ASSESSMENT OF THE EFFECTIVENESS OF THE TB SCREENING PROGRAMME AMONG INJECTION DRUG USERS IN GEORGIA

Nino Mdivani
Georgia

44th International Course in Health Development
September 24, 2007- September 12, 2008

ASSESSMENT OF THE EFFECTIVENESS OF THE TB SCREENING PROGRAMME AMONG INJECTION DRUG USERS IN GEORGIA

A thesis submitted in partial fulfilment of the requirement for the degree of

Master of Public Health

By

Nino Mdivani
Georgia

Declaration:
Where other people's work has been used (either from a printed source, internet or any other source) this has been carefully acknowledged and referenced in accordance with departmental requirements. The thesis: "Assessment of the Effectiveness of the TB Screening Programme among Injection Drug Users in Georgia" is my own work.

Signature: …….

44th International Course in Health Development (ICHD)
September 23, 2007 – September 12, 2008
KIT (Royal Tropical Institute)/ Vrije Universiteit Amsterdam
Amsterdam, The Netherlands

September 2008

Organized by:

KIT (Royal Tropical Institute), Development Policy & Practice
Amsterdam, The Netherlands

In Co-operation with:
Vrije Universiteit Amsterdam/ Free University of Amsterdam (VU)
Amsterdam, the Netherlands

TABLE OF CONTENTS

LISTS OF TABLES AND FIGURES

List Of Tables

List Of figures

ACKNOWLEDGEMENT

Firstly I would like to thank the Nuffic and the Netherlands government for awarding the fellowship and give me the opportunity to accomplish my studies and .

I am extremely grateful to course coordinators: Prisca Zwanikken, Yme van den Berg and Sanjoy Nayak, for their guidance and being so supportive and understanding during the whole period of work. I have learnt many things from communicating with them and I have benefited from their invaluable academic and best personal supports. I also express my gratitude to Rinia Sahebdin for all her efforts and dedication to assist all the participants.

I want to express my deep gratitude to my backstopper for his tremendous support and invaluable guidance on my thesis writing. It was pleasure for me to work with him and to benefit from his highly professional and best personal skills. I am also indebted to my thesis advisor for his instructions and recommendations on my thesis.

Special thanks go to the staff of the Georgia Health and Social Projects' Implementation Center and the National Center for their invaluable support and commitment during the whole period of our cooperation. Special thanks to them for allowing to use and providing the information and data for my thesis; And also for being so friendly and supportive. A lot of thanks should also given to all colleagues who were involved in data collection.

My gratitude goes to all 44th ICHD course participants who gave me their valuable support and friendship.

I also want to thank my friend Carolyn Mohan who was supporting and encouraging me, giving advices and recommendations during the whole process of thesis writing.

Finally I would like to thank my family for their love and patience

Abstract

Background: IDU is widespread in Georgia and regardless of HIV status it is at increased risk of developing active TB. It is necessary to identify the screening and effectively address the TB cases among IDUs.

Objective: To assess the effectiveness of the screening programme for identification of TB suspects and TB cases among IDUs in Georgia in order to reduce TB and MDR TB rate among IDUs.

Methodology: Using the data of prospective cohort study: from April 2006 to January 2007 IDUs at harm reduction sites were screened for TB symptoms with the questionnaire. TB suspect cases were referred to TB units for verification of diagnosis. Relevant literature was reviewed. A pilot model was used to analyse the effectiveness of TB screening program among IDUs.

Findings: 1406 IDUs were screened for TB symptoms. 229 (16.3%) were classified as TB suspects. HIV results were obtained for 285 individuals, giving the HIV prevalence of 19%. Only 38 (16.6%) suspected TB cases were presented at TB units for further examination. TB was diagnosed in 30 cases, constituting the prevalence rate of 2133/100.000. In univariate analysis, active TB was associated with cough longer than 2 weeks in TB suspects (OR 8.57, CI 1.35-54.15).
The findings of this paper also show that the utilization of harm reduction and TB services by IDUs being low, are influenced by several factors including socio-economical, cultural, legal, etc..

Conclusions: IDU and TB represent public health problem in Georgia, and stand high risk of TB among. Active case finding is one of the useful tools for addressing TB problem among this group. Low utilization of harm reduction services and low referral rate to TB units can be considered as constraints for coverage IDUs by TB screening and diagnosis. The low referral is basically due to poor coordination of TB and harm reduction services and also-due to a low motivation of IDUs.

Key words: IDU, tuberculosis, Georgia.

List of Abbreviations

ACF	Active Case Finding
AFB	Acid Fast Bacilli
AIDS	Acquired Immunodeficiency Syndrome
CDC	Center for Disease Control and Prevention
CXR	Chest X-ray
DOTS	Directly Observed Therapy Short Course
DST	Drug Susceptibility Test
ENCDDA	European Monitoring Center for Drugs and Drug Addiction
GDP	Gross Domestic Product
GFATM	Global Fund to Fight AIDS, TB and Malaria
GHSPIC	Georgia Health and Social Projects Implementation Center
GNI	Gross National Income
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HIV	Human Immunodeficiency Virus
ICRC	International Committee of Red Cross
IDP	Internally Displaced Persons
IDU	Injecting Drug User
MDR TB	Multidrug Resistant Tuberculosis
MMR	Mass Miniature Radiography
MoH	Ministry of Health
MOHLSA	Ministry of Health, Labor and Social Affairs
NCTBLD	National Center of TB and Lung Diseases
NGO	Non Governmental Organization

NIDA	National Institute of Drug Addiction
NRL	National Reference Laboratory
NTP	National TB Programme
PHC	Primary Health Care
SCAD	South Caucasus Anti Drug Programme
SEP	Syringe Exchange Programme
STI	Sexually Transmitted Infections
TB	Tuberculosis
TST	Tuberculin Skin Test
UNAIDS	United Nations Joint Programme on HIV/AIDS
UNDOC	United Nations Office on Drugs and Crime
UNGASS	United Nations General Assembly Special Session
USAID	United States Agency for International Development
VCT	Voluntary Counseling and Testing
WB	World Bank
WHO	World Health Organization
XDR	Extremely Resistant Tuberculosis

Introduction

Tuberculosis is serious public health problem worldwide, as we as in Georgia. Some relationship exits among IDUs (which is widespread in Georgia) and development TB, in particular IDUs can be considered as high risk group for TB due to several factors: high HIV prevalence among this group, lifestyle factors, Immunological factors, etc. To address this problem TB screening program for IDUs at harm reduction sites was introduced.

I have been working with Georgia Health and Social Projects Implementation Center, which is the Primary Recipient of Global Fund Grants in Georgia. I was involved in all stages of process of development (while my working at NTP) and implementation of Global Fund TB project "Expansion of DOTS implementation in Georgia". My responsibility as a GFATM TB project coordinator is to monitor the implementation of project, evaluate its effectiveness and develop necessary strategies for improvement. One of the component of this project was implementation of TB screening among IDUs, which one quite innovative intervention. As the screening program is new there is no well-defined indicators (mostly outcome and impact indicators) to evaluate its effectiveness, so I decide to do operational research using the data of the screening program in order to find out SMART indicators for this intervention and develop some recommendations for further improvements. After joining this ICHD/MPH course I got opportunity to undertake a critical analysis of the findings of TB screening among IDUs.

Chapter 1: Background

1.1 General Information

Georgia is located in the South Caucasus, between the Black sea and the Caspian Sea (annex 1). It is bordering Turkey, Armenia, Azerbaijan and Russia and covers 69,700 square km. (GOG, 2008).

The population in Georgia totals to 4.6 million (SDS, 2008). The population is Georgian nationality but its a multi-ethnic country with 94 different ethnicity, beside Georgians (83,8%), other ethnic groups are leaving in Georgia: Azeri 6.5%, Armenians 5.7%, Russians 1.5%, others 2.5% (SDS 2002). The majority of population (52%) is leaving in urban area and 1.1 million are in the capital city alone (SDS 2008).

The capital of Georgia is Tbilisi. Country is divided into 12 administrative units and 63 regions, which include Abkhazia and Samachablo. The official language is Georgian, which is derived from 14 functioning languages. The religion of the majority of population is Greek Orthodox, other religion minorities include Muslims (Shiites and Sunnis), Gregorians, Catholics, Jews, and others (CIA, 2008).

Georgia get independence in 1991 after dissolution of Soviet Union. During the 1992-1993 Georgia faced civil war and armed conflicts in Abkhazia and South Ossetia which led to the displacement of 300, 000 people and these territories became de facto independent (Gotsadze, 2003).

Georgia is Presidential Republic. The country is executed by the President, supported by a Cabinet of Ministers. The President is elected by popular vote for a five-year term (World Bank, 2007).

According to the World Bank Georgia belongs to the category of lower middle income countries. The country experienced growth of GDP from 2.7 to 7.74 billion US dollars between 1995 and 2006, with annul growth in 2006 – 9.6; In 2006 Gross National Income (GNI) per capita was 1560 US dollars, but despite these improvements still 55% of populations lives below National Poverty line(World Bank, 2007).

1.2 Health situation and health system

In Georgia after dissolution of Soviet Union and owing significant decline in socio-economic conditions in the1990s serious deterioration of health status of population were observed. From the mid of 1990s some positive trends were it began to improve again, but it is still amongst the lowest in the European Union and Commonwealth Independent Countries (WHO, 2008d).

Table 1 Core Health Indicators in Georgia

Indicator	Year	Value
Life Expectancy Male/Female	2005	69/76
Crude Death Rate per 1000	2005	11
Crude Birth Rate per 1000	2005	11
Maternal Mortality rate per 100000 live birth	2004	45.3
Mortality rate among children <5 years per 1000 live birth	2004	45
Governmental expenditure on health as a percentage of general government expenditure	2005	7.1

Source: WHO 2008, Health for all database; MoLHSA 2008

In 1995 government of Georgia initiated healthcare reform programme, which introduced new model of financing, combining social insurance, tax revenues and out of pocket payment. The Ministry health, Labour and Social Affairs (MOHLSA) is the lead agency for the health care system, implementing government policy and coordinating all activities in healthcare. Decentralization has been a major component of healthcare reform and has taken place through the devolution of management of the health system to 12 regional health authorities and also the privatization of much of the provision of health care (Gamkrelidze et al, 2002).

The primary health care (PHC) system functioning in Georgia is essentially that inherited from the Soviet era. It is poorly utilized because of the lack of operational referral processes and that were poorly equipped but Primary Health Care reform has been implemented by the support of various donors and aiming set of functional PHC services.

1.3 Organization of TB services in Georgia

Financing and provision of health care services in Georgia are both public and private. However, in accordance with the Presidential Decree of 1998, all tuberculosis control services in the country are the responsibility of the state.

The MOLHSA of Georgia is overall responsible for TB control. Financing of TB services is part of compulsory insurance scheme. The resources of the Social Insurance Fund come from social taxes and in addition by transfers from the state budget.

There are three levels of the National Tuberculosis Control Programme (NTP) (see Annex 2):

Central level – the National Center of TB and Lung Diseases (NCTBLD) has been delegated the authority of planning, implementation, monitoring and evaluation of TB control activities countrywide.

Regional level is represented by regional TB dispensaries coordinating TB control in the region.

District level is represented by district TB offices, that coordinate TB control activities in the district (in close collaboration with PHC provide management of TB cases).

Overall, there are 69 specialized institutions in the civilian sector providing specialized TB care: 3 hospitals, 4 TB dispensaries with beds, 15 TB dispensaries without beds and 47 TB cabinets in general polyclinics.

The TB laboratory network includes: the central laboratory acting as the National Reference Laboratory, 32 microscopy laboratories and 38 sputum collection points.

Chapter 2: Problem statement, objectives and methodology

2.1 Problem Statement

Political, economic and social transitions, environmental problems faced by Georgia after the dissolution of the Soviet Union (in early 90^{ies}) significantly influenced Drug use (Nijaradze et al, 2005); the number of drug users has sharply increased: based on the database of the Georgian Institute of Drug Addiction, an officially registered number of drug users and addicts increased from 2,700 in 1990 to 21,000 in 2004 (Nijaradze et al, 2005), but the registered numbers do not reflect the reality: according to recent estimations in Georgia the number of drug users totaled 250.000 (SCAD, 2006).

Injecting Drug Users (IDU), in general, have high rates (Aceijas et al 2004; MAP 2005) of HIV infection and risk of blood-borne infections (HCV, HBV, HIV, etc.) mostly due to unsafe injection behaviors. IDU is a major mode of HIV transmission in some regions including Georgia. Although Georgia is a low-prevalence country for HIV, the risk for the rapid spread of the infection is rather high. In 2006, cumulatively reported HIV cases totaled 1156 and the main route of HIV transmission (63.9%) in Georgia is intravenous drug use (UNGASS 2007).

Beside the HIV and other infections transmitted by blood, IDUs have higher risk of TB infection and disease. According to the WHO European regional office (WHO-Euro), injecting drug users are at risk of HIV infection, as well as of TB and, in some settings multidrug-resistant TB (MDR TB) (WHO 2003). IDU-s are exposed to several risk factors for TB such as HIV, poverty, homelessness, overcrowding living conditions, imprisonment, etc. (WHO, 2008c). Considering the fact that for the former Soviet countries the resurgence of infection diseases and among them dual epidemic of Tuberculosis and HIV are most important, it is obvious that drug-use has become intertwined with these diseases (Schwalbe & Harington, 2002). TB case notification rate in Georgia is one of the highest in Eastern European countries - 101/per 100.000 population in 2005 (WHO, 2007a). All these gives ground to consider TB as a huge probable problem among IDUs.

Besides, there is also certain linkage between MDR-TB and IDU: drug users are associated with poor treatment compliance (Curtis et al 1994; Spire et al 2007), which leads to the development of drug resistance and also IDUs have higher risk of imprisonment where MDR TB rate are higher (Portales et al 1999). Moreover, in Georgia high rates of drug resistant tuberculosis including MDR TB seem appear to be emerging (6,3% MDR among new TB cases) (WHO, 2008b).

In 2005, among 242 new HIV-positive individuals, 78 were identified as co-infected with TB (32%). Among those co-infected, 38% had active TB, while 62% had latent TB infection (Tsertsvadze, 2007). There is no information available about prevalence of TB infection among general population in Georgia, but according to WHO estimations, 3736 new TB cases occurred annually (WHO 2008a). As for the transmission among these investigated HIV-positive cases 87.5% were IDU. This data suggests that the dual epidemics of HIV and TB may be fed by growing drug use in Georgia. Considering that the drug users tend to be marginalized and asocial group with highest health needs, but having poor access to health services due to individual, provider-level or environmental barriers (Mehta et al, 2005) healthcare system should make an efforts to adequately addressing the needs of these groups and should act more coordinated in order to provide universal access prevention, treatment and care services at all entry point.

2.2 Study Questions

- What are the main factors determining the effectiveness of the screening programme of IDUs for active TB?
- How to improve TB case detection among IDU-s in Georgia?

2.3 Thesis Objectives

2.3.1 General Objective

- To assess the effectiveness of the screening programme for identification of TB suspects and TB cases among IDUs in Georgia in order to reduce TB and MDR TB rate among IDUs.

2.3.2 Specific Objectives

- To describe the magnitude of TB and TB/HIV co-infection among IDUs;
- To analyze factors influencing the TB prevalence among IDUs;
- To evaluate the results of screening program;
- To evaluate effectiveness and appropriateness of screening tool;
- To analyze problems and constraints for integrated TB/HIV approach for IDUs;
- To develop recommendations in order to improve TB services for IDUs.

2.4 Methodology

2.4.1 Literature review

The literature review was made for analyzing the study questions. A search of Pubmed and Google Scholar databases was conducted to find original and review articles between 1960-2008. The following key words and phrases : "Tuberculosis", "MDR TB", "DOTS", "Risk factors", "Intravenous Drug Use", "HIV", "Infectious Disease", "TB Infection", "Case finding", "active case finding", "screening" "treatment adherence", "VCT", "syringe exchange program" "methadone substitution Therapy".

