.3	3	1	0.7
Marital Status					
Married	3	42.9	167	54.4	53.6
Divorced	1	14.3	62	20.2	21
Has never been married	3	42.9	78	25.4	25.4
Education Level					
Secondary	1	1.3	82	26.7	27.1
Incomplete High			16	5.2	5.3
High	6	85.7	209	68.1	67.6

Table 3. Socio-demographic characteristics of seeds vs. total sample in Gori

Gori	Seeds		Sample		
	n= 5	%	n=205	SPSS (%)	RDSAT adjusted (%)
Age					
18-24			35	17.1	23.1
25-30			38	18.5	20.0
31-40	1	20	74	36.1	33.6
41-50	4	80	50	24.4	18.4
50+			8	3.9	4.9
Gender					
Male	5	100	200	97.6	97.7
Female			5	2.4	2.3
Marital Status					
Married	3	60	111	54.1	54.6
Divorced	1	20	20	9.8	9.2
Has never been married	1	20	74	36.1	36.2
Education Level					
Secondary	3	60	132	67.3	68.0
Incomplete High	1	20	7	3.4	3
High	1	20	60	29.3	28.9

Table 4. Socio-demographic characteristics of seeds vs. total sample in Telavi

Telavi	Seeds		Sample		
	n= 5	%	n=205	SPSS (%)	RDSAT adjusted (%)
Age					
18-24	1	20	34	16.6	18.3
25-30	1	20	56	27.3	29.5
31-40	3	60	75	36.6	35.8
41-50			36	17.6	14.9
50+			4	2.0	1.5
Gender					
Male	5	100	205	100	100
Female					
Marital Status					
Married	2	40	85	41.5	41.7
Divorced			21	10.2	10.4
Has never been married	3	60	99	48.3	47.9
Education Level					
Secondary school	4	80	139	67.8	66.3
Incomplete Higher			5	2.4	3.8
Higher	1	20	61	29.8	30

Table 5. Socio-demographic characteristics of seeds vs. total sample in Zugdidi

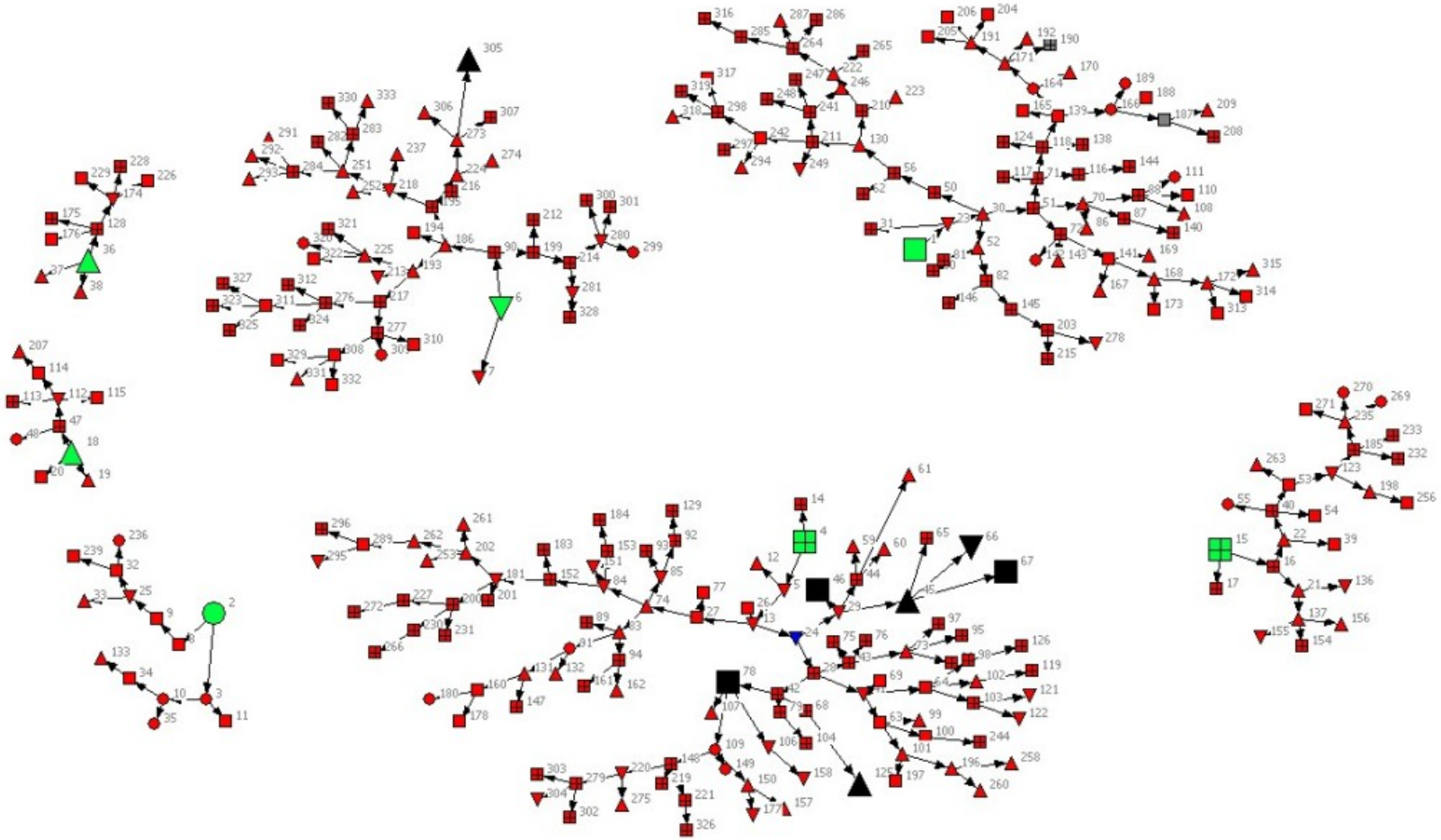
Zugdidi	Seeds		Sample		
	n= 4	%	n=204	SPSS (%)	RDSAT adjusted (%)
Age					
18-24			27	13.2	15.4
25-30	1	25	45	22.1	22.6
31-40			78	38.2	37.9
41-50			40	19.6	18
50+	3	75	14	6.9	6.1
Gender					
Male	4	100	203	99.5	99.5
Female			1	0.5	0.5
Marital Status					
Married	3	75	106	52.0	50.3
Divorced			8	3.9	4.6
Has never been married	1	25	90	44.1	45.2
Education Level					
Secondary	3	75	118	57.8	57.4
Incomplete High			12	5.9	6
High	1	25	74	36.3	36.6

Table 6. Socio-demographic characteristics of seeds vs. total sample in Batumi

Batumi	Seeds		Sample		
	n= 6	%	n=206	SPSS (%)	RDSAT adjusted (%)
Age					
18-24	1	16.7	25	12.1	12.5
25-30	2	33.3	47	22.8	24.6
31-40	2	33.3	78	37.9	37.5
41-50	1	16.7	48	23.3	22.1
50+			8	3.9	3.3
Gender					
Male	5	83.3	200	97	98.1
Female	1	16.7	6	3	1.9
Marital Status					
Married	1	16.7	99	48.1	49.1
Divorced	2	33.3	27	13.1	12.4
Has never been married	3	50	80	38.8	38.5
Education Level					
Secondary	2	33.3	142	68.9	70.2
Incomplete High	1	16.7	15	7.3	7
High	3	50	49	23.8	22.8

Overall, 1188 IDUs were recruited (including seeds) between November 10, 2008 and April 4, 2009 (the illustrative sample in Tbilisi, using NetDraw, a network illustration program, is presented below in Figure 4). Average duration of recruitment process in each site was 14 days. A total of 3064 coupons (865 in Tbilisi, 561 in Gori, 615 in Telavi, 510 in Zugdidi and 513 in Batumi) were handed out to participants to recruit their peers. Of the 1188, 5% (59) were ineligible to participate in the study for reasons listed in Table 7. Two eligible participants refused to participate in BSS. Thus, 1127 eligible IDUs participated in the BSS study.

Figure 5. Sample of Recruitment Pattern in the Study (Tbilisi)



Legend for Sample

Age

Circle – 18-24, Square – 25-30, Triangle – 31-40, Crossed square – 41-50, Turned triangle -50+

HIV positive – Black

Seeds - green

87 (12 in Tbilisi, 14 in Gori, 26 in Telavi and Zugdidi and 9 – in Batumi) refused to answer the questions after administering the nomination questionnaire and dropped out of the multiplier/benchmark study using, leaving a total of 1040 participants. The reasons for refusal were different, some of them did not like to say anything about their friends, some of them said that they injected alone, so they did not have information about other IDUs; others stated that in 2007 they were imprisoned or were out of the country, so did not have real and correct information about their friends. Another reason for refusal was the fact that respondents started to inject drugs only 6 months ago, so they could not answer any questions about 2007 year time period.

Table 7. Ineligibility, refusals and drop-outs

	Tbilisi		Gori		Telavi		Zugdidi		Batumi	
	#	%	#	%	#	%	#	%	#	%
Persons arriving at the study site	333	100	210	100	218	100	212	100	215	10
Ineligible to participate	25	7,5	5	2,4	13	6,0	7	3,3	9	4,2
Reasons for ineligibility										
Was not an IDU	18		5		13		4		4	
Did not inject drugs within the past month	5						3		4	
Was not 18 years old	1									
Had already been interwieved	1									
Other									1	
Refusal (did not want to talk about himself)	1						1			
Enrollments in BSS	***307***	***92,2***	***205***	***97,6***	***205***	***94,0***	***204***	***96,2***	***206***	***95,8***
Drop-outs (refused to answer the questions after administering the nomination questionnaire)	12	3.9	14	6,8	26	12,7	26	12,7	9	4,4
Reasons for refusal										
Injected alone	5		3		4		2		1	
Was imprisoned			2		3		4		1	
Was outside of the country	1		4		9		14		2	
did not like to say anything about their friends	6		3		3		4		2	
Started injection later			2		7		2		3	
Enrollments in studies using nomination techniques	***295***	***96,1***	***191***	***93,2***	***179***	***87,3***	***178***	***87,3***	***197***	***95,6***

Socio-demographic characteristics of non-respondents in nomination survey see in appendix 1 (Table 31).

Interview of Respondents

Data collection for BSS (under the Global Fund Project) consisted of an interviewer-administered structured questionnaire and a blood sample collection to test for syphilis and HIV infections among IDUs recruited into the study. The BSS core questions assess the participant's demographic information, drug use history, drug and sex-related risky behaviors, HIV/STI knowledge, opinion and attitudes, HIV testing history, and access to and use of HIV prevention services.

After the eligibility check and informed consent procedures, the questionnaire with unique ID number was assigned and the subjects were brought to interview rooms designed to maintain privacy. Face to-face and individual interviews were conducted in the interview rooms by trained interviewers. Each interview took about 20-30 minutes.

After that nomination questionnaire (with the same ID number) was administered to the respondents (see appendix 3). The average duration of the interview process was 10-15 minutes. The study participants were asked to nominate up to 10 close friends with whom they had been using drugs in 2007 (Table 8).

Table 8. Number of acquaintances nominated by IDUs

N	Tbilisi		Gori		Telavi		Zugdidi		Batumi	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
1	6	2,0	5	2,4	8	3,9	7	3,4	6	2,9
2	20	6,5	19	9,3	16	7,8	8	3,9	41	19,9
3	46	15,0	36	17,6	51	24,9	42	20,6	68	33,0
4	57	18,6	44	21,5	53	25,9	49	24,0	26	12,6
5	81	26,4	40	19,5	27	13,2	45	22,1	33	16,0
6	32	10,4	19	9,3	9	4,4	7	3,4	11	5,3
7	18	5,9	15	7,3	5	2,4	6	2,9	5	2,4
8	7	2,3	6	2,9	4	2,0	4	2,0	4	1,9
9	3	1,0	2	1,0	1	0,5	0		0	
10	25	8,1	5	2,4	5	2,4	10	4,9	3	1,5
Total	**295**	**96,1**	**191**	**93,2**	**179**	**87,3**	**178**	**87,3**	**197**	**95,6**
Missing System	12	3,9	14	6,8	26	12,7	26	12,7	9	4,4
Total	**307**	**100**	**205**	**100**	**205**	**100**	**204**	**100**	**206**	**100**

The respondents were then asked how many of their closest friends had received treatment or been tested by police for drug presence during this time period. Identifier information for nominated peers was used to establish an unknown to known ratio for each site.

When both interviews were completed, participants were guided to rooms for the collection of biologic samples. The blood test was anonymous-linked. ID numbers were used to label containers of biological specimens (blood). Blood specimens were sent to the Laboratory of Serology and Virology of the AIDS Center in Tbilisi for testing and the results were reported back to the organization. The IDUs were asked to return with their identification card and their results would be provided.

Detailed checking of the completed questionnaires was initiated by the study coordinator during the fieldwork. Care was taken to check errors and inconsistencies to avoid any difficulty at the stage of data analysis. By the end of each day, coupon manager entered recruitment data to the Coupon tracking form version 3.1[17]

Benchmark Data Collection

Routine statistics have the advantage that they are readily available. If they have been collected consistently, then they can provide indirect indicators of trends over the years. However, they often provide only basic, aggregated information on a small number of variables. A more important limitation is that information systems which are not specifically concerned with drug use are very likely to under-record drug-related cases.

The benchmark data for this study were collected from the following accessible data sources:

1. **National Center for Disease Control and Public Health database of IDUs gathers records from different abstinence oriented treatment facilities (Research Institute on Addiction, addiction center in Batumi and the licensed private treatment centers; available in Tbilisi and Batumi**
   This database obtains anonymous data on individuals who are in contact with a range of drug services. The number of centers involved in treatment of drug addicts in 2007 was 7 (five of those were located in Tbilisi and 2 – in Batumi). Total number of beds in these clinics was 45 (32 in Tbilisi and 13 – in Batumi). Medical treatment of drug dependent individuals had not been financed by the State, donor or private organizations in 2007. The patients had to pay for themselves. The treatment was quite expensive. Many individuals, willing to undergo treatment, could not afford it. Thus, the number of treated cases does not reflect the actual level of demand for treatment in the country.

2. **Information from the treatment facilities on waiting lists for the abstinence oriented treatment in 2007; available in Tbilisi and Batumi**
   This information had been gathered from the heads of detoxification clinics in Tbilisi and Batumi, based on personal communications.

3. **Methadone Program database of attending IDUs; these data also include information on IDUs in waiting lists; available in Tbilisi and Batumi**
   In December 2005, the first Methadone substitution therapy programme was launched in the country. This programme, financed by Global Fund, is coordinated by the Georgian Research Institute on Addiction. 60 patients were selected for treatment at the first stage. In 2006, within the framework of Global Fund's programme, another centre for substitution therapy had been established in Tbilisi. By that time, all the HIV infected active opioid users residing in Tbilisi that expressed their willingness to undergo treatment, had been included in the substitution programme. In February 2007 the third center started operating in Batumi.

4. **Ministry of Internal Affairs database of IDUs**
   The data on Injection drug users come into contact with the police throughout the country is available by special request from the MoIA. Under Article 45[18] of the Administrative Code of Georgia, purchase and possession of drugs in minor quantities or use of drugs without

[17] This excel file was created for the purpose of assisting the RDS research study in Zagreb, Croatia. Author: Hrvoje Fuchek

[18] Article 45 of the Administrative Code of Georgia - "Illegal production, purchase, storage, use without doctor's prescription of small amounts of psycho-active substances under control in Georgia for individual use"

medical prescription is punishable with fine, or administrative detention. Article 273[19] of the Criminal Code of Georgia stipulates that drug use is only qualified as a criminal offence if a person previously subjected to administrative punishment for drug use continues to use drugs without medical prescription during one year following the penalty. Georgian drug legislation does not distinguish between being detained in connection with the use of drugs and being convicted for purchase or possession of drugs.