The literature was also collected through VU and KIT library. The websites of WHO,UNAIDS, NIDA, USAID, World Bank and MoH of Georgia were reviewed for reports and other publications. Some unpublished studies were used conducted by Georgian AIDS and Clinical Immunology Research Center, Georgian Institute of Drug Addiction and National Center of TB and Lung Diseases.

2.4.2 Field study

The operational research was conducted using the pre-existing data of Global Fund project Geo-405-G03T "Expansion of DOTS implementation in Georgia" in order to find out the effectiveness of the screening program for TB disease among IDUs.

A. Research design

Prospective cohort study of IDU-s applying for counseling, testing, needle exchange or substitution therapy was carried out in order to detect active TB cases.

B. Study setting and study subjects

The screening programme was implemented in Tbilisi and the following institutions were participated:

Bemoni – Voluntary Counseling and Testing (VCT) and rehabilitation center for IDUs;

New Way – VCT Center for IDUs, needle exchange (in average 440 permanent clients);

Uranti – VCT and substitution therapy (In average 500 clients);

Georgian AIDS and Clinical Immunology Research Center – VCT center;

Georgian Institute of Drug Addiction – VCT, rehabilitation, treatment, substitution therapy (In average 500 clients).

The Georgian Institute of Drug Addiction, Uranti, AIDS center and New Way are taking part in the implementation of harm reduction component of the Global Fund HIV project. The VCT centers are providing counseling and health education on HIV, HCV, HBV and in case of clients' consent, are also testing for these infections; they also are providing some assistance to IDUs to apply to different type medical services.

All IDU-s presented to these units were eligible for screening. Clients entering the centers from April 1 2006 to March 31 2007 were asked for existence TB symptoms using special structured questionnaire (annex b).

TB suspected IDUs were advised to refer to TB units and in case of presenting were investigated in Tbilisi TB dispensaries (the National Center of TB and Lung Diseases (NCTBLD), Dispensary #1, Dispensary #2, Dispensary #3, Dispancery#5) or elsewhere in TB units of Georgia.

The TB units are responsible for detecting and treating of TB cases. For TB diagnosis they provide sputum smear examination, Chest X-ray and consultation of TB doctors. At the Reference Lab of NCTBLD the culture examinations and Drug Susceptibility Tests (DST) are performed.

HIV testing for IDU-s were provided at the Georgian AIDS and Clinical Immunology center.

C. Screening instrument

The screening questionnaire developed and used by International Committee of Red Cross (ICRC) in Georgian prisons was used for screening. The questionnaire includes the background demographic information, information about history of TB disease and treatment during previous 5 years, measurement of height and weight and accordingly, calculated BMI, questions for identification TB symptoms (cough for more than 2 weeks, sputum production, subjective weight loss, loss of appetite or chest pain (see annex b).

Each positive response on the question receives one point except of cough more than 2 weeks, which is scored by two points. Screened subjects are classified as TB suspect or not TB suspect based on this questions.

An IDU meeting the following criteria was classified as a tuberculosis suspect: a score on the standard questionnaire of at least 5 points or a BMI _19 kg/m2.

Screening for HIV was done using ELISA - Enzyme-linked immunosorbent assay and was confirmed by Western Blot assay;

Criteria for TB suspects:

5 points out of:

1	Cough >2 weeks	2 points
2	Expectoration	1 point
3	Weight loss	1 point
4	Loss of appetite	1 point
5	Night sweat	1 point
6	Chest pain	1 point

And/or:

BMI <19kg/m^2

The diagnosis of active TB was based on:

bacteriological confirmation – positive acid-fast bacilli (AFB) smear or culture

clinical confirmation based on Chest radiographic (CXR) findings and/or clinical signs.

The criteria for diagnosis were based on the recommendations of the National TB guidelines.

D. Data collection:

The counselors from VCT centers were involved in data collection. They were trained in order to make them familiar with the content and practical use of questionnaire.

The IDUs, in case of verbal consent underwent a measurement of height and weight in order to calculate BMI at entry and were interviewed with a structured questionnaire. Health education for TB was conducted as well as participants were explained to refer to TB units in case of suspicion of TB.

If a client was screened more than once, only the result where TB was suspected, was considered.

Information about presence of TB suspect IDUs at TB units and confirmation of TB diagnosis was collected from TB dispensaries in Tbilisi and from the National TB database at NCTBLD.

E. Data Analysis

The data were entered into EPI-Info (Version 3.3.2, Centers for Disease Control and Prevention, Atlanta, Georgia) and statistical analyses were performed. Mean, median and proportion were used for descriptive analysis of study population. Potential factors associated to TB suspects and TB cases were assessed in univariate analysis. Mental-Haenszel odds ratios and corresponding 95% confidence intervals (CI) were calculated. Categorical variables were compared using X^2 test were and probability test devised by Fisher was applied for small numbers (Swinscow et al, 2002).

F. Study limitations

The screening data were not initially assigned for the scientific research (the screening program was implemented as routine practice) and some information, important for the research but not available is not included in the questionnaire.

It should also be mentioned that characteristics of IDUs who has applied to needle exchange, treatment or VCT centers may not be representative of whole IDU population of Georgia; It's not known if these services are equally used by all IDUs (considering the fact that drug use is illegal in Georgia and a part of IDUs are afraid to apply to these facilities).

Although HIV, HCV and HBV counseling were provided for majority of clients and in case of agreement testing was done, the information about testing results was not included in the questionnaire. The HIV status for screened clients was provided only by AIDS and Clinical Immunology Research Center while from other centers was not possible to obtain the information.

H. Ethical consideration:

The verbal inform consent were obtained from all the participants enrolled into the screening program.

The clearance for using primary data for this operational research were obtained from the Georgia Health and Social Projects Implementation Center (GHSPIC) -Primary Recipient of Global Fund grants- and from NCTBLD. The paper-based information (questionnaires) was obtained from NCTBLD for further analysis.

2.4.3. Conceptual framework

For the evaluating the effectiveness of screening program operational model developed by Piot was used (Dujardin et al 1997). The model developed in

order to evaluate the effectiveness of control measures. It comprises several steps - from the occurrence of TB symptom to the patient to be cured.

The modification of Piot model was used for the evaluating of screening program among IDU-s, following steps were used in this study:

- Annual Incidence/prevalence of TB cases among IDUs;
- Utilization - Patients presented for consultation at screening sites;
- Selection - Patients considered as TB suspects;
- Referral - Patients presented at the TB units;
- Examination- Patients were correctly diagnosed;

These five steps were evaluated in order to find out the effectiveness of the screening program and its usefulness.

Chapter 3: IDU, HIV and TB and their interrelationship

3.1 Problem of use injecting drugs

3.1.1 Global drug use

The estimated number of drug users (by the United Nations Office and Crime) totaled 25 million worldwide and 13.2 million of them are IDUs (0.3% of the adult population) and majority (10.3 mln -78%) lives in developing countries (UNODC 2007; Aceijas et al 2004). Eastern Europe and Central Asia has the highest IDU prevalence (Aceijas et al 2006).

Usage of illicit drugs (heroin and other opioids) can induce a sense of well-being and self-esteem and increase tolerance to pain. People using drugs (opioids), whether for recreational use or for medical condition, may become dependent on drugs and this can have many negative effects, such as overdose, increased risk of infections, disruption at work, family distress and mostly involvement in criminal activities (Connock et al 2007).

Drug users are often among most vulnerable and socially excluded people and therefore are exposed to many other risk factors for TB and other infectious such as homelessness, poverty, overcrowding and imprisonment. It is well known that large proportions of drug users have been in prison. In some settings more than half inmates are drug users and they continue to use drugs in prisons. Drug misuse is seen as one of the main health problems facing prison systems in Europe (Dolan et al 2007) along with TB, and MDR TB which is widespread in prison population and much higher than in general population (WHO, 2007b). Also HIV represents a big problem among imprisonment IDUs (UNAIDS, 2006).

Considerable harm associated with illicit drug use includes: increased mortality (10–20 times greater than for non-users), increased infection with blood-borne viruses, high levels of depression and anxiety disorders; (Connock et al 2007). According to National Institute on Drug Abuse (NIDA) "Individuals who suffer from addiction often have one or more accompanying medical issues, including lung and cardiovascular disease, stroke, cancer, and mental disorders" (NIDA nd; EMCDDA 2007).

There is a well established link between Injecting drug use and some blood-borne infections, such as HIV, HCV, HBV and other series of potentially fatal liver disorders (CDC 1996; UNAIDS 2006; EMCDDA 2007). A large proportion of infections among IDU-s are related to the methods of injection and life-style practices, which increase their exposure to microbial agents; Several studies have shown association between infection diseases and use of illegal drugs (Friedman et al 2003; Rachlis et al 2007). Injection is not the

only contributing factor of spreading infectious diseases among IDUs, drugs of abuse can cause some form of intoxication which increases the likelihood of risky sexual behaviors and contributes to spread of HIV, hepatitis B and C and other sexually transmitted diseases (NIDA, nd).

Beside the lifestyle and risky behaviors according to data the addictive drugs have adulteries affect on immunity. Drugs of abuse represent a source of acquired immunodeficiency (independent of HIV) by altering host immunocompetence. The evidence indicates that the functions of most cells of the immunological system are influenced by opiates. They affect the host immune response directly through receptors on immune cells and indirectly via the receptors on neuronal cells. This clearly supports the notion that IV drug abusers can suffer from generalized drug-induced immunodeficiency (Donahoe 1990). There is a hypothesize that opiates cause immunosuppression and therefore serve as a cofactor for microbial infections. Pulmonary infections caused by different microbes including Mycobacterium are among the most common diagnoses of opiate abusers (McCarthy at al 2001).

3.1.2 Drug use in Georgia

In Georgia drug use began to spread in the 1960s . During that time Soviet ideology considered drug use a characteristic of the 'capitalist system, drug use was perceived as a habit which had penetrated from the capitalist world. A drug user was considered an anti-social person and punishment was thought to be the best way of dealing with them. Therefore, there was no system oriented on prevention and/or treatment (Nijaradze et al, 2005).

One of the distinguishing characteristic of IDU population in Georgia was that drug use spread not among the marginal and poor groups but among people from successful and well-off families. The use of drugs became a symbol of maturity and independence among teenager and the stigmatization of drug users, which was very strong at the beginning, soon weakened. Other opinion suggests that reasons for the wide spread of drug use in Georgia and other soviet republics were false character of existed social ideology and lack of true spiritual values, which were expressed in use of drugs as one form of protest against soviet system (Nijaradze et al 2005).

Since the 1990s, beginning with the collapse of the Soviet Union, Georgia has weathered several social, political, and economic crises, in particular: the collapse of governmental efforts to control illegal substances, dramatic increases in crime rates, uncontrolled border, worsening corruption, social-economic collapse, armed conflicts in Abkhazia and South Ossetia, crises in social values, escalating unemployment, etc have contributed to a rise in injecting drug use in Georgia (Nijaradze et al 2005).

The geographical location of Georgia plays a big role in spreading of drug use in the population and compounds the drug situation. The country is located on the "Silk Road", route which is increasingly used for the illicit drug transit from Afghanistan and Central Asia to Russia, Ukraine an other European countries and also for the trafficking of synthetic drugs from industrialized countries to Central and West Asia (Fenopetov 2006), which makes different types of drugs available on the black market.

Despite observed gradual improvement of the country's economy, social life and decreases in crime rates during recent years the usage and trafficking of injecting drugs continues to escalate. The Subotex (contains buprenorphine) has become most popular new drug in Georgia. In more than 30 countries in world including western Europe it is available on doctor's prescription and used for heroin withdrawal under supervised treatment. In Georgia this drug is illegal and they are smuggled from Europe illegally by drug dealers. IDUs dissolve and inject the Subotex, often in dangerous cocktails with tranquillizers and antihistamines (Parfitt 2006). The influx of Subutex is thought to have caused an overall rise in addiction. The International Narcotics Control Board estimates there has been an 80% increase in drug misuse in Georgia since 2003 (Fenopetov 2006).

The officially registered number of drug users increased from about 2,700 to 24,000 between 1990 and 2005 (Narcology Register data). Out of those, almost 20% were patients received detoxification treatment and up to 80% were registered in consequence of police-ordered drug test. From the officially registered data up to 14 400 were injecting opioid users (SCAD 2006). It should be mentioned that these numbers do not reflect the real situation in Georgia, even still they point out to a sharp increase in drug use (IDUs do not register officially because of a fear of being arrested). According to the international experience the officially registered and the actual figures on drug use differ considerably. To get a relatively accurate description of the situation, according to international experts the existing officially registered data should be usually multiplied by a certain index (the value of index for Georgia ranging from 8 to 10), as a result, the number of drug users for 2004 should be estimated as 200.000 – 240.000 (SCAD 2006).

Drug use is more widespread in urban area rather than in rural. Drug use occurs among all social classes, from the uneducated and poor to high-ranking government officials (SCAD 2006). Highest number of drug users is between 21 to 40 years old (Aceijas et al 2004) but they can be found among all age groups. Most part of drug users are males although according to experts drug use among women and young girls has increased in recent years. A 2002 survey of IDUs in Tbilisi indicated that almost 70% of IDUs had either graduated from a university or had started but not completed their university studies. Unlike Russia and some other Eastern European

countries alcohol consumption is not widespread among IDUs in Georgia (Nijaradze et al 2005).

As mentioned above drug use and especially injecting drug use causes serious health problems. According to the research done in 2005 by SCAD programme, in Georgia the mortality rate of male drug users of reproductive age, at least two times higher than the mortality rate of non-users of the same age (SCAD 2006);

IDU is widespread in penitentiary system of Georgia. Tsintsadze (2006) evaluated HIV/AIDS prevalence and high risk behavior in penitentiary system and found out that injecting drug use is especially remarkable among high risk behavior in the penitentiary system. Number of prisoners in penal institutions sentenced for sale, keeping, distribution or use of drugs is not very high – 7-9%, but vast majority of prisoners did not refuse occasional drug use: 40% of them used drugs before detention and continue drug use in prisons, about 25% of prisoners admitted that they started drug use in prisons.

The several studies indicated that IDU, related risky behaviors and some blood-borne infections are serious problem for Georgia:

The population-based cross-sectional survey of the adult population of Tbilisi conducted by Georgian AIDS and Clinical Immunology Research Center in collaboration with Johns Hopkins Bloomberg School of Public Health in 2001-2002 (sample size – 2000study participants) showed that 8% of surveyed individuals had engaged in injecting drug use at some point in their lifetimes, 98% of them reported current use of drugs and 85% sharing needles with injection partners. The study found high prevalence of HCV among drugs users (70.4% of IDUs were HCV seropositive versus to 1.1% of non-IDUs). HIV seroprevalence was relatively low (only 1.8%), but all HIV-positive cases found were among drug users (Stvilia et al 2006).

Shapatave et al (2005) also demonstrated high prevalence of HCV and HBV among IDUs, while HIV prevalence was found quite low among study population. Only 1.7% of investigated IDUs were HIV positive, 55.2% were seropositive for HBV (HBsAg and/or anti-HBc) and 68.8% were HCV positive. The study also found most commonly used drug reported was heroin (58.7%), followed by homemade drugs (31.6%) and opium (9.8%). The needle sharing practice is quite common in Georgia: 77.4% of study participants reported sharing their needles with others at least once in the previous 6 months.

Behavior Surveillance with biomarker component among IDUs in Tbilisi and Batumi, conducted by the Save the Children, reported that 93.1% of surveyed individuals reported injection with the sterile needle during the last injection, but the high prevalence of HCV among younger IDUs (25%) with

shorter injecting history suggests recent infection with HCV and accordingly using of unsterile equipment. High percentage of self-reported safe injection can be explained by "social desirability bias" (UNGASS, 2007).