Information relating to the use of injection drugs is available from the Department of Information and Analysis of MoIA. According to Article 45 of the Code of Administrative Offences, in case of considerable doubt that a person is under the influence of drugs and/or psychotropic substances, or has used drugs, the police officer is authorized to demand that the person in question undergo an examination. A clinical laboratory and/or laboratory test determining the fact of drug use and/or drug and/or psychotropic intoxication is carried out based on the official referral from an authorized police officer. Ministry of Internal Affairs, specifically, the Department of Information and Analysis records all cases where the fact of drug use without appropriate medical purposes has been established.

5. **AIDS and Clinical Immunology Research Center database for HIV testing with IDU identifier (form #23)**

   Georgian AIDS and Clinical Immunology Research Center is a main institution responsible for development, implementation and coordination of all activities against HIV/AIDS epidemic spread in Georgia. It is the governmental institution affiliated with Department of Pubic Health of the Ministry of Labor, Health and Social Affairs. The Center was established in 1989 on the bases of the first HIV/AIDS Diagnostic Laboratory at the Hospital of Infectious Diseases in Tbilisi, Georgia.

   The Center and its branch offices in various districts and regions (56 Diagnostic Labs) of the country serve entire population of Georgia providing counseling, testing, monitoring and treatment of HIV/AIDS. Also the Georgian AIDS and Clinical Immunology Center coordinates all activities concerning of HIV/AIDS prevention in the country. The AIDS Center is well known by its labs especially high performance, where both, screening (simple/rapid and ELISA methods) and confirmation methods (WB and PCR qualitative and quantitative) of HIV/AIDS and various other infections.

6. **AIDS Center's, Research Institute on Addiction's, databases of IDUs receiving VCT and records from other law threshold services; available in all selected cities except Telavi**

   Georgian AIDS and Clinical Immunology Research Center provides VCT services to all interested individuals, including IDUs. The law threshold services of Research Institute on Addiction and local NGOs operate under the framework of different international projects. The program managers from all these services run the computer based database for monitoring of the program operation: # of first time service users, # of repeated users, information on risky behaviors of clients, utilization of commodities, etc.

   Low threshold agencies often view drug misuse, and therefore the treatment of drug misuse as a social rather than a medical problem, and thus could be attracting a more

[19] Article 273 of the Criminal Code of Georgia – "Illegal production, purchase, storage of narcotic drugs, their analogs or precursors for personal use and/or illegal use without doctor's prescription"

representative group of drug misusers. These agencies may collate the same standard of information on their clients as the more formal drug treatment agencies described above, although in some instances some clients may only be known by a forename or an assumed name. The needle exchange programs provide basic supplies (syringes, needles, condoms, etc) to their clients on continuous basis. Along with the needle exchange the IDUs receive the information and counceling on safe injection and sexual practices. The VCT centers provide HIV risk reduction counseling to their clients. Relevant IEC materials and condoms are distributed as well by these services.

7. **National Forensic Expertise Bureau of the Ministry of Justice database on IDUs deceased due to a fatal drug overdose**
   In 2004, National Forensic Expertise Bureau was established at the Ministry of Justice, which re-started to register drug-related death cases. The data on fatal drug overdose in 2007 related only to cases investigated and tested by the Bureau in Tbilisi. Though the data do not cover the country in general and do not allow to be broken down according to the type of drug/s that caused the overdose, it is the first time when the Bureau broke the long drug death-related silence in Georgia. Data on whole Georgia are not yet available.

Data Entry and Analysis

The data was analyzed using Respondent Driven Sampling Analysis Tool version 6.0 (RDSAT). The sampling frame for RDS is based on specific information collected from participants, including:

- ⇒ Who recruited whom (tracked in RDSCM)
- ⇒ The relationship of the participant to the recruiter. The RDS population estimates are based on an assumption that the recruiter and the participant know each other.
- ⇒ The participant's personal network size (i.e., how many injectors they know). The network size information from individuals is used to estimate the average network size by different sample characteristics (e.g., by gender, race/ethnicity, drug of choice, etc.).

From this frame, sampling probabilities can be calculated and, in turn, population estimates can be assessed for bias and the variability of these estimates can be determined. To calculate the population estimates derived from RDS, several sources of bias are taken into account: the differences in effective recruitment across groups (those more effective at recruitment would be overrepresented in the sample); homophily (groups that are more insular would be overrepresented because it is more difficult to break out of those groups); and the network size (groups with larger networks would be overrepresented because more recruitment paths lead to their members).

The researchers assessed whether the sample reached equilibrium, resulting, therefore, in a sample which should allow the calculation of unbiased population-based estimates. The parameters used to calculate the RDS population-based estimates were 15,000 bootstraps and imputation of 5 percent of the outliers in both extremes for the restricted network size. The number of recruitment waves required was calculated in RDSAT for all independent and key dependent variables. Almost all variables reached equilibrium between the third and fourth recruitment waves, and the remaining at the maximum of eleven waves. Raw data was first prepared using SPSS version 13.0. This included generating new variables, re-coding missing values following analysis strategy and RDSAT Manual. Datasets were then converted to Microsoft Excel files, and then to RDS files. RDS database was developed by Curatio International Foundation research team and kindly provided to us.

Socio-demographic variables in this study are presented as both sample proportions and population-based estimates with 95% confidence intervals (CI) weighted for personal network size and recruitment patterns based on RDSAT. Additionally, data for the multiplier calculation was also

analyzed using SPSS version 13.0 (95% confidence intervals (CI) were calculated by the SPSS Syntax Editor, Syntax for confidence intervals).

At the completion of the nomination interviewing process, database and statistic processing specialists created a database matching the questionnaire that included variable names, variable descriptions and value labels. The completed questionnaires were double entered, cleaned, processed and analyzed. Two experienced individuals made the data entry, one who read the completed interview form and the other entering the data. Once the SPSS databases were completed, a random check was made of 5% of the completed interview forms. In addition, a frequency was run on all variables to examine values, labels and frequencies. The "cleaned" database was submitted to Bemoni for data analysis.

Quality Control

The interviewing process was closely monitored by Project Coordinator and Expert Team Leader in all sites. The survey quality control was implemented through two stages:

- ⇒ Control of interviewing processes through site visits;
- ⇒ Attendance at interviews.

The findings of quality control show the surveys were undertaken in compliance with the existing instructions and no errors were reported. Specifically:

- ⇒ All respondents were interviewed in separate rooms;
- ⇒ All respondents were asked whether they had any objection to the interview and were explained the meaning of confidentiality;
- ⇒ All interviewers did their best to be polite and respectful;
- ⇒ All questions were asked in compliance with the written text;
- ⇒ Interviews were held at a pace set by the respondent.

FINDINGS

The findings of the study conducted in five locations across the country have bee presented in four sub-sections:

1. RDS Survey

The discussion in this section will be centered on some key indicators such as age, gender, educational level, marital status, the use of drugs, and the exposure to different services. Major characteristics of study sample (total n =1127) and RDS-adjusted population-based estimates (95% CI) are presented in Tables 32-36 (see appendix 2).

⇒ Demographic and Social Characteristics of Respondents

Gender and Age

Virtually all (99,3% in Tbilisi, 97,7% in Gori, 100% in Telavi, 99,5% in Zugdidi and 98,1% in Batumi) IDUs interviewed were men. Only 15 women (3 in Tbilisi, 5 in Gori, 1 in Zugdidi and 6 in Batumi) were identified in the RDS methodology. Since there were few women recruited in these studies, the findings primarily represent male IDUs.

Majority of the respondents across the survey locations were in the age group of 31 to 40 years, except Tbilisi where the majority of respondents were between 41-50 years of age. The proportion of respondents in this age group was highest in Zugdidi (37.9%) and Batumi (37.5%) while it was lowest in Tbilisi (26.5%). Few IDUs are younger than 24 years of age in Tbilisi (7.6%) while this percentage is higher in other locations - about 23.1% in Gori, 18.3% in telavi, 15.4% in Zugdidi and 12.5% in Batumi. The proportion of respondents was the lowest in 50+ age group (Figure 5).

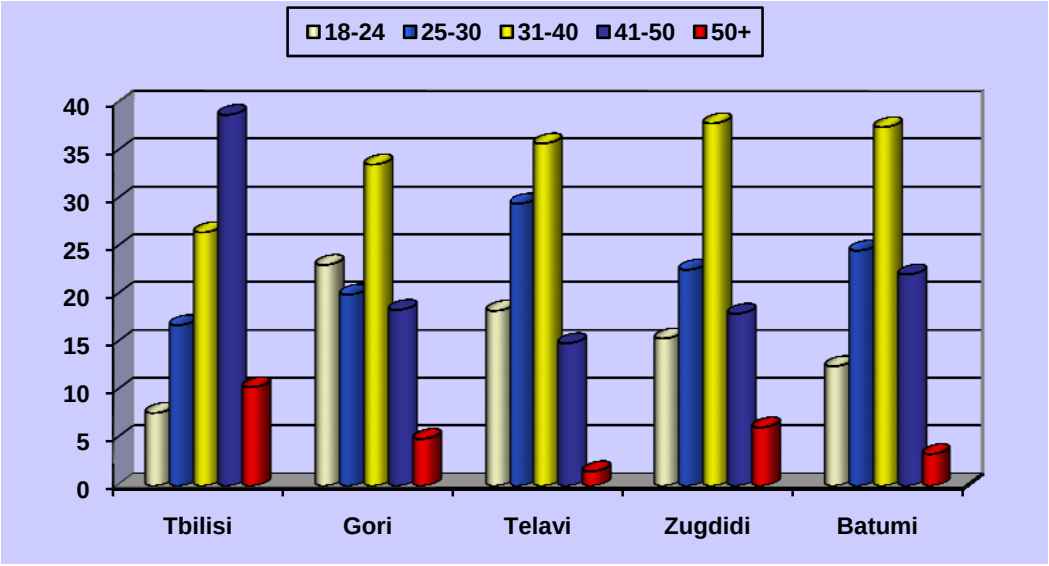


Figure 6. Distribution of Respondents by Age Groups

The median age of the respondents ranged between 32 and 40 years across the survey locations. The median age was observed to be highest in Tbilisi (40 years) while it was lowest in Telavi (32 years). In other cities (Gori, Zugdidi and Batumi) the median age was 34-35.

Educational Level

Figure 6 presents the educational status of respondents across the survey locations, which includes the respondents with secondary, incomplete high and university education. In general,

IDUs tend to be well educated. Overall, the proportion of respondents with university digree was highest in Tbilisi (67.6%), followed by Zugdidi (36.6%), than comes Telavi and Gori ((30% and 28.9% respectively), and the lowest proportion was reported in Batumi (22.8 %). Among the whole survey population only 3 respondents (2 in Gori and 1 in Telavi) had not completed either a secondary schooling or vocational training.

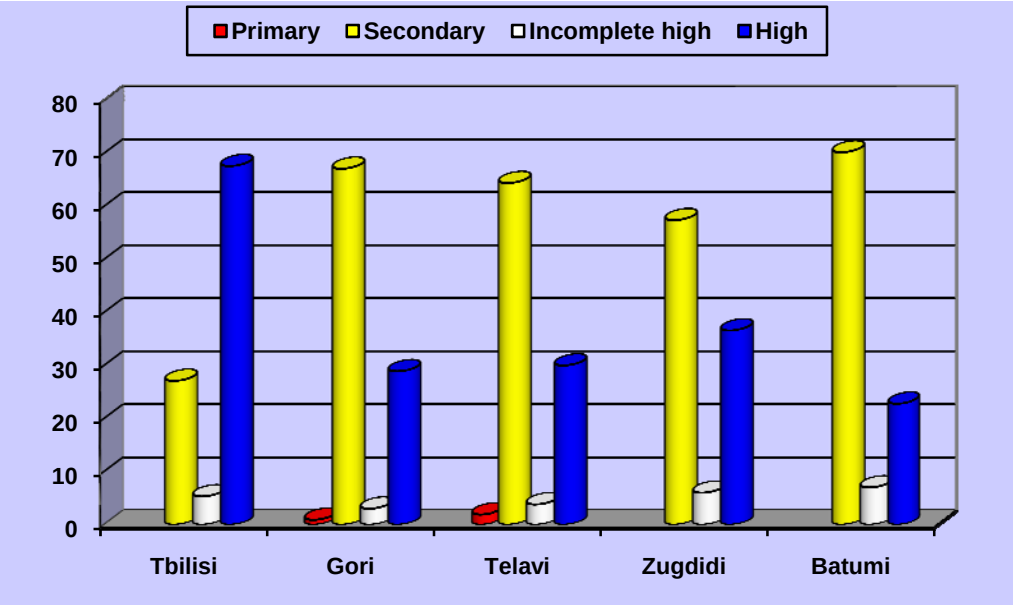


Figure 7. Distribution of Respondents by Educational Level

Marital Status

IDUs tend to be either single (never married) or married. Almost half of respondents reported being currently married. Virtually all of the married IDUs live with their spouse. 25% in Tbilisi, 36% in Gori, 48% in Telavi, 45% in Zugdidi and 39% in Batumi of study participants had never been married. Only few reported that they are divorced (Figure 7).

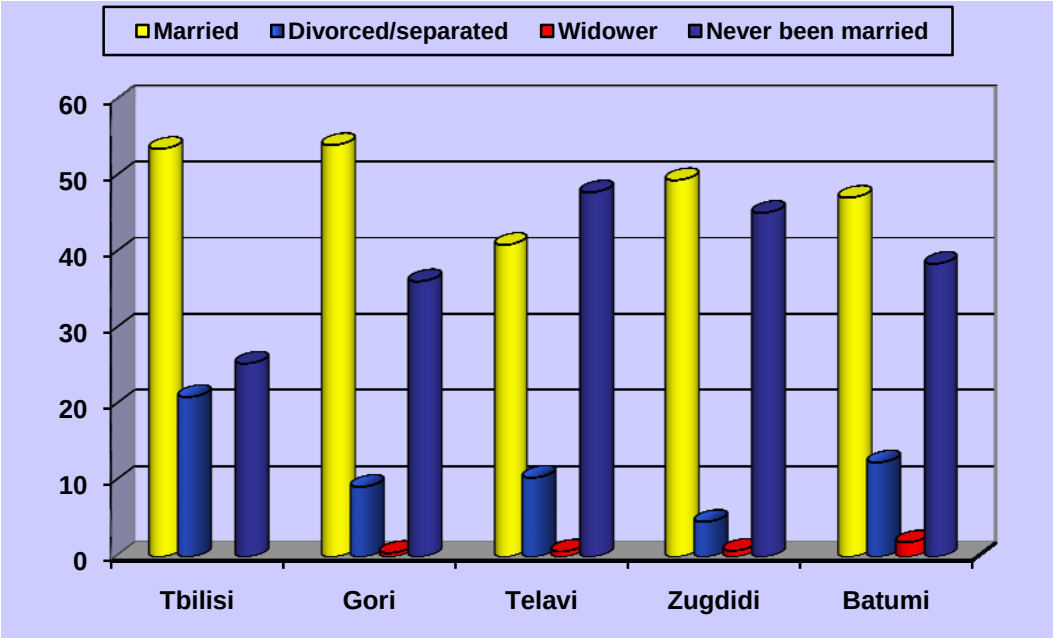


Figure 8. Distribution of Respondents by Marital Status

⇒ Drug Usage Pattern

All the IDUs interviewed across the five survey locations were asked their age when they first started taking any drug. They were also asked how long they had been injecting drugs, how old they were when they first took any injectable drug, frequency of drug injection in last week before the survey and type of drugs taken during last week.

Age at which started using drugs

Figure 8 presents the findings on age at which the respondents started using any drug. Almost two-third (63% in Tbilisi, 68% in Gori and Telavi, 71% in Zugdidi and 59% in Batumi) of IDUs began using drugs between 15 to 19 years of age. About 25 percent of the respondents In Tbilisii and 28 percent in Batumi reported that they started using drugs before the age of 15 years. In other cities the percentage of IDUs started using drugs before 15 years old varies between 12-14%. The median age of starting drugs was reported between 16-17 in all survey locations.

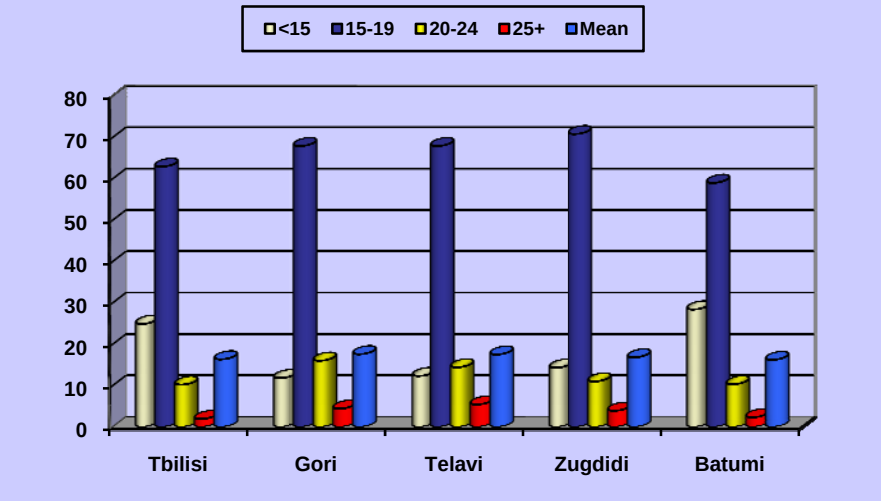


Figure 9. Age When First Used Any Drug

Age at which Started Injecting Drugs

Almost half of all IDUs in all survey sites except Telavi began *injecting drugs* when they were between 15-19 years of age; In Telavi, about one out of three respondents (35%) began injecting drugs during between these ages. Figure 9 presents the age distribution.

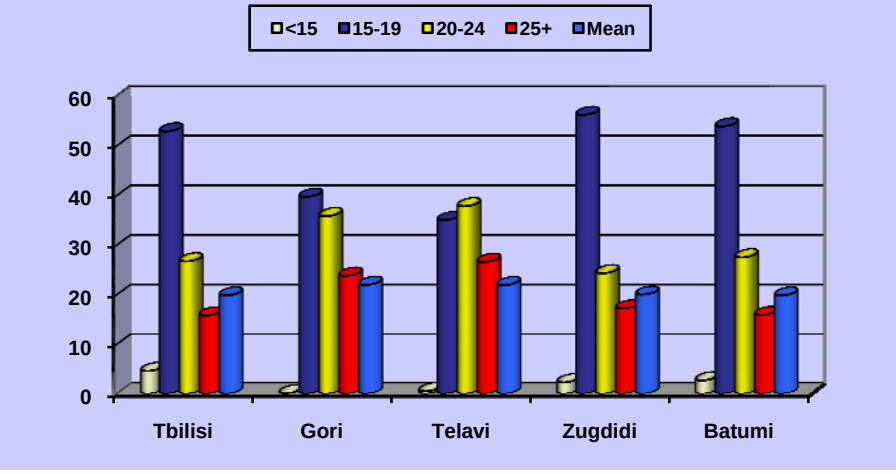


Figure 10. Age When First Injected Any Drug

The median age of starting injecting drugs was also calculated for each survey location and it ranged from 18 years in Zgdidi to 20 years in Telavi and Gori.

Duration of Injecting Drugs

Table 9 presents the average duration of drug injection. The mean varied from 12 years in Tbilisi to around 7 years in Gori.

Table 9. Mean duration of injecting drug use

Indicators	RDS Population Estimates % (95% CI)				
	Tbilisi	Gori	Telavi	Zugdidi	Batumi
Mean duration of injecting drug use (in years)	11.93 (0.4-37)	7.42 (0.2-39)	8.2 (0.5-30)	9.8 (0.5-30)	9.9 (0.5-40)

Membership of regular injecting group

IDUs were also asked if they were a member of a regular injecting group in the last 6 months, and if so, how many members regularly injected together. Almost 3 of every 5 IDUs were the members of a regular injecting group. The size of these injecting groups ranged from a low of 2 to 20 members, for an average of from 3.8 (Batumi) to 4.67 (Tbilisi) members (Table10).

Table 10. Mean number of injecting group members

Indicators	RDS Population Estimates % (95% CI)				
	Tbilisi	Gori	Telavi	Zugdidi	Batumi
Mean # of injecting group members	4.67 (2-15)	4.62 (2-15)	4.5 (2-10)	4.6 (2-15)	3.8 (2-10)

Type of drugs injected last week

Out of those who reported that had injected drugs last week, most of them stated that they inject several times a week. In addition to understanding the frequency of drug use, it is imperative to know the type of drugs used by the respondents. Thus, all the respondents were asked to recall all the type of drugs which they had injected in last week. Respondents could list more than one response in this multiple response question and the major findings are presented in figure 10.

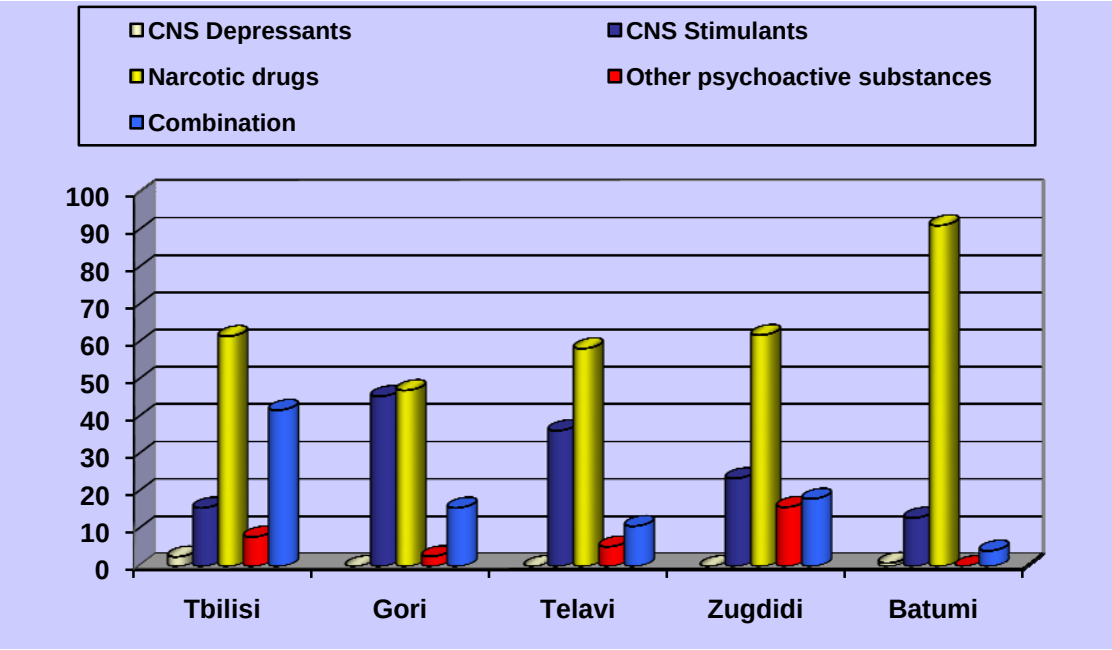


Figure 11. Injected Drugs Last Week

The highest percentages of the IDUs who had injected in the previous week injected Heroin, Buprenorphine (subutex), and Ephedrone. Among Narcotic Drugs Buprenorphine was reported mostly in Tbilisi (50.5%) and Gori (33%) while Heroin was widely used in Batumi (82%), and Telavi (36.4%). Illegal consumption of Morphine was observed in Gori (9.8%). Ephedrone (CNS Stimulants) was used more in Gori (38.3%), while antihistamines were reported by 39.6 percent of the respondents in Tbilisi (combination).

Of those IDUs that had injected drugs in the previous week they injected from 1.1 to 1.46 drugs, on average (1.46 in Tbilisi, 1.17% in Gori, 1.2% in Telavi and Zugdidi and 1.1% in Batumi).

⇒ Treatment/intervention history

The exposure to drug treatment (detoxification, substitution) and different prevention services such as VCT, IEC, needle/syringe exchange was assessed in this survey.

Detoxification treatment for IDUs

All the respondents were also asked whether they received any treatment for drug use or not and the current status of their treatment. There was considerable variation in reported cases of exposure to detoxification treatment across the study locations. Maximum proportion of respondents reported that they have never received any treatment. This proportion was reported to be highest in Gori (84.8%) and lowest in Batumi (51.6%). Consequently, the proportion of respondents who underwent detoxification treatment was reported highest in Batumi (43.9%) and and lowest in Gori (1.2%). This proportion was 39.4% in Tbilisi, 29.5% in Telavi and 37.5% in Zugdidi.

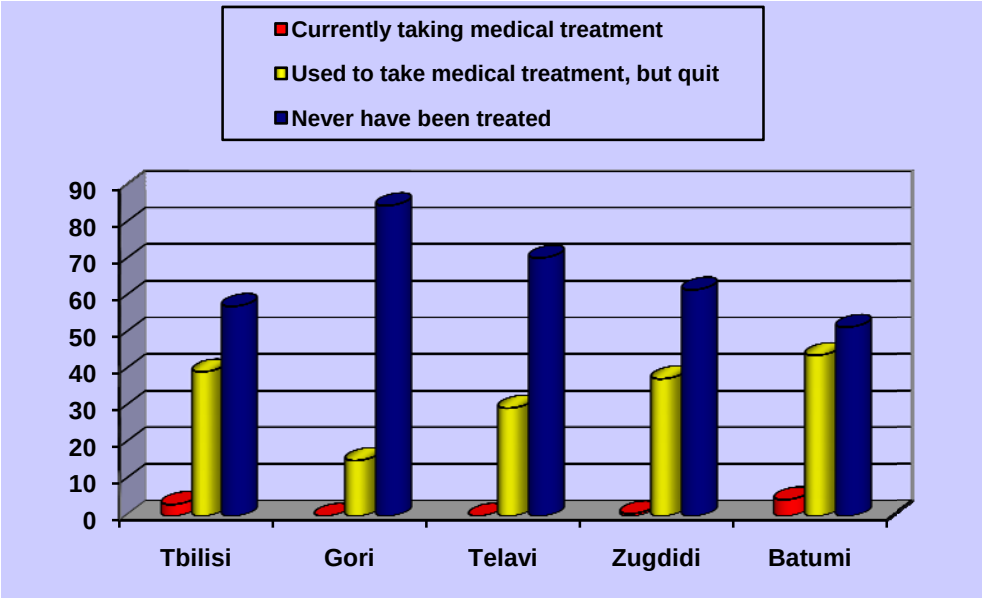


Figure 12. Detoxification Treatment

HIV/AIDS Program intervention in the last 12 months

The proportion of respondents who attended methadone substitution program was 1.9% in Tbilisi and 1.4% in Batumi. More than a half of the respondents were given information about this program. The proportion of IDUs who have heard information about needle/syringe exchange varies from 15% in Tbilisi to 50% in Gori. 18.3% of respondents in Gori reported that they were given sterile syringes in last year. The lowest percentage of IDUs by this indicator was in Zugdidi – 1.1%. The proportion of respondents who were given condoms in the last 12 months was reported to be highest in Batumi (25.6%) and Gori (20.3%) and lowest in Telavi (6%) and Tbilisi (9%).

The proportion of respondents who reported that it was possible for them to get a confidential HIV test was highest in Tbilisi (92.6%), and in Batumi (87.4%) and lowest in Telavi (65.8%). Among all locations proportion of respondents who had taken a voluntary HIV test and received the results in the last 12 months was highest in Gori (8.4%) and lowest in Telavi (2.9%). Figure 12 presents findings on exposure to various services in the last one year.

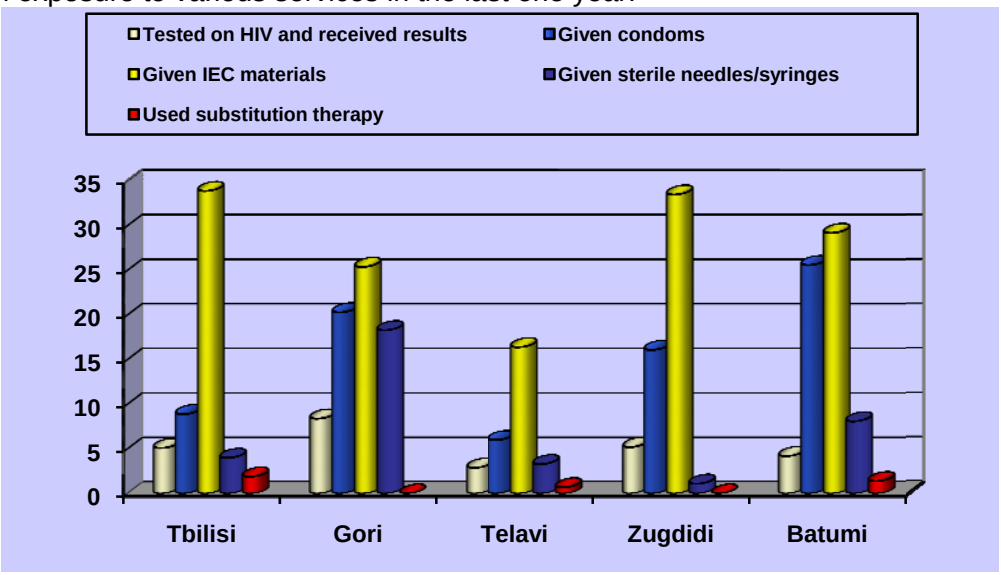


Figure 13. Other Services

⇒ Biomarker

The biomarker component of the survey involved the analysis of blood specimens at the Laboratory of Serology and Virology of the AIDS Center in Tbilisi.

HIV testing: HIV antibody testing was performed using a three-level enzyme-linked immunosorbent assay (ELISA) testing strategy. If a sample was reactive in the first ELISA (Genescreen Plus HIV Ag-AB, Bio-rad) test, the sample was retested two more times using another kit of ELISA. Samples were considered HIV antibody positive if they were reactive in two out of three tests. Any sample non-reactive to the first test was considered as HIV-antibody negative. HIV-antibody positive samples were tested with Western Blot (HIV blot, Genelabs) as the confirmatory test for HIV. **Syphilis testing**: Serum samples were tested also for syphilis antibodies with rapid plasma regain (RPR, Human) test and T*reponema pallidum* hemaglitination assay (TPHA, Human). ELISA (ELISA TP IgG test [Nubenco]) tests were used for confirmation of syphilis-antibody positive samples.