3.2 HIV in injecting drug users

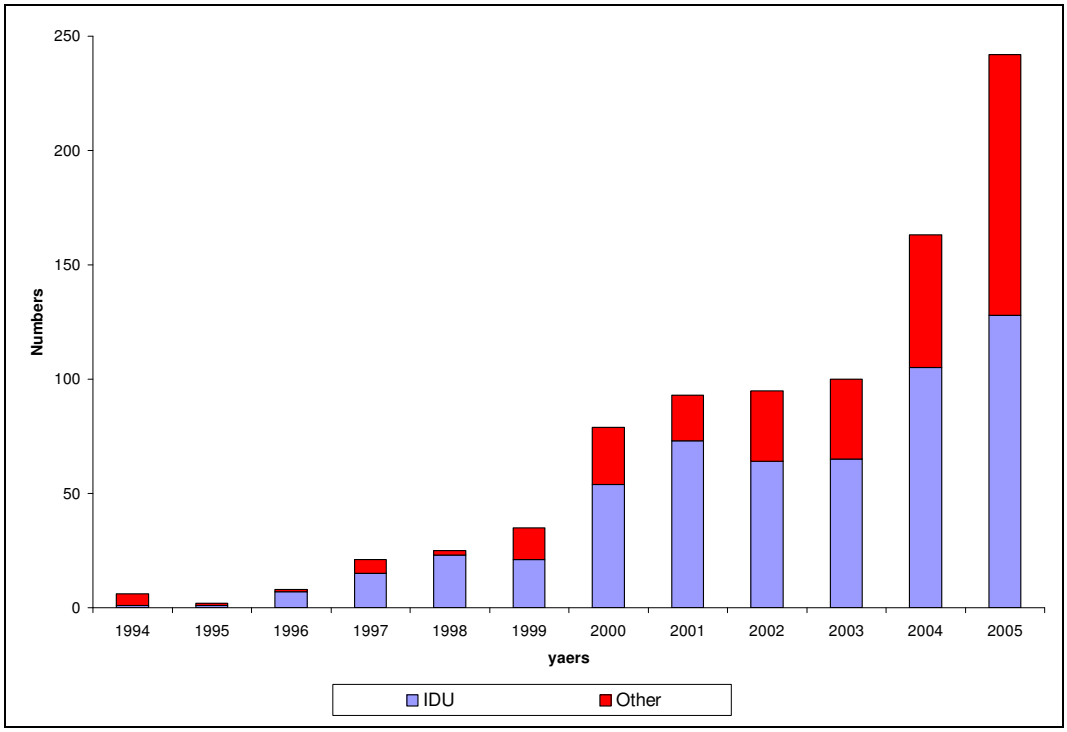
UNAIDS and WHO estimate that in 2007 there were 33.2 million people living with HIV (HIV-1), 2.5 million persons become newly infected and 2.1 million died of AIDS (UNAIDS, 2007a). Most countries have concentrated HIV epidemic, in which the infection is detected among specific groups at risk (IDU, MSM, sex workers, etc) (Cohen et al, 2008). According to UNAIDS the HIV epidemics in Eastern Europe and Central Asia are concentrated mainly among injecting drug users, among the new HIV cases reported in 2006 nearly two third (62%) were attributed to injecting drug use. The number of reported HIV cases among IDUs increased significantly between 2001 and 2006 in several eastern European countries (UNAIDS, 2007b).

Based on the registered HIV-positive cases Georgia belongs to a low-prevalence HIV epidemic countries: the HIV prevalence does not exceed 0.02%, HIV prevalence found in most-at risk populations is still low (1.3% in female sex workers and 1.1% in injecting drug users). The estimated HIV prevalence rate is higher and totaled to 0.09% among adults aged 15-49 (UNGASS, 2007). But Georgia is considered to be at high risk for an expanding epidemic due to widespread IDU and population movement between neighboring Ukraine and Russian Federation, where HIV prevalence are high.

The first case of HIV in Georgia was diagnosed in 1989; since that time the HIV epidemic has been progressing, numbers of newly registered cases are increasing gradually year by year (276 new HIV cases in 2006). According to reported data for 2006 1156 HIV cases have been registered - 897 (78%) were males, and 259 (22%) – females; AIDS has been developed in 470 persons and 243 patients died (UNGASS, 2007). HIV had reached all regions of the country; however, the infection is unevenly distributed through the regions: the most of the cases are aggregated in the capital city - Tbilisi and the Black sea coastal regions (Adjara and Samegrelo) (Mdivani, 2008).

In Georgia HIV epidemics shows similarities with the epidemics in most Eastern European countries with injecting drug use being the major transmission mode: IDUs represents 62% of all cases with a known route of transmission (UNGASS, 2007). IDU-s represent an important route for spread of HIV to the rest of the community: HIV can spread very rapidly through IDUs, and then infected IDUs can spread HIV to their sexual partners, their children and the rest of the community (CHR, 2003; Mdivani, 2008).

FIGURE 1: IDU AMONG NEW HIV-POSITIVE INDIVIDUALS, GEORGIA, 1994-2005



There are no routine data on the prevalence of HIV infection among drug injectors in Georgia (Fielin et al 2008). Only less than 5% of IDUs are regularly tested for HIV. Only IDUs who visit specialized health care institutions (AIDS Center, Institute on Drug Addiction and the NGOs Bemoni, New Way, etc) are tested for HIV on a regular basis (SCAD 2006). According to results of the pilot study conducted by AIDS center in 2005 among 2100 tested IDU-s 68 (3.2%) were found to be HIV positive (AIDS Center, 2005).

Until recently, more emphasis was placed on criminal penalties than providing support, care and treatment for IDUs. "Zero Tolerance" campaign against crime launched by the government of Georgia affected the Public Health and in particular HIV prevention for IDU-s. Since the fine for drug possession (about 300 USD) was implemented the people tested for drugs has increased by almost 13 times (they are testing by police) , while the governmental response to the public health effects of drugs has been limited. The persons who can not afford to pay the fine are arrested and incarcerated, which also increase risk behavior of IDU-s and endangers health (Mdivani 2008).

Considering IDUs are concentrated in penitentiary system, the prevalence of HIV in prisons are high compare to civil population. Tsintsadze demonstrated

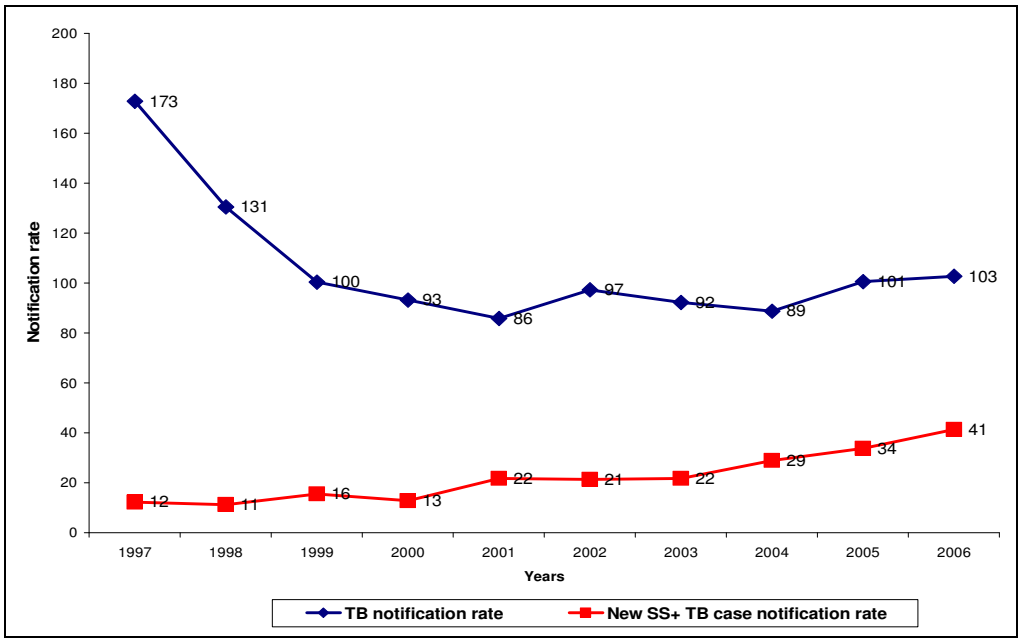
that prevalence of HIV in penitentiary system exceed its prevalence in the civil society: HIV/AIDS prevalence among general population in 2005 was 0.15%, while in prisons – 1.76%; i.e. prevalence of the disease in penitentiary system exceed 10-fold and more than outside it (Tsintsadze, 2006).

3.3 TB in Georgia

TB is considered as one of the serious public health problems in Georgia (Zalesky et al 1999). The resurgence of TB was experienced after dissolution of Soviet Union, which can be explained by worsening economic situation due to the transition period form the socialist to the market economy, political instability, civil war and deterioration of healthcare system. Even after almost 20 years from desolation of Soviet Union TB notification rate remains high and its one of the highest in Eastern Europe and totaled to 103 and notification rate for new smear-positive cases is 41 per 100.000 population (WHO 2008a).

The most affected age groups in Georgia are 25-34 (81new smear-positive/100.000) and 35-44 (60 new smear-positive/100.000), male/female ration is 3.3; 72% of notified cases were pulmonary and 28% - extrapulmonary (WHO 2008a).

FIGURE 2: TB CASE NOTIFICATION RATE, GEORGIA, 1997-2006



Although Georgia showed the lowest proportion of MDR in the Eastern European region it's still quite high compared to western European countries: according to Fourth Global Report on Anti-Tuberculosis Drug Resistance in the World MDR TB rate among new cases is 6.8% (95% CI, 5.1-8.8) , and among retreatment cases 27.4%. It is also alerting that 3 cases of XDR were found (WHO 2008b).

There is no data about prevalence of TB infection in Georgia, because nationwide survey was not conducted since soviet times, but considering the study results conducted among internally displaced persons (IDP) which showed high prevalence of latent TB disease (48%) can be estimated that the prevalence of infection is also high in general population (Weinstock et al 2001). The high rate of latent TB prevalence was also observed among health care workers in Georgia: study demonstrated 67% of prevalence of latent infection by Tuberculin Skin Test (TST) and 60% of prevalence rate using QFT-3G (Mirtskhulava et al 2008). The results of the similar study among health workers from neighboring country (Russian Federeation) demonstrated prevalence of latent infection 49.3% among TB staff compared to 6.2% among non-medical students (Drobniewski et al 2007). Based all information provided above it should be assumed that prevalence of latent TB infection might be quite high in Georgia.

HIV prevalence in incidence TB cases in 2006 was totaled to 0.3%. Out of 17 cases found, 9 of them were put on ART (WHO, 2008a).

3.4 Relationship between TB and IDU

A relationship exists among TB and drug use from the early twentieth century, when opiates were used as a cough suppressant drug and also as a drug which has ability to create "sense of well-being" in TB patients as a routinely used medicine. By that time drug addicts were iatrogenic addicts (Perlaman et al 1995).

Nowadays evidence suggests that drug use is associated with increased rate of tuberculosis disease and tuberculosis infection (WHO, 2008c). CDC considers IDUs as a high risk group for TB and recommends to use PPD skin test for them at the drug treatment programme settings (CDC 1995).

The high rate of TB infection and disease among IDUs can be explained by several factors such are:

- HIV coinfection - it's well-known that progression to TB disease dramatically increases by infection with HIV, which is widespread in IDUs (CDC 1995, Rieder 1999).
- Lifestyle factors – homelessness, alcohol use, etc, which are widespread among IDUs represent risk factors for TB (Rieder 1999);

- Imprisonment – TB transmission is very common among prison population where IDU represent big proportion (WHO 2001).
- Affect on immunity – immunodeficiency caused by drug use (Friedman 2003).

According to Paul Nunn (coordinator of TB/HIV and Drug resistance activities in Stop TB department of WHO) "Increasingly, the HIV epidemic and its effects, and TB, are being localized to vulnerable groups, in this case drug users, of whom only a small percentage are accessing the services they need" (Smart 2008).

The higher rates of TB infection and disease were demonstrated in different studies elsewhere:

A high risk of tuberculosis among IDUs compared to non-users were found before the discovery of AIDS in the study conducted in US (Rieder 1999).

The follow-up study conducted in New-York showed higher risk of TB, HIV and death among drug and alcohol abusers compared to general population (risk ratio for TB 14.8). It is interesting that the study also indicated two times higher risk of active tuberculosis among persons who abused only drugs compared to persons abused only alcohol (Friedman et al 1996).

High prevalence of latent TB infection were found in IDUs in Toronto. The prevalence rate found out to be 31%, which is much higher than the rate reported in the general population (0.4% to 16.4%) (Rusen et al 1999).

Brassard et al found high prevalence of TST-positivity rate among injecting drug users (22.4%) in Canada while the prevalence of TST among young Canadian-born workers (general population) was 4.3%. This highlights once more that IDU should be considered as a risk group for TB infection. The LTBI was associated with age and duration of injection drugs (Brassard et al 2004).

In Amsterdam the higher rate of TB was observed among IDU-s compared to general population. The study aiming to find out relation of tuberculosis among HIV-positive and HIV-negative IDU-s indicated that TB incidence in HIV negative IDUs is still six times higher than in the overall Amsterdam population but HIV infection increases risk of TB nearly 13 times (Manos et al, 1987). Another study also conducted in Amsterdam using molecular epidemiological methods also proved high degree of active *M.tuberculosis* transmission among drug users (Deutekom et al 1997).

Drug abuse was found as a predictor of recent TB transmission in univariate analysis in study conducted in Hamburg, Germany, while in multivariate analysis drug addict was not significantly associated with clustering (Diel et al, 2002).

Malotte et al (1998) in the study conducted among IDUs found that they are at higher risk for TB infection (Malotte et al 1998).

The high prevalence of latent tuberculosis infection among IDUs were found by Salomon et al and also they demonstrated strong association between the prevalence of TST reaction and years of use injection drugs (Saloman et al 2000).

Beside the high prevalence of TB infection and disease among IDUs study conducted by Kurbatova et al found that IDUs have high risk for TB mortality (Kurbatova et al 2006) one reason for this might be that IDU is predictor of non-adherence (Wobeser et al 1999) to TB treatment which leads to high death rate.

The routine exact number of TB incidence and prevalence rate among UDU-s in Georgia to a large extent is unknown. Although there is not any data available, some assumptions (proxy estimations) can be made to evaluate the magnitude of TB problem among IDUs in Georgia considering the following data and study results:

the results of the studies in different countries (Manos et al 1987, Van Deutekom et al 1997, Sytze et al 2000) where the high prevalence of TB infection and disease among drug abusers were found;

Estimated high IDU prevalence in Georgian population (SCAD 2006);

IDUs are mostly males and between 25-29, 30-39 age groups (Aceijas et al 2004) and TB is also prevalent among the same groups (males, age groups) (WHO, 2008a);

IDUs is illegal in Georgia and imprisonment is considered as a punishment methods for drug users and in this setting IDUs have a high chance to get TB due to high TB prevalence in prisons and other factors contributing to its spread (overcrowding, poor nutrition, etc) also exist (Aerts et al 2000); According to Georgian expert (Khechinashvili 2008): with increases in putting drug users in jails resulting from "zero tolerance" and war on drugs, the penitentiary system may serve to amplify the spread of TB among IDUs in the beginning and after to their families and community as a whole (personal communication). According to National TB Program data TB prevalence in prisons is almost 30-times higher than in general population (NCDCS, 2007).

IDU is a main route for HIV infection in Georgia and risk to develop TB in HIV infected persons is up to 50-times higher than in uninfected (WHO 2005).

High HCV prevalence among TB patients (Richards et al 2006).

The study conducted as part of AIDS surveillance project at the Georgian AIDS and Clinical Immunology Research Center were investigated the risk

factors for HCV, HBV and HIV among Tuberculosis patients. The study showed that 95.7% of recruited TB patients had history of drug use (Kuniholm et al 2008). The second study also demonstrated high prevalence (39%)of IDU among TB patients (Richards et al 2005).

The results of MDR survey conducted within the BTEP project in National Center of TB and Lung Diseases in Tbilisi demonstrated the association between MDR TB and history of injecting drug use (Mdivani et al 2008).

Based all these available information it can be assumed that TB including MDR TB (as well as other infection diseases (HBV, HCV, HIV) should be widely spread among IDUs and visa versa - high proportion of TB patients are IDUs. It's obvious that IDU and related health problems are important to be addressed by public health professionals as in Georgia. The further surveys among IDUs to identify TB infection and disease should be implemented in order to make clear this problem.

Chapter 4: Effectiveness of TB screening among IDUs

4.1 Introduction

This chapter starts with reviewing the application of Piot model as analytical framework for the study. This model was designed by Piot to analyse disease control programs, in particular, different technical and operational aspects of TB control Programme (Dujerdin, 1997). This model has proven to be useful for other disease control programmes as well. Buve et al (2001) used it for STI control programme and it has provided realistic picture of the programme performance - STI case detection and management. Mumba et al (2003) applied this model for analyzing case management in Malaria control programme and its usefulness was demonstrated.

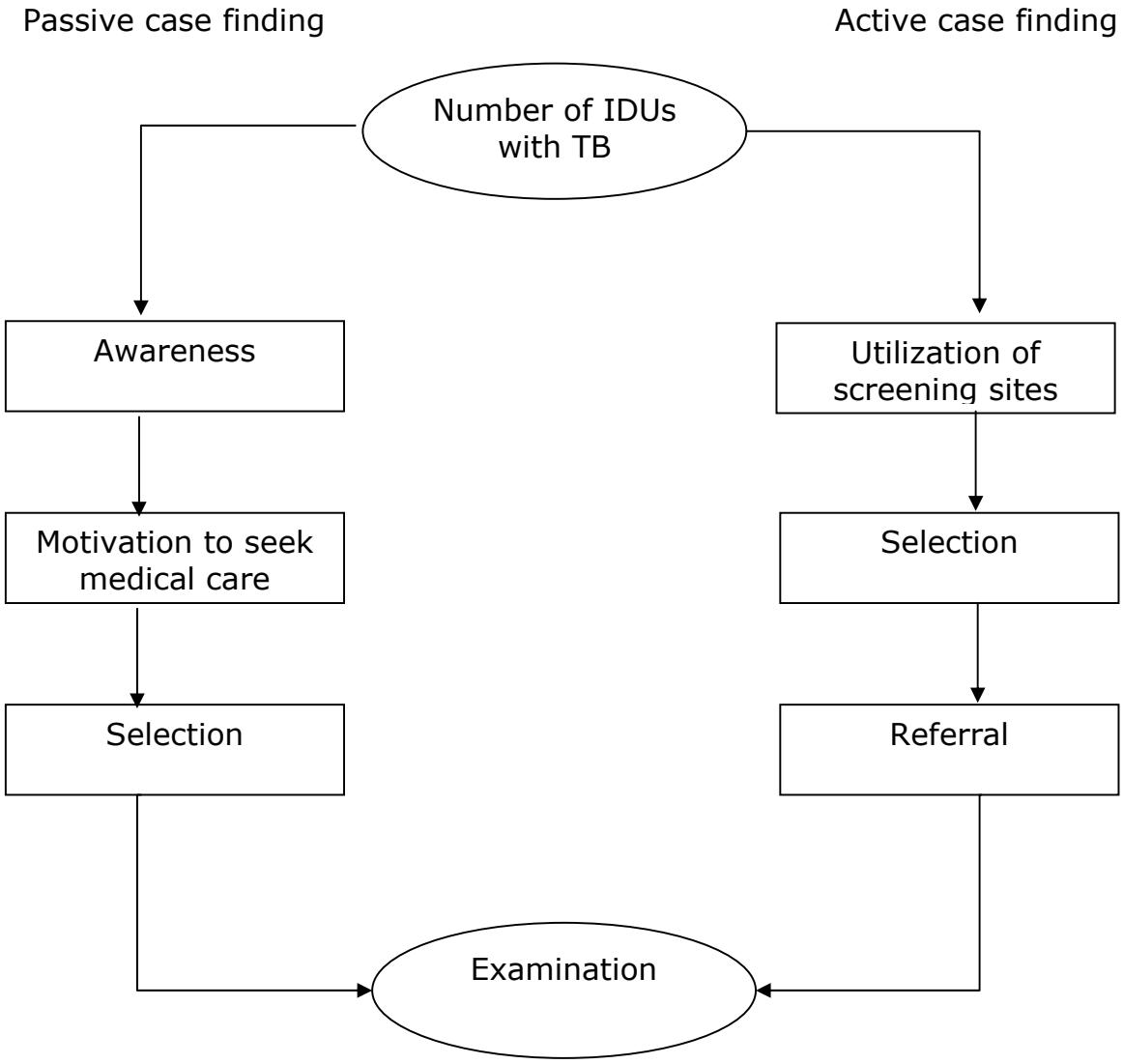
This model is based on passive case finding of smear-positive TB cases and gives opportunity to identify priorities for operational research. As it was mentioned in the methodology (see 2.4.3) a modification of this model is used as an analytical framework for this study. Only some modified step of Piot model are appropriate to this study considering that this model was initially designed to analyse passive case finding, but the aim of this study is the evaluation screening (active case finding) programme (figure 3).

The literature was assessed for relevance of the Piot model for TB case finding among IDU-s. The model gives opportunity to asses the steps which are most problematic – where most patients are lost and to identify factors for poor performance (Mumba et al 2003).

The following steps from Piot model were used for analyzing study results:

- Starting point – Number of TB cases among IDUs (incidence or prevalence);
- Utilization –utilization of harm reduction services as a entry point to screening by IDU-s- number of IDUs covered by screening sites.
- Selection – number of patients correctly considered as TB suspects.
- Referral – number of TB suspect IDU-s referred and presented at TB units.
- Examination – Number of IDUs correctly diagnosed with TB.

FIGURE 3: MODIFICATION OF PIOT MODEL



4.2 Utilization of harm reduction services by IDUs

Drug users represent the difficult-to reach or hidden population (Wiebel at al 1990) and despite they experienced plenty of medical problems compared to the general population utilization of medical services including TB services by them are fragmented (WHO 2006a).

According to WHO recently published guideline for Collaborative HIV and TB services for injecting and other drug users "service delivery is likely to be successful where there is access to the right intervention at right time by right service" (WHO, 2008c). For the drug users this means to use drug treatment, TB and HIV services at the same time coping also with other problems like imprisonment, homelessness and poverty and WHO recommends to plan the services in a way which meets these complex needs for IDUs. Regarding the case finding they recommend intensified case finding for HIV and TB at the services where IDUs initially present. At least using of brief questionnaire on TB symptoms (along with other interventions for prevention, care and treatment) is recommended to screen active TB among drug users at the drug treatment and syringe exchange programmes (SEP) (WHO 2008c).

Methadone programes have been shown to be effective platform for providing a number of healthcare services including HIV and TB (Marco et al 1998). Combination of methadone treatment with providing other long-term treatment services (TB prevention and treatment) has shown high success rate. Based on the study Batki et al (2002) concluded that methadone treatment has the role of creating the conditions in which TB prevention and treatment services as well as treatment of HIV and hepatitis "will be successful, by motivating patients to attend daily for observed treatment".

Considering that almost 80-90% of drug users even in developed countries (more in developing countries) are not in drug treatment at any given time health managers are looking for other effective means for delivery TB services to them. One option for delivery of such services is syringe exchange programs. Study evaluating effectiveness and cost-effectiveness of TB screening and preventive therapy for IDU-s at a syringe exchange found out that implementation of these services at SEP is efficient and cost-effective (Parlman et al 2001).

The effectiveness of SEPs beside the provision of clean needles, resides in the provision of other services in order to reduce the harm of drug use (referral and facilitated entry of individuals into substance abuse and also provision of some medical care). In some areas SEP provides medical services like HIV, STD, and TB screening; hypertension and diabetes diagnoses and acute primary health care, etc (Heimer 1998).

Good practice was indicated in collaboration of SEP and TB program in provision of TB screening and prophylaxis at SEP location in USA. The data has shown good acceptance of TB screening by participants (96.5%), 90.8% of those screened returned for skin test reading and 78.5% completed screening including chest X-ray (Perlman et al 1996). Some good results were also demonstrated in the study assessing utilization of TB services at needle exchange programme sites in Baltimore city (Riley et al 2006).

Along with good results of implementation medical services at methadone treatment and SEP, UNAIDS indicated that outreach programs employing drug users have been also successful strategy for promoting harm reduction services among IDUs and encouraging them in HIV-testing (UNAIDS 2000).

Although harm reduction services demonstrated to be efficient and effective in addressing some other health problems, the main problem is access to these services by IDUs. The experience has shown that access to these services for drug users is frequently complicated due to several factors including fear of prosecution, stigmatization, chaotic lifestyle etc (WHO, 2006). A qualitative study conducted in Russia found out that the utilization of syringe exchange facilities is insufficient due to several constrains like fear of registration, restrictive exchange policies of needles, opening times, etc (Sarang et al, 2008). The assessment of syringe exchange programme in China also demonstrated that coverage is extremely limited due to several factors which include low awareness of IDU about NEP services, distance and difficulties to get there, attitude of police, etc. (Liu et al, 2007).

In Georgia harm reduction (including VCT, needle exchange and substitution therapy) is carried out in systematic scale. There are three major operational programmes:

- Open Society "Georgia Foundation" harm reduction programme, which has been implemented since 1999 and carries out following activities: needle exchange, education and consultancy, substitution therapy;
- Save the Children Federation Project which has been implemented since 2002 and providing counseling and tasting for different risk groups including IDUs in several cities of Georgia.
- Global Fund Programme which has been implemented since 2005 and covers needle exchange, substitution therapy and VCT among IDUs.

Like other countries Georgia also experienced low access of harm reduction services by IDUs. According to research which assessed the access, activity and syringe coverage of SEP in Central and Eastern Europe and Central Asia, in 2002 was demonstrated that in Georgia in 4 syringe exchange sites 3000 IDUs were reached which constitutes to only 24% of estimated IDUs (Aceijas et al 2007). According to GFATM grant performance report cumulative number of IDU-s reached through syringe exchange centers from the March

2004 to the end 2006 is totaled to 1112. Although target set in this proposal is reached the number of IDU-s covered is still low considering the estimated number of IDU-s in Georgia (GFATM 2008).

The Behavior Surveillance Survey (BSS) conducted among IDUs demonstrated that information about needle exchange programme in Tbilisi had been heard or seen by about 2 of every 5 IDUs, but it should be mentioned that use of this services is not good enough: only one IDU from all interviewees (469 IDUs) indicated obtaining needle from SEP (UNGASS 2008). This can be explained by the easy accessibility and low price of needles and syringes in pharmacies and also fear for arresting, visiting of SEP is associated with some risk of detection and interference by police.

It should be assumed that in Georgia IDU-s have some knowledge about services for VCT. The above mentioned BSS also found out that 72.7% of interviewed drug users reported that they know where to get HIV test (UNGASS 2008). Compared SEP VCT services are utilized better by IDUs: VCT were provided for 3739 IDU-s by the end of 2006 within the GFATM project (GFATM 2008), which means that almost 30% of registered IDUs were covered in one year.

Although methadone treatment demonstrated the best results for providing other long-term healthcare services, it's covering in Georgia is very poor. The Methadone substitution therapy introduced by GFATM in 2005 and covers only 152 IDUs (GFATM 2008).

Based on this information it can be assumed that utilization of harm reduction services by IDUs in Georgia is not very high and most probably it corresponds to approximately 30-35% of registered IDUs, which means that majority of IDUs would not be covered by screening programme.

4.3 TB case finding among IDUs

For TB control to be successful effective interventions must be found to reach the IDUs who remain at high risk of TB partly because they have been difficult to reach. The prevalence of TB infection and HIV infection is high among drug users and accordingly they are at high risk of developing and consequently spreading active TB (Parlman at al 1996). This means that they represent the threat for the whole community. Active case finding (ACF) among high risk groups (including IDUs) is considered as useful and important strategy for reducing the TB morbidity and mortality (Golub et al 2005).

The epidemiological modeling developed and used by Murray&Salomon (1998) for evaluating the impact of TB control strategies has demonstrated that ACF strategies combined with DOTS would yield great benefits in areas

of high TB prevalence. The ACF is recommended for high-risk groups and has shown the good results; Targeted active case finding is also considered as the most cost-effective strategy (Golub et al 2005).

The experience from USA suggests that the TB screening at the SEP settings is well acceptable for active drug users and it is viewed as an extension of harm reduction strategy. The drug users demonstrated good involvement into screening program and it is considered as a valuable strategy for identification of latent and active TB among them. As it was mentioned previously (part 4.2) IDUs are difficult to reach, most of them are not in drug treatment and do not have medical insurance, so using SEP is a good opportunity for TB screening as well as for providing preventive TB treatment, considering taht the population of IDUs at SEPs are quite stable (Parlman et al 1997).

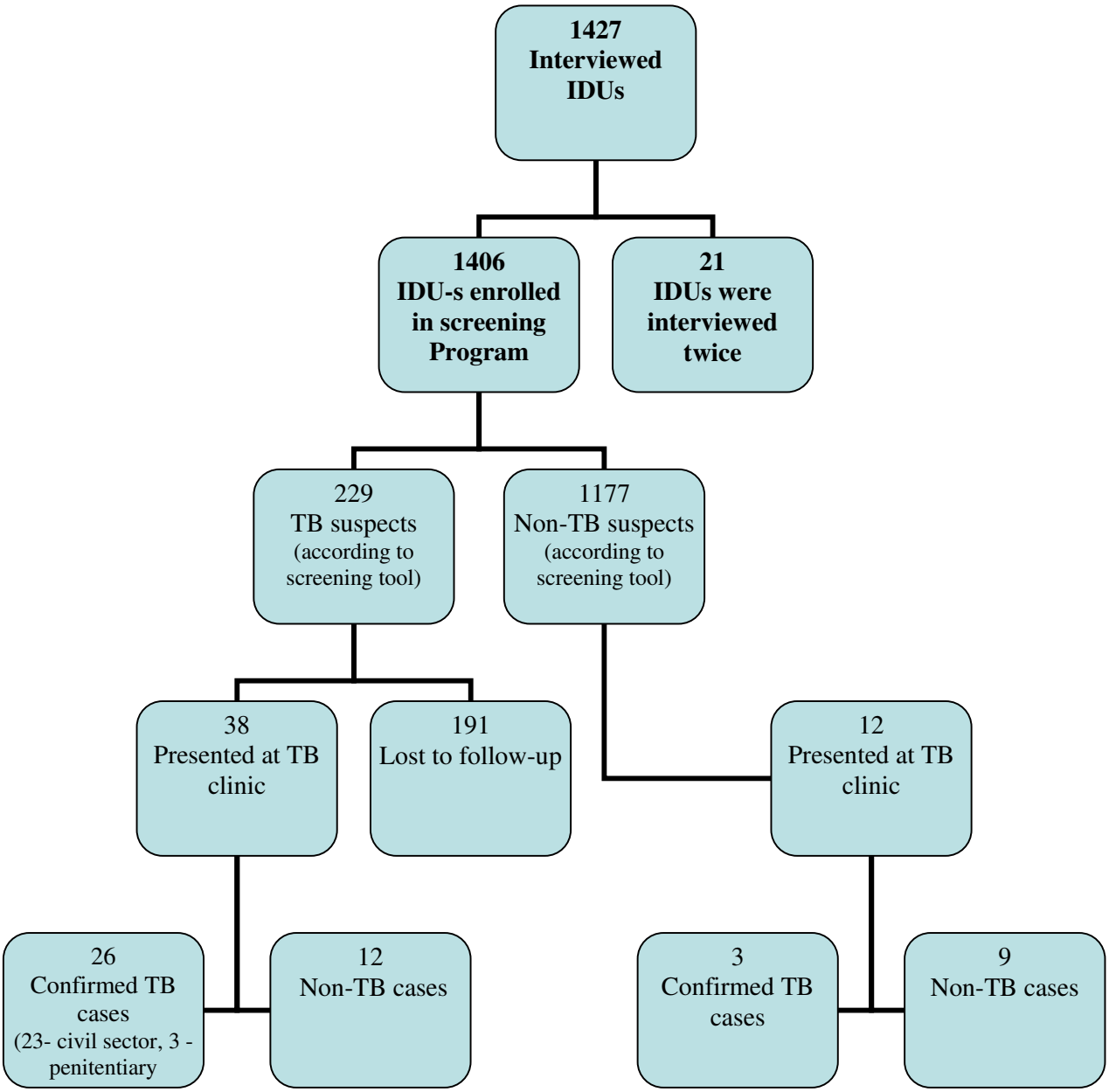
4.3.1 Field Study: TB screening among IDUs in Georgia

The TB screening programme for IDUs in Tbilisi were implemented within the GFATM TB programme "Expansion DOTS implementation in Georgia". The screening of IDUs was conducted in 5 sites (see 2.4.2). A questionnaire evaluating clinical symptoms was used (annex 3) and TB suspected persons were referred to TB clinics for further examination and diagnosis.