Table 11. Prevalence of HIV and STIs

Indicators	RDS Population Estimates % (95% CI)				
	Tbilisi	Gori	Telavi	Zugdidi	Batumi
HIV	2.5 (0.3 – 5.4)	0	1.5 (0-3.5)	2.2 (0-3.5)	4.5 (1.5-8)
Syphilis	6.3 (3.7 – 9.3)	3.9 (1.1 – 7.3)	5.5 (2.5-8.5)	6.9 (3.5-11)	7.6 (4-12)

2. Benchmark Data

As a drug user may be in contact with more than one agency, and therefore be included in the data from more than one source, sufficient information is needed on each individual to identify multiple occurrences. Matching records between data sources can be complex, and within the area of record linkage, it is recognized that problems exist even when several different fields of data on each individual has been collected.

Health-related Indicators

⇒ *Injection drug users (IDUs) in abstinence oriented treatment in 2007*

Source of information: National Center for Disease Control and Public Health (NCDC)

Table 12. Detoxification treatment benchmark data

City	Treatment Facility	# of Inpatient IDUs	# of Outpatient IDUs	Total #
Tbilisi	Research Institute on Addiction	229	285	514
	Center “Uranti”	203	75	278
	Clinic “Bemoni”	119	10	129
	Addiction Dispensary	154	26	180
	Clinic “Tanadgoma”	82	15	97
	Total in Tbilisi	**787**	**411**	**1198**

Batumi	Addiction Center	47	14	61
	Center for Medical Support and Expertise "Levgori"	0	57	57
	Total in Batumi	**47**	**71**	**118**
	Grand Total	***834***	***482***	***1316***

Explanation: Double counting cannot be excluded, as many drug users will come into contact with a variety of treatment facilities. Utilizing unique personal identifiers to prevent double counting is impossible in Georgia.

The absolute majority (96%) of the individuals treated (detoxified) in 2007 were opioid users. Out of 834 IDUs treated in 2007, 769 were diagnosed as opioid dependents (F 11 – Mental and behavioral disorders due to use of opioids, ICD-10), in 32 cases multiple drug use (F 19 – Mental and behavioral disorders due to multiple drug use: opioids + other psychoactive substances) was diagnosed and 33 patients received treatment due to injecting of Ephedrone (F 15 – Mental and behavioral disorders due to use of other stimulants). All outpatients were opioid dependents.

⇒ ***Injection drug users on waiting lists for the abstinence oriented treatment in 2007***

Source of information: Drug treatment agencies

Explanation: As long as the capacity of facilities was limited, drug users had been put on waiting lists. They might break off contact again, before any data can be collated, or they may leave incomplete, unreliable or even wrong data. There is no official data on this. Based on personal communication with the heads of clinics it can be assumed that ***in 2007 the average number of IDUs on waiting lists in the abstinence oriented treatment facilities in Tbilisi was 1200. There were no waiting lists in Batumi.***

⇒ ***Drug users in Methadone substitution treatment in 2007***

Source of information: Methadone Substitution Programme database of the Georgian Research Institute on Addiction

Table 13. Methadone substitution treatment benchmark data

City	Treatment Facility	# of Male IDUs	# of Female IDUs	Total #	Among them, # of HIV+ IDUs
Tbilisi	Research Institute on Addiction	94	0	94	14
	Center "Uranti"	91	1	92	13
	Total in Tbilisi	**185**	**1**	**186**	**27**
Batumi	Addiction Center	101	0	101	7
	Total in Batumi	**101**	**0**	**101**	**7**
	Grand Total	***286***	***1***	***287***	***34***

Explanation: Three pilot Methadone substitution therapy programs were operated in Georgia in 2007. These programs had been coordinated by the Georgian Research Institute on Addiction.

⇒ *Injection drug users on waiting lists for Methadone substitution treatment in 2007*

Source of information: Methadone Substitution Programme database of the Georgian Research Institute on Addiction

Table 14. Methadone substitution waiting list benchmark data

City	# of IDUs at the beginning of year 2007	# of IDUs during the year 2007	# of IDUs on waiting lists in 2007		Out of them, # of IDUs included into the Program during the year 2007
			Male	Female	
Tbilisi	125	160	**282**	**3**	55
Batumi	22	154	**176**	**0**	101
Grand Total	***147***	***314***	***461***		***156***

⇒ *Drug users using needle exchange and other low-threshold programs in 2007*

Source of information: Monitoring systems of low threshold agencies - computer based database for monitoring of the program operation

Table 15. Needle exchange benchmark data

Needle Exchange						
City	Needle Exchange Programs	# of "Permanent" Clients		# of Other Clients		Total # of Clients
		Male	Female	Male	Female	
Tbilisi	NGO "New Wave"	451	28	261	51	791
	NGO "New Vector"	171	4	895	72	1142
	Total in Tbilisi	**622**	**32**	**1156**	**123**	**1933**
Batumi	NGO "Imedi"	483	7	2224	0	2714
Gori	NGO "Nabiji Momavlisken"	295	15	330	20	660
Zugdidi	NGO "ORDU"	170	0	96	0	266
	Grand Total	***1570***	***54***	***3806***	***143***	***5573***

Table 16. VCT services benchmark data

VCT						
City	VCT Centers	# of Clients received VCT in Centers		# of Clients reached by outreach workers		Total # of Clients
		Male	Female	Male	Female	
Tbilisi	AIDS Center	365	15			380
	Research Institute on Addiction	927	32	1468	0	2427
	NGO "New Wave"	655	624	3923	0	5202
	NGO "Bemoni"	452	8			460
	NGO "Tanadgoma" –			412	0	412

	in prisons					
	Total in Tbilisi	**2399**	**679**	**5803**	**0**	**8881**
Batumi	NGO "Tanadgoma"	128	0			128
	Addiction Dispensary	224	0			224
	Total in Batumi	**352**	**0**			**352**
Zugdidi	NGO "Ksenoni"	808	4			812
	Grand Total	***3559***	***683***	***5803***	***0***	***10,045***

Explanation: The main services offered to IDUs under the harm reduction programs in Georgia are voluntary counseling and testing (VCT), and needle exchange. These activities are carried out within three major projects: 1) Harm reduction programme of the "Open Society – Georgia" Foundation; 2) Anti drug component of the GFATM Programme "Strengthening national response in Georgia to implement the effective prevention and control of HIV/AIDS, tuberculosis and malaria", and 3) STI/HIV Prevention (SHIP) Project for Georgia, funded by USAID. All the agencies providing these services to IDUs in 2007 are included in present study.

⇒ *Drug users tested on HIV in 2007*

Source of information: HIV/AIDS register run by the Georgian AIDS and Clinical Immunology Research Center

Table 17. HIV testing benchmark data

City	Service Provider	# of IDUs tested on HIV	# of IDUs infected by HIV	# of IDUs *deceased due to AIDS*
Tbilisi	AIDS Center	380	43	7
	Research Institute on Addiction	460	5	
	Methadone substitution (2 Programmes)	200	36	
	Center "Uranti"	108	2	
	NGO "New Way"	392	4	
	Center Tanadgoma (in prisons)	412	3	
	Total in Tbilisi	**1952**	**93**	**7**
Batumi	Methadone substitution Program	101	7	2
	Union "Imedi"	147	3	
	Healthy Cabinet	66	3	
	Outpatients of other clinics	23	0	
	Inpatients of other clinics	47	2	
	Total in Batumi	**384**	**15**	**2**
Zugdidi	NGO "Ksenoni"	**427**	**8**	1
Gori	Blood Transfusion Station	**127**	**3**	3
Telavi	AIDS Center	**25**	**1**	0
Other cities			81	26
	Grand Total	***2915***	***201***	***39***

Explanation: The cases are identified through routine surveillance data reported by HIV diagnostic labs operating throughout the country.

HIV antibody testing was performed using a three-level enzyme-linked immunosorbent assay (ELISA) testing strategy. If a sample was reactive in the first ELISA (Genescreen Plus HIV Ag-AB,

Bio-rad) test, the sample was retested two more times using another kit of ELISA. Samples were considered HIV antibody positive if they were reactive in two out of three tests. Any sample non-reactive to the first test was considered as HIV-antibody negative. HIV-antibody positive samples were tested with Western Blot (HIV blot, Genelabs) as the confirmatory test for HIV.

⇒ *Drug users deceased due to a fatal drug overdose in 2007*

Sources of information: National Center for Disease Control and Public Health (NCDC); National Forensic Expertise Bureau of the Ministry of Justice

Explanation: NCDC reported that the death cases caused by fatal drug overdose were not registered by the relevant agencies (emergency departments, ambulances) in the country in 2007. Although everybody knows that such cases exist, emergency rooms make other diagnoses and do not record the cases of drug use.

According to the National Forensic Expertise Bureau of the Ministry of Justice, **39 cases of drug overdose deaths had been recorded in Tbilisi**, i.e. approximately 1.06% of all unnatural deaths in Georgia in 2007.

Crime-related Indicators

⇒ *Injection drug users registered by the police tested positively for presence of illegal drugs in 2007*

Source of information: Ministry of Internal Affairs

Table 18. Benchmark data on IDUs came into contact with the police

City	Total # of registered drug users, based on the positive test results	of those, # of registered IDUs, based on the positive test results
Tbilisi	9519	**8168**
Telavi	82	**28**
Zugdidi	1166	**381**
Gori	1602	**829**
Batumi	2634	**2244**
Grand Total	***15,003***	***11,650***

Explanation: Taking into consideration that Georgian drug legislation does not distinguish between being detained in connection with the use of drugs and being convicted for purchase or possession of drugs, we use only police records regarding the persons tested positively for presence of illegal drugs.

3. Calculation of the Size of IDU Population in 5 selected cities

Multipliers were derived from the RDS survey of 1127 IDUs recruited from across 5 cities. Participants' responses to the questionnaire were used to produce a final series of IDU size estimates, including 95% confidence intervals.

The following section provides specific estimates for each selected city. Different number of separate multiplier estimates was made to calculate the quantity of problem drug users in different cities.

The population size estimate for IDUs was the mean of six multiplier estimations in Tbilisi, 5 in Batumi, 3 in Gori and Zugdidi and 2 in Telavi. This study suggests using the statistical lower and upper limits (at 95% confidence interval) to reflect the minimum and maximum ranges.

Calculation of the estimated size of the IDU population in the surveyed cities revealed these figures (mean estimates): **Tbilisi - 27 107 (23 694-31 532); Gori – 2 989 (2 537-3 570); Telavi – 557 (358-941); Zugdidi - 4 855 (3 945-6 089); Batumi – 5 937 (5 008-7 162).** Tables 19-23 set out the multiplier estimates of IDUs in 5 cities across the country derived from different sources, together with the mean and median of the estimates.

Table 19. Estimates of the number of IDUs in Tbilisi

	Benchmark		Multiplier	95% CI			Estimated size	95% CI	
Police data	8168		2.54	2.37	2.74		20747	19358	22380
HIV testing data	1952		7.06	6.13	8.18		13781	11966	15967
Treatment data	2398		3.6	3.28	3.96		8633	7865	9496
Methadone substitution data	471		4.64	4.17	5.21		2185	1964	2454
Low Threshold Programs data	10814		8.34	7.15	9.82		90189	77320	106194
						Mean	**27107**	**23694**	**31532**
						Median	**13781**	**11966**	**15967**

Table 20. Estimates of the number of IDUs in Gori

	Benchmark		Multiplier	95% CI			Estimated size	95% CI	
Police data	829		4.27	3.73	4.92		3540	3092	4079
HIV testing data	127		11.66	9.17	15.11		1480	1165	1919
Low Threshold Programs data	660		5.98	5.08	7.14		3947	3353	4712
						Mean	**2989**	**2537**	**3570**
						Median	**3540**	**3092**	**4079**

Table 21. Estimates of the number of IDUs in Telavi

	Benchmark		Multiplier	95% CI			Estimated size	95% CI	
Police data	28		4.09	3.55	4.76		114.52	99.4	133.28
HIV testing data	25		40	24.63	69.93		1000	615.75	1748.25
						Mean	**557**	**358**	**941**
						Median	**557**	**358**	**941**

Table 22. Estimates of the number of IDUs in Zugdidi

	Benchmark		Multiplier	95% CI			Estimated size	95% CI	
Police data	381		3.16	2.82	3.57		1204	1074	1360
HIV testing data	427		7.08	5.86	8.69		3023	2502	3710.63
Low Threshold Programs data	1078		9.59	7.66	12.24		10338	8258	13195
						Mean	**4855**	**3945**	**6089**
						Median	**3023**	**2502**	**3711**

Table 23. Estimates of the number of IDUs in Batumi

	Benchmark		Multiplier	95% CI			Estimated size	95% CI	
Police data	2244		2.03	1.88	2.22		4555	4219	4982
HIV testing data	384		5.84	4.89	7.06		2243	1878	2711
Treatment data	118		4.28	3.7	5.01		505	437	591
Methadone substitution data	277		6.64	5.49	8.16		1839	1521	2260
Low Threshold Programs data	3066		6.7	5.54	8.24		20542	16986	25264
						Mean	**5937**	**5008**	**7162**
						Median	**2243**	**1878**	**2711**

4. Estimation of the prevalence of injection drug use

Prevalence estimates for the injection drug use were produced for 5 cities of Georgia. Census data gave the population between 18 and 64 for urban areas across the country. The appropriate estimations of injecting drug use shown in the tables above were then applied to that population. The statistical lower and upper limits (at 95% confidence interval) were used to reflect the minimum and maximum ranges.

Calculation of the IDU prevalence estimation in the surveyed cities revealed these figures (mean estimates): **Tbilisi – 4,03 (3,98-4,09); Gori – 3,61 (3,47-3,75); Telavi – 1,30 (1,19-1,42); Zugdidi: 4,63 (4,37-4,76); Batumi – 7,97 (7,79-8,15).**

Tables 24-28 below present the IDU prevalence estimation (%) in 5 cities across the country derived from different sources, together with the mean and median of the estimates.