Description of study population:

One thousand four hundred and twenty seven IDUs were interviewed for TB between the period - April 1 2006 - March 31 2007. Twenty one clients were interviewed twice and the duplications were deleted from the database. The analysis was performed on 1406 interviewed IDU-s.

FIGURE 4: PARTICIPANTS FLOWCHART



Majority of clients (33%) were screened at the VCT center which is operating at AIDS and Clinical Immunology Research Center, 24% in NGO "Bemoni "(VCT center), 20% in Georgian Institute of Drug Addiction, 15% in Uranti (VCT and drug treatment center), 8% in New Way (SEP and VCT center).

Most of the enrolled clients (95.5%) were males, reflecting the demographics of IDU-s in Georgia (Nijaradze et al 2005). On the other hand female drug users might be more hidden population and do not want to

disclose their behavior, which means they do not utilize harm reduction services and accordingly have not been included in this study.

The mean age of the study population, excluding "unknown", was 33.5 years, median age – 32, while the age was ranging from 14 years and to 74 years. The majority of clients were in the 20-29 and 30-39 age groups (table 2).

The mean BMI of study population was 23.42, the median – 23.2, minimum BMI- 15.7, maximum 34.7. The underweight was found among 4.4% of study population, 25.6% were overweight and 1.8% obese.

Twenty three percent of IDUs had cough, 30.6% had expectoration, more than half of investigated population had loss of appetite (50.6%) and night sweat, only 11.1% had chest pain (table 2). Based on these symptoms and BMI results 229 (16.3%) clients were classified as TB suspects and were advised to refer to TB units.

Of those enrolled clients HIV results were available only for 285 (20.3%) individuals. Fifty tree individuals were HIV-positive, 232 HIV-negative and for the rest of IDU-s results of HIV screening were not provided. Based on the known HIV-status the prevalence of HIV infection (among 285 known cases) totaled to 19%.

Table2: Characteristics of study population

		Numbers	Percentage
1	Age group	(n= 1406)	
	<20	33	2.3%
	20-29	483	34.4%
	30-39	532	37.8%
	40-49	238	16.9%
	50-59	65	4.6%
	>60	11	0.8%
	Unknown	44	3.1%
2	Sex		
	Male	1343	95.5%
	Female	63	4.5%
3	BMI		
	<19	62	4.4%
	19-24.9	958	68.1%
	25– 29.9	360	25.6%

	>30	26	1.8%
4	TB symptoms		
	Cough >2 weeks	323	23%
	Expectoration	430	30.6%
	Weight loss	555	39.5%
	Loss of appetite	711	50.6%
	Night sweat	742	52.8%
	Chest pain	156	11.1%
5	TB suspect		
	Yes	229	16.3%
	No	1177	83.7%
6	HIV status (n=285)		
	Positive	53	19%
	Negative	232	81%
7	TB history		
	Yes	50	3.6%
	No	1353	96.2%
	Unknown	3	0.2%

According to the screening 229 individuals were classified as TB suspects. The mean age of TB suspect cases (excluding "unknown") was 34.8 years, the median 33, age was ranging from 18 years and to 74 years. The mean BMI was 21.87, the median – 21.7, the range 15.7-33.8.

Univariate analysis was performed in order to identify factors associated to TB suspects. Table 3 provides results of univariate analysis.

The analysis has shown that history of previous TB diagnosis is significantly (OR = 5.26) associated to TB suspicion. HIV test results were available for 286 cases only and based on the known data univariate analysis indicated that HIV-positivity (OR=4.7) also significantly associated with TB suspect. TB suspicion were not differ significantly by the other characteristics (sex, age group).

Out of 1409 IDU-s enrolled in the screening program 50 individuals attended TB clinics for further examination. In 3 cases TB were diagnosed in penitentiary system after incarceration. Out of 50 self-presented to TB clinics 12 clients had not been classified as a TB suspects by screening protocol.

Table 3: Univariate analysis of factors associated to TB suspects

	TB suspects		Non-TB suspects		OR (95% CI)	p-value
	n=229	(%)	n=1177	(%)		
Sex						
Male	216	(16.10%)	1127	(83.90%)	1.36 (0.72-2.54)	0.34
Female	13	(20.60%)	50	(79.40%)		
Age group (n=1363)						
<20	2	(1%)	31	(2.7%)	1.00 Reference	0.38
20-29	68	(32.5%)	415	(36%)	2.54 (0.59-10.86)	
30-39	81	(38.8%)	452	(39.2%)	2.78 (0.65-11.83)	
40-49	43	(20.6%)	195	(16.9%)	3.42 (0.79-14.83)	
50-59	13	(6.2%)	52	(4.5%)	3.88 (0.82-18.33)	
>65	2	(1%)	9	(0.8%)	3.44 (0.42-28.01)	
TB history (n=1403)						
Yes	24	(48%)	26	(52%)	5.26 (2.85-9.69)	<0.01
No	202	(14.90%)	1151	(85.10%)		
HIV-positive (n=286)						
Yes	19	(35.20%)	35	(64.80%)	4.7 (2.21-10.04)	<0.01
No	24	(10.30%)	208	(89.70%)		

Out of 30 confirmed TB cases 26 was diagnosed from group classified as TB suspects, 3 cased out of non-suspect persons and in 1 case was found out that TB treatment already started

The characteristics of confirmed TB cases are shown in Table 4. The majority of active TB cases were within the 30-39 (47%) and 40-49 (30%) age groups, 29 (97%) were male out of 30 diagnosed TB cases. Only 7 (23%) of diagnosed TB cases had BMI below 19kg/m^2. The most prevalent TB symptoms were weight loss (93%), cough (83%) and night sweat (83%). HIV status were known only for 11 (37%) individuals. In 30 TB cases 14 (47%) had pulmonary smear-positive TB, 12 (40%) smear negative and 4 (13%) extrapulmonary TB.

Table 4: Characteristics of confirmed TB cases

		Number n=30	Percentage
1	Age group		
	<20	0	0%
	20-29	4	13%
	30-39	14	47%
	40-49	9	30%
	50-59	2	7%
	>60	0	0%
	Unknown	1	3%
2	Sex		
	Male	29	97%
	Female	1	3%
3	BMI		
	<19	7	23%
	19-24.9	21	70%
	25– 29.9	2	7%
	>30	0	0%
4	TB symptoms		
	Cough >2 weeks	25	83%
	Expectoration	19	63%
	Weight loss	28	93%
	Loss of appetite	22	73%
	Night sweating	25	83%
	Chest pain	12	40%
6	HIV status		
	Positive	3	10%
	Negative	8	27%
	Unknown	19	63%
7	TB history		
	Yes	7	23%
	No	23	77%
	Unknown	0	0%
8	TB Diagnosis		

Pulmonary Smear-positive	14	47%
Pulmonary Smear-negative	12	40%
Extrapulmonary	4	13%

As shown above 30 active TB cases were identified among 1406 subject screened, giving the rate of 2133/100.000 and for 14 new-smear positive cases the rate totals to 996/100.000.

Univariate analysis was performed to find out factors associated to active TB. The results are presented in the Table 5. For small numbers Fisher Exact test was used in statistical analysis.

In univariate analysis active TB was associated with cough more than 2 weeks (Fisher exact p-value=0.022), other symptoms and factors haven't shown any statistically significant association with active TB (table 5). The small number IDUs presented at TB clinics limited the power to detect a statistically significant association between these variables and TB.

Table 5: Univariate analysis of factors and symptoms associated to active TB among TB suspects

	TB cases		Non-TB cases		OR (95% CI)	p-value*
	n=26	%	n=12	%		
Sex						
Male	25	(68%)	12	(32%)	Undefined	1.0
Female	1	(100%)	0	(0%)		
TB history						
Yes	5	(71%)	2	(29%)		
No	21	(68%)	10	(32%)	0.84 (0.14-5.11)	1.0
Cough >2 weeks						
yes	24	(77%)	7	(23%)	8.57 (1.35-54.15)	0.022
No	2	(29%)	5	(71%)		
Expectoration						
yes	18	(62%)	11	(38%)	0.21 (0.02-1.87)	0.22
No	8	(89%)	1	(11%)		
Loss of appetite						
Yes	19	(70%)	8	(30%)	1.36 (0.31-5.96)	0.71
No	7	(64%)	4	(36%)		

* Fisher's exact test two-sided P-value

Loss of weight						
Yes	25	(71%)	10	(29%)	5 (0.41-61.52)	0.23
No	1	(33%)	2	(67%)		
Night sweat						
Yes	23	(68%)	11	(32%)	0.7 (0.07-7.48)	1.0
No	3	(75%)	1	(25%)		
Chest pain						
yes	10	(71%)	4	(29%)	1.25 (0.29 -5.26)	1.0
no	16	(67%)	8	(33%)		
BMI						
<19	7	(78%)	2	(22%)	1.84 (0.32-10.58)	0.68
>19	19	(66%)	10	(34%)		
HIV-positive (n=16)						
Yes	7	(54%)	6	(46%)		
No	2	(67%)	1	(33%)	1.71 (0.12-23.94)	1.0

To sum up, the most important findings of screening program were:

- 16% of investigated IDUs were classified as TB suspects;
- Only 16.6% (38 out of 229 cases) self-presented at TB clinic for further investigation;
- TB was diagnosed in 30 cases, which constitutes a prevalence rate of 2133 per 100,000;
- In univariate analysis, active TB was associated with cough longer than 2 weeks in TB suspects.

Study limitations:

The majority of TB suspects (191/229) were lost to follow-up. As mentioned above, data were not initially assigned for the scientific research and the study protocol, and the study design was not developed, (including the follow-up protocol). It is not possible to evaluate validity of the screening tool, its sensitivity or specificity. For this purpose, verification or exclusion of active TB is needed in both groups: TB suspects and non-TB suspects.

The characteristics of IDUs who utilize harm reduction services is unknown. The population enrolled in this study might not be representative of the

general IDU population. Selection bias might occur and study findings may not be generalizable to the general IDU population

The cases that had a TB examination were very small and drawing a conclusion about a statistically significant relationship of active TB and patients characteristic was not possible.

Despite the study limitations, the results of the field study still suggest that IDUs are at high risk group for TB disease. The 16.3% of recruited IDUs were considered as TB suspects. This number is quite high compared to the results of surveys among general population in different countries. A study conducted in central India showed that only 1.7% of surveyed population (through house-to house symptom survey) was symptomatic (Narang et al 1999). Almost the same prevalence of symptomatic patients was found in Addis Ababa, Ethiopia through house to house surveys: the 1.4% of symptomatic cases was revealed among 120.000 residents (Demissie et al 2002). Even a survey conducted among out-patients (considered to have higher prevalence of symptoms compared to general population) at health centers in India showed lower prevalence of TB symptoms (cough as a primary symptom) compared to field study findings. The survey found 6.7% of symptomatic patients (Baily et al 1967).

Considering all data mentioned above, it can be assumed that IDU-s are a group with widespread TB symptoms and accordingly active TB could be more prevalent. However, as mentioned in the study limitations, it should be taken into account that the characteristics of IDUs who applied to harm reduction sites (where screening was done) is unknown and selection bias could be considered. As mentioned in Section 3.2, only 20% of IDU-s are registered voluntarily for detoxication therapy and rest are registered by police after mandatory drug-testing. Assuming that persons arrested by police and obligated to undergo drug testing might be mostly marginalized individuals, with higher risk of medical problems (including HIV/AIDS and TB) it may be assumed that TB prevalence among non-registered IDU-s might be lower than was demonstrated in the study.

The value of this screening tool, its sensitivity and specify to detect TB suspect and active cases among IDUs is questionable. As mentioned, the TB questionnaire used by ICRC among incarcerated persons was used in this study (annex 3). The questionnaire contains 6 questions about TB symptoms (cough more than 2 weeks, expectoration, loss of appetite, weight loss, night sweating and chest pain) and assessment of BMI. The screened individual was classified as a TB suspect with a score of 5 or higher (see part 2.4.3) or BMI <19.

It should be assumed that sensitivity of screening tool is quite low, which can be proved by the fact that 3 cases of active cases were identified among individuals classifieds as non-TB suspects. Considering the study results,

which demonstrated the cough as a main symptom for suspicion TB (Baily et al. 1967). Univariate analysis of symptoms attributed to active TB (although the numbers in this analysis was low, the results can not be generated) also found out that only cough (more than 2 weeks) has a statistically significant association to active TB. So, if cough (more than 2 weeks) were considered as a leading symptom for evaluating IDUs in this field study the prevalence of TB suspects would be 23% (compared to 16.3%). So it could be assumed that using of all these symptoms for evaluating the IDUs would reduce the chance to detect TB cases by reducing the number of cases classified as TB suspects.

However, it should be considered that IDUs might be HIV-positive cases in which extra-pulmonary TB are common, and using cough as the only symptom for identification of TB suspects would contribute to poor detection of active TB cases and would reduce the sensitivity of the screening tool tool (Golub et al 2005).

It should be assumed that the specificity of the screening tool is also low. The symptoms in the questionnaire such as loss of appetite, weight loss, night sweating, low BMI are too general and they can not be attributed to TB only. In this particular situation (in IDUs) they can be considered as a side effects of drug use: according to NIDA "many drugs produce body changes such as dramatic changes in appetite and increases in body temperature, which may impact a variety of health conditions" (NIDA, nd). According to Sapira (1968), the drug user (if currently addicted) may be below his normal weight. This means that specificity of these symptoms in detecting TB is quite low. Consequently, the chance of excluding non-diseased individuals is quite low.

The methods for detecting latent and active TB cases include tuberculin skin testing, chest radiography, acid-fast smears, culture, screening of TB symptoms. Mass miniature radiography (MMR) may detect approximately 90% of prevalent TB cases (Borgdorff et al 2002) in the population, but it was proven that using the MMR for detecting active TB cases is impractical even if it's provided repeatedly in short time intervals, because the great majority of TB cases develop in shorter period of time than MMR rounds and also its cost is quite high (Rieder 2004). However, the study conducted in Amsterdam showed good impact on early case finding of TB cases among drug users attending methadone programmes who were provided with screening twice a year by chest radiography (Sytze et al 2000).