Table 24. Estimated Prevalence Rates in Tbilisi

Tbilisi				Adult population (18-64)	672000	
	Estimated size	95% CI		Prevalence of IDU (%)	95% CI	
Police data	20747	19358	22380	3,09	3,04	3,13
HIV testing data	13781	11966	15967	2.05	2.01	2.09
Treatment data	8633	7865	9496	1.28	1.25	1.32
Methadone substitution data	2185	1964	2454	0.33	0.31	0.34
Low Threshold Programs data	90189	77320	106194	13.42	13.33	13.51
Mean	**27107**	**23694**	**31532**	**4,03**	**3,98**	**4,09**
Median	**13781**	**11966**	**15967**	**2,05**	**2,01**	**2,09**

Table 25. Estimated Prevalence Rates in Gori

Gori				Adult population (18-64)	82800	
	Estimated size	95% CI		Prevalence of IDU (%)	95% CI	
Police data	3540	3092	4079	4,28	4,12	4,43
HIV testing data	1481	1165	1919	1.79	1.69	1.89
Low Threshold Programs data	3947	3353	4712	4.77	4.6	4.93
Mean	**2989**	**2537**	**3570**	**3,61**	**3,47**	**3,75**
Median	**3540**	**3092**	**4079**	**4,28**	**4,12**	**4,43**

Table 26. Estimated Prevalence Rates in Telavi

Telavi					Adult population (18-64)		42900
	Estimated size	95% CI			Prevalence of IDU (%)	95% CI	
Police data	114.52	99.4	133.28		0.27	0.21	0.33
HIV testing data	1000	615.75	1748.25		2.33	2.17	2.5
Mean	**557**	**358**	**941**		**1,30**	**1,19**	**1,42**
Median	**557**	**358**	**941**		**1,30**	**1,19**	**1,42**

Table 27. Estimated Prevalence Rates in Zugdidi

Zugdidi					Adult population (18-64)		105000
	Estimated size	95% CI			Prevalence of IDU (%)	95% CI	
Police data	1204	1074	1360		1,15	1,07	1,22
HIV testing data	3023	2502	3711		2.88	2.77	3
Low Threshold Programs data	10338	8258	13195		9.85	9.64	10.05
Mean	**4855**	**3945**	**6089**		**4,63**	**4,37**	**4,76**
Median	**3023**	**2502**	**3711**		**2,88**	**2,77**	**3,00**

Table 28. Estimated Prevalence Rates in Batumi

Batumi					Adult population (18-64)		74500
	Estimated size	95% CI			Prevalence of IDU (%)	95% CI	
Police data	4555	4219	4982		6,11	5,92	6,31
HIV testing data	2243	1878	2711		3.01	2.87	3.15
Treatment data	505	437	591		0.68	0.61	0.75
Methadone substitution data	1839	1521	2260		2.47	2.34	2.6
Low Threshold Programs data	20542	16986	25264		27.57	27.21	27.94
Mean	**5937**	**5008**	**7162**		**7,97**	**7,79**	**8,15**
Median	**2243**	**1878**	**2711**		**3,01**	**2,87**	**3,15**

EXTRAPOLATION FROM LOCAL TO NATIONAL PREVALENCE ESTIMATES

Local estimates using multiplier-benchmark methods give important information on extent of drug problem. However, they are employed in studies of drug use on a smaller, geographically local scale. Nonetheless, there is still very often a need for overall national estimates to be made, and one way of doing that is to extrapolate from local prevalence studies to an overall picture.

Extrapolation methods are not a specific method of prevalence estimation in themselves, but when some prevalence information is known they are used to extend that information into areas - usually, other geographic regions—where the prevalence information is not known. The important element of any extrapolation method is that it makes use of known prevalence figures in certain regions to estimate prevalence in other regions. To do that, the regions must have some data sources that are the same as (or very similar to) the regions for which prevalence estimates exist, although of course they lack the regional prevalence figure itself. The general principle is then to use data that are similar across the separate localities to project figures for drug use prevalence from localities where it is known to localities where it is lacking.[20]

The extrapolation methods are based on statistical regression techniques. The method described below comes under various headings: usually, "synthetic estimation", or "multi-indicator" method, or sometimes under the more technical name of "regression on principal components".

Extrapolation Method: The multivariate indicator for injection drug use[21]

The ***Multivariate Indicator Method (MIM)*** is a special case of synthetic estimation. Generally, synthetic estimation methods are methods which transfer information about a variable of interest, e.g. drug use prevalence, from a population in which it can be observed (calibration population/anchor point) to a target population in which it cannot be observed. From anchor points, a functional relationship between some variables and the variable of interest is derived which is extended to the target population. Applied to the field of drugs, the prevalence of problem drug use in a country may be estimated by relating a set of drug use indicators, which are available in all regions of a country, to prevalence estimates in a few regions (calibration population). The indicators may be directly (e.g. mortality, morbidity, and arrest) or indirectly related to drug use (e.g. population density, unemployment rate, housing density). Typically, analyses are based on prevalence rates and indicator rates per 100,000 inhabitants.

With regard to the MIM, two main variants of the method are common. One way is to estimate the relationship between drug use indicators and prevalence estimates in the anchor points via (linear) regression and to apply the regression coefficients to the drug use indicators in the target population. This yields prevalence estimates for the non-anchor points. Summing up all regional prevalence estimates yields the national prevalence estimate. Smit and colleagues (2003) used this method to estimate local and national

[20] Estimating Prevalence: Indirect Methods for Estimating the Size of the Drug Problem. Global Assessment Programme on Drug Abuse, Toolkit Module 2. UNODC, 2003

[21] Key Epidemiological Indicator: Prevalence of problem drug use, EMCDDA, 2004

problem drug use prevalence in the Netherlands, employing population density and housing density as indicators.

As the anchor points have a great impact on the actual figures of the total prevalence by fixing the regression line, great care has to be taken in obtaining reliable and valid estimates with the same target group. Furthermore, the estimates should cover at least one area with an assumed high prevalence rate and at least one region at the lower end of prevalence rates, in order to improve the quality of the regression model. Using only estimates of regions with a high prevalence makes the method useless, and may even result in negative prevalence rates. Indicator values for the anchor points must be available. In practice, prevalence estimates are often available only on city level whereas indicators are collected on a regional level. If problem drug use is concentrated heavily in these cities they may be used as anchor points. However, the relationship between indicators and drug use prevalence may be different for urban and rural areas.

Application

The aim of this method is to estimate the number of problem drug users in the population by combining information on prevalence that is available only in a few areas (the calibration population, or anchor points) and indicators or predictors of drug use that are available in all areas (Mariani and others (1994)). The method was first used in the United States (Woodward and others (1984)) and has been described more fully elsewhere (Wickens (1993)).

The key assumption of the method is that the relationship between prevalence (dependent variable) and the predictors (independent variables) in the calibration sample is transferable to all other areas. It is also assumed that a single factor underlies the drug-related indicators and that principal components analysis can be used to extract the main factor that explains the largest amount of variance in the indicators.

The application of the multivariate indicator method requires a breakdown of national states by regions or provinces and data on problem/injection drug use (indicators), which must be available for each of the regions and refer to the same time period. ***The national IDU prevalence estimates in the present study were derived from the estimates of the urban areas.*** Since injection drugs are more available in cities and drug injection is not common in rural areas (locally cultivated pot is particularly widely spread in villages), actually there is a little number of IDUs in rural areas as well. Consequently, not considering this population may have resulted in an under-estimate. However, assuming that injection drug users are mainly concentrated in the urban parts of Georgia we are willing to ignore this downward bias.

Two separate national estimations were produced:

Estimation N 1. It is recommended to use drug-related indicators as predictors in this regression model, i.e. drug related offences, drug-related deaths, clients in treatment, HIV cases related to injection drug use, imprisoned drug users (EMCDDA, 1999). Unfortunately, however, ***these statistics are not available in Georgia for the whole country.*** Due to a lack of available drug-related indicators the Dutch research group used an alternative model with social indicators such as housing density and population

density.[22] Similarly, taking in consideration that none of the drug-related indicators could be obtained for all urban areas in Georgia, national IDU prevalence was calculated using only one ***demographic indicator such as population density*** (Census data). Unfortunately the data on housing density was not collected in the Country.

Estimation N 2. The second method used ***the drug injection prevalence rate coefficient*** for each city in order to estimate the number of injection drug users nationwide (modified from the method suggested by E. Pizani). [23] It was based on input from people working in the area of drug addiction. Addiction experts ranked all 65 cities in Georgia by prevalence rates with corresponding coefficients. Five categories of prevalence rate coefficients had been chosen and each city was assigned to one of the following categories:

Prevalence Rate	Very High	High	Medium	Low	Very Low
Coefficient	8	3,5	1,5	1,0	0,5

Description of the Multivariative Indicator Method Applied

Five indicators, denoted by A, B, C, D and E had been used for MIM. Additionally to the indicators, the population size F of the age group 18-64 in each city (totally 65 cities) as well as independently obtained prevalence estimates G for 5 cities (the so-called anchor points) are needed.

The different indicators highlight different aspects of the drug problem. No indicator is supposed to measure prevalence. The indicators are, however, indicative of whether problem drug use increases or decreases (Person et al., 1977). By applying principal component analysis a common factor is extracted which is assumed to be proportional to prevalence of problem drug use. As principal component analyses underlies the assumption of a linear relationship between observable variables and the principal components there should be a linear relationship between indicators of problem drug use and the unknown prevalence.

Obviously, the validity of prevalence estimation can be improved by increasing the number of anchor points. Then, more drug use indicators (proxy variables) can be used in the linear regression model. One of the problems is, however, the choice of appropriate drug use indicators (proxy variables). If the number of drug use indicators equals or exceeds the number of anchor points linear regression is not possible. As drug use indicators are more easily available than reliable regional prevalence estimates it is often necessary to reduce the number of drug use indicators. Up to now, different methods of reducing the number of indicators have emerged: Mariani (1999) as well as Person, Retka and Woodward (1977, 1978) applied a principal component analysis (PCA).[24]

[22] Estimating Local and National Problem Drug Use prevalence from Demographics, Filip Smit et al., Addiction Research and Theory, 2003, Vol. 11, N6

[23] Estimating the number of drug injectors in Indonesia. Elizabeth Pisani, International Journal of Drug Policy N 17, 2006

[24] Prevalence of problem drug use at the national level, EMCDDA, 2002

The steps below summarize the process used to derive the national estimate for the percentage of injection drug users in Georgia using the Multiple Indicator Method.

Step 1. Data indicating the prevalence of injection drug use must be collected for a defined time period for each city. The following variables were used as indicators:
A - Number of IDUs registered by Police for drug consumption
B - Number of IDUs tested on HIV
C - Number of clients in treatment
D - Number of clients of the law threshold services
E - Population density (for the estimation N 1) and prevalence rate coefficients (for the estimation N 2).

Step 2. In addition, the population size F for urban areas had been obtained from data on population distribution (State Department of Statistics of the Ministry of Economic Development of Georgia).

Step 3. For five selected cities reliable independent estimates G (resulting from the multipliyer- benchmark study) are necessary. These cities are called „anchor points".

Step 4. For each of the variables A to E, G and for each region the figure per 100,000 inhabitants has to be calculated.
A_F=A*100,000/F
G_F=G*100,000/F

Step 5. Principal components analysis requires standardised values for A_F to G_F (subtracting the mean and dividing by the standard deviate).

Step 6. Principal components analysis of A_F to E_F with the extraction of the first factor, whose coefficients are saved. No rotational solution is needed, as any rotation only serves as an improvement for the fit of a set of indicators, and is therefore here redundant as only one indicator will be extracted.

Step 7. A linear regression (dependent variable: G_F, independent variable: coefficients of the first factor) results in estimated prevalence rates per 100,000 inhabitants. Finally, these have to be transformed to prevalence estimates for the cities (multiplying with F and dividing by 100,000). Summation of the urban area prevalence estimates yields the national prevalence estimate.

In order to derive national estimates original data was entered into the SPSS version 13.0 data files, than ***SPSS-Syntax of the variant "PCA per 100,000"*** reflecting the above mentioned steps had been created based on instructions provided in the EMCDDA Scientific Report.[25] The regression analysis was done by this SPSS syntax to make predictions of the estimated level of the drug abuse prevalence rates. Two separate estimations (by demographic indicator and by prevalence rate coefficients) were made.

[25] Prevalence of problem drug use at the national level, EMCDDA, 2002

Results of the national prevalence estimation

National prevalence estimates for the injection drug use were produced for 65 cities of Georgia. Census data gave the population between 18 and 64 for all urban areas across the country. Calculation of the IDU prevalence estimation nationwide revealed these figures: estimation method N 1, using demographic indicator (population density) – **1,46% (estimated number of IDUs equals 39 152)** estimation method N 2, using prevalence rate coefficients - **1,53% (Number of IDUs – 41 062).**

Tables 29-30 below present the national IDU prevalence estimation (%) produced by 2 different indicators:

Table 29. Estimation by Population Density

N	Cities	Total Population	Population 18-64	Density of the Population per 1 sq.km	Prevalence per 100 000	Prevalence %	Estimated Number
1	**Tbilisi**	**1 081 679**	**659 824**	**4425.8**	**3 856,2**	**3,86**	**25 913,7**
2	**Batumi**	**121 806**	**74 302**	**7293.8**	**8 910,4**	**8,91**	**6 638,2**
3	Keda	20 024	12 215	44.3	88,1	0,09	10,8
4	Kobuleti	88 063	53 718	122.3	62,9	0,06	33,8
5	Shuakhevi	21 850	13 329	37.2	72,5	0,07	9,7
6	Khelvachauri	90 843	55 414	219.8	94,4	0,09	52,3
7	Khulo	33 430	20 392	47.1	63,5	0,06	12,9
8	Lanchkhuti	40 507	24 709	76.0	77,8	0,08	19,2
9	Ozurgeti	78 760	48 044	144.4	201,0	0,20	96,55
10	Chokhatauri	24 090	14 695	29.2	57,5	0,06	8,4
11	Kutaisi	185 965	113 439	2746.9	722,2	0,72	819,27
12	Baghdati	29 235	17 833	35.9	57,9	0,06	10,3
13	Vani	34 464	21 023	61.9	75,3	0,08	15,8
14	Zestaponi	76 208	46 487	180.2	92,7	0,09	43,1
15	Terjola	45 496	27 753	127.4	106,0	0,11	29,4
16	Samtredia	60 456	36 878	166.0	104,4	0,10	38,5
17	Sachkhere	46 846	28 576	48.1	51,8	0,05	14,8
18	Tkibuli	31 132	18 991	65.0	84,2	0,08	16,0
19	Tskhaltubo	73 889	45 072	116.9	68,8	0,07	31,0
20	Chiatura	56 341	34 368	184.0	120,3	0,12	41,3
21	Kharagauli	27 885	17 010	30.5	53,8	0,05	9,2
22	Khoni	31 749	19 367	74.1	91,8	0,09	17,8
23	Akhmeta	41 641	25 401	18.9	34,3	0,03	8,7
24	Gurjaani	72 618	44 297	85.8	56,5	0,06	25,0
25	Dedoplis Tskaro	30 811	18 795	12.2	32,5	0,03	6,1
26	**Telavi**	**70 589**	**43 059**	**84.4**	**263,6**	**0,26**	**113,1**
27	Lagodekhi	51 066	31 150	57.4	54,8	0,05	17,1
28	Sagarejo	59 212	36 119	39.7	329,1	0,33	118,86
29	Sighnaghi	43 587	26 588	34.8	44,8	0,04	11,9
30	Kvareli	37 658	22 971	37.7	51,0	0,05	11,7
31	Akhalgori	7 703	4 699	7.6	50,6	0,05	2,4
32	Dusheti	33 636	20 518	11.3	30,6	0,03	6,3
33	Tianeti	14 014	8 549	15.5	54,2	0,05	4,6

34	Mtskheta	64 829	39 546	90.1	62,9	0,06	24,9
35	Kazbegi	5 261	3 209	4,9	48,9	0,05	1,6
36	Ambrolauri	16 079	9 808	16.3	51,4	0,05	5,0
37	Lentekhi	8 991	5 485	6.7	43,2	0,04	2,4
38	Oni	9 277	5 659	5.4	38,2	0,04	2,2
39	Tsageri	16 622,0	10 139	22.0	60,9	0,06	6,2
40	Poti	47 149	28 761	716.6	1 480,5	1,48	425,8
41	Abasha	28 707	17 511	89.0	115,2	0,12	20,2
42	**Zugdidi**	**167 760**	**102 334**	**346.9**	**1 965,7**	**1,97**	**2 064,0**
43	Martvili	44 627	27 222	50.7	55,1	0,06	15,0
44	Mestia	14 248	8 691	4.7	30,5	0,03	2,7
45	Senaki	52 112	31 788	100.1	79,1	0,08	25,2
46	Chkhorotsku	30 124	18 376	48.6	69,7	0,07	12,8
47	Tsalenjikha	40 133	24 481	62.1	67,7	0,07	16,6
48	Khobi	41 240	25 156	62.6	66,8	0,07	16,8
49	Adigeni	20 752	12 659	25.9	58,6	0,06	7,4
50	Aspindza	13 010	7 936	15.8	57,5	0,06	4,6
51	Akhalqalaqi	60 975	37 195	49.4	45,2	0,05	16,8
52	Akhaltsikhe	46 134	28 142	63.9	228,4	0,23	64,28
53	Borjomi	32 422	19 777	27.2	75,5	0,08	14,94
54	Ninotsminda	34 305	20 926	25.3	42,9	0,04	9,0
55	Rustavi	116 384	70 994	1920.5	980,3	0,98	695,96
56	Bolnisi	74 301	45 324	92.4	162,4	0,16	73,61
57	Gardabani	114 348	69 752	87.7	43,8	0,04	30,6
58	Dmanisi	28 934	17 650	23.4	45,1	0,05	8,0
59	Tetri Tskaro	25 354	15 466	21.6	46,4	0,05	7,2
60	Marneuli	118 221	72 115	126.4	53,1	0,05	38,3
61	Tsalka	20 888	12 742	19.8	49,4	0,05	6,3
62	**Gori**	**148 686**	**90 698**	**146.7**	**1 528,0**	**1,53**	**1 265,2**
63	Kaspi	52 217	31 852	65.0	58,5	0,06	18,6
64	Kareli	50 422	30 757	46.2	48,4	0,05	14,9
65	Khashuri	62 714	38 256	107.1	72,6	0,07	27,8
							39 152,4

Table 30. Estimation by Prevalence Rate Coefficient

N	Cities	Total Population	Population 18-64	Rank	Prevalence Coefficient	Prevalence per 100 000	Prevalence %	Estimated Number
1	**Tbilisi**	**1 081 679**	**659 824**	H	**3,5**	4274,72476	4,28	28726,15
2	**Batumi**	**121 806**	**74 302**	VH	8,0	8531,66778	8,53	6356,09
3	Keda	20 024	12 215	VL	0,5	67,93795	0,68	8,3
4	Kobuleti	88 063	53 718	L	1,0	31,41563	0,31	16,88
5	Shuakhevi	21 850	13 329	VL	0,5	52,70972	0,53	7,03
6	Khelvachauri	90 843	55 414	VL	0,5	74,11766	0,74	41,07
7	Khulo	33 430	20 392	VL	0,5	5,13605	0,05	1,05
8	Lanchkhuti	40 507	24 709	VL	0,5	24,20531	0,24	5,98

9	Ozurgeti	78 760	48 044	L	1,0	163,03544	1,63	78,33
10	Chokhatauri	24 090	14 695	VL	0,5	37,1819	0,37	5,46
11	Kutaisi	185 965	113 439	M	1,5	248,72324	2,49	282,15
12	Baghdati	29 235	17 833	VL	0,5	10,52581	0,11	1,88
13	Vani	34 464	21 023	VL	0,5	8,41074	0,08	1,77
14	Zestaponi	76 208	46 487	VL	0,5	66,40416	0,66	30,87
15	Terjola	45 496	27 753	VL	0,5	34,08313	0,34	9,46
16	Samtredia	60 456	36 878	VL	0,5	53,92899	0,54	19,89
17	Sachkhere	46 846	28 576	VL	0,5	36,39434	0,36	10,4
18	Tkibuli	31 132	18 991	VL	0,5	2,92065	0,03	0,55
19	Tskhaltubo	73 889	45 072	VL	0,5	64,90146	0,65	29,25
20	Chiatura	56 341	34 368	VL	0,5	49,52083	0,50	17,02
21	Kharagauli	27 885	17 010	VL	0,5	16,56823	0,17	2,82
22	Khoni	31 749	19 367	VL	0,5	0,64294	0,01	0,12
23	Akhmeta	41 641	25 401	VL	0,5	26,65839	0,27	6,77
24	Gurjaani	72 618	44 297	VL	0,5	64,03715	0,64	28,37
25	Dedoplis Tskaro	30 811	18 795	VL	0,5	4,14173	0,04	0,78
26	**Telavi**	**70 589**	**43 059**	M	1,5	**287,65591**	2,88	**123,4**
27	Lagodekhi	51 066	31 150	VL	0,5	42,83097	0,43	13,34
28	Sagarejo	59 212	36 119	L	1,0	389,34193	3,89	140,63
29	Sighnaghi	43 587	26 588	VL	0,5	30,57054	0,31	8,13
30	Kvareli	37 658	22 971	VL	0,5	17,39046	0,17	3,99
31	Akhalgori	7 703	4 699	VL	0,5	359,40278	3,59	16,89
32	Dusheti	33 636	20 518	VL	0,5	5,80452	0,06	1,19
33	Tianeti	14 014	8 549	VL	0,5	146,08498	1,46	12,49
34	Mtskheta	64 829	39 546	L	1,0	1,71661	0,02	0,68
35	Kazbegi	5 261	3 209	VL	0,5	579,27399	5,79	18,59
36	Ambrolauri	16 079	9 808	VL	0,5	112,64624	1,13	11,05
37	Lentekhi	8 991	5 485	VL	0,5	291,54511	2,92	15,99
38	Oni	9 277	5 659	VL	0,5	279,03384	2,79	15,79
39	Tsageri	16 622,0	10 139	VL	0,5	105,233	1,05	10,67
40	Poti	47 149	28 761	M	1,5	1300,35054	13,00	373,99
41	Abasha	28 707	17 511	VL	0,5	12,8214	0,13	2,25
42	**Zugdidi**	**167 760**	**102 334**	H	3,5	2313,26483	2,31	2428,93
43	Martvili	44 627	27 222	VL	0,5	32,52142	0,33	8,85
44	Mestia	14 248	8 691	VL	0,5	141,80885	1,42	12,33
45	Senaki	52 112	31 788	VL	0,5	44,26518	0,44	14,07
46	Chkhorotsku	30 124	18 376	VL	0,5	6,84251	0,07	1,26
47	Tsalenjikha	40 133	24 481	VL	0,5	23,36586	0,23	5,72
48	Khobi	41 240	25 156	VL	0,5	25,80636	0,26	6,49
49	Adigeni	20 752	12 659	VL	0,5	61,54544	0,62	7,79
50	Aspindza	13 010	7 936	VL	0,5	166,178	1,66	13,19
51	Akhalqalaqi	60 975	37 195	VL	0,5	54,44271	0,54	20,25
52	Akhaltsikhe	46 134	28 142	VL	0,5	199,06086	1,99	56,02
53	Borjomi	32 422	19 777	VL	0,5	73,02162	0,73	14,44
54	Ninotsminda	34 305	20 926	VL	0,5	7,92003	0,08	1,66
55	Rustavi	116 384	70 994	M	1,5	522,15781	5,22	370,7

56	Bolnisi	74 301	45 324	VL	0,5	96,58615	0,97	43,78
57	Gardabani	114 348	69 752	VL	0,5	82,37407	0,82	57,46
58	Dmanisi	28 934	17 650	VL	0,5	11,8242	0,12	2,09
59	Tetri Tskaro	25 354	15 466	VL	0,5	29,63072	0,30	4,58
60	Marneuli	118 221	72 115	VL	0,5	83,41945	0,83	60,16
61	Tsalka	20 888	12 742	VL	0,5	60,40063	0,60	7,7
62	**Gori**	**148 686**	**90 698**	H	3,5	1712,56543	1,71	1418
63	Kaspi	52 217	31 852	VL	0,5	44,40598	0,44	14,14
64	Kareli	50 422	30 757	VL	0,5	41,91836	0,42	12,89
65	Khashuri	62 714	38 256	VL	0,5	56,10204	0,56	21,46

DISCUSSION

This is the first time the multiplier/benchmark method has been applied to estimate an IDU population in Georgia.

While every effort has been made to produce as accurate an indication of the prevalence of drug use as possible, these estimates are based on sparse data of poor quality. It is clear that more robust estimates of the size of the drug using population are required. This can only be done through indirect prevalence estimation, using a range of methods and data sources. It is also clear, however, that the secondary data necessary for such estimation, and the capacity to undertake it, is lacking in Georgia.

There was wide variation in the estimates derived from the different multipliers. There may have been some inflation of the treatment prevalence estimates because treatment data would have included a small number of duplicate episodes where a person has been transferred between services. The prevalence estimates for IDUs that were derived using the benchmark data from low threshold services were higher than those derived using other multipliers. Three of the estimates derived from the various multipliers seem more realistic: one derived from the police data, one derived from data on HIV tests, and one derived from the proportion that had been in treatment (unfortunately this indicator is available only in 2 cities of Georgia). The estimate derived from the low threshold agencies may be worth focusing on, as the collection of this data may be the most robust of all the routine sources of data, since some experts suggest that estimates based on these data sources must be an overestimate.

Each indicator selected to calculate the IDU estimates has biases; each indicator that we considered in this study is based on a different way of "encountering" an IDU. HIV counseling and testing and drug abuse treatment are usually based on voluntary interaction with health agencies. Data on treatment demand and HIV testing and counseling events depend on the desires of potential clients and on the availability of capacity at the service agency, they can happen multiple times a year for some persons and much less often for others. Drug abuse treatment and HIV counseling and testing services may be funded more or less adequately, and this can change over time. HIV testing and counseling encounters also depend on the physical locations of sites where these services are provided.

Regardless of its size it is apparent that there is a population of IDUs in Georgia that is currently underserved by the health sector. Implementing a broad range of health services for drug users and strengthening the data collection capabilities of the providers of these services would help to generate the data necessary for indirect estimation.

On the other hand, the multiplier method used in this study has its advantages. Firstly, the result suggests that combining this method with the HIV/AIDS behavioural surveillance to produce population size estimations is feasible and cost effective – in this way the necessary parameters for the estimation can be simply obtained. Secondly, combining this method with the BSS, estimates can be obtained regularly (under the framework of the National Surveillance System) and trends in the size of IDU populations with time can be observed. Furthermore, this method can be generalized to the whole BSSs, and thus estimates can be obtained for broader geographical areas.

The methodology used for recruiting IDUs in the study - RDS offers certain unique features (Heckathorn 1997). It reduces the biases associated with non-random recruitment, allows greater penetration into diverse groups of IDUs, and allows respondents to recruit only a limited number of respondents irrespective of their network size (Magnani et al 2005). One advantage of the RDS method is that the sampling frame is built up during the recruitment process and this helps to avoid

incomplete sampling frames. In this manner it provides unbiased population estimates. Additionally, at the stage of analysis, RDS takes into account, the different network-sizes and to what extent each respondent has recruited others like him/her. Another theoretical advantage of RDS is that it is based on a dual incentive system, financial rewards in combination with peer pressure, which can be expected to reduce non-response bias. All these factors make RDS a superior method for recruitment as compared to conventional methods like snow-ball sampling.

The study was conducted using minimum of resources. NGO already working on the ground implemented the study. Additionally, the staff members experienced in BSS had been involved in data collection. Thus, no new structures were required to be established. Moreover, the recruitment process, using RDS, was surprisingly fast - the data collection was completed within just 10-14 days in each site.

Some key issues must be kept in mind in using multiplier methods successfully for IDU population size estimation. Firstly, a clear and consistent definition of IDUs in different surveys should be used. Even when referring to the broadest possible target group, the „drug users“, any definition should include: a time period, an age group, frequency of use, and a definition of substances. Secondly, the catchment area for the selected data sources should be ideally the same as that covered in the survey from which multipliers are derived.

Possible limitations to the study could have affected the results. The small numbers of women participating in the surveillance may indicate a strong desire to remain hidden, their limited numbers, or a reflection of poor recruiting. Because few women have been arrested or attended treatment facilities, there are only some data regarding injection drug use amongst women in Georgia.

Reporting bias: as in any interview-based surveys, it is possible that respondents may not have accurately answered some of the sensitive questions, or may have had difficulties in recalling information.

The applicability of the Multiple Indicator Method for the extrapolation from local to national prevalence estimates as proposed by the EMCDDA was of limited use in the Georgian context because of a lack of drug-related indicators throughout the country. Among anchor points the prevalence estimation was derived based on the limited number of indicators – all 5 indicators were available only in 2 cities. Single drug related indicator such as number of IDUs registered by Police for drug consumption could be obtained even in 13 cities. Among the demographic indicators only population density was available.

The prevalence estimates that are used as anchor points in a multiple indicator analysis will have an impact on the prevalence figures derived for other areas. These anchor points must be available for at least two of the areas (preferably far more than two areas) and must be valid and reliable as they determine the parameters of the regression model.

Generally, the analysis showed that the total prevalence is highly dependent on the choice of anchor points, as these anchor points give the actual span of prevalence between which the regions are spread. Therefore, anchor points should be from both sides of the continuum, i.e. the estimates should cover at least one area with an assumed high prevalence rate and one region at the lower end of prevalence rates, in order to improve the quality of the regression model. Usually, however, there are very few anchor points from which to extrapolate, which results in highly unstable multiple regression predictions, and so an amended regression procedure is required.

Obviously, it is easier to get high prevalent anchor points than low prevalent anchor points since scientific projects are more often conducted in regions where the drug problem has become apparent. The same situation was appeared in Georgia – out of five anchor points none of them represented the low prevalence area.

Reliability and validity of estimates for the anchor points are of critical importance. On the other hand, the unobserved prevalence is related to the observed indicators, and that the relationship between the indicators and the anchor points is similar for other geographical areas. However, other factors also have a bearing on the indicators and may invalidate that assumption and the derived results, in particular, the number of drug users in treatment may be restricted by the capacity of treatment services, or affected by the level of underreporting that can vary across the country; otherwise the level of policing and attention given to drugs offences may vary across the country and etc. However, research has shown, that the anchor points have a much greater impact on the national prevalence estimate than the choice of indicators.[26]

The total prevalence estimates derived by the different calculations reached from around 39 000 IDUs to 41 000 which is a difference of no more than 2 000. Comparison made of the extrapolated - predicted values of estimated drug prevalence derived from the regression model for the anchor points themselves with the actual data provided for those points revealed that there is a considerable difference between the anchor point observed prevalence and the prevalence predictions of the multiple indicator model. This might be caused by the lack of appropriate original data in target points.

[26] Prevalence of problem drug use at the national level, EMCDDA, 2002

CONCLUSION AND RECOMMENDATIONS

Understanding something about the dynamics of the drug problem makes it possible not only to assess the likely impact of the problem, but also to alert policy makers to a worsening situation, or alternatively to provide evidence that prevention and other initiatives may be working. Although the need for information on the scale of the drug problem is clear, the data are, in practice, extremely hard to generate. Of all the methods of indirect estimation the multiplier-benchmark approach is probably the easiest to implement and probably the one with the longest history of use in the field of drug epidemiology.

Given that the concordance of different methods probably gives the best indicator of a satisfactory estimate being derived, prevalence estimates derived from a range of methods should be obtained and the different estimates compared and contrasted to help in selecting the "best estimate". We should use both capture-recapture and multiplier-benchmark methods if possible; Because of problems in obtaining data the capture-recapture method cannot be used in Georgia. When using multiplier/benchmark method, multiple multipliers generated from more than one source should be applied.

In this report we have provided the first ever estimates of the prevalence of injection drug use within Georgia. We have shown that injection drug use is occurring in all selected cities of Georgia and that, on average, from 1, 30% to 7, 97% of the population aged between 18 and 64 has used these drugs within the year 2007. Since this is the first time that an estimate of this kind has been produced there is no previous figure with which to make comparisons. The current study has demonstrated that it is feasible to apply the multiplier-benchmark method to the task of estimating the size of IDU population in Georgia.

The recording of information on problem drug use should be improved. The treatment monitoring system should not only provide figures of drug users seeking treatment categorized by main substance groups, but should also be able to avoid double counting.

Establishment of the Unique Identifier Code (UIC) system of anonymous client registration and tracking service is required. Therefore the actual time and effort spent collecting data will be reduced and this would further minimize the costs of a prevalence estimation exercise in the future. Thus when sufficient data have been collated, methods such as the truncated Poisson method or the capture-recapture method can be used to provide prevalence estimations.

The best results were found for police multiplier and treatment coverage (both detoxification and substitution) multiplier methods. They offer rather stable estimates. The police multiplier method is based on the number of individuals registered as drug offenders. The treatment coverage multiplier is based on the number of individuals treated for addiction problems that had in contact with treatment services in a given year period. Despite the perception that the estimate derived from HIV testing data within a multiplier method may be an underestimate, this method appears to be the most suitable for estimating the size of injecting populations in Georgia, since this indicator is available across the country.

The multiple indicator method to derive national prevalence estimates is cost-effective, as it does not require new data collection, unless separate studies are needed to estimate new anchor points. Evidently, increasing the number of anchor points makes the regression more stable. Local estimation methods should be used and further developed to produce regional anchor points for the multivariative indicator method.

Only prevalence estimates of cities, but not of the surrounding regions are available in Georgia. As problem drug use is concentrated heavily in these cities they may be used as anchor points. If only cities are employed as anchor points the requirement is that also low prevalent regions should be available. One problem encountered during the study was obtaining data across the country to use a variety of drug indicators available in the anchor and target areas in order to improve the predictability of drug abuse prevalence nationwide. The current study suggests that a more differentiated response to the problem of drug abuse may be possible, although more work is required to provide more detailed breakdowns in terms of drug-related and demographic indicators.

Finally, this research has shown that it is possible to provide estimates of the prevalence of problematic drug use at both a national and local level within Georgia. It will be important to build upon this work so that over time we have a much clearer picture of the extent to which the drug problem in Georgia is changing. We also have to recognize that the problem of illegal drugs within the country can change rapidly. This indicates the importance of developing accurate on-going monitoring systems to identify rapid changes in the behavior of drug users within Georgia. Similar studies should be conducted on the regular basis. Since, the technical expertise for conducting such exercises is limited in the country at this moment; there is a need to develop pool of experts at the national level.

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APPENDIXES

Appendix 1. Socio-demographic characteristics of non-respondents in research studies using nomination techniques

Table 31. Characteristics of non-respondents in IDU prevalence study

	Tbilisi				Gori				Telavi				Zugdidi				Batumi			
	Non-respondents		Sample		Non-respondents		Sample		Non-respondents		Sample		Non-respondents		Sample		Non-respondents		Sample	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
	12	**3.9**	**307**	**100**	**14**	**6.8**	**205**	**100**	**26**	**12.7**	**205**	**100**	**26**	**12.7**	**204**	**100**	**9**	**4.4**	**206**	**100**
Age																				
18-24	1	8,3	21	6.8	2	14.3	35	17.1	5	19,2	34	16.6	2	7,7	27	13.2	3	33,3	25	12.1
25-30	1	8,3	51	16.6	3	21,4	38	18.5	8	30,8	56	27.3	4	15,4	45	22.1	2	22,2	47	22.8
31-40	3	25,0	80	26.1	5	35,7	74	36.1	9	34,6	75	36.6	11	42,3	78	38.2	1	11,1	78	37.9
41-50	6	50,0	122	39.7	4	28,6	50	24.4	4	15,4	36	17.6	6	23,1	40	19.6	2	22,2	48	23.3
50+	1	8,3	33	10.7			8	3.9			4	2.0	3	11,5	14	6.9	1	11,1	8	3.9
Gender																				
Male	12	100	304	99	14	100	200	97.6	26	100	205	100	26	100	203	99.5	9	100	200	97
Female			3	1			5	2.4							1	0.5			6	3
Marital Status																				
Married	7	58,3	167	54.4	8	57,1	111	54.1	8	30,8	85	41.5	12	46,2	106	52.0	5	55,6	99	48.1
Divorced	3	25,0	62	20.2	1	7,1	20	9.8	1	3,8	21	10.2	4	15,4	8	3.9			27	13.1
Has never been married	2	16,7	78	25.4	5	35,7	74	36.1	17	65,4	99	48.3	10	38,5	90	44.1	4	44,4	80	38.8
Education Level																				
Secondary	3	25,0	82	26.7	10	71.4	132	67.3	22	84,6	139	67.8	21	80,8	118	57.8	8	88,9	142	68.9
Incomplete High	1	8,3	16	5.2			7	3.4	1	3,8	5	2.4	1	3,8	12	5.9			15	7.3
High	8	66,7	209	68.1	4	28.6	60	29.3	3	11,5	61	29.8	4	15,4	74	36.3	1	11,1	49	23.8

Appendix 2. Key characteristics of IDU sample in five locations across the country

Table 32. Key Characteristics of IDU sample in Tbilisi

Characteristics	RDS population estimates, % (95% CI)	n/N	Adjusted n/N
Socio-demographic characteristics			
Age			
18-24	7.6 (4-12)	21/307	20/300
25-30	16.8 (12.3 -21.4)	51/307	50/300
31-40	26.5 (21.3 -31.7)	80/307	78/300
41-50	38.8 (32 – 46)	122/307	120/300
50+	10.3 (7 -14)	33/307	32/300
Mean	38.4		
Median	40		
Gender			
Male	99.3 (98.1 – 99.7)	304/307	298/300
Female	0.7 (0/3 – 1.7)	3/307	2/300
Educational level			
Secondary	27.1 (22 – 32.7)	82/307	81/300
Incomplete high	5.3 (3 -8)	16/307	16/300
High	67.6 (62 – 73)	209/307	203/300
Marital status			
Married	53.6 (47 – 60.3)	167/307	164/300
Divorced/Separated	21 (16.3 – 25.7)	62/307	61/300
Never been married	25.4 (20.3 – 31)	78/307	75/300
Drug use history			
Age when first used any drug			
<15	24.9 (20 – 30.3)	76/307	74/300
15-19	62.9 (57 – 68.7)	192/307	189/300
20-24	10.2 (7 – 13.7)	33/307	31/300
25+	1.9 (0.7 – 3.7)	6/307	6/300
Mean (minimum – maximum)	16.33 (9 – 35)		
Median	16		
Age when first injected drugs			
<15	4.6 (2.3 – 7)	14/307	14/300
15-19	52.9 (46.7 – 59)	163/307	159/300
20-24	26.7 (21 – 32.4)	83/307	80/300
25+	15.8 (11.3 – 20.7)	4/307	47/300
Mean (minimum – maximum)	19.81 (13 – 35)		
Median	19		
Duration of injecting drug use in years			
Mean (minimum – maximum)	11.93 (0.4 – 37)		
Median	10		
Frequency of injecting drug use in the last week			
Once a week	6.6 (3.7 – 9.7)	20/307	19/300
Several times a week	43.7 (38 – 49.4)	130/307	129/300

Once a day	18.5 (14.3 -22.7)	57/307	57/300
Several times a day	13.8 (9.7 – 17.7)	42/307	42/300
Have not taken	17.0 (13 – 22)	57/307	52/300
Member of regular injecting group			
Yes	81.3 (75.3 – 86.7)	253/307	246/300
No	18.7 (13.3 – 24.7)	54/307	54/300
Mean number of injecting group members	4.67 (2 – 15)		
Consumed drugs last week	51.6 (47 – 56.3)	161/307	155/300
CNS depressants	47.5 (39.3 – 55.4)	76/161	73/155
CNS stimulants	0		
Narcotic drugs	41.5 (33.3 – 49.7)	67/161	65/155
Hallucinogens	45.1 (36.8 – 53.5)	73/161	69/155
Other psychoactive substances	3.8 (1.3 – 6.9)	7/161	6/155
Mean # of drugs used	1.66 (1-5)		
Injected drugs last week	82.9 (78.3 – 87.3)	250/307	248/300
CNS depressants	2.6 (0.8 – 5.2)	7/250	7/248
CNS stimulants	15.7 (10.8 – 20.9)	39/250	39/248
Narcotic drugs	61.7 (55.2 – 68.1)	154/250	152/248
Hallucinogens	0		
Other psychoactive substances	7.9 (4.7 – 11.5)	20/250	20/248
Combination	41.9 (35.4 – 48.5)	104/250	104/248
Mean # of drugs used	1.46 (1-4)		
Exposure to interventions			
Drug treatment			
Currently taking medical treatment.	3.2 (1.3 – 5.3)	12/307	10/300
Used to take medical treatment, but quit	39.4 (34 – 46.3)	124/307	122/300
Never have been treated	57.3 (50.5 – 64.2)	171/307	168/300
Other services			
Had voluntary HIV test and received results	5.1 (3– 7.7)	16/307	14/300
IDUs who where given condoms in the last 12 months	8.9 (6 – 12)	27/307	27/300
IDUs who where given brochures/pamphlets/ booklets on HIV/AIDS in the last 12 months	33.9 (29 – 39)	107/307	101/300
IDUs who where given qualified information on HIV/AIDS in the last 12 months I2.3	19.6 (15.3 – 24)	63/307	58/300
IDUs who have heard/seen/read information about syringe exchange program in the last 12 months	14.9 (11 – 18.7)	46/307	45/300
IDUs who where given sterile syringes in the last 12 months	4.0 (1.7 – 6.6)	12/307	12/300
IDUs who where given information about substitution therapy program in the last 12 months	93.4 (89.7 – 96.7)	285/307	279/300
IDUs who used substitution therapy program in the last 12 months	1.9 (0.3 – 3.7)	6/307	6/300
Biomarker			
HIV	2.5 (0.3 – 5.4)	7/306	7/299
Syphilis	6.3 (3.7 – 9.3)	19/306	19/299

Table 33. Key Characteristics of IDU sample in Gori

Characteristics	RDS population estimates, % (95% CI)	n/N	Adjusted n/N
Socio-demographic characteristics			
Age			
18-24	23.1 (14.1 -33)	35/205	35/200
25-30	20.0 (14.5 – 25.9)	38/205	38/200
31-40	33.6 (26.6 – 41)	74 /205	73/200
41-50	18.4 (11.9 – 25.6)	50/205	46/200
50+	4.9 (2 – 8.4)	8 /205	8/200
Mean	34.57		
Median	34		
Gender			
Male	97.7 (95 – 99.5)	200/205	195/200
Female	2.3 (0.5 -5)	5/205	5/200
Educational level			
Primary	0.9 (0 – 2.5)	2 /205	2/200
Secondary	67.1 (59.5 – 74.5)	136 /205	133/200
Incomplete high	3 (1 -5.5)	7 /205	6/200
High	28.9 (22.1 -36)	60 /205	59/200
Marital status			
Married	54.1 (47.5 – 61)	109 /205	107/200
Divorced/Separated	9.2 (5.5 – 13.5)	20 /205	19/200
Widower	0.5 (0 – 1.5)	2 /205	1/200
Never been married	36.2 (30 – 42.5)	74 /205	73/200
Drug use history			
Age when first used any drug			
<15	11.8 (7.5 – 16.4)	24/205	24/200
15-19	67.9 (61 – 74.9)	140/205	135/200
20-24	16 (11 – 21.5)	31/205	31/200
25+	4.4 (2-7.1)	10/205	10/200
Mean (minimum – maximum)	17,57 (12-39)		
Median	17		
Age when first injected drugs			
<15	0.07 (0.05 – 3.5)	2/205	2/200
15-19	39.7 (32.5 – 47.5)	84/205	80/200
20-24	35.8 (29-42)	72/205	71/200
25+	23.8 (17.5 – 30)	47/205	47/200
Mean (minimum – maximum)	21.96 (14-53)		
Median	20		
Duration of injecting drug use in years			
Mean (minimum – maximum)	7.42 (0.2 – 39)		
Median	5		
Frequency of injecting drug use in the last week			
Once a week	10.6 (6 – 15.4)	22/205	22/200
Several times a week	33.6 (28.5 – 40.4)	67/205	65/200

Once a day	6.1 (3-9)	12/205	12/200
Several times a day	5.1 (2.5 -8)	11/205	10/200
Have not taken	43.4 (36 – 50.9)	91/205	89/200
Member of regular injecting group			
Yes	75.6 (69 – 81.9)	151/205	150/200
No	24.4 (18.1 – 31)	54/205	50/200
Mean number of injecting group members	4.62 (2 – 15)		
Consumed drugs last week	16.6 (11.5 -22)	33/205	33/200
CNS depressants	51.7 (31 – 72.4)	17/33	17/33
CNS stimulant	0		
Narcotic drugs	4.1 (0 -10)	1/33	1/33
Hallucinogens	51.7 (31.6 – 72.2)	17/33	17/33
Other psychoactive substances	11.8 (0 – 20)	3/33	3/33
Mean # of drugs used	1.27		
Injected drugs last week	55. 1 (48 – 62.5)	114/205	111/200
CNS depressants	0		
CNS stimulant	45.6 (35.9 – 55.4)	51/114	51/111
Narcotic drugs	47.2 (36.4 – 57.9)	55/114	52/111
Hallucinogens	0		
Other psychoactive substances	2.7 (0.9 – 6.1)	3/114	3/111
Combination	15.7 (8.1 – 24.5)	17/114	17/111
Mean # of drugs used	1.17		
Exposure to interventions			
Drug treatment			
Currently taking medical treatment.	0		
Used to take medical treatment, but quit	15.2 (10.4 – 20.5)	33/205	31/200
Never have been treated	84.8 (79.5 – 89.6)	172/205	169/200
Other services			
Had voluntary HIV test and received results	8.4 (4.9 – 12.5)	20/205	19/200
IDUs who where given condoms in the last 12 months	20.3 (14.5 – 26.5)	47/205	42/200
IDUs who where given brochures/pamphlets/ booklets on HIV/AIDS in the last 12 months	25.4 (18.5 – 32.5)	59/205	55/200
IDUs who where given qualified information on HIV/AIDS in the last 12 months I2.3	20.6 (14-27.5)	48/205	45/200
IDUs who have heard/seen/read information about syringe exchange program in the last 12 months	49.5 (42.4 – 57)	105/205	100/200
IDUs who where given sterile syringes in the last 12 months	18.3 (12- 25)	44/205	40/200
IDUs who where given information about substitution therapy program in the last 12 months	57.4 (50.5 – 64.5)	120/205	115/200
IDUs who used substitution therapy program in the last 12 months	0		
Biomarker			
HIV	0		
Syphilis	3.9 (1.1 – 7.3)	7/187	7/183

Table 34. Key Characteristics of IDU sample in Telavi

Characteristics	RDS population estimates, % (95% CI)	n/N	Adjusted n/N
Socio-demographic characteristics			
Age			
18-24	18.3 (12.5 – 24.5)	34/205	33/200
25-30	29.5 (22.3 – 37.2)	55/205	54/200
31-40	35.8 (28.5 – 43.2)	76/205	73/200
41-50	14.9 (9 – 21.6)	36/205	36/200
50+	1.5 (0 – 4)	4/205	4/200
Mean	33		
Median	32		
Gender			
Male	100	205/205	200/200
Female	0		
Educational level			
Primary	1.9 (-- – --)	1/205	1/200
Secondary	64.4 (60.5 – 75)	138/205	134/200
Incomplete high	3.8 (0.5 – 4.5)	5/205	5/200
High	30 (22 – 36.5)	61/205	60/200
Marital status			
Married	41 (33.5 – 49.6)	84/205	82/200
Divorced/Separated	10.4 (6 – 15)	21/205	21/200
Widower	0.7 (0 – 1.5)	1/205	1/200
Never been married	47.9 (39.5 – 56)	99/205	96/200
Drug use history			
Age when first used any drug			
<15	12.3 (7.5 – 17.5)	26/205	25/200
15-19	67.9 (61.5 – 74.1)	139/205	135/200
20-24	14.4 (1 – 19)	29/205	29/200
25+	5.4 (2.5 – 8.5)	11/205	11/200
Mean (minimum – maximum)	17.5 (13-40)		
Median	17		
Age when first injected drugs			
<15	0.5 (0 – 1.5)	1/205	1/200
15-19	35 (29.5 – 40.6)	74/205	71/200
20-24	37.8 (32.1 – 43.5)	77/205	75/200
25+	26.6 (20.9 – 32.5)	53/205	53/200
Mean (minimum – maximum)	21.9 (14-42)		
Median	20		
Duration of injecting drug use in years			
Mean (minimum – maximum)	8.2 (0.5-30)		
Median	6		
Frequency of injecting drug use in the last week			
Once a week	9.8 (6 – 13.5)	19/205	19/200
Several times a week	8.7 (4.5 – 13)	17/205	17/200

Once a day	0		
Several times a day	1.4 (0 – 2.5)	2/205	2/200
Have not taken	80.1 (75.4 – 87)	167/205	162/200
Member of regular injecting group			
Yes	67 (60.5 – 73.5)	136/205	134/200
No	33 (26.5 – 39.5)	69/205	66/200
Mean number of injecting group members	4.5 (2-10)		
Consumed drugs last week	11.5 (7 – 16.5)	24/205	23/200
CNS depressants	13 (0 – 27.5)	3/24	3/23
CNS stimulant	0		
Narcotic drugs	6.2 (0 – 14.8)	1/24	1/23
Hallucinogens	87 (72 – 100)	21/24	20/23
Other psychoactive substances	0		
Mean # of drugs used	1.1 (1-2)		
Injected drugs last week	19 (13 – 25)	38/205	38/200
CNS depressants	0		
CNS stimulant	36.4 (17.9 – 53.1)	14/38	14/38
Narcotic drugs	58.4 (42.5 – 75.9)	22/38	22/38
Hallucinogens	0		
Other psychoactive substances	5.3 (0 – 13.9)	2/38	2/38
Combination	10.8 (2.5 – 20.8)	4/38	4/38
Mean # of drugs used	1.2 (1-3)		
Exposure to interventions			
Drug treatment			
Currently taking medical treatment.	0		
Used to take medical treatment, but quit	29.5 (21.7 – 37.8)	66/205	64/200
Never have been treated	70.5 (62.2 – 78.4)	139/205	136/200
Other services			
Had voluntary HIV test and received results	2.9 (0.5 – 6)	7/205	6/200
IDUs who where given condoms in the last 12 months	6 (3 – 9.5)	14/205	12/200
IDUs who where given brochures/pamphlets/ booklets on HIV/AIDS in the last 12 months	16.4 (11 – 22)	36/205	33/200
IDUs who where given qualified information on HIV/AIDS in the last 12 months I2.3	6.6 (3 – 11)	18/205	15/200
IDUs who have heard/seen/read information about syringe exchange program in the last 12 months	25.6 (19 – 32.4)	58/205	53/200
IDUs who where given sterile syringes in the last 12 months	3.3 (1 – 6.5)	9/205	7/200
IDUs who where given information about substitution therapy program in the last 12 months	61 (53.5 – 68)	128/205	123/200
IDUs who used substitution therapy program in the last 12 months	0.7 (0 – 1.5)	1/205	1/200
Biomarker			
HIV	1.5 (0 – 3.5)	3/205	3/200
Syphilis	5.5 (2.5 – 8.5)	11/205	11/200

Table 35. Key Characteristics of IDU sample in Zugdidi

Characteristics	RDS population estimates, % (95% CI)	n/N	Adjusted n/N
Socio-demographic characteristics			
Age			
18-24	15.4 (9.4-22.1)	27/204	27/200
25-30	22.6 (16.9-29)	45/204	44/200
31-40	37.9 (31-45)	78/204	78/200
41-50	18 (12.4-24)	40/204	40/200
50+	6.1 (3-9.6)	14/204	11/200
Mean	34.8		
Median	35		
Gender			
Male	99.5 (98.5-100)	203/204	199/200
Female	0.5 (0-1.5)	1/204	1/200
Educational level			
Secondary	57.4 (49.6-64.5)	118/204	115/200
Incomplete high	6 (3-9.5)	12/204	12/200
High	36.6 (30-43.5)	74/204	73/200
Marital status			
Married	49.5 (43-57.5)	105/204	102/200
Divorced/Separated	4.6 (1.5-8.3)	8/204	8/200
Widower	0.8 (0-1.5)	1/204	1/200
Never been married	45.2 (38.5-51.5)	90/204	89/200
Drug use history			
Age when first used any drug			
<15	14.3 (9.9-19)	29/204	29/200
15-19	70.8 (65-76.5)	142/204	139/200
20-24	11 (6.5-15.9)	25/204	24/200
25+	3.9 (1.5-6.5)	8/204	8/200
Mean (minimum – maximum)	16.8 (11-29)		
Median	16		
Age when first injected drugs			
<15	2.3 (0.5-4.5)	5/204	5/200
15-19	56.2 (48.5-64)	110/204	108/200
20-24	24.3 (18-30.6)	51/204	49/200
25+	17.2 (12-22.5)	38/204	38/200
Mean (minimum – maximum)	20 (14-40)		
Median	18		
Duration of injecting drug use in years			
Mean (minimum – maximum)	9.8 (0.5-30)		
Median	8		
Frequency of injecting drug use in the last week			
Once a week	7.8 (4-11)	17/204	16/200
Several times a week	10.6 (6-15.1)	19/204	19/200
Once a day	2.1 (0-3.5)	2/204	2/200

Several times a day	2.3 (0.5-4)	4/204	4/200
Have not taken	77.3 (73-84.4)	162/204	159/200
Member of regular injecting group			
Yes	64 (57.5-70.5)	132/204	128/200
No	36 (29.5-42.5)	72/204	72/200
Mean number of injecting group members	4.6 (2-15)		
Consumed drugs last week	8 (4.5-12)	16/204	16/200
CNS depressants	8.7 (0-21.1)	1/16	1/16
CNS stimulant	0		
Narcotic drugs	0		
Hallucinogens	75 (50-94.4)	12/16	12/16
Other psychoactive substances	18.6 (0-41.7)	3/16	3/16
Mean # of drugs used	1 (1-1)		
Injected drugs last week	21.2 (16-26.5)	44/204	43/200
CNS depressants	0		
CNS stimulant	23.6 (11.8-35.9)	10/44	10/43
Narcotic drugs	62 (46.2-78)	28/44	27/43
Hallucinogens	0		
Other psychoactive substances	15.9 (2.6-22.2)	5/44	5/43
Combination	18.1 (6.1-31.9)	8/44	8/43
Mean # of drugs used	1.2 (1-2)		
Exposure to interventions			
Drug treatment			
Currently taking medical treatment.	0.7 (0-1.5)	1/204	1/200
Used to take medical treatment, but quit	37.5 (31-44.5)	76/204	75/200
Never have been treated	61.8 (55.5-68.6)	127/204	124/200
Other services			
Had voluntary HIV test and received results	5.2 (2.5-8)	10/204	10/200
IDUs who where given condoms in the last 12 months	16.1 (11.5-21)	33/204	32/200
IDUs who where given brochures/pamphlets/ booklets on HIV/AIDS in the last 12 months	33.5 (27.3-40)	69/204	66/200
IDUs who where given qualified information on HIV/AIDS in the last 12 months I2.3	11.8 (7-17)	24/204	24/200
IDUs who have heard/seen/read information about syringe exchange program in the last 12 months	24.8 (18-32)	50/204	49/200
IDUs who where given sterile syringes in the last 12 months	1.1 (0-2.6)	2/204	2/200
IDUs who where given information about substitution therapy program in the last 12 months	63.2 (55.6-70.5)	130/204	127/200
IDUs who used substitution therapy program in the last 12 months	63.2 (55.5-70.5)	130/204	130/200
Biomarker			
HIV	2.2 (0-3.5)	3/204	3/200
Syphilis	6.9 (3.5-11)	14/204	14/200

Table 36. Key Characteristics of IDU sample in Batumi

Characteristics	RDS population estimates, % (95% CI)	n/N	Adjusted n/N
Socio-demographic characteristics			
Age			
18-24	12.5 (7-18.8)	25/206	24/200
25-30	24.6 (17-33.2)	47/206	45/200
31-40	37.5 (30-45.2)	78/206	76/200
41-50	22.1 (15.9-28.5)	48/206	47/200
50+	3.3 (1-6)	8/206	8/200
Mean	35.07		
Median	35		
Gender			
Male	98.1 (95.5-100)	200/206	195/200
Female	1.9 (0-4.5)	6/206	5/200
Educational level			
Secondary	70.2 (63-77)	142/206	140/200
Incomplete high	7 (3.5-10.9)	15/206	14/200
High	22.8 (16.5-29.5)	49/206	46/200
Marital status			
Married	47.2 (39.5-54.7)	95/206	94/200
Divorced/Separated	12.4 (7.5-17.6)	27/206	25/200
Widower	1.9 (0.5-4)	4/206	4/200
Never been married	38.5 (31-46)	80/206	77/200
Drug use history			
Age when first used any drug			
<15	28.4 (21.6-35.5)	59/206	56/200
15-19	59 (52-66)	120/206	118/200
20-24	10.3 (6-14.9)	22/206	21/200
25+	2.3 (0.5-4.5)	5/206	5/200
Mean (minimum – maximum)	16.2 (9-30)		
Median	16		
Age when first injected drugs			
<15	2.7 (1-5)	6/206	6/200
15-19	53.9 (46-62)	110/206	106/200
20-24	27.5 (21-34.5)	57/206	56/200
25+	15.9 (10.5-22)	33/206	32/200
Mean (minimum – maximum)	19.8 (13-34)		
Median	19		
Duration of injecting drug use in years			
Mean (minimum – maximum)	9.9 (0.5-40)		
Median	7		
Frequency of injecting drug use in the last week			
Once a week	11.3 (7-15.5)	23/206	23/200
Several times a week	42.5 (33.8-51.5)	82/206	81/200
Once a day	3.2 (1-5.6)	7/206	6/200
Several times a day	4.2 (1.5-7.5)	10/206	10/200
Have not taken	38.8 (30.7-47)	84/206	80/200

Member of regular injecting group			
Yes	60.1 (53-67)	124/206	120/200
No	39.9 (33-47)	82/206	80/200
Mean number of injecting group members	3.8 (2-10)		
Consumed drugs last week	23.9 (18-30.1)	49/206	48/200
CNS depressants	34 (20-48.9)	16/49	16/48
CNS stimulant	6.1 (0-11.5)	2/49	2/48
Narcotic drugs	29.5 (16.2-43.5)	15/49	14/48
Hallucinogens	47.8 (33.3-62.3)	23/49	23/48
Other psychoactive substances	4.1 (0-10.2)	2/49	2/49
Mean # of drugs used	1.3 (1-3)		
Injected drugs last week	61.1 (52.9-69)	122/206	119/200
CNS depressants	0.9 (0-2.9)	1/122	1/119
CNS stimulant	13 (6.5-20.2)	16/122	15/119
Narcotic drugs	91.4 (85.7-96.4)	112/122	110/119
Hallucinogens	0		
Other psychoactive substances	0		
Combination	4.2 (0.9-7.8)	5/122	5/119
Mean # of drugs used	1.1 (1-4)		
Exposure to interventions			
Drug treatment			
Currently taking medical treatment.	4.5 (2-7.5)	9/206	9/200
Used to take medical treatment, but quit	43.9 (36.5-51.5)	90/206	88/200
Never have been treated	51.6 (44-59.1)	107/206	103/200
Other services			
Had voluntary HIV test and received results	4.2 (1.5-7.5)	12/206	10/200
IDUs who where given condoms in the last 12 months	25.6 (19.5-32)	57/206	52/200
IDUs who where given brochures/pamphlets/ booklets on HIV/AIDS in the last 12 months	29.2 (22.5-36)	67/206	61/200
IDUs who where given qualified information on HIV/AIDS in the last 12 months I2.3	21.5 (16-27.5)	48/206	43/200
IDUs who have heard/seen/read information about syringe exchange program in the last 12 months	42.7 (35-50.5)	91/206	87/200
IDUs who where given sterile syringes in the last 12 months	8.1 (4-12.5)	21/206	18/200
IDUs who where given information about substitution therapy program in the last 12 months	81.1 (75.5-86.5)	168/206	162/200
IDUs who used substitution therapy program in the last 12 months	1.4 (0-2.5)	2/206	2/200
Biomarker			
HIV	4.5 (1.5-8)	9/206	9/200
Syphilis	7.6 (4-12)	15/206	15/200

Appendix 3. Nomination method/questionnaire

Questionnaire Identification Number: ☐

Coupon Number: ☐

1. What is the number of your **close friends** with whom you have been using drugs in 2007 (or whom you know for sure they are or were using drugs, including those who passed away and those who ceased to use drugs meanwhile)?
   _____

2. Are you sure? Could you please think about this number for me for a while? Sounds to me (too high or low /too quick/ too round). Maybe you could name them by their first names (even unreal, imaginary) to obtain more specific number?
   Names: I. _____
   II. _____
   III. _____
   IV. _____
   V. _____
   Final number: _____

3. Was (name) ____ tested by police for presence of illegal drugs in 2007?
   1. Yes
   2. No
   88. Don't know
   99. No response

4. Was (name) ____ tested for HIV in 2007?
   1. Yes
   2. No
   88. Don't know
   99. No response

5. Was (name) ____ in abstinence-oriented treatment in 2007?
   1. Yes ***(Go to Q. 8)***
   2. No
   88. Don't know } ***Continue***
   99. No response }

6. Was (name) ____ considering entering the abstinence oriented treatment in 2007, but did not do so?
   1. Yes ***(Continue)***
   2. No ***(Go to Q.8)***
   88. Don't know **(Continue)**
   99. No response ***(Continue)***

7. Why s/he did not?
   1. Changed his mind
   2. Because of high cost

3. Entered the substitution treatment
4. Any other reason
88. Don't know
99. No response

8. Was (name) ____ in substitution treatment in 2007?
   1. Yes ***(Go to Q. 10)***
   2. No
   88. Don't know } ***Continue***
   99. No response }

9. Was (name) ____ in substitution treatment waiting lists in 2007?
   1. Yes
   2. No
   88. Don't know
   99. No response

10. Was (name) ____ in the needle exchange (when used needles are changed by new ones) and other low-threshold programs (e.g. voluntary counseling and testing on Hepatitis B, C and HIV/AIDS by physicians and psychologists) in 2007?
   1. Yes
   2. No
   88. Don't know
   99. No response

11. Was (name) ____ deceased due to a fatal drug overdose in 2007?
   1. Yes
   2. No
   88. Don't know
   99. No response

Questions 3-11 will be asked for every nominated drug user.

Thank you indeed!