As experience has shown, population survey using TB symptoms to screen can detect around 70% of cases and are less costly (Elink Schuurman et al 1996).

Although tuberculin skin test (TST) involves low technology, is inexpensive, and its administration is relatively simple, its value for detecting active TB

cases is very poor, especially in BCG-vaccinated persons. TST is arguably useful to identify TB infection among HIV-positive cases (Menzies 2004). However, Friedman et al (1996) showed that a single skin test (positive or negative) in IDU-s does not predict the development of active tuberculosis. This can be explained by anergy, which occurs mostly in HIV-positive persons or common new infections. So, this finding is putting under doubt the value of the TST alone for screening programs among IDUs. The anergy and hypoergic reaction to Mantoux skin test were found also in drug users in Amsterdam (Manous 1987).

The screening program of IDU-s for TB at harm reduction sites in Tbilisi started with the support of the Global Fund in 2006. Although some studies demonstrated effectiveness of using chest X-ray as a screening tool (Sytze et al 2000, Borgdorff et al 2002), for Georgia its introduction at harm reduction sites for screening is not feasible due to logistical and other organizational issues. Although TST was found to be less effective in detection of active TB another constraint for implementation of TST is that more than 80-90% of Georgian population is BCG-vaccinated (at birth), it will be still useful and feasible to implement TST for screening at least among HIV-positive IDU-s.

As study demonstrated 1233 per 100.000 TB prevalence rate among IDUs. As discussed above 191 of 229 IDUs had not presented (or information was not found) for further examination at TB clinics, it is possible that additional persons had active TB that were not detected. If it will be assumed that cases of active TB existed among the remaining TB suspect individuals the prevalence of active TB among the study population may be significantly higher than demonstrated in this study. Also it should considered that additional cases of active TB may have been presented among non-TB suspect individuals, and as it was observed it is a case: 3 cases of active TB were diagnosed among non-TB suspect subjects.

Prisoners and refugees (including IDPs) are considered as high risk groups for TB. The studies conducted among these high risk groups in Georgia (Weinstok et al 2001, Aerts at al 2000) indicated that prevalence of active TB among IDP-s was 537/100000 and 5995/100.000 among prisoners. It is reasonable that the TB prevalence among IDUs are between these two high risk groups, it's quite higher than prevalence among IDP-s, but lower than TB prevalence in prisoners.

4.4 Referral to TB services

The study demonstrated that from the 229 suspected TB cases only 38 presented to TB units. This number is corresponds to 16.6% referral rate, which is very low. This low referral rate partly can be explained by the

limitation of the study: some of the screening sites (e.g. SEP-"New way") denied to provide names of clients who were screened, so it was not possible to find them in the TB database. Also some of clients of VCT and needle exchange centers do not disclose their real name due to perceived security reasons (fear to be arrested) and it was impossible to find them in TB register.

But beside these limitations the referral system itself from VCT centers to TB clinics was not set properly, the TB suspects were only advised to apply to TB facilities for further medical examination and confirmation of diagnosis, but they were not followed-up.

Low referral rate among IDU-s were found is several studies elsewhere:

Low rate (43%) of accepted referral to TB clinic after positive TST results were observed in the study among IDUs in Toronto (Rusen et al 1999).

Umbricht-Schneiter et al (1994) found low referral rate among IDUs in Baltimore. Only 35% of IDUs referred from methadone treatment clinic to TB services were enrolled into medical care.

As it was mentioned previously despite the higher incidence of TB and other medical problems among IDUs compared to general population the utilization of healthcare services by them is quite limited. The barriers to healthcare can be divided by different level (Mehta et al 2005):

- ***individual barriers***, which might include low awareness about disease, unstable lifestyle, inconsistent income, unstable housing, frequent incarceration, alcohol use, depression, fear for discrimination, confidentiality, etc.; Issue of confidentiality was identified as important in some studies while providing of TB screening and treatment services for IDUs. It was concern raised that IDUs may not wiling to disclose their HIV status to TB program personal, but during implementation of screening program showed that this issue was not relevant for participants of syringe exchange programs (Paone et al, 1998).
- ***Provider-level barriers:*** perceptions of medical staff about IDUs and their behavior, some medical practices tend to avoid referrals from drug treatment units (Umbricht-Schneiter et al 1994);
- ***Environmental barriers***: access to healthcare in general, health insurance, lack of coordination and communication between different components of healthcare delivery system.

In Georgia, in general, was observed poor access to the healthcare and limited utilization of services (Zakareishvili 2007) due to some demographic, social, economic factors, widespread poverty, etc. If we discuss these barriers in regard of TB services in Georgia the issue of affordability, which includes perception of client toward the cost of medical services and

willingness to pay (Penchansky & Thomas 1981) of services is one of the most important (personal opinion). One of the main barrier to utilize TB services by IDUs is their perception that it costs money, although TB care are free for population. Several surveys demonstrated that main reason not to seek medical care is official or unofficial out-of-pocket payments (Gotsadze et al 2001, Gotsadze et al 2005, Belli et al 2004) and patients prefer self-treatment or consultations with friends having medical background (Belli et al 2004). These findings are applicable also in case of IDUs.

Another reason which might affect utilization of TB services by IDU-s is poor link between harm reduction and TB services. This refers to organization of healthcare system in Georgia in general, where vertical programs (TB, HIV, drug treatment, etc) are separate and have not cooperated between each other a lot. This screening program among IDU-s is a first attempt to coordinate TB and drug treatment services at some level.

Sylla et al (2007) discussed three levels of healthcare organization for integrated provision of TB, HIV and drug treatment services: separate, partial and fully integrated. Separated services provides only referral mechanisms for other problems and should implement effective communication between each other, partial integrated services considers collaboration of different programmes by means of screening, testing and referral to other services, while full integration provides the one-stop services to provide comprehensive screening, testing, treatment and management services for each health problem. The authors have evaluated the fully integrated approach and concluded that although the provision of integrated services is effective but needs large resources, strong political will to put in place this approach.

Study aiming to evaluate the efficiency of providing medical care at methadone clinic sites compared to referral to another site has shown that on-site medical care was highly effective: more than 90% of patients received medical care versus to 35% receiving medical care when referred to other healthcare units (Umbricht-Schneiter et al 1994).

Beside the full integration of these services another way to improve utilization of TB services by IDU-s and to improve referral rate in case of separate or partially integrated services is using incentives (especially monetary incentives). Parlman et al (2003) assessed impact of monetary incentives on adherence to referral of IDUs from syringe exchange program to TB clinic for chest X-ray in order to exclude active TB among TST positive individuals. The study found that recipients of incentives for referral was independently associated with adherence. So incentives have been shown to be effective in improving adherence. The similar results were found in other study assessing different level of monetary incentives versus to educational

interventions on return for TST reading in active drug users. The study found out the incentives were effective and had substantial impact on compliance (Malote et al 1998).

In conclusion, referral rate of TB suspects to TB clinics is quite low in Georgia and elsewhere, which are caused by different factors. The integration of TB, HIV and drug treatment services and also using incentives for referral has been demonstrated to be effective.

4.5 Diagnosis of TB cases

Diagnostic capacity of National TB Programme of Georgia was evaluated in relation of effective implementation "International Standards of Tuberculosis Care" (WHO 2006b). Performance of NTP was evaluated according to six standards for diagnosis:

"STANDARD 1. All persons with otherwise unexplained productive cough lasting two–three weeks or more should be evaluated for tuberculosis" (WHO 2006b).

There was a significant increase in case detection of new smear-positive TB cases (in 2005 case detection rate exceeded WHO target and reached 78.5%) which is pointed on sustainable progress in case detection and diagnosis (GFATM 2006). This can be explained by intensive involvement of PHC providers into TB detection and treatment and also massive TB awareness campaign which was implemented under the GFATM project (GHSPIC 2007).

"STANDARD 2. All patients suspected of having pulmonary tuberculosis should have at least two, and preferably three, sputum specimens obtained for microscopic examination. When possible, at least one early morning specimen should be obtained" (WHO 2006b).

Improved case detection indicates good performance of this standard, also according to NTP quarterly supervision data the average rate of smears per TB suspected individual is totaled to 2.6 (NTP 2007), which indicates that from almost all TB suspects who can produce sputum 3 specimens are obtained and checked.

It should be mentioned that quality of laboratory performance has been improved significantly (GFATM 2006) in recent years due to:

- The lab network were optimized;
- sputum collection points were organized.
- Routine sputum transportation (from collection points to microscopy units and from microscopy to National Reference Laboratory (NRL) has been established.

- Binocular microscopes were provided for all microscopy laboratories.
- Laboratory consumables are provided uninterrupted countrywide.
- Trainings and re-trainings were provided for all Lab staff.
- Quality control and supervision system for microscopic laboratories were established.

"STANDARD 3. For all patients suspected of having extrapulmonary tuberculosis, appropriate specimens from the suspected sites of involvement should be obtained for microscopy and, where facilities and resources are available, for culture and histopathological examination" (WHO, 2006b).

According to WHO in population with a low prevalence of HIV infection extrapulmonary tuberculosis should account for 15–20% of tuberculosis, but in Georgia in 2006 proportion of extrapulmonary TB was 29% (WHO 2008a), which indicates that some over-diagnosis has been occurred.

Diagnosis of extrapulmonary cases mostly are based on clinical symptoms and chest X-ray, only limited number of TB facilities investigates specimens from the "suspected sites".

"STANDARD 4. All persons with chest radiographic findings suggestive of tuberculosis should have sputum specimens submitted for microbiological examination". (WHO, 2006b)

As it was mentioned above all TB suspected cases (independently how TB was suspected, clinically or based on chest X-ray findings) are requested to submit sputum for investigation. This procedure is defined in National Guideline for TB diagnosis and treatment (NTP 2004) and every TB doctor are obliged to follow this guideline. The performance of this standard (as well as other standards) are checked by supervision visits quarterly (NTP, 2007).

"STANDARD 5. The diagnosis of sputum smear-negative pulmonary tuberculosis should be based on the following criteria: at least three negative sputum smears; chest radiography findings consistent with tuberculosis; and lack of response to a trial of broad-spectrum antimicrobial agents. For such patients, if facilities for culture are available, sputum cultures should be obtained. In persons with known or suspected HIV infection, the diagnostic evaluation should be expedited". (WHO 2006b)

The proportion of smear-negative TB in new TB cases in Georgia totaled to 40%, which is quite good indicator, pointing that bacteriological services are working well and TB diagnosis are confirmed bacteriologically in the right proportion . According to NTP guidelines beside smear examination chest X-ray are provided for all TB suspected individuals and diagnosis are based on the X-ray findings and clinical symptoms if obtained 3 smears are negative. Georgia implemented new standard to test all smear-negative TB patients by

culture from 2007. The specimens from all over the country are transported to NRL and regional reference laboratory (which was established by the support of GFATM) in west Georgia and are checked by culture and DST. It should me mentioned that quality control for NRL are checked by Supranational laboratory in Antwerp, Belgium and agreement rate is 100% (Euro-TB 2008).

The new clinical guideline for TB in HIV cases was developed and HIV cases are provided with expanded diagnostic techniques. TST are provide for HIV-positive individuals and some deep examination (bronchoscopy, immunological and biochemical test, EMR, etc) are provided for them (NTP 2007).

"STANDARD 6. The diagnosis of intrathoracic tuberculosis in symptomatic children with negative sputum smears should be based on the finding of chest radiographic abnormalities consistent with tuberculosis and either a history of exposure to an infectious case or evidence of tuberculosis infection. For such patients, if facilities for culture are available, sputum specimens should be obtained for culture". (WHO 2006b)

Around 360-400 TB cases in children are diagnosed annually in Georgia, which represent 6% of all notified TB cases (Euro-TB 2008). Main location of in children is intrathoracic TB.

TB diagnosis in children are made by pediatricians (phthizio-pediatricion) who are trained specifically in TB. The diagnosis mostly based on chest X-ray findings, clinical evaluation and TST results. Most severe and difficult to diagnose cases are referred to the NCTBLD where special department for children is functioning, which provides more deep investigational opportunities.

In conclusion, Georgia has adequate capacities to implement International Standards for TB care, only issue which should be addressed is bacteriological confirmation of extrapulmonary TB.

Chapter 5: Conclusions and Recommendations

5.1 Conclusions

This study described the main factors which determine effectiveness of the screening programme of IDUs for active TB, analyzed value and usefulness of active case findings among this risk group and discussed the main problems faced for effective detection of TB cases amongst the IDUs.

In conclusion, the study results have shown:

1. TB among IDUs represents a serious problem and needs to be addressed adequately. High prevalence of TB infection and disease is observed due to several reasons: lifestyle and risky behavior factors (e.g., alcohol use) and socio-economic factors (poverty, homelessness, imprisonment, etc) which are common among IDUs. Concomitantly, there is high prevalence of HIV among IDUs and very harmful affect of drugs on immunity. Drug use and TB separately are considered as serious public health problems in Georgia. Moreover, TB is fuelled by IDUs.
2. Low utilization of drug treatment and syringe exchange programmes is one of the main problems to access drug users for TB screening, while implementation of TB and HIV interventions in these sites has been shown to be accepted by IDUs and being effective. The utilization of these services is influenced by fear of prosecution, stigmatization, lifestyle factors as well as awareness about the services.
3. Active case finding is useful tool for detecting TB cases among high risk groups and in particular among IDUs and this intervention (as was demonstrated in chapter 4.3) is considered to have significant impact on reducing TB morbidity and mortality. The screening programme identified 30 TB cases among 1406 screened IDUs in Georgia which corresponds to 2133 cases per 100,000 population and about 20 times higher than TB prevalence in general population.
4. The questionnaire used for screening of IDUs has limitations especially the sensitivity and specificity of this screening tool seems to be quite low. The symptoms described in the questionnaire which are the bases for suspicion of TB in screened individuals are neither specific nor sensitive enough to identify TB suspects properly.
5. Link between IDU services and TB clinics are very poor, several cases of IDUs identified as TB suspects were lost due to improper follow-up.

Referral system from the harm reduction centers to TB clinics is not well established. Out of 229 IDUs identified as TB suspects, only 38 presented to TB clinics for further examination. As it was demonstrated, on the basis of experience of other countries incentives (especially monetary) play an important role in improving referrals.

6. Diagnostic capacities in TB clinics in Georgia are adequate enough and mostly in line with international standards for TB care. As was discussed in chapter 4.5 some increase of case detection rate and other TB control indicators are observed during recent years. National Guidelines for TB diagnostic and treatment are well-developed and followed by TB network. Lab network is well established and effective.

5.2 Recommendations

Based on the results from field study and literature review several recommendations are presented as follows:

1. The coordination body for planning and monitoring of joint TB, HIV and drug treatment services for IDUs should be established. The coordination body should be one of the working groups under CCM and include as representatives of TB, HIV and Drug addiction institutions as well as representatives from Ministry of Justice (penitentiary system).
2. Clear case finding protocol should be developed for IDU, TB and HIV services. The staff of these programs should be able to detect these cross-cutting (co-infection) diseases and should refer suspects for further investigation and treatment to appropriate follow-up services.
3. Active case-finding among IDUs should be expanded in order to identify TB cases. One of the subcomponent of new Stop TB strategy is to "address prisoners, refugees and other high-risk groups and special situations". This intervention strategy should be extended to IDUs as well. One of the key strategies of addressing this high risk group is implementation of active case finding at drug treatment and syringe exchange programs.
4. Screening tool should be improved and considering that IDUs are at high risk of HIV infection it will be appropriate to adapt the questionnaire for screening. Along with questioning for symptoms introduce at least TST for detection of TB infection among IDUs in order to start preventive INH therapy in HIV-positive individuals.
5. A system of incentives should be introduced to improve referral from drug treatment centers to TB clinics. The results indicated that the monetary incentives have substantial impact on compliance on returning the patients for reading the skin test, in contrast educational intervention appeared to have no impact on return rate. This can be applicable for compliance for referral of TB suspects for further investigation to medical services.
6. Further research should be undertaken in order to improve screening tool and understand risk factors for TB among IDUs. This should include first all of clearly developed study protocol, involvement of harm reduction staff in designing study and testing the screening tool apriori for validation. Some demographic information and characteristics of drug use should be added in order to identify and address risk factors for developing TB.

.

References:

Aceijas, C., Hickman, M., Donoghoe, M.C., Burrows, D., Stuikyte, R., 2007.Access and coverage of needle and syringe programmes (NSP) in Central and Eastern Europe and Central Asia, Addiction, 102(8), p.1244-50

Aceijas C, Stimson GV, Hickman M, Rhodes T; United Nations Reference Group on HIV/AIDS Prevention and Care among IDU in Developing and Transitional Countries, 2004. Global overview of injecting drug use and HIV infection among injecting drug users, AIDS, 19;18(17), p.2295-303.

Aceijas, C., Friedman, S.R., Cooper, H.L.F., Weissing, L., Stimson, G.V., Hickman, M., 2006. Estimated of injecting drug users as the national and local level in developing and transitional countries and gender and age distribution, Sexually Transmitted Infectections,82;p.iii10-iii17

Aerts, A., Habouzit, M., Mschiladze, L., Malakmadze, N., Sadradze, N., Menteshashvili, O., Portaels, F., Sudre, P., 2000. Pulmonary tuberculosis in prisons of the ex-USSR state Georgia: results of a nation-wide prevalence survey among sentenced inmates, International Journal of Tuberculosis and Lung Diseases, vol.12, p.1104–1110.

AIDS Center, nd, Unpublished annual report, 2005.

Baily, G.V.J., Savic, D., Gothi, G.D., Naidu, V.B., Nair, S.S., 1967. Potential yield of pulmonary tuberculosis cases by direct microscopy of sputum in a district of South India. Bulletin of World Health Organization, Vol. 37, p.875-892.

Balabanova D., McKee M., Pomerleau J., Rose R., Haerpfer C, 2004, Health Service Utilization in the Former Soviet Union: Evidence from Eight Countries, Health Services Research, 39(6), p. 1927-1949;

Batki, S.L., Gruber, V.A., Bradleu, J.M., Bradley, M., Delucchi, K., 2002. A controlled trail of methadone treatment combined with directly observed isoniazid for tuberculosis prevention in injection drug users, Drug and Alcohol Dependence, 66, p.283-293.

Belli, P., Gotsadze, G., Shahriari, H., 2004. Out-of-pocket and informal payments in health sector: evidence from Georgia, Health policy, 70, p.109-123.

Borgdorff, M.W., Floyd, K.,Broekmans, J.F., 2002. Interventions to reduce tuberculosis mortality and transmission in low- and middle-income countries, Bulletin of the World Health Organization, 80 (3), p. 217-227.

Brassard, P., Bruneau, J., Schwartzman, K., Sénécal M, Menzies D, 2004, Yield of tuberculin screening among injection drug users, International Journal of Tuberculosis and Lung Diseases, vol.8(8):988–993

Buve, A., Changalucha, J., Mayaud, P., Gavyole, A., Mugeye, K., Todd, J., Clayton T, Mosha F, Grosskurth H, Mabey D, Laga M, Van Lerberghe W, Hayes RJ, 2001, How many patients with sexually transmitted infection are cured by health services? A study from Mwanza region Tanzania, Tropical Medicine and International Health, 6, p.971-979.

CDC, 1995. Screening for Tuberculosis and tuberculosis infection in high-risk population: recommendations of Advisory Council for Elimination of Tuberculosis. Morbidity and Mortality Weekly Report, 44 (RR11), p.18-34

CDC, 1995. Screening for tuberculosis and tuberculosis infection in high-risk populations: recommendations of the Advisory Council for the Elimination of Tuberculosis. Morbidity and Mortality Weekly Report, 44(RR-11), p.1-34.

CDC, 1996. HIV/AIDS surveillance report, 1995. US Department of Health and Human Services, Atlanta. (Vol. 7, No. 2).

CIA, 2008, The world Factbook- Georgia, available at: https://www.cia.gov/library/publications/the-world-factbook/geos/gg.html

Cohen MS, Hellmann N, Levy JA, DeCock K, LAnge J, 2008. The spread, treatment, and prevention of HIV-!: evolution of global pandemic, The Journal of Clinical Investigation, Vol.118 (4), p. 1244-1254

Collins, T, 2003, The aftermath of health sector reform in the Republic of Georgia: Effects on People' s health , Journal of Community Health, 28(2), p. 99-113

Connock M, Juarez-Garcia A, Jowett S Frew E, Liu Z, Taylor RJ, Fry-Smith A, Day E, Lintzeris N, Roberts T, Burls A, Taylor RS, 2007, Methadone and buprenorphine for the management of opioid dependence: a systematic review and economic evaluation, Health Technology Assessment, Vol. 11(9)

Curtis R, Friedman S, Neagus A, Jose B, Goldstein M, Jarlais DC, 1994, Implications of Directly Observed Therapy in Tuberculosis Control Measures Among IDUs, Public Health Report, Vol.109 (3), p. 319-327

Demissie M, Zenebere B, Berhane Y, Lindtjorn B, 2002, A repid survey to determine the prevalence of smear-positive tuberculosis in Addis Ababa, International Journal of Tuberculosis and Lung Diseases, Vol.6, p. 580-584.

Diel R, Schneider S, Meywald-Walter K, Ruf CM, Rüsch-Gerdes S, Niemann S, 2002, Epidemiology of tuberculosis in Hamburg, Germany: long-term population-based analysis applying classical and molecular epidemiological techniques, Journal of Clinical Microbiology, 40(2), p.532-9

Dolan K, Khoei EM, Brentari C, Stevens A, 2007. Prisons and Drugs:A global review of incarceration, drug use and drug services, report 12, The Beckley Foundation Drug Policy programme.

Donahoe, R,M. 1990, Drug abuse and AIDS: causes for connection. NIDA Research Monograph, 96, p.181-191.

Drobniewski F, Balabanova Y, Zakamova E, Nikolayevskyy V, Fedorin I, 2007, Rates of Latent Tuberculosis in Health Care Staff in Russia, PLoS Med, Vol 4(2), 0273-0279

Dujartin B, Kegels G, Buve A, mercenier P, 1997. Tuberculosis control: did the programme fail or did we fail the programme?, vol.2 (8), p.715-718

Elink Schuurman MW, Srisaenpang S, Pinitsoontorn S, Bijleveld I, Vaeteewoothacharn K, Methapat C., 1996, The rapid village survey in tuberculosis control, Tuberculosis and Lung Disease, 77(6), p.549-54

EMCDDA, 2007, Drug-related infectious diseases and drug-related deaths, available at: http://www.emcdda.europa.eu/publications/online/ar2007/en/diseases, (accessed Augst 6, 2008)

Euro TB, 2008, Country profile, available at: http://www.eurotb.org/country_profiles/georgia.pdf, (accessed August 2008)

Fenopetov V, 2006, The Drug Crime Threat to Countries Located on the "Silk Road", China and Eurasia Forum Quarterly, Vol. 4(1), p 5-13;

Fiellin DA, Green TC, Heimer R, 2008, Combating the twin epidemics of HIV/AIDS and drug addiction, Opportunities for progress and gaps in scale, A report of CSIS task force on HIV/AIDS, CSIS.

Friedman H, Newton K, Klein T.W., 2003. Microbial Infections, Immunomodulation, and Drugs of Ause, Clinical Microiology reviews, 15(2), p.209-219

Friedman LN, Williams MT, Singh TP, Frieden TR., 1996, Tuberculosis, AIDS, and death among substance abusers on welfare in New York City, The New England Journal of Medicine, Mar 28;334(13), p.828-33

Gamkrelidze, A., Autun, R., Gotsadze, G., MacLehose, L., 2002, Healthcare system in transition: Georgia, vol.4-no.2, European Observatory on Health Care Systems, available at: http://www.euro.who.int/document/E75489.pdf, (accessed 10 February 2008)

GFATM, 2006, Proposal: Bridging the gap in the management of drug-resistant tuberculosis in Georgia, CCM of Georgia.

GFATM, 2008, Grant Performance report, Georgia, available at: http://www.theglobalfund.org, (accessed 10 August, 2008).

GHSPIC, 2007, Annual report for the project "Expansion DOTS Implementation in Georgia, GHSPIC.

GoG, 2008, Government of Georgia. Available at www.goverment.ge, (accessed 10 May 2008)

Golub JE, Mohan CI, Comstock GW, Chaisson RE, 2005, Acrive case finding of tuberculosis: historical perspective and future prospects, International Journal of Tuberculosis and Lung Diseases, Vol.9(11), p.1183-1203

Gotsadze G, Bennet S, Ranson K, Gzirishvili D, 2001, Health Service Utilization and Expenditures in Tbilisi – 2000 Report of a Household Survey. Curatio International Foundation and London School of Hygiene and Tropical Medicine

Gotsadze G, Bennet S, Ranson K, Gzirishvili D, 2005, health care seeking behaviour and out of pocket payments in Tbilisi, Georgia" Household Survey Findings. Health Policy and Planning, 20(4), p. 232-242

Gotsadze, T.,Chawla, M., Chkatarashvili, K., 2003. HIV/AIDS in Georgia : addressing the crisis, World bank, available at: http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/, (accessed June 7, 2008)

Heimer R, 1998, Syringe Exchange Programs: Lowering the Transmission of Syringe-Borne Diseases and Beyond, Public Health Reports, Vol 113, Supl 1, p.67-74

Khechinashvili G, 2008, Zero Tolerance, Personal communication, July 2008.

Kuniholm MH, Mark J, Aladashvili M, Shubladze N, Khechinashvili G, Tsertsvadze T, Del Rio C, Nelson KE, 2008, Risk factors and algorithms to identify hepatitis C, Hepatitis B, and HIV among Georgian Tuberculosis patients, International Journal of Infectious Diseases, 12, p.51-56

Kurbatova E, Borodulin B, Borodulina EA, del rio C, Blumberg HM, Leonard MK, 2006, Risk factors for mortality among adult patients with newly diagnosed tuberculosis in Samara, Russia, International Journal of Tuberculosis and Lung Disease, 10(11), p.1224-1230.

Liu B, Sullivan SG, Wu Z, 2007, An evaluation of needle exchange programmes in China, AIDS, 21 (suppl 8), p.S123–S128

Malotte CK, Rhodes F, Mais KE, 1998, Tuberculosis screening and compliance with return for skin test reading among active drug users, American Journal of Public health, May,88(5). p. 792-796

Manous GE, Van Santen GW, Leentvaar-Kuijpers A, Coutinho RA, 1987, Tuberculosis and multitest skin tests in drug abusers, The Lancet, 330 (8558), p. 567-568

MAP, 2005, Drug Injection and HIV/AIDS in Asia, MAP

Marco a, Cayla JA, Serra M, Pedro R, Sanrama C, Guerrero R, Ribot N, 1998, Predictors of adherence to tuberculosis treatment in a supervised therapy programme for prisoners before and after release, European Respiratory Journal, 12(4), p. 967-971;

McCarthy L, Wetzer M, Sliker JK , Eisenstein TK, Rogers TJ, 2001. Opioids, opioid receptors, and the immune response, Drug and Alcohol Dependence, 62, p.111-123

Mdivani N, 2008, HIV Prevention strategies for Injected Drug Users and Prisoners in Georgia, SRH paper, KIT.

Mdivani N, Zangaladze E, Volkova N, Kourbatova E, Jibuti T, MDa, Shubladze,Kutateladze T, Khechinashvili G, del Rio C, Salakaia A, Blumberg HM, (in press) High Prevalence of Multidrug-Resistant Tuberculosis in Georgia, International Journal of Infectious Diseases. (accepted for publishing 29 May, 2008)

Mehta SH, Thomas DL, Sulkowski MS, Safaein M, Vlahov D, Strathdee SA, 2005, A framework for understanding factors that affect access and utilization of treatment for hepatitis C virus infection among HCV-mono-infected and HIV/HCV-co-infected injection drug users, AIDS, Suppl 3, p.S179-S189.

Menzies D, 2004, What is the role of tuberculin skin testing in the diagnosis of tuberculosis? in Toman's Tuberculosis case detection, treatment and monitoring, by Frieden, second edition, Geneva, WHO.

Mirtskhulava, V, Kempker, R., Shields, K.L., Leonard, M.K., Tsertsvadze, T., del Rio, C., Salakaia, A., Blumberg, H.M, 2008, Prevalence and risk factors for latent tuberculosis infection among health care workers in Georgia, International Journal of Tuberculosis and Lung Disease, Vol. 12(5), p. 513-519

Mumbda M, Visschedijk J, Cleeff MV, Hausman B, 2003, A Piot model to analyse case management in malaria control programmes, Tropical Medicine and International Health, Vol 8 (6), p. 544-551.

Murray CJ, Salomon JA, 1998, Expanding the WHO tuberculosis control strategy: rethinking the role of active case-finding, International Journal of Tuberculosis and Lung Diseases, 2 (sup. 1), p.S9-S15;

Narang P, Tyagi NK, Mendiratta DK, Jajoo UN, Bharambhe MS, Nayar S, 1999, Prevalence of sputum-positive pulmonary tuberculosis in tribal and non-tribal populations of the Ashti and Karanja tahsils in Wardha district, Maharashtra state, India, International Journal of Tuberculosis and Lung Diseases, Vol.3, p.478-482

NCDCS, 2007, Statistical report 2006, Tbilisi, Georgia

NIDA, no date, Addiction and Health, available at: http://www.nida.nih.gov/scienceofaddiction (accessed on July 17, 2008)

NIDA, No date, Medical consequences of Drug use, available at: http://www.nida.nih.gov/ (accessed July 24, 2008)

Nijaradze G, Stvilia K, Todadze K, 2005, HIV and AIDS in Georgia: A socio-cultural approach, UNESCO

NTP, 2004, National Guideline for TB diagnosis and treatment, Tbilisi, Georgia.

NTP, 2007, National Guideline for management TB/HIV coinfection, Tbilisi, Georgia.

NTP, 2007, Supervison report, unpublished, September 2007 NCTBLD, .

OSI, 2008, Newflash Georgia: "Zero Tolerance" affects Health in Georgia", available at: www.soros.org [accessed 10 May, 2008]

Paone D., Perlman D. C., Perkins M.P., Kochems M, Salomon N, Des Jarlais D.S, 1998, Organizational Issues in Conducting Tuberculosis Screening at a Syringe Exchange Program, Journal of Substance Abuse Treatment, Vol. 15(3), p.229–234.

Parfitt T, 2006, Designer drug Subutex takes its toll in Tbilisi, Lancet, Vol 368(22), p. 273-274

Parlman DC, Saloman N, Perkins MP, Yancovitz S, Paone D, Jarlais DC, 1995, Tuberculosis in Drug Users, Clinical Infectious Disease, 21(5), p.1253-64

Penchansky R, Thomas J. W 1981, The concept of access: Definition and relationship to consumer satisfaction. Medical Care, Vol. 19 (2), p. 127-40

Perlman D.C, Perkins MP, Solomon N, Kochems L, Jarlais DD, Paone D, 1997, Tuberculosis screening at syringe exchange program, American Journal of Public Health, 87(5), p. 862-863.

Perlman DC, Friedman P, Leslie H, Nugent A, Schoeb V, Carey J, SAlomon N, Jarlais CD, 2003, Impact of Monetary Incentives on Adherence to Referral for screening Chest X-rays after Syringe Exchange-BAsed Tuberculin Skin Testing, Journal of Urban Health, Vol.80, p.423-437

Portales F, Rigouts L, Bastian I, 1999, Addressing multidrug-resistant tuberculosis in penitentiary hospitals and in the general population of the former Soviet Union, International Journal of Tuberculosis and Lung Disease, 3(7), p.582-588

Rachlis B, Brouwer K, Mills EJ, Hayes M, Kerr T, Hogg RS, 2007, Migration and transmission of blood-borne infections among injection drug users: Understanding the epidemiologic bridge, Drug and Alcohol Dependencem

Vol. 90,p.107-119

Richards DC, Mikiashvili T, Parris JJ, Kourbatova EV, Wilson JCE, ShubladzeN, TsertvadzeT , Khechinashvili G, del Rio C,Blumberg HM, 2006, High prevalence of hepatitis C virus but not HIV co-infection among patients with tuberculosis in Georgia, International Journal of Tuberculosis and Lung Diseases, 10(4), p.396–401

Rieder H, 1999, Epidemiologic basic for Tuberculosis control, 1st ed, IUATLD.

Rieder H, 2004, What is the role of case detection by periodic mass radiographic examination in tuberculosis control? in Frieden ed. Toman's Tuberculosis case detection, treatment and monitoring, Geneva, WHO.

Riley ED, Vlahov D, Huettner S, Beilenson P, Bonds M, Chaisson RE.2002, Characteristics of injection drug users who utilize tuberculosis services at sites of the Baltimore city needle exchange program, Journal of Urban Health, 79(1), p.113-27

Rusen ID, Yuan L, Millson ME, 1999, Prevalence of Mycobacterium tuberculosis infection among injection drug users in Toronto, CMAJ- canadian Leading Medical Journal,23;160(6), p.799-802.

Salomon N, Perlman DC, Friedmann P, Ziluck V, Des Jarlais DC, Prevalence and risk factors for positive tuberculin skin tests among active drug users at syringe exchange program, Int J Tuberc Lung Dis, 2000, 4(1), p.47-54

Sapira JD, 1967, The NArcotic Addict as a Medical Patient, American Journal of Medicine, vol. 45, p.555-588

Sarang A, Rhodes T, Platt L., 2008, Access to syringes in three Russian cities: implications for syringe distribution and coverage, International Journal of Drug Policy;19 Suppl 1, p.S25-36.

SCAD, 2006, Report to the UNDP and EMCDA by SCAD National Focal point Georgia Drug situation 2005, SCAD Programme.

Schwalbe N, Harrington P, 2002, HIV and tuberculosis in the Soviet Union, The Lancet supplement, 360, p.s19-20

SDS, 2008, data of State Department of Statistics available at: www.statitstics.ge. (accesed 10 May 2008)

Selwen PA, Harter D, Lewis VA, Schoenbaum EE, Vermund Sh, Klein RS, Walker AT, Friedland GH, 1989, A prospective study of the risk of tuberculosis among intravenous drug users with human immunodeficiency virus infection, The New England Journal of Medicine, Vol.320 (9), p.545-550.

Shapatava E,Nelson KE, Tsertsvadze T,Del Rio C, 2005, Risk behavior and HIV, Hepatitis B, and Hepatitis C seroprevalence among injecting drug users

in Georgia, Drug and Alcohol Dependence, 82 Suppl. 1, p.S35-S38.

Smart T, 2008, New TB/HIV guidelines released to improve care and treatment of drug users, Aidsmap news, available at: http://www.aidsmap.com/en/news, (accesed on August 11, 2008)

Spire B, Lucas B, Carrieri PM, 2007, Adherence to HIV treatment among IDUs and the role of opioid substitution treatment (OST) , International Journal of Drug Policy, vol. 18, p.262-270

Stvilia, K., Tsertsvadze, T., Sharvadze, L., Aladashvili, M, Rio, C., Kuniholm, M.H., Nelson, K.E., 2006. Prevalence of Hepatitis C, HIV, and Risk Behaviors for Blood-Borne Infections: A Population-Based Survey of the Adult Population of T'bilisi, Republic of Georgia, Journal of Urban Health: Bulletin of the New York Academy of Medicine, Vol. 83(2), p. 289-298.

Swinscow TDV, Campbell MJ, 2002, Statistics at Squire One, Tenth edition, BMJ books

Sylla L, Bruce RD, Kamarulzaman A, Altice FL, 2007, Integration and co-location of HIV?AIDS, tuberculosis and drug treatment services, International Journal of Drug policy, 18, p.306-312

Sytze T Keizer, Miranda M W Langendam, Henk van Deutekom, Roel A Coutinho, Erik J C van Ameijden, 2000. How does tuberculosis relate to HIV positive and HIV negative drug users? J Epidemiology of Community Health, 54, p. 64–68

The Center for Harm Reduction, Macfarlane Burnet Centre for Medical Research and Asian Harm Reduction Network, 2003, Manual for reducing Drug related harm in Asia, CHR.

Tsertsvadze T, 2007, TB among HIV cases in Georgia, Presentation at TB/HIV working group meeting;

Tsintsadze M, 2006, Study of HIV/AIDS and high risk behaviour among penitentiary system in Georgia, Dissertation nominated for degree of candidate of medical science, Tbilisi Medical University.

Umbricht-Schneiter A, Ginn DH, Pobst KM, Bigelow GE, 1994, providing Medical Care to methadone Clinic Patients: Referral vs On-site care, American Journal of Public Health, Vol 84 (2), p.207-210

UNAIDS, 2000, Voluntary Counseling and Testing, technical Update, UNAIDS, Geneva.

UNAIDS, 2006, The global AIDS epidemic: At risk and neglected, four key population, pp. 103-123. Geneva: UNAIDS.

UNAIDS, 2007a, AIDS Epidemic update: December 2007. available at: http://www.unaids.org/en/KnowledgeCentre/HIVData/EpiUpdArchive/2007/d

afault.asp, (accessed May 17, 2008)

UNAIDS, 2007b, Eastern Europe and Central Asia AIDS epidemic update Regional Summary, available at: http://www.unaids.org/en/KnowledgeCentre/HIVData/EpiUpdate/EpiUpdArchive/2007/, (accessed 20 May, 2008)

UNDOC, 2007, World Drug Report 2007, available at: ttp://www.unodc.org/documents (accesed May 22, 2008)

UNDP, 2000, Human Development Report of Georgia. Tbilisi: United Nations Development Programme: Tbilisi, Georgia.

UNGASS, 2007, United Nations General Assembly Special Session on HIV/AIDS, Monitoring the declaration of Commitment on HIV/AIDS, Georgia, Country report, 2006, UN.

UNODC, World Drug Report, 2007, UNODC.

van Deutekom H, Gerritsen JJ, van Soolingen D, van Ameijden EJ, van Embden JD, Coutinho RA, 1997. A molecular epidemiological approach to studying the transmission of tuberculosis in Amsterdam. Clinical Infection Disease 25 (5), p.1071–7

Weinstock DM, Hahn O, Wittkamp M, Sepkowitz KA, Khechinashvili G, Blumberg HM, 2001, Risk for tuberculosis infection among internally displaced persons in the Republic of Georgia, International Journal of Tuberculosis and Lung Diseases 5(2), p.164–169

WHO, 2001, Tuberculosis control in prisons, manual for program managers, WHO, Geneva, WHO/CDS/TB/2001.281

WHO, 2003. European framework to decrease the burden of TB/HIV, EUR/03/5037600

WHO, 2005, Key TB and TB/HIV facts and figures, availabe at: (http://www.who.int/3by5/en/facts.pdf, (accessed 1 August, 2008).

WHO, 2005. Highlights of Health in Georgia, WHO Europe, available at: http://www.euro.who.int/highlights

WHO, 2006a, Treatment of injecting drug users with HIV/AIDS: promoting access and optimizing service delivery, WHO, Geneva.

WHO, 2006b, International Standarts for Tuberculosis care, available at: http://www.who.int/tb/publications/2006/ (accessed June 17, 2008)

WHO, 2007a, Global TB Report 2005, available at: www.who.int, accessed February 27, 2008

WHO, 2007b, Status Paper on Prisons and Tuberculosis, WHO regional Office

for Europe, Copenhagen.

WHO, 2008a, Global TB Report 2006, available at: www.who.int, (accessed April 15, 2008).

WHO, 2008b, Fourth Global Report on Anti-Tuberculosis Drug Resistance in the World, WHO/HTM/TB/2008.394, available at: www.who.int, (accessed March 5, 2008).

WHO, 2008c, Evidence for action technical papers: Policy guideline for collaborative TB and HIV services for injecting and other drug users, an integrated approach,, WHO, Geneva.

WHO, UNODC and UNAIDS, 2004, Substitution Maintenance Therapy in the Management of Opoid Dependence and HIV/AIDS Prevention, Geneva, WHO

Wiebel, W.W., 1990, Identifying and gaining access to hidden population, in Lambert E.Y.ed. The collection and interpretation of data from hidden populations. NIDA Research Monograph 98. Rockville, Maryland: US Department of Health and Human Services.

Wobeser W, Yuan L, Naus M, Outcome of pulmonary tuberculosis treatment in the tertiary care setting — Toronto 1992/93, Canada's Leading Medical Journal; 160 (6), p.789-794.

World Bank, 2007, Georgia at Glance, Available at: http://devdata.worldbank.org, accessed Augus 10, 2008

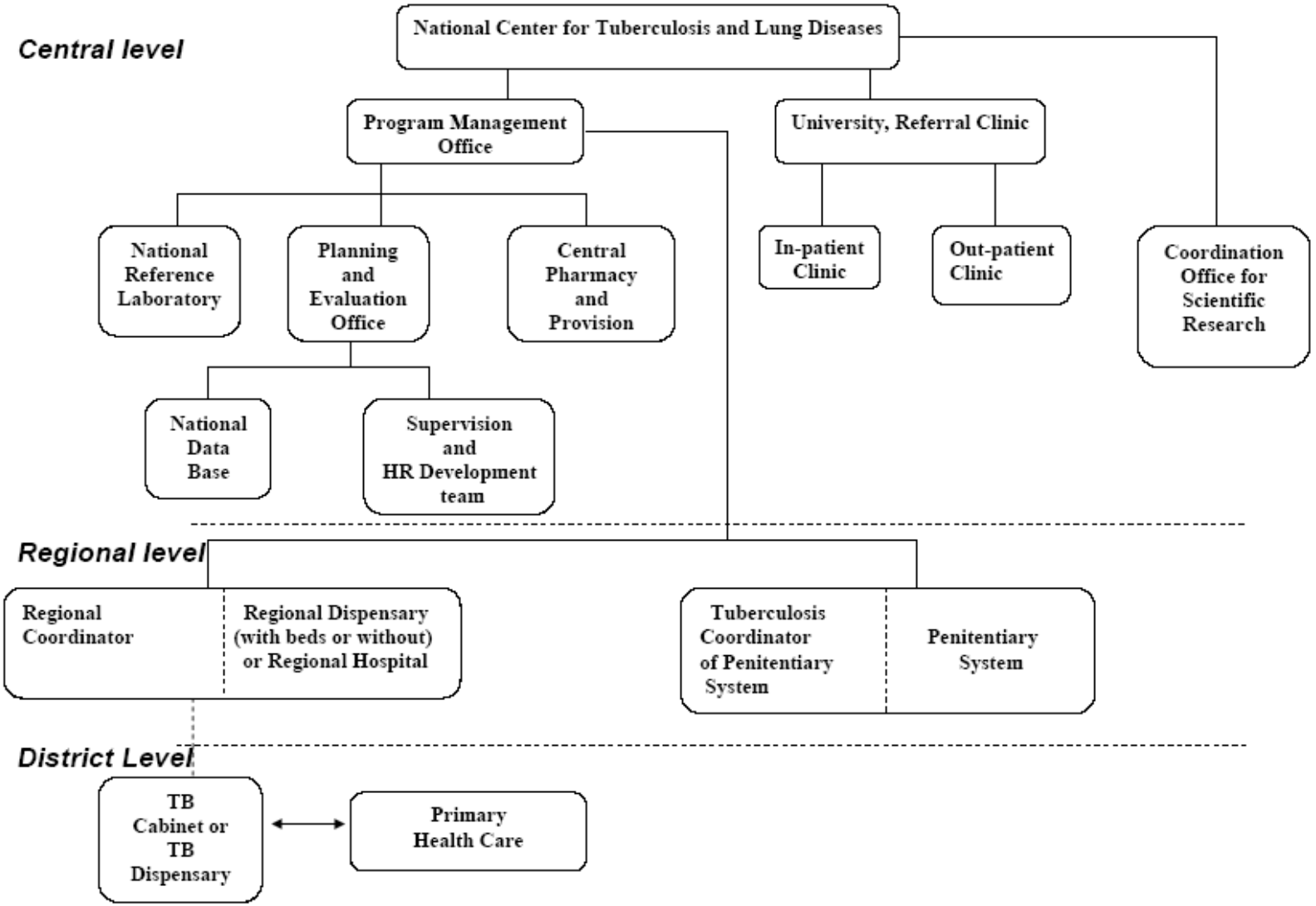
Zakareishvili, N., 2007, Factors influencing the Health Care Utilization in Georgia, Thesis for MPH, Royal Tropical Institute.

Zalesky R, Abdullajev F, Khechinashvili G, et al, 1999, Tuberculosis control in Caucasus: successes and constrains in DOTS implementation. International Journal of Tuberculosis and Lung Diseases; 3, p.394-401;

Annexes

Annex 1: Map of Georgia

Annex 2: Organizational Structure of NTP



Annex 3: Screening questionnaire

kiTxvari tuberkulozze saeWvo avadmyofTa gamosavlenad

Questionnaire for detection suspect patients on TB **ID:** _____

☐ **skriningi Semosvlisas** ☒ **masiuri skriningi** ☐ **pasiuri skriningi**

Entry screening **Massive screening** **Passive screening**

TariRi _____ gvari _____

Date P saxeli _____ mamis sax. _____

dabadebis TariRi _____ _____ _____ samkurnalo'dawesebuleba _____

Date of Birth ricxvi Tve weli Hospital

tub-diagnozi ukanasknel i 5 wlis ganmavl obaSi: ki ☐ ara ☐

TB Diagnosis during the last 5 years: Yes No

tub-sawinaaRmdego medikamentebi ukanasknel i 5 wlis ganmavl obaSi: ki ☐ ara ☐

TB drugs during the last 5 years: Yes No

standartizebuli qimioTerapia uSualo zedamxedvel obiT ki ☐ ara ☐

DOTS treatment : Yes No

wona: _____ **Kg** **simaRle:** _____ **Cm** **smi:** _____

Weight: **Height:** **BMI:**

"smi" - 19 da nakl ebi iTvl eba saeWvod. **"BMI" 19 or less - suspect.**

xvel eba 2 kviraze meti xniT:	ki	2	ara	0
Cough more then 2 weeks:	yes		no	
naxvel i:	ki	1	ara	0
Expectoration:	yes		no	
wonis dakarg va:	ki	1	ara	0
Loss of weight:	yes		no	
umadoba:	ki	1	ara	0
Loss of appetite:	yes		no	
ofl ianoba RamiT:	ki	1	ara	0
Night sweating:	yes		no	
tkivil i gul mkerdis areSi:	ki	1	ara	0
Chest pain:				

qul ebis saerTo raodenoba: _____ **5 an meti saeWvo.**

Total number of score: **5 or more suspect.**

To be filled by doctor or nurse (health worker)

Sevsebuli unda iqnes samedicino personalis mier

klinikurad saeWvo: **YES** ☐ **NO** ☐

Clinically suspect: