Knowledge for Action in HIV/AIDS in the Russian Federation

Report of findings

Working Document

October 2006

This is a Working copy of the Report prepared by the Knowledge for Action in HIV/AIDS in the Russian Federation Programme funded by the UK Department for International Development. The programme was implemented jointly by UK and Russian researchers between September 2002 and September 2006. This paper outlines the first draft of the Report prepared in August 2005 for consultations between programme partners. The consultation process was undertaken between September 2005 and June 2006 and included a series of high level and working meetings with a wide range of national and international stakeholders. The primary purpose of the programme has been to support effective decision-making processes in the area of HIV/AIDS in Russia; and the report findings have aimed primarily at Russian national and local policy-makers and practitioners. Therefore, comments, amendments and additions recommended by programme partners through the process of consultations have been introduced in the Russian copy of the Report only. The English version does not include any changes made to the Report since August 2005 and should be referred to as a working document only. For more complete and up to date version of the Report the readers are advised to refer to the Russian version of the Report published in October 2006. Both versions can be obtained from the Institute for Health and Human Development, University of East London.

The key differences between the English and the Russian versions of the Report, which the readers are advised to take into account are as follows:

a. The Working copy prepared in August 2005 does not include some behavioural data analysed at later stages of the programme. The sections where the data are missing indicate that the data are available in the Russian version only;

b. The Working copy was drafted, primarily, by UK researchers and reflects interpretation of findings and recommendations proposed by the UK team. During the process of consultations Russian stakeholders and researchers suggested a series of amendments and/or alternative interpretations of the findings. Although these changes do not affect any primary data presented here, the Russian version provides a more comprehensive view of the HIV/AIDS situation in Russia and should be interpreted as a master copy;

c. In the late 2005 the Russian government introduced a number of policy changes in the area of HIV/AIDS, particularly in relation to universal access to antiretroviral treatment; and substantial financial resources were allocated to HIV/AIDS from the national budget in the early 2006. These changes have been commented upon in the Russian version only. Some conclusions and recommendations provided in this version of the Report, particularly those regards political and financial commitment, should be treated as related to the period of 2005 or earlier.

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Foreword

The purpose of the present document is to provide a basis for consultation with key partners as to the interpretation of the findings and the implications and policy recommendations which they may imply.

In the report we present early findings from the research programme: Knowledge for Action in HIV/AIDS in the Russian Federation, implemented since August 2002. The programme was funded by the UK Department for International Development as part of its wider programme to support Russian Federal and Regional Authorities and civil society in responding to epidemics of HIV infection in the country which have been among the fastest growing in the world.

Over recent years there has been a universal acknowledgement that epidemics of HIV infection are at the same time linked, across the globe, and embedded, in each country, in the rich matrix of social, economic, political and institutional conditions and processes which obtain there. These processes and conditions may drive or mitigate HIV epidemics through their effects in structuring risk environments, conditioning individual behaviours, and by providing the mechanisms for delivery of prevention and treatment interventions, while at the same time creating barriers to their effective implementation. This acknowledgement has lead to widespread acceptance of the view that prevention and control of HIV/AIDS requires action at the social and political, as well as the medical levels. The UNGASS Declaration (1) and the Global AIDS Strategy Framework (2) demand a multisectoral response delivered through policies which integrate education, prevention and care and tackle HIV-related risks, vulnerability and impact. But while a multisectoral response must be built on a foundation of knowledge and evidence, this foundation and the research activities which generate it have, all too often, been fragmented both intellectually and contextually.

By linking studies of risk behavior, HIV epidemiology, economic aspects of HIV, and the policy environment at all stages of the research process: from design, through fieldwork to analysis and interpretation; the current programme sought to contribute to the knowledge base for delivery of an effective response to HIV/AIDS in Russia. A multidisciplinary programme to support a multisectoral response.

The programme has been delivered at unprecedented speed for such a complex undertaking. Over three years more than 15 primary fieldwork-based research studies have been carried out in four research sites across Russia involving the conduct of several thousand interviews and laboratory based tests. Two factors made this possible to achieve, while at the same time maintaining scientific rigor. First, the leadership provided at the federal level by the Russian

[1] United Nations. Declaration of commitment on HIV/AIDS. United Nations General Assembly Special Session on HIV/AIDS, June 2001

[2] UNAIDS. The Global Strategy Framework on HIV/AIDS, June 2001.

Ministry of Health and Social Affairs, the Federal AIDS Centre, and the Central Institute of Public Health, and at the regional level by administrations of Altai krai and the Volgograd oblast, despite the almost permanent revolution of political and administrative restructuring they have faced over the period of programme implementation. Second, the unfailing commitment and efforts of the research and logistical support teams in Russia and Imperial College. Through genuine partnership, we have been able to overcome the many difficulties and barriers which the programme has faced.

Russia's response to HIV/ADS is constantly evolving. New influences including moves within Ministries toward evidence based policy making; and output and outcome focused planning, together with the availability of new resources from the World Bank and the Global Fund to fight AIDS, TB and Malaria are likely to accelerate this evolution, and enhance the delivery of effective HIV prevention and care in the country. We are confident that the research findings presented in this report, and those which the research will continue to generate over the coming period can contribute to this acceleration and enhancement by providing a solid basis of knowledge to support policy and intervention, and to challenge preconceptions and stereotypes.

CHAPTER 1. INTRODUCTION

1.1. Background to the HIV epidemic and its origins:

1.1.1. Economic political and social change

The period since the beginning of the last decade has seen rapid economic, political and social change in the Russian Federation. Market reforms and political restructuring continue to effect radical changes in economic conditions, standards of living and conditions of work, as well as major shifts in ideology. While decline in domestic production in the early 1990s have been reversed over the last five years, its legacy in creating increases in poverty, huge income differentials, and unemployment, (especially among women) has persisted. Economic migration, wars and the opening of borders led to increased migration both within the Russia and between the Russia and other countries.

Internal and international travel has increased considerably together with internal migration and the influx of refugees; with large numbers experiencing long periods of displacement from family relationships, poor living conditions and financial dependency on the informal economy. Economic and political changes have been paralleled by a change in ideological focus from the collective to the individual, both in terms of the locus in which values are determined, and the orientation of these values. At the same time, the increasing cultural commerce between Russian and Western societies has led to a rapid penetration of sexually oriented products, images and advertising. Pornography has become widely available through sex shops, the internet and other outlets.

1.1.2. Impact on patterns of drug use and sexual behaviour

Although systematic studies documenting changes in drug-using and sexual behaviour and attitudes to these in Russia are few, significant changes are widely believed to have occurred, and it is possible to discern a number of factors which may have engendered them. Russia is located geographically above Central Asia. In 2002, the United Nations Office on Drugs and Crime (UNODC) estimated that 3,400 metric tons of opium was produced in Afghanistan, representing 76% of world production and with a value at the farm gate of $1.19 billion[1]. Production is distributed through three major trafficking routes. The “Northern route” passes directly through the central Asian Region to Russia, the South Caucasus and then to Europe. Since the mid 1990s, there has been an important shift in trafficked volumes away from the Western and towards the Northern route, with perhaps 50% of Afghan production (35% or world production) now passing through Central Asia to Russia. With transit and trafficking, local markets have developed and these have driven an explosion of injecting drug use in Russia, with high levels of risk behaviour for transmission of blood-borne pathogens. While injecting drug users are registered by the state in Russia the number of IDUs registered is widely believed to be an underestimate (4). Estimates of the true number of IDUs suggests between 1.5 and 3 million or 1-2% of the population of Russia (4;5).

Travel provides with its associated opportunity for sexual contact, perhaps with prostitutes, and sometimes in areas with a high prevalence of STIs such as South East Asia and Africa. At the same time increasing unemployment and impoverishment of sections of the undisplaced population, especially women, and pressures on resources for education and social services are believed to have led to a rapid growth in formal and informal prostitution. In addition there is anecdotal evidence that large numbers of young people are dropping out of school and that this is associated with earlier sexual debut, drug use and an increase in child and adolescent prostitution.

The combination of the declining influence of collectively defined and oriented social norms, the emphasis on individual choice and consumerism, the glamourisation of sexuality and the diffusion of sexual imagery may have had led to a profound shift in sexual mores and lifestyles within Russia, especially among young people. In addition to explicit prostitution for money and payment in kind, it is widely believed that there had been an increasing

commoditization of sexual relations in a more general sense, with a tendency for the formation of temporary sexual relationships with a clear but implicit economic dependency of one partner on the other.

1.2. Impact on Health system.

The health care system inherited by the Russian Federation from the Soviet Union was the "Semashko model". Its main features were an emphasis on inpatient care and hospital based services rather than primary care or preventative medicine, input based planning, rather than needs, or cost effectiveness based planning and a reliance on funding from the state budget rather than through social insurance or direct payment. By the end of the Soviet period this model had already shown itself to be inadequate to meet the evolving health needs of the population and following the an economic collapse suffered in Russia during the 1990s this centrally funded model of health care became unaffordable. The 1990s also saw significant worsening in many health indicators, especially life expectancy among men.

In 1993 the Russian Government began to introduce a number of reforms including compulsory health insurance, both to address the shortage of funding for health services and to move towards more cost effective, responsive and efficient health care delivery. Key objectives were to decentralise funding and planning, to promote the development of primary care, and to reduce unnecessary hospitalisation. However the pace of reform continues to be compromised by budgetary constraints.

1.3. Epidemics of sexually transmitted infection and HIV.

Over the past 15 years the Russian Federation experienced major epidemics of infectious diseases associated with transmission through sex or drug use. From the low point in 1988, more than 80 fold rises in annual syphilis notifications had been observed by 1998, with incidence rates among younger women reaching more than 3% in some regions. These syphilis epidemics point to more widespread epidemics of STIs in the population. Although these now appear to have stabilized, incidence remains high.

After the first case of HIV was registered in the Russian Federation in 1987 incidence remained low and stable until the mid 1990s with a cumulative total of 726 cases registered to the end of 1993. From 1995 onwards the number of new cases began to increase sharply from 1,086 in 1995, to 6,959 in 1997, to 178, 857 in 2001 (1). There are currently 305,805 people registered as living with HIV in the Russian Federation, and the majority of cases are associated with injecting drug use (IDU). Thus HIV is concentrated among injecting drug users although Russian Health Authorities argue that heterosexual spread has been increasing in recent years (2;3). There is considerable regional variation in incidence and prevalence.

There is a substantial overlap between sex worker and IDU populations (6), giving rise to the possibility of large epidemics of sexually transmitted HIV infections; especially against the background of high prevalence of HIV transmission enhancing STI infections. Russia has the second largest prison population in the world and a very high turnover (9). A large proportion of the prison population are IDUs and this, coupled with the high turnover of the population and severe overcrowding, leads to a high potential for HIV transmission within prisons.

1.4. HIV/AIDS in the Russian Federation: some key challenges and the role of evidence in overcoming these.

Russia is experiencing major epidemics of HIV infection, currently concentrated among IDUs. However there is potential for generalisation of the epidemic through sexual transmission and some evidence that heterosexual transmission is increasing. This epidemic has been driven

by the social political and economic changes which have occurred in the country since the beginning of the last decade and the effect of these changes on risk environments and the risk environments and drug injecting and sexual behaviour within the population.

1.4.1. Key challenges

In developing a response HIV/AIDS Russian stakeholders are confronted with at least three key challenges:

1. First, the concentration of these epidemics among injecting drug users, many of whom are also commercial sex workers creates a dilemma for Russian authorities. On the one hand the concentration of HIV infection within IDU populations provides a major opportunity to focus resources prevention and care activities where they are most needed. On the other, because injecting drug users and commercial sex workers are viewed as deviant and antisocial elements, it is very difficult politically for politicians and government officials to justify spending scarce health resources for prevention or treatment among these groups in the face of competing priorities. This political difficulty is compounded by the nature of internationally accepted best practice in treating opiate addiction and reducing risk of HIV infected drug users transmitting the virus to others. The most effective way to prevent HIV transmission by drug users is through the delivery of targeted harm reduction interventions, and a key modality of drug treatment for opiate abusers is provision of substitution therapy. However, both harm reduction and substitution therapy can, and have been viewed as a form of complicity with drug use, and have therefore proven extremely difficult for health leaders to embrace, in both political and legal terms. How can we help to make delivery of effective interventions at adequate scale among stigmatized groups a political possibility?

2. Second, epidemics of HIV infection are long-wave events. The effects of action or inaction on HIV prevention now will be felt over decades. But political cycles are short. How can politicians and health leaders be supported to take the necessary decisions now and mitigate any short term political consequences, particularly when there is so much uncertainty over the future trajectory of the HIV epidemic in Russia, and extent to which it may become generalized and over what timescale ?

3. Third, the health system itself is in transition. The old “Semashko model” with its emphasis on inpatient care and hospital based services rather than primary care or preventative medicine, input based planning, rather than needs, or cost effectiveness based planning is peculiarly ill adapted to delivering type of multisectoral response which is universally acknowledged to be required to address HIV/AIDS prevention and treatment. While reforms have been in progress for more than a decade, they are incomplete, and the continuing shortage of funds for public health services have created a mixed model, often with significant proportions of service revenue delivered through out of pocket payments. This “market in healthcare” can often work to create perverse financial incentives for providers to deliver services which deliver maximum income rather than maximum health gain. How can we help overcome barriers within the health system to ensure that the structures are in place to deliver rational cost-effective interventions?

1.4.2. Role of evidence in addressing challenges

Objective evidence can help address each of the three problems identified above in a number ways:

1. Firstly, evidence can be used to challenge stereotypes and preconceptions about HIV epidemics and the people who are affected by them, and assumptions about the views and perceptions of different constituencies including policy makers and the general public. Overcoming these stereotypes and abandoning misconceptions can help to make delivery of needed interventions more politically feasible
2. Information on possible trajectories of HIV epidemics based on models grounded in locally estimated behavioural patterns can clarify planning and intervention prioritization.
3. Knowledge of health system barriers to implementation of effective interventions allows the development of strategies to overcome these.
4. Detailed characterization of patterns of behaviour which drive HIV epidemics inform the design and fine tuning of preventive interventions
5. Knowledge of the source quantity and disposition of resources available, and currently being brought to bear on the problem of HIIV/AIDS allows them to be reallocated in a more cost effective way.

The research presented and reported here aims to add to the evidence base on HIV/AIDS in Russia and thus to help address the challenges the country faces in responding to the epidemic.

1.5. The Knowledge for Action Programme: background, purpose and design

1.5.1. Background to the programme

The programme: “Knowledge for Action in HIV/AIDS in the Russian Federation”, has been implemented as a partnership between Russian Federal and Regional Authorities, the UK Department for International Development and Imperial College since September 2002. The programme was funded by the UK Department for International Development. as part of its wider programme to support Russian Federal and Regional Authorities and civil society in responding to epidemics of HIV infection in Russia. The programme grew out of a longer term engagement of staff at Imperial College problems of prevention and control of infectious diseases and health service reform in countries of the former Soviet Union. In particular collaborative work had been carried out with the Russian health ministry on control of infectious diseases since 1997, addressing first the reform of venereological services in the Samara Oblast and later the explosive outbreak of HIV infection in Togliatti.

In 2001 the UK Department for International Development agreed to fund a £25m programme of work in Russia to support Russian federal and regional Authorities and civil society to responding to epidemics of HIV infection in Russia. The programme included a large component to support scaling up of harm reduction activities in two regions, as well as support to UN agency activities within the country and the current programme. The harm reduction scale-up was cancelled in 2002.

1.5.2. Purpose of the programme

The purpose of the programme was to contribute to the knowledge base needed to guide effective policy and intervention. and to build capacity to carry out research to provide evidence to guide effective public policy as well as sustainable capacity to undertake

epidemiological, behavioural, sociodemographic and economic analyses of the HIV epidemics in Russia.

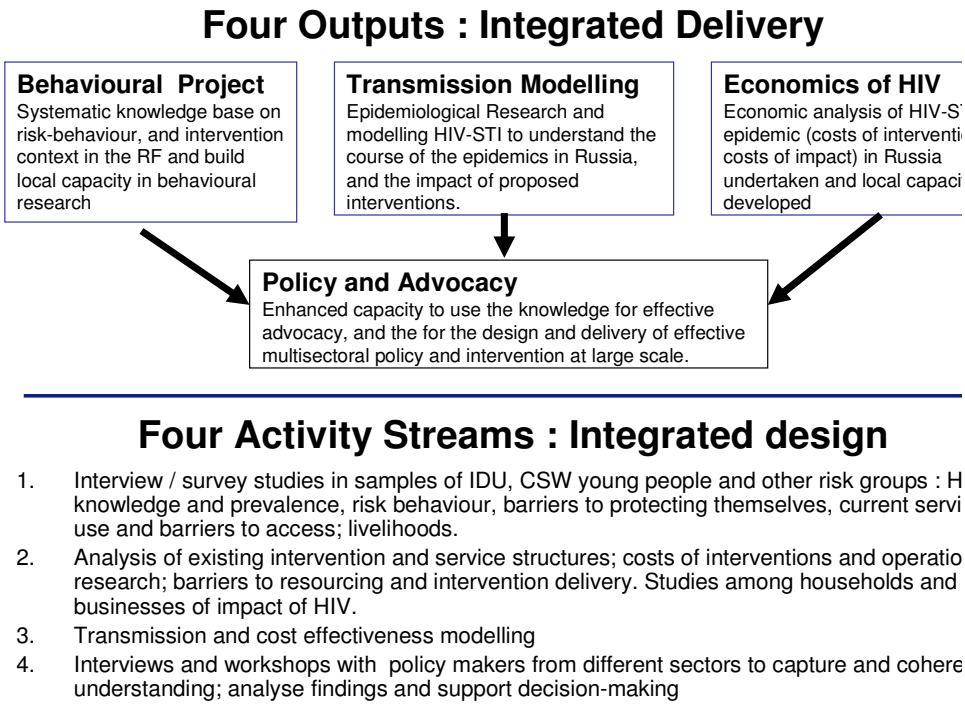
1.5.3. Design of the programme

The programme was designed with four linked outputs, each delivering new knowledge in a key area :

- **Output 1**: Behavioral research
- **Output 2**: A mathematical model of the transmission dynamics of HIV-STI to understand the course of the epidemics in Russia, and the impact of proposed interventions.
- **Output 3**: Economic analysis of HIV-STI epidemic in Russia
- **Output 4**: Policy and advocacy research.

The four outputs were designed together from the bottom up in order that findings from each output could be integrated with that from other outputs. The overall structure f the programme is presented in Figure 1.

Figure 1. Outputs and activities



1.6. Narrative summary of Key findings

In this section we provide an overview of the major findings of the research programme . We present these theme by theme.

1.6.1. Perception of HIV/AIDS as a public problem:

Both policy-makers and the population are well aware about the growing problem of HIV/AIDS in Russia. They recognize that the uncontrolled epidemic may have a significant negative impact on the country in the future. However at present the problem is of small scale compared to many other public issues and its consequences appear to be distant and uncertain. As a result policy choices and allocation of financial resources is made in favour of other public priorities.

The current system of decision-making and the overall public service management does not have effective mechanisms or capacities to choose between various policy priorities and strategies for interventions. The choices made by policy-makers are multiple and often arbitrary based on personal opinion and knowledge. There is neither an agreed set of strategic public priorities nor clear guidelines on how these priorities are chosen. As in many countries HIV/AIDS in Russia is 'swallowed up' by dozens of other competing policy issues.

The threats of the uncontrolled epidemic are seen by regional decision-makers largely through the impact on demography, mortality and public finance. There are doubts about the impact on the economy, poverty and political situation.

The attention of the government to HIV/AIDS has increased in recent years. However it seems to be more of symbolic and declarative nature and can possibly be linked to the international pressure and significant financial resources allocated through internationally funded programmes.

The evidence of the changes in the attitudes of the population towards HIV/AIDS is contradictory. On the one hand the population got used to the problem and started talking less about it. On the other hand almost a half of 15-49 year olds report having changed their behaviour as a result of the epidemic.

The level of stigma towards HIV/AIDS and HIV+ people is still high. Although AIDS is not seen as a disease of high risk groups alone, it is still common to think that "normal" people can be infected "only by chance". The "real" risk is possessed by certain population groups who are marginal to the society and who are not those who live and work next to us.

1.6.2. Attitudes towards interventions:

Harm reduction and sex education in schools are still perceived as controversial and difficult to scale up. However the overall societal resistance to these strategies seems to be more of a widely believed myth than a fact. Harm reduction is supported and opposed by approximately the same proportion of decisions-makers and the population with about a third taking nether side. As for sex education, it is supported by the overwhelming majority. There is no doubt that there are a number of institutions who appear to be highly influential in contemporary Russia and who, for various reasons, take a negative position towards Harm reduction and/or sex education in schools. However one of the key obstacles to scaling up of both strategies seems to be this faulty conventional belief that "public opinion" is against it.

Among other key obstacles to the development of Harm reduction in Russia are the following there is little information on operation and effectiveness of existing projects in Russia; financial dependence on grants and the lack of government resources to support the projects; mistakes in advocating for harm reduction by making a strong on needle-exchange and IDU rights rather than prevention of HIV; discrepancies and gaps in the legislation; stigma and marginalizing of high risk groups.

The key obstacles to the development of sex education programmes in schools are conservative views of the Russian education system on the issues related to sexuality with a strong focus on abstinence and moral upbringing rather than on providing young people with important information about their bodies and themselves; the lack of qualified trainers and adequate education materials; and mistakes in the implementation of the earlier programmes without taking into account contextual and cultural context of Russia.

Harm reduction and sex education are also perceived as "Western" interventions which were imposed on Russia. Despite a wide spread of international development programmes in Russia the expression "Western influence" still seems to have more negative rather than positive connotation.

The development of ART programmes is widely supported by decision-makers. However they are realistic about the government financial capacities and do not think that the free universal treatment can be supported by the government in the near future. It seems there are two possible options for the development of ART in Russia: the provision will be either universal, but with the majority of resources provided by international sources, or selective with prioritizing children, pregnant women and those who acquired HIV through unsafe medical procedures.

Drug treatment services are not effective and the access to treatment is limited by a number of constraints including compulsory legal requirement to be registered; inability to pay fees and low efficacy. The services are poorly connected with other drug-related facilities and interventions.

1.6.3. Communication, co-ordination and delivery of services

Co-ordination between different HIV stakeholders has improved in recent years. The co-ordination structures are in principle perceived as effective. In the regions however these have almost no representation of NGOs and PLWHA. NGOs are involved in implementation. But there is little exchange of information between the government and NGOs and the involvement of the latter in decision-making is marginal. The involvement of PLWHA in policy-making is generally supported. However there are currently no mechanisms available at the regional level.

The role of private sector stakeholders in HIV/AIDS is not clearly defined. At the regional level they are viewed largely as providers of extra budgetary funding. At the federal level the understanding of their potential role in prevention of HIV at the workplace is broader. However there is no evidence of any strategy or mechanisms to initiate this. The private sector itself does not yet see how the epidemic may affect them in the future or what they themselves could realistically do to prevent it.

Financial resources allocated to HIV/AIDS by the government are still perceived as insufficient. It remains unclear, however, whether the substantial funding allocated by international donors is taken into account by decision-makers and if so, how it is done and what the actual financial gap is. We also found evidence that existing resources are not efficiently spent with a number of services and activities being duplicated.

The Healthcare system in Russia is experiencing resource constraints. Access to and quality of services are widely believed to have fallen relative to Soviet times. Fees and under-the-counter payments are widespread and a large proportion of the population cannot afford basic healthcare. It appears that the reforms implemented since the late 1980s have stagnated. It is likely that these challenges within health system will continue to impose constraints on effective HIV control, particularly in relation to treatment, care and support.

Although the need for high level political leadership and multisectoral response is widely recognised, in practice the responsibility for HIV/AIDS still remains within the remit of the health authorities and health institutions. They appear to be the main actors holding the key information on HIV/AIDS and deciding on the content of the AIDS programmes. At the same time decisions on HIV finance are taken by the financial authorities who have little knowledge or understanding of technical aspects of the design, implementation and evaluation of interventions. This leads to gaps between policies and programmes on paper and their implementation in practice.

The involvement of international donors and agencies in HIV control is generally perceived as positive. They however are widely criticized for pushing their own agendas, and being

insensitive toward the local contexts as well as coordination of their activities poorly with the Russian authorities.

Information on HIV/AIDS available to and used by decision-makers is perceived as insufficient. There is more information on epidemiological and behavioural aspects of HIV/AIDS but very little data from modeling and economic analyses.

The NGO sector is still poorly developed with one group of NGOs being significantly dependent on international grants and the agendas of the international donors; and the other group being quasi- NGOs dependent on the government policies and funding. There are significant deficiencies in the legislation regulating co-operation between NGOs and government structures.

1.6.4. Prevalence of HIV, hepatitis C and syphilis among IDUs

Among community recruited injecting drug users HIV prevalence was over 14% in Moscow, 9% in Barnaul and 3% in Volgograd. It has been suggested that 10% HIV prevalence can be a critical threshold in the efficient containment of HIV epidemics among IDU, as after this point far greater resources and intervention coverage are required to bring about epidemic containment or reversal. Given that prevalence of HCV was over 50% in all sites with a substantial co-prevalence of syphilis markers there must remain an urgent need scale-up community-based initiatives in HCV and HIV prevention, as well as sexual risk reduction, for IDUs in Russia.

1.6.5. Profile of IDUs

The samples of injecting drug users recruited in both the community recruited survey included a large number of recent initiates into injecting, aged between 20-29 years. The sample comprised predominantly heroin injectors, with the majority reporting a history of injecting home made drugs. Contrary to our expectations, higher than anticipated proportions reported only occasional injection. The treatment sample which had a larger number of recent initiates into injecting than anticipated, were more likely to inject with used needles/syringes (in Barnaul) as well as inject more frequently, and were younger than IDUs in the community sample.

Social stereotyping is a key issue here. By constructing drug users and sex workers as “other” society can feel more comfortable in taking moral, financial and clinical shortcuts in its dealings with these people. But reality is different. Our findings contradict widely held stereotypes of injecting drug users as belonging to marginalized groups or as being “foreigners”. Most drug users were born in the town/region where they now live with their families and have the right to medical treatment there. Many had job, regular incomes and had received substantial education.

1.6.6. Prevalence of risk behaviour in general population sample.

Data from our research through the Russian Longitudinal Monitoring Survey suggest significant levels of injecting drug use. Seven per cent reported having used drugs in the past and nearly 2% reported injecting drugs at some time in their lives. Most of respondents who had ever injected were male (84.6%). Only twelve participants (0.2%) reported injecting in the last 4 weeks. One third of the people who had ever injected reported injecting with a used syringe (29.8%).

Only 5% subjects reported having had sexual intercourse without a condom with two or more partners in the previous 12 months suggesting relatively low rates of risk behaviour in the wider population. Interestingly when we conducted; and were therefore classified as “at risk” by our definition. However there was evidence that those in their thirties with good jobs and high incomes were the most at risk.

Our findings suggest that the common belief that HIV/AIDS affects only marginalized populations who do not contribute to the national economy is incorrect, but that those most

vulnerable to the sexual transmission of HIV may be the core economically active population. The risk of sexually transmitted HIV and other infections are not confined to poor and marginalized groups in Russia. It does not affect young people only either. Risky sexual behaviour seems to increase when a person is employed and with higher earnings. It also surprisingly increases with age – which in itself may be considered to be a measure of socio-economic status.

The study also suggests that the younger population groups exhibit safer sexual behaviour than those in their 30s and 40s. One of the explanations may be that younger people in today's Russia are more exposed to health information and safe sex campaigns or that the messages sent through these campaigns are more effective with the younger population group. Health promotion campaigns need to be targeted at the general population to prevent a generalized epidemic

1.6.7. Risk behaviour among IDUs

Injecting with used needles and syringes was occurring among all groups sampled and is consistent with previous reports from the Russian Federation. In Moscow, HIV prevalence was higher amongst IDUs who reported that on the last day of injection they had injected once only, and no association was found with frequency of injection. This suggests that harm reduction initiatives need to target all types of IDUs to prevent blood borne transmission, both more frequent injectors as well as episodic and more controlled users.

A high proportion of both the community and treatment samples reported communal use of injecting paraphernalia such as filters, spoons and injecting from 'working syringes'. Whilst these behaviours may carry less risk of HIV infection than direct needle and syringe sharing, there is some evidence that HCV transmission can occur. Prevention needs to emphasize the importance of reducing all equipment-sharing practices, including various forms of 'indirect sharing. This points to the need to pay attention to the availability of the range of injecting paraphernalia, such as cookers and cotton filters, through harm reduction initiatives. Some association was found between HIV and HCV and the injection of home made drugs, most likely because these are often prepared and injected in groups. This highlights need for outreach to target networks of drug users using home made drugs as well as pointing to the potential of network or group-oriented interventions which seek to build on peer influence and 'group-mediated social control' as mechanisms of behavioural reinforcement and change.

In Barnaul, all the HIV cases identified were concentrated amongst heroin users who had been interviewed by only two of the field work team. This could suggest that HIV was concentrated in one or two drug user networks. This also points to the need to better understand the dynamics of HIV transmission within particular social and geographic networks as well as the dynamics of onward transmission of HIV between networks.

Injecting drug users from both the treatment and community sample reported having more sex partners in the last 12 months than the general population sample with inconsistent condom use and high levels of sexual mixing between non IDU and IDU populations. This suggests the possibility of HIV and syphilis transmission from IDU populations to non IDU populations and the urgency of implementing targeted interventions to reduce sexual risk behaviours amongst IDU populations.

The community sample suggested a high overlap between injecting drug use and sex work with almost a quarter of female IDUs reporting exchanging sex. The risk factor analysis clearly indicated that female IDU sex workers are at greater risk of infection with syphilis than male IDUS in Barnaul and Volgograd. Interventions that target sexual risk reduction and are specific to the needs of sex workers are urgently needed. We suggest that mobile and outreach services seek to target IDUs involved in sex work.

1.6.8. Accessibility of injecting equipment

The vast majority of the community sample reported their main source of needles/syringes to be pharmacies, with much smaller proportions obtaining them from needle and syringe

exchanges. Qualitative interviews indicate that pharmacies easy to use but that there was a substantial risk of arrest by street police. This suggests the need for interventions to foster better linkage between street policing and harm reduction initiatives at the city level. The development of multi-sectoral partnership projects between policing, narcology and public health services, complemented by training and capacity-building as necessary should be considered.

Provision of needles/syringes through pharmacies is a useful option and pharmacies could be given an extended role in distribution of HIV prevention materials given the widespread network of pharmacies in most Russian cities. Pilot projects are needed to assess the feasibility of this in combination with enhancement of low threshold and geographically accessible harm reduction interventions.

1.6.9. The prison as a risk environment

The Moscow community sample indicated increased risk of HIV infection associated with ever having been in prison. The qualitative data provided further data in support of the increased HIV risks associated with imprisonment. Given that prison emerges as a major risk environment for HIV transmission, further attention should be given to targeting HIV prevention to prisoners as well as to drug injectors on release.

According to the Ministry of Justice, three quarters of prisoners in Russia have a serious disease such as tuberculosis and AIDS and almost all are using drugs (37). This reinforces our findings and the urgent need to set up interventions to reduce risky injecting practices within the prison service.

The prison setting could be seen as an opportunity to improve the health of prisoners, particularly when they come from marginalized populations. In the case of IDUs it could provide an opportunity to reduce drug use through the provision of drug treatment and rehabilitation programmes as well as an opportunity to give hepatitis B immunization and testing for HCV/HIV.

1.6.10. Drug treatment in the context of HIV prevention

There was clear evidence of major barriers to accessing drug services. In particular fear of registration leading to stigmatization and job loss; high out of pocket payments and perceived ineffectiveness of treatment regimes. Provision of quality drug treatment services could become a major tool for HIV prevention in Russia. Such services could reduce new HIV cases not only by moderating and reducing drug injecting but also by providing prevention messages to their patients. Half the drug users in our treatment sample reported injecting on a daily basis and engaging in high risk injecting behaviours, exactly population that needs to be targeted by harm reduction initiatives. Services need to further integrate with harm reduction programmes, to provide harm reduction messages whilst drug users are in treatment, and refer clients to harm reduction programs such as needle exchanges where necessary.

Russian drug treatment services might benefit from a move away from the highly centralized and medicalised model which dominates current practice towards a more holistic approach increasing the range of available services to meet a variety of treatment needs among drug injectors. Realistically, this will require economic resources as well as political commitment at the federal level alongside increasing the capacity of expertise of those working within the treatment system. There is thus a need to target the removal of structural constraints at the community and individual level, including the development of mechanisms to reduce the financial and social burdens of treatment for drug users seeking help. Taken together, interventions are needed which advocate for, and create, policies which foster an ‘enabling environment’ for drug treatment, and which place patient rights to treatment and care at the centre of such initiatives.

1.6.11. Modelling epidemic futures

The future of the emerging HIV epidemics in Russia is difficult to project, mainly as a result of the varying quality of surveillance data and information on prevailing patterns of risk behaviour. In this chapter we have explored previously published projections for Russia and have used models to explore epidemic trajectories using model parameter estimates derived from the behavioural surveys and other primary research undertaken during the course of the Knowledge Programme. In using this data we have developed a simple transmission model and used it to examine the interactions between high risk IDUs and the general population; have explored the possible utility of network structures to the future of HIV modeling; and have developed a model of HIV transmission dynamics in collaboration with local experts that captures the different populations at risk of HIV and their interactions. This model has been used to generate tentative epidemic projections. We have also explored a simple metapopulation model that can be used to look at the impacts of migration on the HIV epidemic.

Previous projections of the future of the HIV epidemic in Russia give results so varied that they are very difficult to interpret. As well as a lack of information about risk behaviours, there is also considerable uncertainty over both the size and turnover of high risk populations. The models used here indicate the potential importance of both the size and turnover of high risk population. The model of IDUs and the general population shows an epidemic concentrated in the high risk IDU population. Prevalence in the low risk general population is driven by high risk individuals who cease their high risk behaviour and return to the low risk population, bringing with them a higher probability of being HIV positive. Further, the more extensive model developed in collaboration with Russian partners indicates that small changes in parameters describing transmission can have a considerable impact on the HIV epidemic.

The behavioural surveys undertaken in this Knowledge Programme provide some information on both sexual and injecting drug use behaviour in the general population and the harder to reach IDU population. However, as shown in an exploration of possible sexual and sharing partner change rates, considerable heterogeneity in behaviour is observed and characterising this heterogeneity is problematic. The rates of needle sharing reported in the IDU behavioural survey were not sufficient to produce an HIV epidemic in our models. This may indicate that there will only be a limited HIV epidemic in this population because of a lack of risk behaviour, it may also indicate a change in behaviour as a result of greater awareness of risk. Alternatively, it may be a result of the IDU survey not capturing the highest risk individuals. As this result is in contrast to that found in other studies further exploration of the distribution of risks of this high risk population is needed.

The models used do not attempt to capture the extent of heterogeneity in either sexual or injecting drug use behaviour but both approaches highlight the potential importance this heterogeneity and indicate that further attempts to explore its impacts on HIV transmission are needed. An exploration of sexual and injecting networks observed in both the general population and higher risk populations may be beneficial in capturing this. However, as observed earlier in this report much research is required to determine the most appropriate methods for modeling networks.

Finally, predictions of the HIV epidemic produced by the models in this chapter are relatively reassuring. In one sense they are possibly also conservative given that the rates of sharing used to parameterize the models were considerably higher than that reported in the IDU behavioural survey. However, we should still be concerned as many of the parameters used are poorly estimated and model results show that small variations in parameters may have a considerable effect.

1.6.12. Cost effectiveness analysis of interventions

Our model and simulations show that cost-effectiveness of prevention interventions is extremely sensitive to the efficacy parameters. In turn, these parameters (i.e. the efficacy of interventions) are influenced by organisational and contextual factors and particular local settings where an intervention is implemented.

Increase in cost effectiveness can be achieved by both increases in the scale of interventions and improvement of the efficacy of interventions. Scaling up interventions is a more effective strategy to pursue, as with increases in scale (coverage) the impact of variations in efficacy on cost-effectiveness considerably declines. Further, for the parameters tested in the model, for a wide range of parameter values, the options with higher coverage levels always dominate in terms of cost effectiveness.

However, there is a risk that rapid increases in the scale of operations can result in substantial decline in the overall quality of services. In addition, scale-up may be constrained by availability of resources – especially human and financial resources. Hence, while scaling up it is important to ensure that quality is not adversely affected.

The results show that needle exchange and condom distribution targeted to IDUs who are also commercial sex workers is the most cost-affective intervention among the modelled prevention interventions. However, these interventions in this target group produce low number of infections averted, most probably, due to predominance of intravenous route of transmission of HIV in the country. Interventions in IDUs and CSWs, despite being less cost effective, produce relatively large epidemiological effect.

Needle exchange and condom distribution targeted at IDUs is more cost effective than condom distribution to CSWs. Needle exchange and condom distribution targeted at IDUs produces considerable effect with relatively low increase in the cost. For these interventions in this target group, in the pessimistic scenario, savings for the health system are realised at coverage levels beyond 60%. However, in the optimistic scenario, NE and CD targeted at IDUs produces cost savings for the health system at coverage levels of 35% and beyond.

For the pessimistic scenario, condom distribution to commercial sex workers does not produce savings for the health system, although many infections are averted at diminishing returns to scale. In contrast, in the optimistic scenario, condom distribution to commercial sex workers produces savings for the health system, but costs increase in a linear manner, in line with benefits

1.6.13. Routine and secondary surveillance

The United Nations Joint Programme on HIV/AIDS (UNAIDS) advocates the use of 'second generation' surveillance systems to monitor HIV spread in vulnerable populations of injecting drug users and sex workers. These call for the use of additional forms of surveillance, including community-based behavioural surveillance surveys, in order to redress some of the inherent weaknesses of existing routine surveillance systems in estimating HIV prevalence. A key recommendation of second generation methodology is the collection of behavioural alongside biological data (HIV and other STIs).

Second generation surveillance methods categorise the HIV epidemic into three groups: low-level, concentrated, and generalised. A low level epidemic may be a long term epidemic, but prevalence never exceeds 5% in any sub population at risk. A concentrated epidemic is one where HIV is well established in subpopulations with known high-risk behaviours such as IDUs, sex workers or men who have sex with men, but where there is no evidence of substantial spread beyond these groups. HIV is consistently over 5% in at least one high risk group. A generalised epidemic is well established in the general population with prevalence exceeding 1% among pregnant women (21).

A key innovation of second generation surveillance methods is the tailoring of surveillance designs for countries with different epidemic settings (22). In countries with concentrated epidemics, surveillance needs to focus on population subgroups with highest levels of risk so that changes in HIV, STIs and behaviours can be monitored over time. Both the HIV case reports and our findings suggest that the HIV epidemic in Russia is a concentrated epidemic, with the burden of HIV cases continuing to fall among injecting drug users, and also, sex workers.

Our findings show how targeted behavioural surveillance in community settings can complement city screening and testing programmes among hard to reach populations at risk to provide additional data on the extent of the epidemic, the links between population groups, the need for targeted interventions, as well as data useful for feeding into transmission dynamic models to project the extent of the epidemic nationally. As we noted above, our community samples estimated HIV prevalence among IDUs to be over four times higher than estimates derived from screening programmes in Moscow, over three times higher in Barnaul, but roughly equivalent in Volgograd.

1.6.14. Economic Impact of HIV on firms

We examined the impact of HIV on a medium sized firm operating in labour intensive section of the Russian economy. The case study findings indicate that currently, HIV/AIDS has very low financial effect on the firm and poses minimal economic risk. This is because of low prevalence levels of HIV and the social welfare system which protects the firms as the wage costs of sick leave are met by the Social Insurance Fund and health care costs are met by the State Guaranteed Services covered by the Compulsory Health Insurance Scheme. Scenario analysis, which projects financial impact to the firm with higher HIV prevalence levels as a result of worsening epidemic, fails to demonstrate substantial financial impact as the form is protected from costs, which are absorbed by the state social and health system.

CHAPTER 2. Risk behaviour in vulnerable and general populations

2.1. Introduction

The routine collation of HIV case reports remains the primary mode of HIV surveillance internationally. In the Russian Federation the first case of HIV was registered in 1987. Between 1987 and 1993 prevalence remained low and stable, with a cumulative number of 726 cases registered during this period. From 1995 onwards the number of new cases began to increase sharply from 1,086 in 1995, to 6,959 in 1997, to 178, 857 in 2001 (1). There are currently 305,805 people registered as living with HIV in the Russian Federation, and the majority of cases (60%) are associated with injecting drug use (IDU).

Whilst HIV case reports can give an approximate view of the burden of HIV in a population, they cannot give the full picture as their accuracy depends on testing patterns and access to testing and treatment services (2,3). Results from recent cross sectional surveys suggest high prevalence of HIV among IDUs in a number of cities in the Federation, sometimes exceeding 50% prevalence, and including instances of rapid or explosive spread (4). Table 2.1 summarizes recent HIV prevalence surveys among IDUs in Russia.

Table 1. Prevalence of HIV amongst injecting drug users in the Russian Federation

City	Year	%	95% CI	Sample recruited	Reference
Kaliningrad	1997	65.0	59.3-70.4		Dehne & Kobyshcha, 2000
St Petersburg	1998	0.0	-	NSEP clients	Karapetyan et al, 2002
St Petersburg	2000	10.9	5.56-18.6	NSEP clients	Abdala et al, 2003
Irkutsk	2001	64.5	56.3-72.1		Smolskaya et al, 2002
Togliatti	2001	56.0	51.2-60.8	Non treatment	Rhodes et al, 2002
Tver	2001	54.6	46.0-63.2		Smolskaya et al, 2002
St Petersburg	2001	35.7	30.0-41.6	NSEP clients	Smolskaya et al, 2002
Rostov	2002	18.0	12.9-24.0	NSEP clients	Smolskaya et al, 2002
Rostov	2002	3.0	1.1-7.61	Treatment	Smolskaya et al, 2002
Samara	2001	28.7	21.6-36.6	NSEP clients	Smolskaya et al, 2002
Samara	2001	27.3	20.4-35.2	Treatment	Smolskaya et al, 2002
Arkhangel'sk	2002	0.5	0.43- 0.57	NSEP clients	Smolskaya et al, 2002
Ekaterinburg	2002	34.1	24.0-45.4	NSEP clients	Smolskaya et al, 2002
Ekaterinburg	2002	25.6	19.9-33.2	Treatment	Smolskaya et al, 2002

This chapter synthesises findings from linked epidemiological and behavioural research to describe the extent and nature of HIV risk in vulnerable populations in three cities; Moscow, Volgograd and Barnaul (5-15). Conscious of the potential for HIV transmission and behavioural mixing between different risk populations (16,17), we sought to describe patterns of HIV risk behaviour in surveys of IDUs and IDUs involved in sex work, as well as estimating the extent of syphilis. These surveys were supplemented by studies to estimate the prevalence of injecting drug use at a city level, and qualitative studies which sought to describe the local 'risk environments' associated with drug injecting and the provision of drug treatment (17a). We also undertook analyses of general population longitudinal datasets to obtain a baseline indicator of risk behaviour in the Russian population more generally.

2.2. Surveys describing risk behaviour and estimating HIV, HCV and syphilis among IDUs

We conducted three cross sectional surveys of current injecting drug users (IDU) in Moscow, Volgograd and Barnaul (5). IDUs were recruited by a team of field workers who made contact and undertook survey interviews outside of treatment centres, in locations that included the street, respondents' homes and cafés. We chose to recruit respondents outside of treatment centres for several reasons. Firstly, evidence suggests that IDUs in contact with drug treatment services tend to be older, with longer injecting careers and may have lower levels of behaviours known to carry a risk of HIV transmission as a result of being in treatment. Secondly, community samples include a large proportion of people that have been in treatment, and can include those currently in treatment, whereas it is not possible for treatment samples to recruit those never in and those currently out of contact with treatment services.

Field workers were employed based on their close contact with IDUs, and included former and current IDUs as well as community outreach workers and others with privileged access to injecting drug user networks. Field workers were trained, and supervised throughout data collection, and a number of measures were employed to minimise potential network or geographic biases in patterns of recruitment (5).

Oral fluid specimens were obtained using the OraSure device (Epitope Inc, Oregon, USA) and screened for antibodies to HCV (anti-HCV) and HIV (anti-HIV) and *Treponema Pallidum*. The biological data were collected anonymously but linked to the behavioural data (for a fuller description see (5)). The study had ethical approval from the Riverside Local Research Ethics Committee and the support of the Russian Ministry of Health National Scientific Centre for Research on Addictions.

2.2.1. Sample characteristics

A total of 1,473 IDUs were recruited in Moscow (n=455), Volgograd (n=517) and Barnaul, Siberia (n=501) in September and October 2003. Distribution of key characteristics and behaviours across the samples are shown in Table 2 and Table 3 in the samples is shown. Two thirds (70.5%) were male and half were aged less than 25 years. One fifth of the sample were recent initiates into injecting (having injected for two years or less), and most (81%) injected less than daily. The most commonly injected drug in the last four weeks was heroin (72%). Around a quarter (26%) had injected home produced drugs in the last four weeks, including 'hanka' or 'mak' (liquid derivatives of opium poppy straw) or 'vint' (a liquid methamphetamine). Two thirds of the sample (66%) reported that they had a regular income and 25% had completed or attended higher education.

2.2.2. Sexual risk behaviour

Over half (59%) reported inconsistent condom use during vaginal sex with a non-paying sexual partner in the last four weeks. Over half reported having vaginal or anal sex with a non IDU sex partner in the last 12 months (52%).

Table 2. Characteristics of IDUs in Moscow, Volgograd and Barnaul

Characteristic	**Moscow**	**Volgograd**	**Barnaul**
	n (%)	**n (%)**	**n (%)**
Total	455 (100)	517 (100)	501 (100)
Sex			
Men	300 (66)	388 (76)	347 (69)
Female non sex workers	119 (26)	89 (17)	121 (24)
Sex workers	35 (8)	35 (7)	35 (7)
Age (years)			
<20	62 (14)	71 (14)	148 (30)
21-24	129 (28)	198 (38)	123 (25)
25-29	168 (37)	204 (39)	114 (23)
30+	96 (21)	44 (9)	116 (23)
Education			
Attended Secondary	286 (64)	372 (73)	434 (87)
Attended Higher	162 (36)	140 (27)	67 (13)
Main source of income			
Regular work	179 (40)	175 (34)	136 (27)
Irregular work	266 (60)	336 (66)	360 (73)
Arrested in the last 12 months			
No	168 (38)	243 (47)	317 (64)
Yes	275 (62)	269 (53)	178 (36)
History of Prison			
No	337 (74)	398 (78)	328 (66)
Yes	117 (26)	115 (22)	171 (34)
Ever had an STI?			
No	254 (57)	332 (66)	298 (60)
Yes	189 (43)	174 (34)	200 (40)
Total number of sex partners in the last 12 months			
1	148 (34)	198 (39)	146 (30)
2 or more	254 (57)	332 (66)	298 (60)
Use of condoms for vaginal sex in the last 4 weeks			
Consistent	90 (27)	213 (54)	178 (41)
Inconsistent	244 (73)	178 (46)	259 (59)

2.2.3. Injecting risk behaviour

In the last four weeks, approximately one sixth (14%) reported injecting with needles and syringes previously used by others, and 84% reported sharing injecting paraphernalia other than needles or syringes, including 'frontloading' (whereby a drug solute is squirted from a donor syringe into another by removing the needle), injecting with filters previously used by others, filling their syringe from a 'working syringe' used by multiple persons to distribute the drug solute or injecting with pre-filled syringes (usually pre-filled prior to purchase).

Table 3. Drug injecting behaviour of IDUs in Moscow, Volgograd and Barnaul

Characteristic	Moscow	Volgograd	Barnaul
	n (%)	n (%)	n (%)
Duration of injecting			
2 years or less	45 (10)	101 (20)	154 (31)
3-5	104 (23)	186 (36)	107 (21)
6-9	185 (41)	168 (32)	111 (22)
10+	118 (26)	59 (11)	129 (26)
Main drug injected in last 4 weeks			
Heroin	279 (73)	424 (87)	277 (56)
Vint	96 (25)	37 (8)	135 (27)
Mak	8 (2)	21 (4)	84 (17)
Last day injected, number of times injected			
1	246 (54)	353 (68)	306 (61)
2+	206 (46)	164 (32)	193 (39)
Frequency of injecting			
Less than daily	365 (82)	428 (83)	398 (80)
Daily	82 (18)	87 (17)	99 (20)
Injected with used needle/syringes in the last 4 weeks?			
No	373 (85)	449 (89)	423 (85)
yes	65 (15)	54 (11)	74 (15)
Ever injected with used needles/syringes?			
No	145 (35)	194 (39)	224 (47)
Yes	273 (65)	302 (61)	254 (53)
Injected with used needles/syringes of sex partner in last 12 months?			
No	325 (76)	432 (93)	423 (87)
Yes	102 (24)	35 (7)	65 (13)
Used communal spoon for preparation of drugs in the last 4 weeks?			
No	284 (67)	233 (47)	328 (67)
Yes	141 (33)	273 (53)	162 (33)
Ever injected home made drugs?			
No	412 (91)	386 (75)	448 (89)
Yes	43 (9)	131 (25)	53 (11)
Registered as an IDU?			
No	328 (78)	376 (74)	394 (80)
Yes	93 (22)	129 (26)	98 (20)
Ever been in drug treatment?			
No	296 (65)	286 (56)	355 (71)
Yes	157 (35)	227 (44)	146 (29)

Among female IDUs, 24% (105/433) had exchanged sex for money, drugs or goods in the last four weeks. The median age of first sex work was 18 years (13-32), slightly later than the median age of first drug use which was 17 years (11-27). Sex workers reported a high turnover of clients in the last 4 weeks. The median number of different clients for vaginal sex in the last 4 weeks was 23 (0-200), of which 63% of sex workers reported that they had had new clients and the median number of new clients was 20 (0-200). The median number of clients who were also IDUs was 0 (0-8) and 30.5% reported having IDU clients in the last 4 weeks. All sex workers reported vaginal sex with a client, and almost all (95%) reported using a condom on the last occasion.

2.2.4. Drug treatment and syringe exchange

Just over a third of the sample reported that they had ever been in treatment, and 3% (26/936) were currently in treatment. The majority (88%) reported that their main source of new needles and syringes in the last 4 weeks were pharmacies and 7% reported using needle exchanges or outreach workers.

2.2.5. Prevalence of antibodies to HIV, HCV and T. Pallidum

As reported elsewhere (5,6), the prevalence of antibodies to HIV, HCV and *T. Pallidum* varied between the three cities: Prevalence of HIV Ab was 14% (95% CI 10.3-17.0%) in Moscow, 3% (95% CI 1.3-4.2%) in Volgograd, and 9% (95% CI 6.3-11.3%) in Barnaul.

The prevalence of anti-HCV was 68% (95% CI 63.8-72.6%) in Moscow, 70% (95% CI 65.6-73.6%) in Volgograd, and 54% (95% CI 49.5-58.4%) in Barnaul. The prevalence of Anti-TP syphilis was 8% (95% CI 5.1 -10.3%) in Moscow, 20% (95% CI 16.2-23.5%) in Volgograd, and 6% (95% CI 4.3-8.7%) in Barnaul.

Table 4 summarises study findings on the prevalence of HIV, HCV and *T. Pallidum*. Almost all (92%) of those anti-HIV positive were also anti-HCV positive.

Table 4. Antibodies to HIV, hepatitis C and syphilis among injecting drug users in Moscow, Volgograd and Barnaul, 2003.

Test Result	City		
	Moscow	**Volgograd**	**Barnaul**
	No (%)	No (%)	No (%)
Total sample[†]	455 (100)	514 (100)	504 (100)
HCV	296 (68)	353 (70)	265 (54)
HIV	55 (14)	13 (3)	44 (9)
Syphilis	32 (8)	93 (20)	32 (6)

[†] Numbers do not always add up to total because not all respondents gave a valid sample of oral fluid
Values are numbers (percentages) of IDUs

2.2.6. HIV/HCV testing

A third (34%) of those HIV antibody positive in the total sample, self-reported as such. Between a half (52% and 53% in Moscow and Barnaul respectively) and three-quarters (74.5% in Volgograd) of IDUs had been HIV tested in the last year. Half (48%) of those found HCV antibody positive in the total sample, self-reported as such. Of those with a history of HCV testing and reporting their last test to be antibody negative (n=454), 52% were anti-HCV positive. While most IDUs were tested for HCV in the last year in Volgograd (73%), this was the case for only a third (35%) in Barnaul and a half (47%) in Moscow.

2.2.7. Routine surveillance

We compared our community-recruited sample estimates of HIV prevalence with routine HIV surveillance data in each city (5). In 2003, the same year as the survey, 2,126,958 HIV screening tests were undertaken in Moscow, of which 0.3% (6,397) was among IDUs and 3.2% (202) were HIV positive. Similarly in Volgograd and Barnaul, a total of 298,810 tests were conducted in Volgograd and 509,273 in Barnaul. From this IDUs represent only 1.7% (5,214) and 0.5% (2,710) of the total screening tests conducted in 2003. Under 3% of screening tests among IDU in each city were positive (2.6%; 136 in Volgograd; and 2.7%; 75 in Barnaul).

Our study findings therefore estimate HIV prevalence among IDUs to be over four times higher than estimates derived from screening programmes in Moscow, over three times higher in Barnaul, but roughly equivalent in Volgograd, where significantly higher proportions of IDUs reported having had recent HIV tests (5). Targeted behavioural surveillance in community settings can serve to highlight the limits of city screening and testing programmes among hard to reach populations at risk. These findings emphasise the critical importance of second generation surveillance and targeted surveys of HIV prevalence among community-recruited samples of injecting drug users as an adjunct to current large-scale HIV screening programmes.

2.2.8. Risk factors associated with HIV

Multivariable analysis indicated a number of risk factors were associated with anti-HIV in each site (5). These are summarized in Table 5. In Moscow, IDUs who reported that they had ever injected with used needles/syringes were three times more likely to be anti-HIV positive than those who had not. IDUs who reported a history of being in prison and being registered as a drug user at a narcology service were twice as likely be anti-HIV positive than those who had never been in prison and those who were not registered. IDUs who reported ever having an STI were less likely to be anti-HIV positive than those who had never had an STI, and those who reported that on the last day they injected they had injected twice as opposed to once only were less likely to test anti-HIV positive.

In Volgograd, IDUs reporting that they had injected with a used needle/syringe of a sex partner in the last year were almost 10 times more likely to be anti-HIV positive than those who had not. IDUs who reported injecting daily had increased odds of testing positive for anti-HIV than those who injected less than daily. Finally, those who reported not having a regular job were less likely to test positive for anti-HIV than those with a regular job.

In Barnaul only two risk factors were associated with anti-HIV positivity. Firstly, those who reported that on the last day of injection they had injected twice were slightly less likely to test positive than those who had injected once only. Secondly, IDUs who reported sharing communal spoons for the preparation of drugs were more likely to test positive for anti-HIV than those who had not.

Table 5. Multivariable risk factors for antibodies to HIV amongst IDU in Moscow, Volgograd and Barnaul

Risk Factor	% overall	No./Total	% HIV	Adjust Odds Ratio	95% CI
Moscow*					
Ever injected with used needles/syringes?					
No	35	8/130	6	1.0	
Yes	65	43/245	18	3.3	1.27-8.69
History of Prison					
No	74	32/294	11	1.0	
Yes	26	22/108	20	2.1	1.24-3.64
Ever had an STI?					
No	57	38/225	17	1.0	
Yes	43	15/168	9	0.3	0.19-0.67
Last day injected, number of times injected					
2+	54	14/180	8	1.0	
1	46	40/220	18	0.4	0.25-0.67
Registered as an IDU					
No	78	30/286	10.5	1.0	
Yes	22	20/88	23	2.3	1.10-4.83
Volgograd ^					
Main source of income					
Regular work	34	8/157	5	1.0	
Irregular work	66	5/318	2	0.2	0.05-0.75
Injected with used needles/syringes of sex partner					
No	93	8/404	2	1.0	
Yes	7	3/30	10	9.6	1.95-47.0
Frequency of injecting					
Less than daily	83	6/401	1.5	1.0	
Daily	17	7/77	9	6.9	1.91-25.1
Barnaul †					
Last day injected, number of times injected					
1	61	35/304	9	1.0	
2+	39	9/190	9	0.7	0.58-0.93
Use of communal spoon for preparation of drugs					
No	67	17/325	5	1.0	
Yes	33	27/160	17	1.7	1.20-2.56

OR=Odds Ratio CI=Confidence Interval

***** Final model adjusted for ever having injected with a used needle/syringe, last day injected number of times injected, prison, registered as an IDU at Narcology and history of STI

^ Final model adjusted for income, frequency of injection and injected with used needle/syringe of sex partner in the last 12 months

† Final model adjusted for last day injected number of times injected and use of communal spoon for preparation of drugs

2.2.9. Risk factors associated with hepatitis C

These are summarized in Table 6. In Moscow, prevalence and odds of testing positive for anti-HCV was higher amongst men compared to female IDUs and female IDU sex workers. IDUs who reported ever having injected with used needles/syringes were almost three times more likely to test positive for anti-HCV than those who had not, and those who reported being registered at a narcology service were almost twice as likely to test positive as those who were not.

In Volgograd, again female and female IDU sex workers were less likely to be positive for anti-HCV than male IDUs. Prevalence and odds of testing positive for anti-HCV increased by duration of injection, with participants who reported injecting between three and five years being 2.5 times more likely to test positive, and those who reported injecting between six and nine years having almost three times the odds of testing positive for anti-HCV. IDUs who reported ever having injected home made drugs (vint or mak) were almost twice as likely to test positive for anti-HCV.

In Barnaul, IDUs who had attended higher education were less likely to test positive for anti-HCV than those who had not. Similarly to Volgograd, prevalence and odds of testing positive for anti-HCV increased with duration of injection, with those who reported injecting longer than 10 years having over three times the odds of testing positive for anti-HCV than recent initiates. Additionally, those who reported ever having injected home made drugs were twice as likely to test positive for anti-HCV as those who had not. Finally, IDUs in Barnaul who reported injecting with used needles/syringes in the last four weeks were almost twice as likely to test positive for anti-HCV.

2.2.10. Risk Factors associated with T. pallidum

Table 7 shows multivariable risk factors for antibodies to T. pallidum for each of the three cities (6). In Moscow, multivariable analyses indicated that, compared to men, non-sex workers (non-SWs) had over twice the odds of testing positive for antibodies to T. pallidum, and sex workers (SWs) were five times as likely to test positive. Ever having been in prison was also independently associated with antibodies to T. pallidum, with those having been in prison almost three times as likely to have syphilis markers compared to those never in prison.

In Volgograd, only one risk factor remained significantly associated with antibodies to *T. pallidum*. Those who had ever been in drug treatment had twice the odds of testing positive for antibodies to *T. pallidum* compared to those never in drug treatment.

Barnaul SWs were nine times as likely as men to have antibodies to *T. pallidum,* and nonSWs almost five times as likely. Odds of antibodies to *T. pallidum* also increased with age. Finally, increased odds were also associated with injecting daily *and* being arrested by the police in the last 12 months.

Table 6. Multivariable risk factors for antibodies to Hepatitis C amongst IDU in Moscow, Barnaul and Volgograd

Risk Factor	% overall	No/Total	% HCV	Odds Ratio	95% CI
Moscow*					
Sex					
Men	66	194/278	70	1.0	
Female non sex workers	26	73/109	67	0.8	0.48-1.23
Sex workers	8	12/30	40	0.2	0.08-0.50
Ever injected with used needles/syringes					
No	35	114/193	59	1.0	
Yes	65	227/296	77	2.5	1.57-3.85
Registered as a drug user at Narcology					
No	78	238/370	64	1.0	
Yes	22	108/128	84	1.9	1.12-3.13
Volgograd ^					
Sex					
Men	76	287/384	75	1.0	
Female non sex workers	17	56/88	64	0.7	0.51-0.95
Sex workers	7	10/36	28	0.3	0.11-0.66
Duration of injection					
2 years or less	20	47/99	47.5	1.0	
3-5	36	136/185	73.5	2.5	1.21-2.90
6-9	33	131/166	79	3.7	1.37-5.41
10+	12	41/60	68		
Ever injected home made drugs?					
No	25	68/130	52	1.0	
Yes	75	287/380	75.5	1.9	1.21-2.90
Barnaul †					
Education					
Attended Secondary	87	233/423	55	1.0	
Attended Higher	13	30/65	46	0.5	0.30-0.97
Duration of injection					
2 years or less	31	47/152	31	1.0	
3-5	21	42/102	41	1.2	0.79-1.78
6-9	22	73/107	68	2.6	1.07-6.24
10+	26	101/127	79.5	3.3	1.33-7.98
Ever injected home made drugs?					
No	11	13/53	24.5	1.0	
Yes	89	250/435	57.5	2.0	1.07-3.65
Ever injected with used needles or syringes?					
No	47	219/419	52.3	1.0	
Yes	53	44/69	64	1.8	1.05-2.97

OR=Odds Ratio CI=Confidence Interval

***** Final model adjusted for sex group, ever having injected with a used needle/syringe and registered as a drug user at Narcology

^ Final model adjusted for sex group, duration of injection and ever having injected home made drugs

† Final model adjusted for education, duration of injection, ever having injected home made drugs and ever injected with used needles/syringes

Table 7. Multivariable risk factors for antibodies to *T. pallidum* by city, 2003

		Syphilis			
Risk Factor	**Overall %**	**No/Total**	**%**	**OR**	**95% CI**
Moscow:*					
Sex group					
Men	66	15/278	5	1.0	
Female non sex workers	26	11/106	10	2.4	1.1-5.6
Sex workers	8	6/30	20	5.0	1.7-14.3
Ever been in prison					
No	74	18/302	6	1.0	
Yes	26	14/111	13	2.7	1.3-5.8
Volgograd^					
Ever drug treatment					
No	56	38/261	15	1.0	
Yes	44	54/203	27	2.1	1.3-3.4
Barnaul†					
Sex group					
Men	69	15/340	4	1.0	
Female non sex workers	24	12/120	10	5.6	2.2-14.8
Sex workers	7	5/34	15	8.0	2.2-29.4
Age group					
<25	52	41/252	16	1.0	
25+	48	55/219	25	2.6	1.1-6.2
Frequency of injecting					
< daily	80	16/392	4	1.0	
Daily	20	16/98	16	3.8	1.7-8.6
Arrested in the last 12 months					
No	64	16/313	5	1.0	
Yes	36	16/167	10	2.8	1.2-6.8

OR=Odds Ratio CI=Confidence Interval
***** Final model adjusted for sex group and ever having been in prison
^ Final model adjusted for ever having been in drug treatment
† Final model adjusted for sex group, age group, frequency of injecting and having been arrested in the last 12 months.

2.3. Collaborative study to estimate HIV risk in sex workers

These data are available in the Russian version of the Report only.

2.4. Studies estimating the prevalence of injecting drug use

These data are available in the Russian version of the Report only.

2.5. Qualitative studies of 'risk environment'

We undertook three targeted qualitative studies of injecting drug users during 2003. A total of 56 were recruited in Moscow, 83 in Volgograd and 70 in Barnaul. The fundamental aim of the qualitative research was to describe, from drug injectors' perspectives, factors associated with risk behaviour, including the shared use of needles and syringes. The studies were particularly interested in documenting factors influencing access to sterile injecting equipment

and needle/syringe acquisition. Interviews were tape recorded, with consent, and transcribed verbatim. Interviews were undertaken by a combination of selected trained fieldworkers and researchers.

For the purposes of this policy report, we provide a brief synthesis of findings characterising the drug injecting risk environments of Barnaul, Volgograd and Moscow, emphasising the importance of two emerging themes: access to sterile injecting equipment; and the prison risk environment.

2.5.1. A brief overview of drug injecting risk environment

These data are available in the Russian version of the Report only.

2.5.2. Accessibility of sterile injecting equipment

As noted above, the majority of injectors relied upon pharmacies, rather than syringe exchange or outreach programmes, as a means of access to sterile injecting equipment. Generally, there was said to be an abundance of pharmacies, making sterile needles and syringes easily accessible. There were no city differences in this respect. As was described, there is a pharmacy "at every step" and syringes are possible to buy in "practically every pharmacy".

Despite this, injectors described a number of situational factors influencing injecting equipment accessibility. Most common, were problems in accessing sterile needles and syringes at night. While some indicated that "there are duty pharmacies, so there isn't really a problem", many talked of reduced equipment accessibility at night: "Complications arise when there are no 24 hour pharmacies, and you have to use an old one (needle/syringe) or take a friend's"; "24 hour pharmacies aren't that accessible about the city. As a rule they happen only after the pharmacy's shut down"; "At night time, all this becomes twice as difficult."; and "Up until 7 at night, you can buy as many as you want. After 7 it's practically impossible."

A second key factor influencing equipment accessibility, as we have reported elsewhere (17b), was a common perception that accessing a pharmacy increased the risk of coming into contact with the police. This was said to act as a deterrent to purchasing clean equipment. As one injector described:

> "Fear is the main reason, fear that you will be caught in a pharmacy… A lot of my friends prefer working with used equipment because they're scared to go to the pharmacy".

As another reflected, a fear of being arrested or stopped at a pharmacy was proffered as a reason for injecting with previously used equipment: "It has happened that you have to inject with a used needle/syringe because of fear of getting caught by the police". Others reported that one of the main reasons for being stopped by the police (and subsequently detained, arrested or coerced into having to pay for their release) was the fact that they had been seen purchasing needles or syringes at a pharmacy. Injectors also referred to the police confiscating their equipment:

> "It happens that when you buy your works (injecting equipment), the cops take these works, even if they (the pharmacies) are still closed. They check your veins, see that you're a drug user, and put you away for 24 hours." (Volgograd, Male, 23)

Crucially, the perceived risks of detainment or arrest associated with using pharmacies as a means to accessing sterile injecting equipment were in some cases viewed as outweighing the taking of chances in relation to re-using and using others' needles and syringes.

> "You go to a pharmacy, and they're standing there, and they'll arrest you for having a needle.. People come round to thinking that they will inject with old needles there,

despite who injected earlier or who didn't inject, or how it's more than likely someone is ill." (Volgograd, Male 38 years)

Whilst the majority of injectors we interviewed (and surveyed, see above) rely upon the pharmacy as their main source for injecting equipment, the frequency with which pharmacies are used for the purchase of needles and syringes might increase were injectors not of the opinion that going to a pharmacy was associated with risk:

> "The police are there constantly. Even more so if everyone has 24 hour pharmacies, as they do, well police are constantly sitting there… Well firstly, people mainly go to the pharmacy to buy needles when they have already got their drugs, so that is already a criminal prosecution. But even if you go in without drugs, if the police recognise you, they're going to stop you. Even the community police, and they could even place something on you.. They know that you're a drug user. It doesn't make a difference (as) no one is going to believe that you didn't have drugs." (Volgograd Male, 29 years)

It was apparent also that many respondents – especially those in withdrawal – felt they did not have the luxury of time and money during night hours, and as a consequence would share injecting equipment with others. This is despite a general perception that needles and syringes were not expensive: "They cost just kopecks".

Other barriers to pharmacy acquisition emerging in interviewee accounts included a perceived negative attitude of pharmacy staff or other customers to drug users, and reluctance to disclose one's status as a drug user. Finally, an additional factor cited was the quality of syringes made available through pharmacies. It was common for interviewees to complain of the poor quality of "Soviet syringes" and of the lack of availability of imported syringes in some pharmacies:

> "Well sometimes it happens, that you go into the pharmacy and they don't have red tops there, but rubbish Soviet insulin syringes with extractable needles, which are blunt and short. That's a problem. Or you buy an insulin but the needle is short. And you try and inject and if someone's veins are bad you have to go in deeper, into the meat, that's not possible. It makes you really mad. " (Moscow, male, 31)

> "It can happen that in the pharmacy they just have bloody awful syringes. I bought a Russian syringe there yesterday, it wasn't…. We were in Volzhkii. Look my arm is like this…You see the abscess and how my arm is swollen. Now I'm sitting here all day, rubbing cream into my arm." (Volgograd, Male, 24)

2.5.3. Accessibility of syringe distribution and exchange interventions

With a well developed network of pharmacies, we found that harm reduction programmes providing syringe distribution and exchange services remain a marginal source of injecting equipment for most drug injectors. Those who do use harm reduction services stated that they are preferable in terms of being safer to access and for the additional services they provide, such as counseling, HIV and hepatitis testing, and peer/social support:

> "The pharmacy isn't free. In the pharmacy I don't know anyone personally. In the pharmacy, they don't smile at me when they give me two packets of insulin needles and say 'Natasha darling, when are you coming to visit again' " (Moscow, Female, 28)

However, disadvantages included the programmes' sporadic opening times, the often unpredictable service experienced, and inconvenient location:

> "Yes of course there are problems (with the needle exchange). It happened several times. I phoned, but they had some kind of problem with the exchange. Something about how they weren't given any money and something else and something else. Well I washed out the old ones (needles/syringe). You can't boil them. You used to

be able to boil the glass ones, but these don't boil. You can wash them through with hot water, so I did, and that's it, it's broke. So I have to use the same one several times." (Barnaul, Male, 56)

Geographical location represents an important factor that deters potential clients from using local services. This was said to be especially the case in Barnaul, where the needle exchange operates via a fixed-site based at the AIDS Centre (in Volgograd and Moscow there are no fixed-sites, and services are provided via mobile exchange (Volgograd) and outreach workers (Moscow, Volgograd)). In Barnaul, many users complained that traveling to the AIDS center to exchange needles is neither economically viable nor quicker than using pharmacies:

"Well not everyone lives near the AIDS Centre. It happens that it's easier to pop into the pharmacy and buy one than to travel. Or inject with one needle, it's unlikely that you're going to travel somewhere, have to change buses, with the cost of tickets. It is better to buy a needle/syringe from the pharmacy with your 6 roubles than travel to the AIDS Centre, give out 6 roubles there and the rest on two buses." ((Barnaul, male, 32).

"Well who needs it? Well, go to hell! A syringe costs 2 roubles. Well you're having a laugh, its better to hand over 2 roubles and get a new syringe than spend 7 roubles to travel there and 7 roubles to travel back" (Barnaul, male, 28)

The main factor prohibiting effective syringe acquisition from harm reduction programmes that respondents described is the necessity to return used syringes. Many users found it difficult to store used needles/syringe for this purpose and were reluctant to do so in case it made it obvious they were drug users to their family. Additionally, they felt vulnerable to police harassment when carrying large numbers of used syringes:

"It's easier for me to buy new ones, than to store old ones. It's not the money, it's just that I don't have anywhere to store them……."

"I don't go to the exchange because of the distance but only for this reason, that it's difficult for me to store them up (old syringes). I can't store them, because I would have problems at home, my wife would notice. Why do I need that?"

"Say I'm walking to the AIDS Centre, carrying used syringes… Say I have a bag of 30 used ones, right? There they are in the bag, and I'm walking I'm withdrawing or I'm high, well all the same, I look like a drug user right? So well, now the police stop you. Straight away, it's 'What's in the bag?'. Oops, syringes. Well, so what do I think?" (Barnaul, Male, 30)

2.5.4. Prison as a risk environment

The prison environment has emerged as a critical determinant in the transmission of HIV associated with injecting drug use in Russia (17c,17d,17d). Many of those participating in our qualitative studies reported having experienced prison as well as having injected while in prison. Injectors' characterised prison as especially important in terms of shaping risk and limiting opportunity for risk reduction (17e). While drugs were described as being available in prison, sterile needles and syringes are not. While in prison, it was therefore common to hand-make syringes out of pens.

Crucially, the lack of availability of injecting equipment in the prison environment leads to syringe sharing, often between large numbers of people. Many respondents said that while they never shared syringes in their civil life, they routinely did so in prisons.

Accounts of syringe sharing indicated considerable variability in the frequency with which syringes were shared in prison settings as well as in the numbers of people with whom syringes were shared. Some accounts described sharing with large numbers of other injectors.

These combination of factors contribute to a perceived norm of acceptance of syringe sharing in the prison environment, even if attempts are made to minimise sharing with individuals outside those sharing the same cell (often termed "families").

All inmates entering prison in Russia are usually routinely tested for HIV (as well as hepatitis and sexually transmitted infections). Inmates testing positive for HIV are usually segregated in separate cells. We found that this may lead to a false sense of security among those testing HIV negative, who unaware of the window period when HIV cannot be detected, believe they and their other cell mates must be free of risk of infection:

> "When they put you away, you go through a commission and you give blood and everything there in prison. And you know that no one is infected. So you inject there, you wash the equipment under the tap. So there are no such things as infected people, let's say with hepatitis, or with syphilis or AIDS. Because when you go into prison, you immediately go through a medical commission. They assess you and take blood. If you're infected, you get put in the medical part, and if you're not, you get put in a cell. So you already know that no one is infected, that you can safely inject. You already know that you won't get infected." (Barnaul, Male, 32 years).

2.6. Drug users in drug treatment

We undertook a multi-method study to map and describe drug treatment services in Volgograd and Barnaul (7). This work sought to assess drug users' and practitioners' perceptions of drug treatment and the feasibility of improving community-based drug treatment interventions as an effective tool in HIV prevention. The studies comprised service mapping, brief treatment surveys, and depth qualitative interviews with clients and service providers.

For our purposes here, we summarise the key findings from the treatment survey to characterise drug users in treatment, and selected findings from qualitative interviews exploring factors acting as barriers to drug treatment access. Participants in Volgograd and Barnaul were recruited from in-patient and out-patient drug treatment facilities and given a questionnaire to complete. The criterion for participation in the study was ever having injected drugs. Participants for the qualitative study were recruited via snowballing through local drug treatment services, needle exchange programmes and drug user networks. Findings from interviews with service providers and from the mapping of drug treatment services are summarized in Chapter 5.

2.6.1. Survey of drug users in treatment

A total of 209 drug users were recruited, 105 in Volgograd and 104 in Barnaul. Over half of respondents were under 25 years, slightly younger than the community survey sample (see above). Three quarters of respondents were male (74%). Table 8 summarises patterns of risk behaviour among those recruited into the survey.

Table 8. Demographic, injecting and sexual risk behaviours of IDUs in treatment in Barnaul and Volgograd

	Barnaul n = 104 %	**Volgograd n=105 %**	**Total n=209 %**
Demographic			
Age (years)			
<20	25	19	23
21-24	31	35	33
25-29	30	38	34
30+	14	8	10
Male	72	76	74

Attended higher education	44	59	51
Duration of injection (years)			
2 years or less	20	33	26
3-5	36	29	32
6-9	25	33	29
10+	19	5	13
Drug use prior to treatment			
Main drug injected			
Heroin	18	40	29
Mak	20	13	17
Heroin and hanka	30	20	25
Vint	6	1	4
Multiple drugs	27	25	26
Daily injection	49	51	50
Injected with used needles/syringes in the last 4 weeks	35	7	21
Used communal filter	27	11	19
Injected from communal container	44	18	31
Ever used needle exchange	19	23	21
Sexual risk behaviours			
More than one sex partner in the last 12 months:	37.5	32	35
Inconsistent condom use last 12 months:	87	68	78

A quarter of the sample had been injecting for less than two years, and around 60% from three to nine years. Half reported that they had been injecting daily before they entered treatment. The majority (71%) reported that they were opiate users (heroin and hanka or both), with about a quarter (26.0%) using both opiates and stimulants.

About 20% of the sample reported injecting with used needles/syringes in the last four weeks of injecting. Significantly, more respondents from Barnaul (35%) than Volgograd (7%) reported sharing needles ($p<0.001$). More respondents from Barnaul (26.9%) reported using someone else's filter than Volgograd (11.4%, $p>.05$), and similarly greater proportions reported drawing up a solution from a container from which somebody else had already filled up their syringe (44.2% in Barnaul and 18.1% in Volgograd, $p<.05$).

Approximately a third of the sample reported having more than one sex partner during the last 12 months. Less respondents in Barnaul (11.5%) than Volgograd (21.9%) reported always using condoms with their sex partners during the last 12 months ($p<.05$).

2.6.2. Qualitative study of drug users in treatment

We conducted a total of 86 depth interviews with current or former drug injectors. Table 9 summarises the sample characteristics of the drug injectors in drug treatment we interviewed. The median age of respondents was 26 years (range 16 to 44 years).

Table 9. Sample characteristics of IDUs recruited for the drug treatment qualitative study in Barnaul and Volgograd

	% (n)
Total	100 (86)
Female	19 (16)
Main drug injected in the last 4 weeks	
Heroin	66 (57)
Hanka	13 (11)
Vint	9 (8)

No drug preference	13 (10)
Previous experience in narcological treatment	50 (43)
Currently in treatment	31 (27)
Types of treatment received	
Detoxification	62 (53)
Rehabilitation	37 (32)
Psychological counseling	33 (24)
Self-help groups	16 (14)
Experiences in self-treatment	
Tranquilizes	49 (42)
Alcohol	37 (32)
Cold turkey	29 (25)
Drop-in at home	8 (7)
Prison experiences	20 (17)
Reported positive HCV	55 (48)
Reported positive HIV	5 (4)

Approximately 73% of participants started their drug use careers by smoking marihuana, at the median age of 16 years. The median age of first injection of drugs for non-medical purposes was reported to be 18 years. Four people reported that they were HIV positive, and 56% said that they had hepatitis C.

Among the 86 respondents, 62% reported receiving detoxification which lasted between three and ten days, only 37% went through some form of rehabilitation, and 16% participated in self-help groups such as a 12 steps programme. Only 34% of respondents reported receiving psychologists' help.

Local drug treatment service providers estimated that only about one in ten drug injectors ever reach their services.

2.6.2.1. Barriers to accessing treatment

Analyses of qualitative accounts of drug treatment from injectors identified three main barriers to drug treatment: (a) registration as a drug user; (b) economic constraint, and (c) perceived low treatment efficacy.

2.6.2.1.1. Registration

The regulation of the Ministry of Health and the Ministry of Internal Affairs №402 requires all drug injectors accessing state drug treatment facilities to be registered centrally. Registration requires that a drug user be observed after treatment by the local drug treatment centre for a period of five years, and has to see a narcologist every month. In practice this observation procedure is a formality and drug users rarely visit their assigned narcologist every month. Although provision of anonymous services has recently been increased, it is not free of charge and is not available to everyone. As illustrated in Figure 2, registration was associated by respondents with loss of employment, difficulty in getting employment, breaches in confidentiality (including fear of being reported to police) and stigma. As one injector commented of the risks of disclosure associated with becoming registered as an addict at the point of access to drug treatment:

> "For the majority it, of course, played a great role. I mean, God forbid that someone finds out, because someone's, for example, wife doesn't know that he does drugs or let's say, her parents don't know, that's also of no small importance. Imagine it, the wife's parents find out that you do drugs, that's it... God forbid they find out at work, sooner or later, they say goodbye to you, even if it's not straightaway, then after some time." (Barnaul, male, 27)

The major concern associated with registration was a perceived negative consequence on the capacity to gain employment:

> "If a drug user has money, he never will go to OND (drug treatment). If you get treatment there – you get registered. You get registered – forget about the job, with all following consequences." (Volgograd, male, 24)

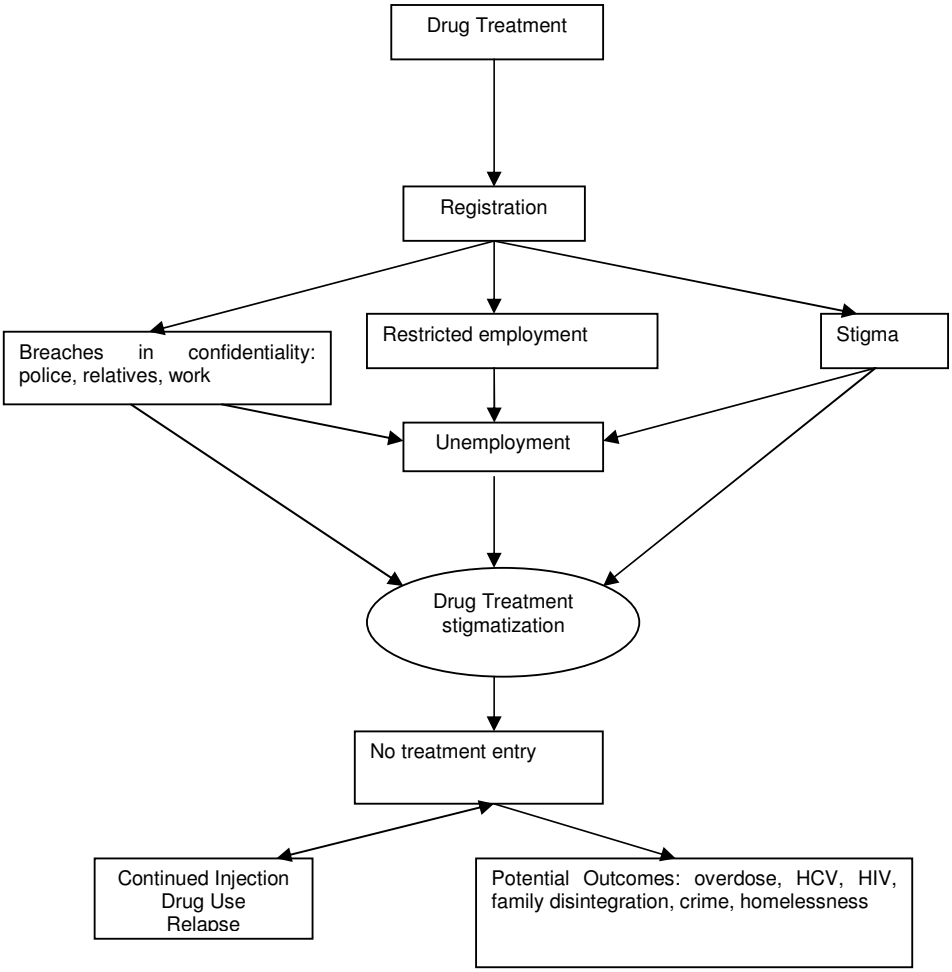
> "But now I've come across them asking at work whether you're registered or not, I mean certificates are needed for you to get work. Well, those certificates they give, they don't take such a person to work with them. It ends up a large closed circle. It puts a spoke in the wheel of a person who would be on the route to recovery." (Barnaul, male, 33)

2.6.2.1.2. Economic constraint

The practice of out-of-pocket payments for medication and longer stays in treatment was widespread in both cities, and is largely a consequence of under-funded treatment services. Drug treatment services in Russia are not covered by health service insurance fees (with the exception of Samara region), and funding from federal and regional budget is reportedly not enough to run the system. This limits access to treatment only to those clients who can pay for services. Moreover, the most vulnerable populations such as drug users with severe addiction who spend most of their income on drugs, or those unemployed either cannot afford to enter treatment or receive treatment of poorer quality:

> "Some people have money. Maybe the parents (…). But if the parents haven't got any money, then who's going to help? It's one thing finding 100 roubles for a dose, but 3000 for treatment is another matter." (Volgograd, male, 22)

Figure 2. Registration barrier in accessing the drug treatment



2.6.2.1.3. Perceived low treatment efficacy

Low treatment efficacy was the third key factor describing as influencing access to drug treatment. Many interviewees indicated that treatment is of no help in reducing or moderating drug use, that it is a "waste of money", and that periods of remission are short. As one injector commented of his experience: "I think that treatment is not at all effective. I ended up injecting immediately after treatment" (Volgograd, male, 33). Participants also mentioned that the length of stay in treatment might be enough to overcome withdrawal symptoms but were not long enough to overcome craving for drugs: "Even a single day of cold turkey is very expensive. The thing is though, that even having been in there for five days, there will be no change" (Volgograd, female, 27). Many therefore relied on their "own will" to stop injecting, and different forms of 'self-treatment' were widespread. Lastly, an unmet need for psychosocial care was reported by many:

> "No one dealt with the psychological issues; they were more concerned with acute syndrome. That is it. The rest of the time I was just hanging around, wandering up and down the corridors, eating and that is it. No one else provided anything for me at all." (Barnaul, male, 28)

2.7. Risk behaviour in a general population sample

In addition to describing risk behaviours in vulnerable populations of injecting drug users and drug injectors involved in sex work, we also sought to describe these behaviours in a general population sample. To this end, data were examined from the Russian Longitudinal Monitoring Survey (RLMS). The RLMS is based on a stratified random sample of households and individuals. It has been carried out annually since 1992. Different sections of the survey deal with health, nutrition, education, economic status, employment, expenditure and other characteristics. In round 12 there was an additional module examining sexual and drug-related behaviour. This module was distributed only to those aged between 15 and 49 years who have also participated in the main survey.

For the purposes of this chapter we examine sexual risk behaviours and drug use amongst a sample that were interviewed in 2003 (n=5779) [2]. First we consider how sexual risk behaviour is related to social and economic characteristics of individuals. We defined *sexual risk* as having had unprotected (without a condom) penetrative sexual intercourse with two or more partners in the 12 months preceding the survey. We performed univariate statistical analysis and compared proportions of people who had reported risky sexual behaviours in different groups varied by: (a) gender; (b) age; (c) urban/rural inhabitancy; (d) educational qualification; (e) employment; (f) monthly income; (g) job security; (h) life satisfaction; and (i) self-appraisal of economic status; power and influence; and health. A more detailed description of methods is provided elsewhere (17e).

2.7.1. Profile of general population sample

Among the 5,779 subjects, 2,659 (44%) were male and 3,120 (65%) were female. The median (range) age of subjects was 31 (15-49). Subjects were evenly distributed across the age strata with 920 (16%) aged below 20, 851 (15%) between 20 and 24, 945 (16%) between 25 and 29 and 2,196) 38% between 30 and 44. The median age at first intercourse was 18 (with 25^{th} and 75^{th} percentiles at 16 and 20) years. Of the sample, 4,623 (80%) had had sexual intercourse in the last year; 663 (11%) were divorced, 4,075 (71%) were currently married and 1,040 (18%) had never been married.

Only 312 (5%) subjects reported having had sexual intercourse without a condom with two or more partners in the previous 12 months; and were therefore classified as “at risk” by our definition. Our analysis comparing the distribution across socioeconomic and demographic groups of those at risk and those not at risk is presented in Table 10. For each variable the percentage of those who exhibited risky behaviour is given. We also report a X^2 statistic against the null hypothesis that the numbers of individuals with risky behaviour is not determined by the group they belong to.

Less than seven per cent reported ever using drugs (6.4%), and only 1.7% reported ever injecting drugs. Most of respondents who had ever injected were male (84.6%). Only twelve participants (0.2%) reported injecting in the last 4 weeks. One third of the people who had ever injected reported injecting with a used syringe (29.8%). Only three people reported using somebody else’s syringe in the last four weeks.

Table 10. Sexual risk by social and economic variables amongst a general population sample

Characteristic	N	Percent with risk behaviour	
Sex			
Male	2659	5.7	
Female	3120	5.2	NS
Age Group			
<=19	920	1.6	
20-24	851	6.1	
25-29	945	6.6	
30-44	2196	6.9	
>=45	867	3.6	$\chi 2 = 44.5$; $p < 0.00001$
Location			
Urban	3268	5.6	
pgt	377	5.6	
Rural	2134	5.1	NS
Highest Qualification			
university	1481	5.5	
technical	1147	6.2	
secondary trade	941	7.5	
no secondary	348	8.0	
basic	414	6.3	$\chi 2 = 26.5$; $p < 0.001$
Employment status			
unemployed	2,067	4.1	
employed	3,712	6.1	$\chi 2 = 10.4$; $p < 0.01$
Wage Quintile			
Mean wage in last month p.958	661	5.3	
Mean wage in last month p.2098	600	5.2	NS
Mean wage in last month p.3416	656	7.3	
Mean wage in last month p.5262	587	6.8	Test of top 3 quintiles vs rest
Mean wage in last month p.11328	585	7.2	$\chi^2 = 4.42$; $p = 0.04$
Confidence in finding job			
Absolutely Certain	558	8.4	
Fairly Certain	766	6.0	
Both Yes and No	560	4.8	
Fairly Uncertain	811	6.0	
Absolutely Uncertain	590	4.7	$\chi^2 = 8.84$; $p = 0.07$
Job Security			
Very Concerned	952	5.4	
A little Concerned	917	5.7	
Both Yes and No	481	5.8	
Not Very Concerned	700	5.9	
Not Concerned At All	643	8.6	$\chi^2 = 8.04$; $p = 0.09$
In the next 12 Months…			
You will live much better	272	7.0	
You will live somewhat better	1647	5.8	
Nothing will Change	2289	4.8	
You will live somewhat worse	282	4.6	
You will live much worse	130	5.4	NS

continued

Characteristic		N	Percent with risk behaviour
Your position in the distribution of wealth			
Lowest step	259	7.7	
step 2	510	4.5	
3	1,221	5.7	
4	1,598	4.9	
5	1,444	5.9	
6	439	5.0	
7	145	4.1	
8	25	12.0	
Highest Step	32	9.4	NS
Your position in the distribution of Power and Influence			
Lowest step	550	4.7	
step 2	842	6.4	
3	1,182	5.8	
4	1,268	6.1	
5	1,171	4.4	
6	337	5.3	
7	153	4.6	
8	48	4.2	
Highest Step	44	6.8	NS
Satisfaction with Life			
Fully Satisfied	422	4.7	
Rather Satisfied	1,593	4.3	
Both Yes and No	1,498	4.6	
Less than Satisfied	1,639	6.8	
Not at all satisfied	609	6.9	$\chi^2 = 14.9$; $p < 0.02$
Self Evaluation of Health			
Very Good	160	3.8	
Good	2,296	5.1	
Average, not Good but not Bad	3,335	5.6	
Bad	287	8.0	
Very Bad	23	17.4	$\chi^2 = 11.6$; $p < 0.03$

We found that many social and economic characteristics were not associated with being at risk. These included sex, whether residence was urban or rural, self-assessed relative economic wealth; self-assess power and influence; and optimism / pessimism about future prospects.

Variables that were significantly associated with being at sexual risk included age group; highest educational qualification achieved; employment status, earnings, job security, satisfaction with life and self-assessed of health status. There were significant differences in proportions of different age groups who were at risk. Sexual risk increased with age to a peak for 30 – 44 year olds among whom 152 (6.9%) were at risk. Subjects under 19 years were more than 3 times less likely to be at risk than the sample as a whole.

To examine educational qualifications achieved we firstly excluded subjects below the age of 20 who might not have finished their education. Among remaining subjects the highest degree of risk was among those classified as having uncompleted secondary education, a vocational qualification or completed secondary education without any further education. This corresponds to having completed between 8 and 10 years of schooling or of finishing education at 16 to 18 years old. Those with a university degree showed the lowest level of sexual risk.

We classed those working or being on paid leave as 'employed'; all others were classed as unemployed. The proportion at sexual risk of those employed was significantly higher (6.1%) than of those unemployed (4.1%). To examine sexual risk by earnings we divided the sample into five quintiles based on the reported earnings during the 30 days prior to the survey. Sexual risk increased with earnings and was significantly higher for the top three quintiles.

Several questions explored the respondents' perceptions of stability, security and satisfaction with different aspects of life. Subjects who were "not concerned at all about the risk of losing their current job" were almost twice as likely (8.4%) to be at sexual risk than those who were very concerned (5.7%). Similarly, those who were absolutely certain to be able to find a better or equivalent new job should they lose their current job exhibited a higher level of risk (8.4%) than those absolutely uncertain to be able to do so (4.7%).

Among subjects who indicated that they were "not at all satisfied" with their life, a significantly higher proportion was at sexual risk (6.9%) than those "fully satisfied". Among subjects who assessed their health as "very good" only 3.8% were at sexual risk compared with 17.4% of those who assessed their health as "very bad".

2.8. Conclusions

Overall our findings indicate the urgent need to introduce and scale up interventions targeting injecting drug users to reduce both injecting and sexual risk behaviour, as well as reducing sexual risk behaviour in the general population. Whilst HIV prevalence among injecting drug users is varied across the three cities it is evident that the context exists for ongoing transmission of HIV within this population. The high prevalence of hepatitis C in all cities suggests that sharing of injecting equipment does occur, perhaps more frequently than reported in the context of research surveys like our own (17g). The high prevalence of syphilis that we found is indicative of high prevalence of sexual risk behaviour and our behavioural data provide further evidence to suggest IDUs are engaging in risky sexual practices with both IDU and non IDU partners. The presence of STIs can facilitate sexual transmission of HIV and suggests that the conditions exist for ongoing sexual transmission of HIV moving the current concentrated epidemic amongst IDU into a more generalized epidemic (42). Repeated targeted surveillance amongst high risk groups such as IDUs with the collection of both behavioural and biological data needs to take place in order to plan and monitor interventions and to track the progression of the epidemic.

2.8.1. Prevalence of HIV, hepatitis C and syphilis

While HIV prevalence amongst IDUs was lower than has been reported in some other Russian cities, our findings suggest the need for urgent action to prevent prevalence increasing (4, 5, 18, 19). It has been suggested that 10% HIV prevalence can be a critical threshold in the efficient containment of HIV epidemics among IDU, as after this point far greater resources and intervention coverage are required to bring about epidemic containment or reversal (20). Our multi-site community survey indicated prevalence of HIV at around 10% or more in two cities (Moscow and Barnaul), high prevalence of HCV, and varied prevalence of syphilis (at 20% in one city). This highlights the urgent need to scale-up community-based initiatives in HCV and HIV prevention, as well as sexual risk reduction, for IDUs in Russia.

2.8.2. Prevalence of injecting drug use

These data are available in the Russian version of the Report only.

2.8.3. Routine and secondary surveillance

The United Nations Joint Programme on HIV/AIDS (UNAIDS) advocates the use of 'second generation' surveillance systems to monitor HIV spread in vulnerable populations of injecting

drug users and sex workers. These call for the use of additional forms of surveillance, including community-based behavioural surveillance surveys, in order to redress some of the inherent weaknesses of existing routine surveillance systems in estimating HIV prevalence. A key recommendation of second generation methodology is the collection of behavioural alongside biological data (HIV and other STIs).

Second generation surveillance methods categorise the HIV epidemic into three groups: low-level, concentrated, and generalised. A low level epidemic may be a long term epidemic, but prevalence never exceeds 5% in any sub population at risk. A concentrated epidemic is one where HIV is well established in subpopulations with known high-risk behaviours such as IDUs, sex workers or men who have sex with men, but where there is no evidence of substantial spread beyond these groups. HIV is consistently over 5% in at least one high risk group. A generalised epidemic is well established in the general population with prevalence exceeding 1% among pregnant women (21).

A key innovation of second generation surveillance methods is the tailoring of surveillance designs for countries with different epidemic settings (22). In countries with concentrated epidemics, surveillance needs to focus on population subgroups with highest levels of risk so that changes in HIV, STIs and behaviours can be monitored over time. Both the HIV case reports and our findings suggest that the HIV epidemic in Russia is a concentrated epidemic, with the burden of HIV cases continuing to fall among injecting drug users, and also, sex workers.

Our findings show how targeted behavioural surveillance in community settings can complement city screening and testing programmes among hard to reach populations at risk to provide additional data on the extent of the epidemic, the links between population groups, the need for targeted interventions, as well as data useful for feeding into transmission dynamic models to project the extent of the epidemic nationally (see also Chapter X). As we noted above, our community samples estimated HIV prevalence among IDUs to be over four times higher than estimates derived from screening programmes in Moscow, over three times higher in Barnaul, but roughly equivalent in Volgograd.

2.8.4. Profile of injecting drug users

The profile of injecting drug users recruited in both the community recruited survey and treatment sample of IDUs are consistent with findings from other surveys. The majority of the sample is male, and includes a large number of recent initiates into injecting, aged between 20-29 years. The sample comprised predominantly heroin injectors, with the majority reporting a history of injecting home made drugs (23-26). Higher than anticipated proportions reported occasional or non-daily injection. Also contrary to our expectations, the treatment sample contained a larger number of recent initiates into injecting, and subjects were more likely to inject with used needles/syringes (in Barnaul) as well as inject more frequently, and were younger than IDUs in the community sample. Further analysis is needed to consider whether these differences are significant across the two samples or a product of sampling variation. The community survey data also suggested the majority of IDUs had a regular income and a quarter had completed or attended higher education, suggesting the injector population is not necessarily a highly socially excluded population or highly marginalised economically.

2.8.5. Injecting risk behaviour

Injecting with used needles and syringes is not uncommon. Reported levels of needle and syringe sharing in a four week period ranged from 14% in the community-recruited sample to 35% in the drug treatment sample in Barnaul. Similar levels of sharing has been found in other studies in the Russian Federation ranging from 12% (n=202) to 38% (27, 28).

Higher proportions of daily injection have been reported in other studies around the Russian Federation, ranging from 37% (n=55) in Tver, to 55% in Ekaterinburg, 73% (n=213) in Samara and 41% in Rostov (n=118) (18). In Moscow, HIV prevalence was higher amongst IDUs who reported that on the last day of injection they had injected once only, and no association was found with frequency of injection. This suggests that harm reduction

initiatives need to target all types of IDUs to prevent blood borne transmission, both more frequent injectors as well as episodic and more controlled users.

A high proportion of both the community and treatment samples reported communal use of injecting paraphernalia such as filters, spoons and injecting from 'working syringes'. Whilst these behaviours may carry less risk of HIV infection than direct needle and syringe sharing, there is some evidence that HCV transmission can occur (27,28). Prevention campaigns need to emphasise the importance of reducing all equipment-sharing practices, including various forms of 'indirect sharing' (17f). This points to the need to introduce and maximise the distribution of paraphernalia, such as cookers and cotton filters, through harm reduction initiatives.

Some association was found between HIV and HCV and the injection of home made drugs. Previous studies have also found increased risk of HIV associated with the injection of home made drugs (4, 29,30). There is slight evidence to suggest that HIV may enter the production process via containers used to decant the ingredients or needles used to distribute the solute (31). Some studies have even reported the use of blood in the preparation of home made drugs (32-34). Evidence, including that derived from laboratory-based simulations, suggests that even if HIV-contaminated blood were to be used, the heating and boiling during the production process would almost definitely inactivate the virus (30). What is more likely is that the increased risk of HIV associated with home produced drugs is associated with their distribution, which often takes place in a group situation wherein the use of shared injecting equipment is not uncommon (31-34). This further highlights the need for intervention to reduce the sharing of injecting equipment, including the provision of clean injecting equipment as well as the need for outreach to target networks of drug users using home made drugs. It also points to the relevance and potential of network or group-oriented interventions which seek to build on peer influence and 'group-mediated social control' as mechanisms of behavioural reinforcement and change (17f).

In Barnaul, all the HIV cases were concentrated amongst heroin users who had been interviewed by only two of the field work team. This could suggest that HIV was concentrated in one or two drug user networks. This also points to the need to better understand the dynamics of HIV transmission within particular social and geographic networks as well as the dynamics of onward transmission of HIV between networks. Network transmission dynamics of HIV are further discussed below.

A substantial proportion of the general population sample (7%) reported that they had ever used drugs and 2% had injected drugs. These proportions are higher than comparative estimates in most western European countries. Amongst these 2%, a third reported that they had ever injected with used needles/syringes. A general health promotion campaign targeting the general population may be required, outlining the risks and harms associated with initiation into injecting drug use. More specifically, we recommend the development of interventions designed to limit or prevent transitions from non-injecting to injecting drug use, especially given also that that injecting remains a predominant feature of illicit drug using cultures in Russia.

2.8.6. Accessibility of injecting equipment

The majority of the community sample reported their main source of needles/syringes to be pharmacies. Only 7% of the community-recruited sample and 20% of the treatment sample reported that they had used city needle and syringe exchange programmes. This is not surprising considering estimates of coverage of IDUs by needle exchanges in Russia is thought to be as low as <1% in many cities (33). Our qualitative data indicate that pharmacies are widespread and easy to use, yet injectors perceive there to be a combination of situational factors which inhibit their use. Importantly, some injectors indicated that they preferred to take chances sharing previously used needles and syringes than risk arrest by purchasing clean injecting equipment at a pharmacy. This suggests the need for interventions to foster better linkage between street policing and harm reduction initiatives at the city level.

Provision of needles/syringes through pharmacies needs to be encouraged. We recommend the importance of considering the role of pharmacies in the enhanced distribution of HIV

prevention materials. Pharmacy distribution of injecting equipment is cost effective given the widespread network of pharmacies in most Russian cities. Pilot projects are needed to assess the feasibility of distributing syringes and condoms through pharmacies, such as the provision of materials at reduced cost or free of charge, or the provision of pilot pharmacy-based syringe exchanges. Such initiatives should work in close collaboration with the enhancement of low threshold and geographically accessible harm reduction interventions such as syringe distribution and exchange, outreach and counseling and advice centres.

Our data suggests that close collaboration and partnerships with the police is needed. Our findings suggest that the police can have a major role in influencing the effectiveness of HIV prevention delivery, especially in relation to drug injectors' use of pharmacies. We recommend the development of multi-sectoral partnership projects between policing, narcology and public health services, complemented by training and capacity-building as necessary.

2.8.7. The prison as a risk environment

There is an urgent need to create pilot and evaluated projects to distribute sterile needles and syringes as well as dispose of used needles and syringes in prison. The Moscow community sample indicated increased risk of HIV infection associated with ever having been in prison. The qualitative data provided further data in support of the increased HIV risks associated with imprisonment. Given that prison emerges as a major risk environment for HIV transmission, further attention should be given to targeting HIV prevention to prisoners as well as to drug injectors on release.

Other studies in the UK and US have highlighted the potential for outbreaks of HIV and HCV in prison settings, suggesting that entering prison may put individuals previously not at risk in a high risk situation with respect to HIV (35, 36). According to the Ministry of Justice, three quarters of prisoners in Russia have a serious disease such as tuberculosis and AIDS and almost all are using drugs (37). This reinforces our findings and the urgent need to set up interventions to reduce risky injecting practices within the prison service.

The prison service could be seen as an opportunity to improve the health of prisoners, particularly when they come from marginalised populations (38). In the case of IDUs it could provide an opportunity to reduce drug use through the provision of drug treatment and rehabilitation programmes as well as provide an opportunity to give hepatitis B immunisation and testing for HCV/HIV. The system of testing inmates on entry and segregating HIV positive individuals, along with inadequate information on HIV transmission, may inadvertently lead to increased injecting risk behaviour amongst inmates.

We also recommend the need for large scale research to assess the scale of drug use and associated risk behaviour in prison settings in order to inform the design and implementation of pilot harm reduction and HIV prevention targeting prison populations.

2.8.8. Sexual risk behaviour and sexual risk reduction

Injecting drug users from both the treatment and community sample reported having more sex partners in the last 12 months than the general population sample. Inconsistent condom use was high amongst the community recruited and treatment sample of IDUs and sexual mixing between non IDU and IDU populations was common. This suggests the possibility of HIV and syphilis transmission from IDU populations to non IDU populations. It also highlights the urgency of implementing targeted interventions to reduce sexual risk behaviours amongst IDU populations. Condoms need to be made widely available through pharmacies, needle/syringes exchanges, STI Clinics and young peoples' clinics. Sexual risk reduction must be made a focus of harm reduction initiatives through distribution of health promotion materials, provision of STI testing and treatment and referrals to services providing family planning advice.

The community sample suggested a high overlap between injecting drug use and sex work with almost a quarter of female IDUs reporting exchanging sex. The risk factor analysis clearly indicated that female IDU sex workers are at greater risk of infection with syphilis than

male IDUS in Barnaul and Volgograd. Interventions that target sexual risk reduction and are specific to the needs of sex workers are urgently needed. We suggest that mobile and outreach services seek to target IDUs involved in sex work.

Our findings suggest that should the epidemic spread sexually to the general population, then the average Russian(non IDU) who is most probable to have multiple unprotected sexual contacts and thus, be at risk of acquiring STIs and HIV they would be between 30 and 44 years of age, have a completed school education but no further degree; are employed with a high degree of job security and a relatively high income and they perceive themselves as economically secure and viable, but more likely to be unsatisfied with their life and health.

Our findings suggest that the common belief that HIV/AIDS affects only marginalised populations who do not contribute to the national economy is incorrect, but that those most vulnerable to the sexual transmission of HIV may be the core economically active population. The risk of sexually transmitted HIV and other infections are not confined to poor and marginalized groups in Russia. It does not affect young people only either. Risky sexual behaviour seems to increase when a person is employed and with higher earnings. It also surprisingly increases with age – which in itself may be considered to be a measure of socio-economic status.

The study also suggests that the younger population groups exhibit safer sexual behaviour than those in their 30s and 40s. One of the explanations may be that younger people in today's Russia are more exposed to health information and safe sex campaigns or that the messages sent through these campaigns are more effective with the younger population group. Health promotion campaigns need to be targeted at the general population to prevent a generalised epidemic.

2.8.9. Drug treatment in the context of HIV prevention

The importance of provision of quality drug treatment services in HIV prevention cannot be overestimated. They could reduce new HIV cases not only by moderating and reducing drug injecting but also by providing prevention messages to their patients (39-41). Half the drug users in our treatment sample reported injecting on a daily basis and engaging in high risk injecting behaviours. This is the very population that needs to be targeted by harm reduction initiatives. Services need to further integrate with harm reduction programmes, to provide harm reduction messages whilst drug users are in treatment, and refer clients to harm reduction programs such as needle exchanges where necessary.

We recommend several interventions that could be made in drug treatment services in order to provide comprehensive care, increase access to drug treatment services and reduce harm associated with drug use. Russian drug treatment services might benefit from a move away from the highly centralised and medicalised model which dominates current practice towards a more holistic approach increasing the range of available services to meet a variety of treatment needs among drug injectors. Realistically, this will require economic resources as well as political commitment at the federal level alongside increasing the capacity of expertise of those working within the treatment system. There is thus a need to target the removal of structural constraints at the community and individual level, including the development of mechanisms to reduce the financial and social burdens of treatment for drug users seeking help. Taken together, interventions are needed which advocate for, and create, policies which foster an 'enabling environment' for drug treatment, and which place patient rights to treatment and care at the centre of such initiatives. Our qualitative data therefore highlights the critical potential importance of environmental factors mediating access to drug treatment and the need structural interventions in response.

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CHAPTER 3. Modelling the HIV epidemic in Russia and the epidemiological impact of interventions

3.1. Background

Although reported numbers of HIV infections have increased rapidly in recent years, the HIV epidemic in Russia is arguably in its early stages and is currently driven by injecting drug user (IDUs). If the HIV infection rates are now increasing among commercial sex workers (CSWs) then there is the threat of dissemination of infection among non IDUs and of a more widespread, but slower growing epidemic driven by heterosexual transmission in the general population. As observed over 20 years ago, "the epidemic in the high-activity classes serves to seed the slower growing, longer-term epidemic" (1).

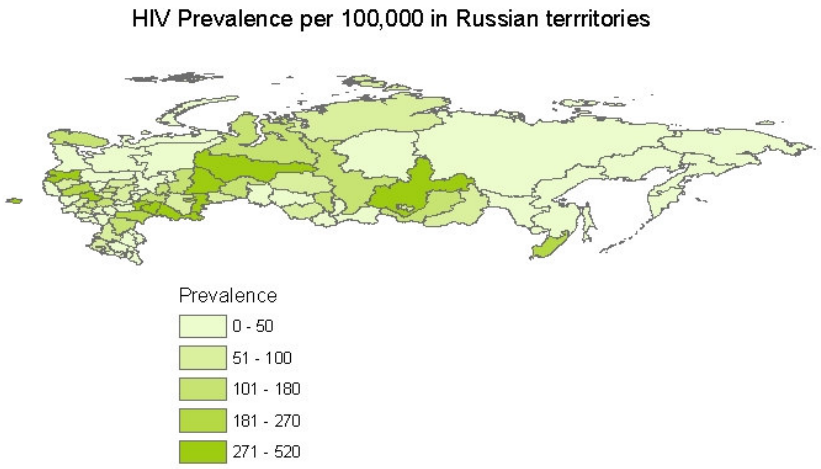
3.1.1. The Russian HIV epidemic

In Russia HIV is concentrated among injecting drug users although health officials believe that heterosexual spread, particularly in sex workers and their clients, has been increasing in recent years (2;3). According to the Russian Ministry of Health 52% of the total cumulative HIV cases (119,496 to end of Dec 2002) are registered as among IDUs (4). HIV infections are not distributed homogeneously across the territories of the Federation. Moreover, the Federal AIDS Centre estimates the proportion of HIV cases associated with IDUs to be nearer 90% (4). While injecting drug users are registered by the state in Russia the number of IDUs registered is widely believed to be an underestimate (4). Estimates of the true number of IDUs suggests between 1.5 and 3 million or 1-2% of the population of Russia (4;5).

There is a substantial overlap between sex workers and IDU populations (6), giving rise to the possibility of large epidemics of sexually transmitted HIV infections. The proportion of female IDUs involved in sex work has been estimated to be between 15 and 50% (4). In addition studies of sex workers have estimated that at least 30% of sex workers also inject drugs (4;7). Russia has the second largest prison population in the world, with 980,600 prisoners in January 2002 (3;8), and a very high turnover (9). A large proportion of the prison population are IDUs and this, coupled with the high turnover of the population and severe overcrowding, leads to a high potential for HIV transmission within prisons. Throughout the 1990s there were dramatic increases in incidence of all sexually transmitted infections in Russia (10;11) and in 1997 a "real and substantial epidemic of syphilis" was observed to be occurring throughout the Russian Federation (10). Surveillance of sexually transmitted infections (STIs) in Russia occurs through notification by physicians of newly diagnosed cases (10;12). It has been observed that increases in incidence rates may, in part, reflect improving diagnostic skills of laboratories (12). The substantial increases in STIs during the 1990s are thought to have been the result of both changes in sexual behaviour and also in the provision, use and effectiveness of services and diagnostic treatment (10). Since 2000 the incidence of STIs is thought to have stabilised (11) or declined (13), although it is not known whether this is indicative of changes in observation methods or a result of a real change in behaviour.

The characteristics of different types of HIV epidemic have implications for the most appropriate way of projecting the future of the epidemic. National HIV prevalence in pregnant women in Russia is less than 1% and HIV is found predominantly in specific high risk populations implying a concentrated epidemic. The future course of such an epidemic depends on whether HIV becomes more widespread through contact between high and low risk populations.

Figure 3. Total HIV infections in each Federal Okrug over time (years since 2002) with the numbers of risk contacts halved.



Data source: AIDS Foundation East West prevalence data as of 31st Dec 2002

3.1.2. A review of projections of HIV prevalence

We reviewed the recent projections of the HIV epidemic created for Russia; who did them, a brief description of the methods used and the projected adult (aged 15-49) prevalence estimates (calculated using UN Population Division demographic forecasts).

The following section examines each of these projections more closely.

3.1.2.1. UNAIDS

UNAIDS' estimates and short term projections are based on data drawn from the HIV Surveillance database maintained by the US Census Bureau (19). These comprise information from sentinel surveillance and routine testing as well as independent surveys and published reports. The method used to estimate and project HIV in countries with concentrated or low level epidemics depends, in part, on the method of reporting/monitoring HIV prevalence used in that country. For those countries with sentinel surveillance systems, the population is divided into groups based on exposure to HIV and prevalence data and estimates of population sizes are used to estimate the number of cases in each group. For the UNAIDS estimates for 2003, regional workshops were held to review and refine these estimates with local experts. The prevalence in the low risk population is estimated from antenatal clinic data or other survey data depending on what is available. Point prevalence estimates are made for multiple years and a start date for the epidemic is set. Then a prevalence curve is fit to these points to characterise the epidemic. For those countries with very recent epidemics the number of regular sexual partners of infected individuals is estimated and yearly transmission probabilities are applied.

However, not all countries have established sentinel surveillance systems. For instance Russia relies predominantly on state registration of cases of HIV from diagnoses. For countries such as Russia, registered HIV cases are used to make estimates of prevalence in the whole population and adjustment is made for under-detection. The officially reported cases are multiplied by three for a low estimate and by five for a high estimate (20). These values were decided upon by comparing the reported to estimated ratios in Ukraine (where sentinel surveillance has recently been introduced) and through consultation with national HIV/AIDS control programmes. Yearly estimates of new infections and assumptions about survival are used to produce yearly prevalence estimates. To project forward, a saturated

prevalence level is estimated based on experience elsewhere and the curve for HIV prevalence is created to reach this level. Thus whilst estimates of 'current' HIV prevalence are grounded in available data, the same cannot be said for the projections.

Table 11. Recent projections of course of HIV epidemics in Russia

Performed by	Methods used	Location	Projected Adult HIV Prevalence (%)
UNAIDS	Worksheet models for concentrated epidemics based on estimates of high risk groups and sentinel HIV surveillance	Countries with concentrated epidemics	
Eberstadt (2002) (14)	Data from NIC. Used epidemic trajectories – 'arbitrary, but … not unreasonable' (Eberstadt).	Russia (and India & China)	In 2025 Low = 6.94 Med = 22.56 High = 32.97
US National Intelligence Council (15)	'Expert estimates' done same as Eberstadt	Russia (and India & China)	In 2010 Low = 7.00 High = 11.19
World Bank (Russia) (16)	Model by Ruhl, Pokrovsky et al. that was developed to examine the economic consequences of HIV in Russia.	Russia	In 2020 Low = 8.69 High = 23.55
Transnational Family Research Institute, Russia, 2003	Projected prevalence from different starting estimates of current prevalence.	Russia	In 2025 scenarios between 1.16 – 5.35
Sharp (2002) (17) and UNDP 2004 (18)	Uses prevalence projections derived by Eberstadt and extends them to 2050 using an assumption of symmetry	Russia	In 2025 Low = 3.0 Med = 6.0 High = 9.0

Lack of data available is a major challenge to UNAIDS methods. Even where surveillance data are available these may well not be representative of the target population; especially for groups at highest risk for HIV such as drug users and sex workers in countries that rely surveillance based on registered cases of HIV (21). Estimates that are based on registered HIV case data are associated with a large degree of uncertainty as a result of under-reporting. Further, applying as single model to larger countries (such as Russia) is unlikely to generate realistic results given the diversity within these countries. Estimates for these countries should ideally be made at a provincial level. However, there are rarely sufficient data for this to be done.

3.1.2.2. Eberstadt (2002)

A set of 'expert estimates' of HIV prevalence have been provided by Eberstadt, which the author described as "arbitrary, but … not unreasonable" (14). Eberstadt assumed that "the epidemics would be essentially 'heterosexual' in nature" (14) and used a suite of models called Spectrum developed by The Futures Group that explore the demographic impact of HIV (23). He further assumed that: the epidemic started around 1985; time to develop AIDS was 9 years; life expectancy after onset of AIDS was 2 years; the epidemic was subject to

'standard heterosexual' distribution between sexes and over age groups as witnessed in low income countries.

Based on these assumptions he arrived at prevalence estimates for HIV prevalence in Russia by 2025 under three scenarios: Severe (10%); Intermediate (6%) and Mild (2%). These estimates of future HIV prevalence are very high, particularly given current adult national prevalence is estimated to be 0.89% in Russia (22) and the assumption that the epidemic would be essentially heterosexual in nature and follow trends observed in sub-Saharan Africa is not borne out by current surveillance data from Russia.

3.1.2.3. US National Intelligence Council

The US National Intelligence Council reported government registered data and used 'expert estimates' of numbers infected in each country using the same approach as (14).

3.1.2.4. World Bank (Russia)

Using registered HIV infections as a starting point a model was developed (16) to examine the economic consequences of HIV in Russia. It multiplies the number of registered cases by a value μ to get the actual number of HIV infected individuals (a value of 6 is used for pessimistic scenario and 4 for optimistic (13)). The population is split into IDUs and non-IDUs, although it is not clear how the sizes of these populations are determined. Population growth is projected for both groups. Three transmission rates (defined as the number of new HIV cases each infected individual is estimated to infect per year) are defined for transmission among IDUs (2 per year for the optimistic case and 4 for the pessimistic), among non-IDUs (0.3 and 0.4 per year respectively) and between IDUs and non-IDUs (0.3 and 0.4). The population growth and these rates are used to project the HIV epidemic.

Given that current estimates for the size of the IDU population puts it at 1.5-3 million (or between 1.9-3.8% of the population) the projection of 23.5% HIV prevalence by 2020 proposed by the authors would require a very large increase in sexual transmission that currently accounts for less than 5% of cases {TFRI, 2003 #24}. Although sexually transmitted HIV in Russia has been increasing in recent years, an increase of this magnitude over this timescale is not suggested by current trends in surveillance derived data.

3.1.2.5. Transnational Family Research Institute, Russia, 2003.

This work used an approach based on the HIV prevalence in the population from registered data on the grounds that "HIV prevalence in Russia can be estimated on the basis of direct observations (registration of HIV cases)" {TFRI, 2003 #24}. The projections used the Futures Group's Spectrum models (23) and the following assumptions: the size of the behaviourally define high-risk groups will not grow; prevalence in high-risk groups is close to stabilisation; the epidemic proceeds mainly by spreading to rest of population through sex contacts. The scenarios all involved an "inevitable decline after a peak has been reached" {TFRI, 2003 #24}. The definitions of the 9 scenarios used are shown below.

Table 12. Scenario definitions: Transnational Family Research Institute projections. Source: {TFRI, 2003 #24}.

	Scenario	Description of starting conditions	Adult HIV prevalence %			
			2002	2005	2015	2025
D	Demographic, baseline	No HIV throughout	0.0	0.0	0.0	0.0
R	Registered	Prevalence at start is number of registered cases	0.3		0.1	0.1
R1	Registered-1	Uses registered cases	0.3		0.6	0.3
R2	Registered-2	Uses registered cases and assumes 100% access to ART	=R1 + 100% ART			
E	Estimated	Assumes substantial under-enumeration so starting point is higher	0.6		1.2	1.2
U	UNAIDS estimated	Starts with estimated number of infections by UNAIDS	0.9		1.8	1.8
A	Alarmist	Starts with number of cases close to that released by NIC (used by Eberstadt)	1.2		2.4	2.4
A1	Alarmist-1	Starts with number of cases close to that released by NIC	1.2	2.4	2.4	2.4
A2	Alarmist-2	Starts with number of cases close to that released by NIC	1.2		4.8	4.8
A3	Alarmist-3	Starts with number of cases close to that released by NIC	=A2 + 100% ART			

3.1.2.6. Sharp 2002 and UNDP 2004

Sharp used an unpublished middle epidemic trajectory for Russia created by Eberstadt. Low and high scenarios were derived by scaling this medium projection down by 50% and up by 33% respectively. These values are arbitrarily chosen (17).

However, the high projection reaches a peak of 8% which, it is argued, is consistent with recent warnings made by the head of the Federal AIDS centre, Dr Vadim Pokrovsky. Eberstadt's projection is extended a further 25 years to 2050 by assuming that the epidemic will peak in 2025 and then decline in a 'mirror' of increase to 2025. The report cites "the symmetrical nature often associated with epidemiological spread" (17). The projections are shown in Figure 4

3.1.2.7. Summary of previous projections

To show the spread of these projections more clearly a graph of prevalence over time showing estimates of adult prevalence (15-49) for each year since the start of the epidemic up to 2003 are plotted in Figure 5. After 2003 the spread of projections is shown and the projections are also shown individually.

The NIC projections for 2010 are for adult HIV prevalences of 7.00% in the low scenario and 11.19% in the high scenario, corresponding to 5 and 8 million cases respectively. These projections are higher than the World Bank projections for the same year, which are for between 3.21% and 7.26% prevalence (or between 2.3 and 5.3 million cases respectively). The World Bank (16) projections can be seen more clearly and in terms of the numbers of HIV cases projected in Figure 6. These projections are of a similar magnitude to Eberstadt's. The World Bank's estimate for 2020 is slightly higher than Eberstadt's middle projection for 2025 (14.5 million cases and 13 million cases respectively).

Figure 4. Projections of adult HIV prevalence in Russia. Source: (17).

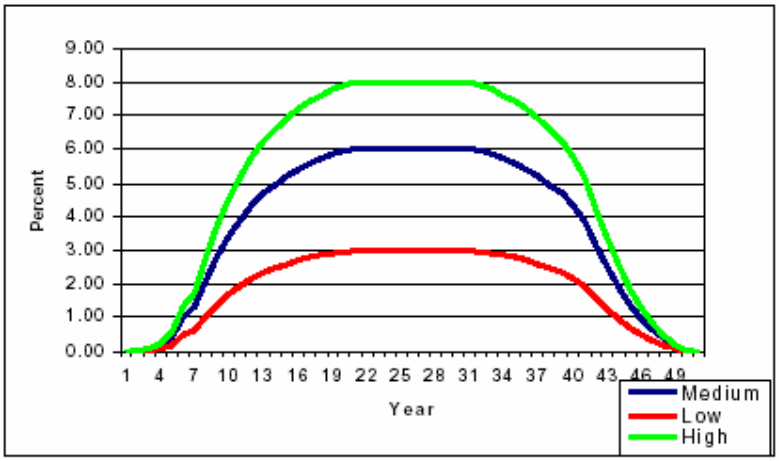


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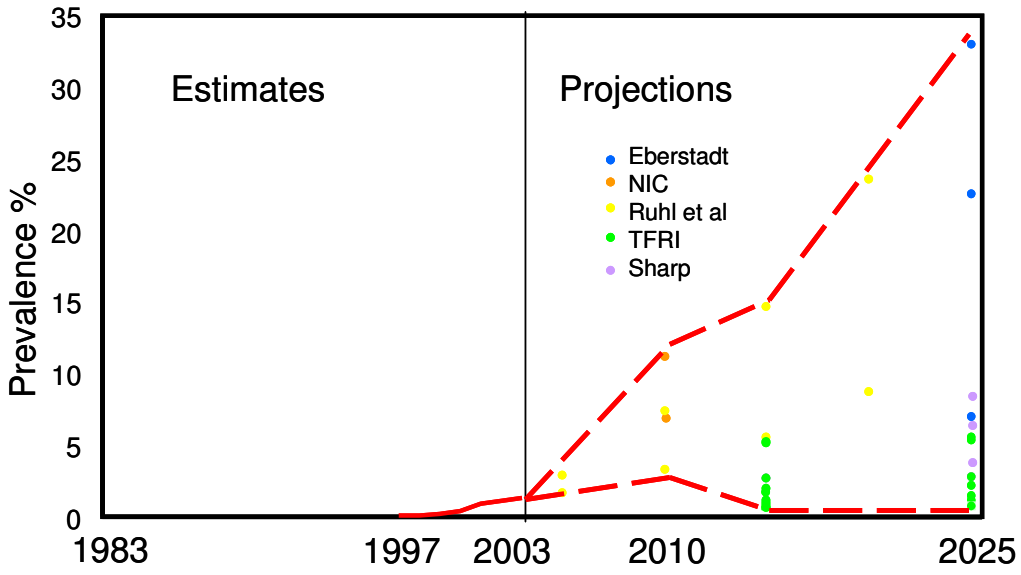
Figure 5. Estimates and previous projections of the HIV epidemic in Russia

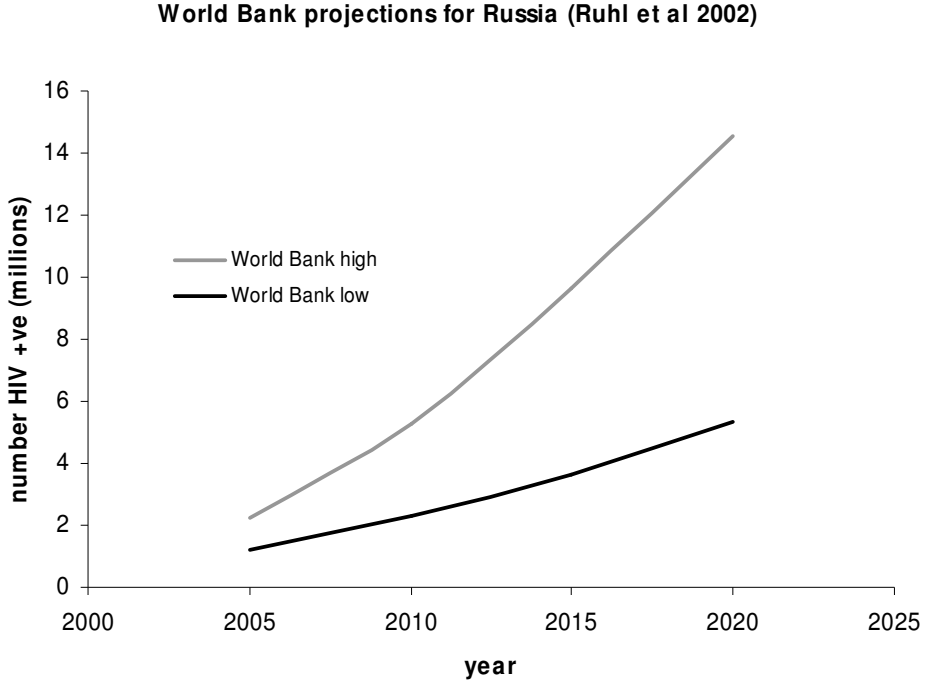


The World Bank's projections for 2020 are for 5.4 million cases in the low scenario or 14.5 million cases in the high scenario, corresponding to 8.4% and 22.9% prevalence respectively. Even the low estimate is considerably higher than the projections done by the Transnational Family Research Institute {TFRI, 2003 #24}, the highest of which is 5.35% prevalence in 2025.

The range in projections for 2025 is a possible 18.6 million cases (the difference between Eberstadt's highest projection of 19 million cases and the {TFRI, 2003 #24}'s lowest scenario of 390 thousand cases). The Transnational Family Research Institute's projections all involve a decline in prevalence after 2015 (except for one scenario when the decline occurs earlier) so this is not the highest number of cases expected by the projection. The lowest of {TFRI,

2003 #24}'s scenarios is one that uses the number of registered cases as the starting point and assumes that all people requiring antiretroviral therapy have access to it .

Figure 6. The number of HIV infections predicted by the World Bank projections for Russia (16).



3.1.2.8. Discussion of projections of the Russian HIV epidemic

The future of the emerging HIV epidemic in Russia is difficult to project, owing in part to the varying quality of both HIV surveillance and data describing on prevailing patterns of risk behaviour. In order for HIV infection to become generalised within a population, sexual transmission must become the main route of transmission (because the other routes influence fewer people). Therefore knowledge about patterns and trends in sexual behaviour is necessary to forecast the future of an HIV epidemic. Lack of information about risk behaviours coupled with "our limited ability to model the transmission dynamics of a disease that depends on highly stigmatised, private and complex behaviours" (24) present major hurdles for any effort to forecast HIV. The uncertainty in estimates of the size and turnover of high risk population groups such as injecting drug users and commercial sex workers combined with uncertainty in estimates of rates of infection in low risk groups means that extrapolation of observed trends in HIV prevalence or case report data can be misleading (24). Despite these problems, demand from policy makers and the media often leads to speculative projections of the future of emerging HIV epidemics and their economic impact, such as those projections by Eberstadt (14) and the US National Intelligence Council (15) (24).

The key difference between the lower prevalence projections and the very high projections reported in (14), (15) and (16) is the assumption about future heterosexual transmission. The higher projections assume that the epidemic will be essentially heterosexual and will follow the trends observed in Sub-Saharan Africa. This seems unrealistic based on current knowledge of the situation in Russia, where the epidemic is still predominantly concentrated in injecting drug users. However, the lack of sexual behaviour surveys means that it is very

difficult to make projections about risk behaviour (both present and future) and the possibility of the epidemic becoming generalised. Recent experiences in Western Europe show clearly how infection slowly seeps out of the high risk groups into the general population over time scales of a few decades.

To date the UNAIDS method for estimating and projecting HIV in concentrated or low level epidemics is arguably the best method available. It requires explicit assumptions about current and future prevalence in different high and low risk groups. While some of these assumptions may be little more than guesses, the fact that they are made explicitly means that they can be debated and the results of projections examined in light of the assumptions used. In addition, sensitivity analyses can be conducted to allow for uncertainty in current and future prevalence figures. This has considerable advantages over projection methods that use arbitrary epidemic trajectories, such as those used by (14). Current surveillance and case reporting systems in Russia cannot accurately characterise the size of the HIV epidemic either in different population sub-groups or nationally. Where HIV is monitored predominantly through state registration of cases, the major problem for estimating the size of the epidemic is the under-reporting of HIV. Estimates of the numbers of people living with HIV in Russia by UNAIDS are in the region of 8 times higher than the number of registered cases (22). However, it should be noted that sentinel surveillance systems do not necessarily solve these problems. Surveillance sites are often concentrated geographically in areas with historically higher HIV prevalence. This has two main implications; the first is that any new epidemics of HIV may be missed by the surveillance system, and the second is that the high prevalences in these areas are unreasonably extrapolated to the rest of the country.

3.1.2.9. Required behavioral surveys

To make more informed estimates of the scale of the HIV epidemic surveys in both the general population and in particular high risk groups are required. These should generate information describing the proportions of those who are injecting drug users, men who have sex with men (MSM), sex workers and clients, together with descriptions of distributions of risk behaviours such as needle sharing, and adoption of protective practices such as needle cleaning and condom use. To date there have been few surveys of sexual and injecting drug user populations in Russia. In those surveys that have been done there are problems with the quality of data due to bias in respondents self-reporting of sexual and drug using behaviour (24). In order to make such data, representative and standardised behavioral surveys are required. These surveys should also, ideally, be aimed at the general population as well as high risk groups, because the future of the HIV epidemic in countries such as Russia, where HIV is currently concentrated in high risk groups is highly dependent on potential for HIV to spread among the general population through this populations risk behaviors (25).

3.2. Parameters describing the determinants of the epidemiology of HIV in Russia

3.2.1. Introduction

The surveys undertaken during this project can be used to develop projection models which attempt to capture both sexual and injecting drug use behaviours among IDUs and non-IDU and to estimate key parameters required by these models. Parameters for modeling can be derived from data from the behavioural survey among IDUs, the Household survey in Altai and the risk behaviour module included in the Russian Longitudinal Monitoring Survey (RLMS) described in CHAPTER 2. The latter two surveys were household surveys with 1388 and 6115 respondents respectively of whom 43% and 46% were male.

The IDU survey had 1664 respondents of whom 64% are male. The mean age of respondents to the Altai Household survey was 30.9 (median 30, range 13-51), to the RLMS 31.1 (median 30, range 14-70) and to In the IDU survey 26.2 (median 25, range 15-62). In terms of sexual behaviour, by the age of 20, in the Altai household survey, 82.4% of women and 86.4% of men were sexually active by the age of 20. In the RLMS these figures were slightly lower at 81.0% of women and 85.7% of men. The age of starting sexual activity was

not reported in the IDU survey, but 95.4% of the IDU population reported having at least one sexual partner in the last twelve months (97.5% of men and 90.4% of women).

As has already been noted in this report, the number of IDUs in Russia is not well described. For the purpose of modeling, because no accurate figure of the size of the IDU population was available, the proportion of people reporting ever having injected drugs in the household survey and the RLMS was used to give an indication of the size of the IDU population. In the household survey 1.7% of men and 0.4% of women reported ever having injected drugs, while in the RLMS, 3.1% of men and 0.5% of women reported ever having injected drugs. As mentioned elsewhere in this report, in the last four weeks only 14% of IDUs reported injecting with needles or syringes previously used by others. However, 84% reported injecting with shared injecting paraphernalia other than needles and syringes. The risk of transmitting or acquiring HIV through such routes is less well known.

3.2.2. Sexual behaviour of IDUs

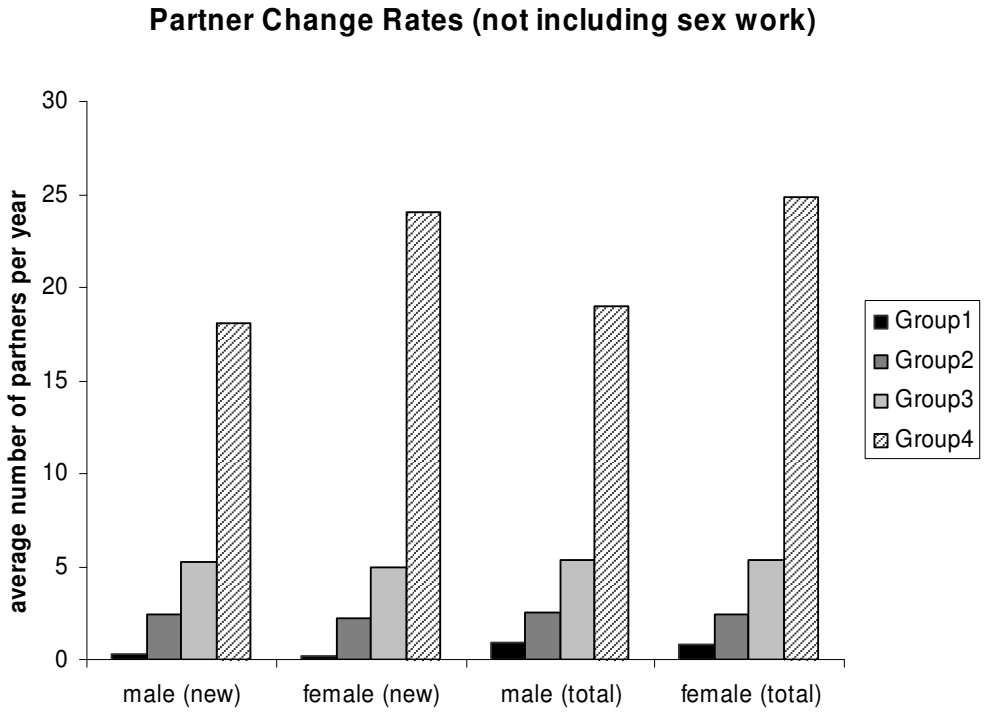
While a large proportion of the IDU survey population reported having no new sexual partners in the last 12 months (27.5% of men and 34.8% of women), 1.1% of men and 1.3% of women reported having over 40 new sexual partners in the last 12 months with one women reporting 198 new partners in that time (not including clients for those respondents engaged in sex work). In order to capture this heterogeneity in sexual behaviour the IDU population was divided into four different activity classes grouped by the numbers of new and total partners in the last 12 months. The proportions of the total IDU population falling into these groups, and average annual partner change rates, and numbers of sex acts per partnership pertaining to these were calculated. The groups used were: Group 1 (0-1 partner); Group 2 (2-3 partners); Group 3 (4-8 partners) and Group 4 (9 or more partners).

The average number of sexual partners over a time period (in this case one year) and the partner change rate, can be calculated from the total number of partners reported in the previous 12 months and the number of new partners reported in the last 12 months. We describe sexual partner change rates for IDUs excluding sex-work activity initially and then including sex-work activity.

3.2.2.1. IDUs not including sex work activity

Among IDUs the average number of new sexual partners not including sex work clients in the previous 12 months was 3.46 for men and 2.74 for women and the average number of total partners reported for the last year was 5.45 for men and 4.58 for women. Average partner change rates for the four activity classes are shown in Figure 7. The greatest difference between partner change rates calculated from new and from total reported partners was in the lowest activity class (0.34 compared with 0.92 respectively for men and 0.25 compared with 0.80 respectively for women) (see figure). There was also a noticeable difference between numbers of new and total partners for the highest activity class (18.13 compared with 18.94 respectively for men and 24.00 compared with 24.82 respectively for women).

Figure 7. Partner change rates calculated excluding sex work for both new and total numbers of partners reported in the last year

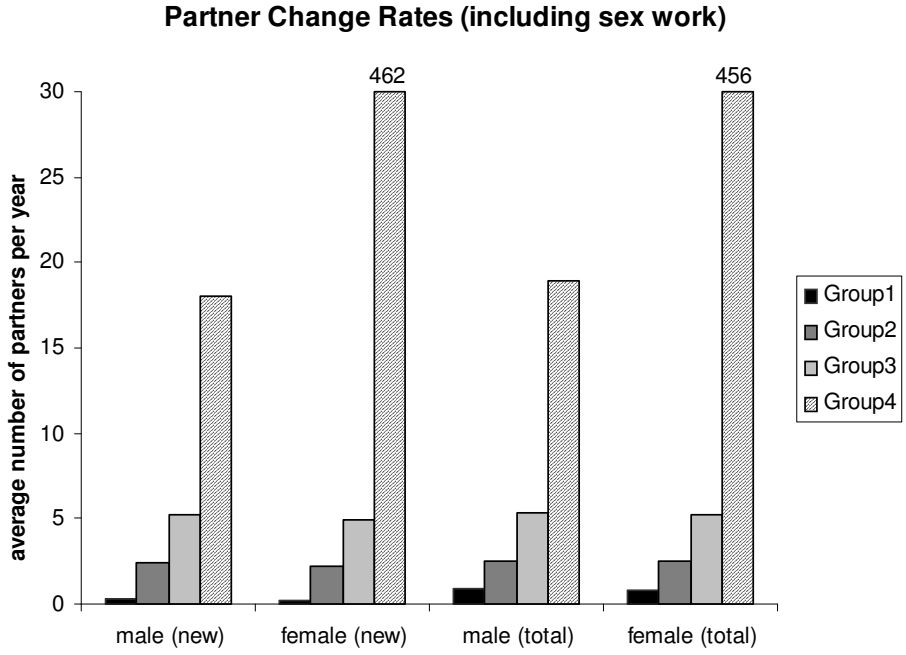


3.2.2.2. IDUs including sex work activity

If sex work activity is included in the partner change rates estimated for IDUs these estimates increase dramatically for women, emphasizing the potential importance of sex work within the IDU population. The IDU survey asked about the number of new and total clients in the last four weeks. If we assume that the last four weeks is typical, multiplying the number of (new and total) clients reported in the last four weeks by 12 gives an indication of the yearly number of clients. This is then added to the number of non-sex-work partners to give the overall number of sexual partners (new and total) in the last year. The partner change rate calculated using numbers of new partners and clients is 3.48 for men and 102.76 for women and the rate calculating using total numbers of partners and clients is 5.47 for men and 125.18 for women.

Figure 8 shows the partner change rates for each class. The main difference between these partner change rates and those observed excluding sex work activity was the average rate for the highest activity class of women. The partner change rate for women in class 4 calculated using new partners was 462.48 compared with 24.00 when sex work activity was excluded, and when calculated using total partners the partner change rate was 456.00 compared with 24.82 when sex work activity was excluded. It should also be noted that the partner change rate for this group calculated using total partners is lower than that calculated using new partners which implies some errors in reporting of numbers of sexual partners.

Figure 8. Partner change rates calculated including sex work for total and new partners in the last year and total and new clients in the last four weeks[3]



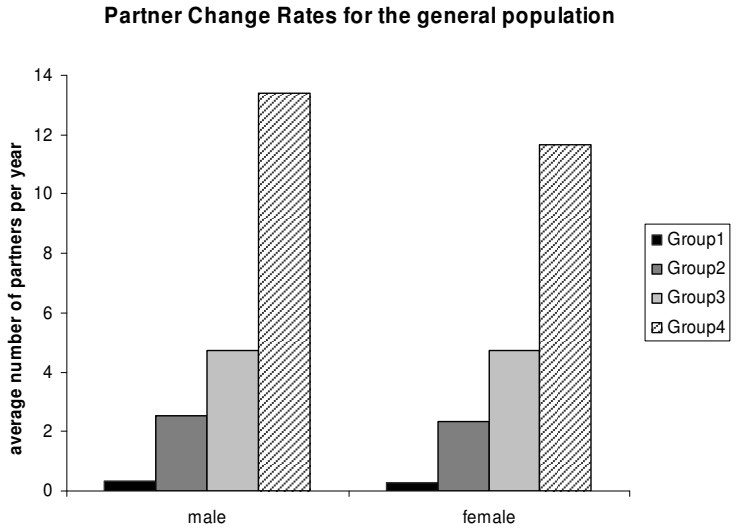
3.2.2.3. Commercial sex work among IDUs.

Amongst IDUs in the IDU survey, 29.4% of women reported having ever sold sex. The mean number of sex acts reported per client was 1.52 (95%CIs 1.32-1.72), with 61% of individuals reporting only one act per clients. There was one individual who reported one client in the last four weeks and 20 sex acts but all others reported fewer than 7 sex acts per client. The mean number of clients per sex worker was 45.3 in the last four weeks, with two individuals reporting having 200 clients each in the last four weeks. In the survey one man reported having had one client in the last four weeks with one sex act with this client.

3.2.3. Sexual behaviour of the general population

The household survey was used to characterise the sexual behaviour of the general non-IDU population. Partner change rates and activity classes were calculated in the same way to allow comparison. The average number of new partners in the last year was 1.25 for men and 0.60 for women and the average total number of partners in the last year was 2.53 for men and 1.40 for women. These numbers of partners are considerably higher than those reported for IDUs in the IDU survey indicating that IDUs are more sexually active than the general population.

Figure 9. Partner change rates for the general population calculated from the household survey data.



The partner change rates calculated with the number of new partners for each activity class shown in Figure 9 are similar to those observed for IDUs excluding sex work activity, especially for the two least active classes (1 and 2). The important difference to note is that while the average number of partners reported in each activity class were similar, the proportion of the population making up each activity class are very different (Table 13). In the IDU population, 9.5% of men and 7.0% of women were in activity class 4 and 47.5% of men and 65.6% of women were in activity class 1 (the lowest activity class). In the general population 0.01% of men and women were in the highest activity class (4) and 89.9% of men and 97.0% or women were in activity class 1 reporting annual partner change rates of less than 0.5.

Table 13. Comparing sexual activity of IDUs and the general population

Group	General population				IDU population			
	Proportion population		Partner change rate (new)		Proportion population		Partner change rate (new)	
	male	female	male	female	male	female	Male	female
1	89.9%	97.0%	0.31	0.28	47.5%	65.6%	0.34	0.25
2	7.8%	2.5%	2.51	2.33	23.8%	17.4%	2.40	2.24
3	2.3%	0.5%	4.74	4.71	19.2%	9.9%	5.26	5.00
4	0.01%	0.01%	13.38	11.67	9.5%	7.0%	18.13	24.00

In the household survey 1.4% of men and 1.4% of women reported ever having sold sex and 5.7% of men and 0.1% of women reported ever having paid for sex.

3.2.4. Injecting drug use behaviour

Injecting behaviour reported in the IDU survey was used to divide the population into two activity classes as the majority of the survey population reported no new sharing partners in the last four weeks (78.3% of men and 72.2% of women). Indeed the majority of the survey population reported no needle sharing at all in the last four weeks (69% of men and 67% of women). Of those who reported sharing needles, the greatest number of sharing partners 10 in the previous four weeks (reported by 3 individuals or 0.4% of the survey).

Sharing partner change rates, or the number of sharing partners reported (new and total) in both the last four weeks (reported directly in the IDU survey) and the last year (calculated from the last four weeks assuming this was typical), were estimated overall and for each activity group. The mean number of new sharing partners reported in the last four weeks was 0.32, or 3.87 per year and the mean number of total sharing partners reported in the last four weeks was 0.47, or 5.68 per year (Figure 10). The mean number sharing acts reported in the last four weeks is 0.42 (CIs 0.37-0.48)

Figure 10. Sharing partner change rates for total population calculated from number of new partners and total number of partners reported in the last four weeks

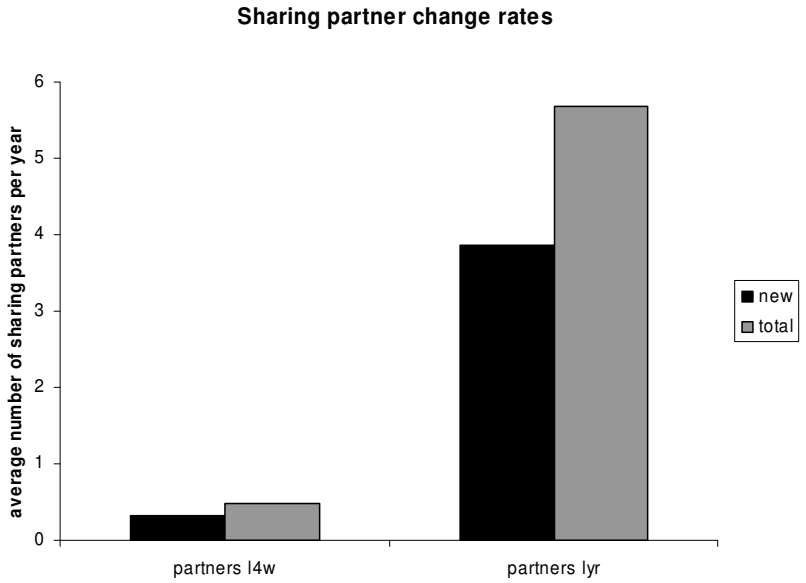


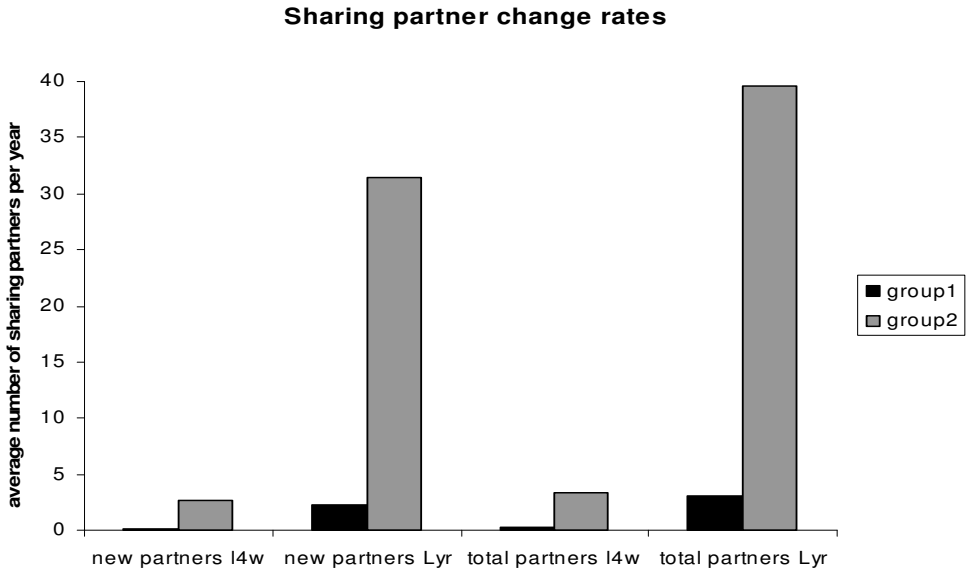
Table 14 and Figure 11 show partner change rates and number of sharing acts calculated both per sharing partner and as a total for the last four weeks. The former assumes that the number of sharing acts per partner in the last four weeks is the same regardless of whether the partner is new or old.

The yearly sharing partner change rates for the highest activity class are 31.38 (new partners) and 39.57 (total partners). These rates are considerably higher than those calculated for the total population indicating the heterogeneity in behaviour in the IDU population. However, the highest activity class only encompasses 5.4% of the population (when calculated using new partners) or 7.0% of the population (when calculated using total partners) which shows the relatively low rate of sharing reported in the IDU survey. Rates of sharing needles were much lower than that found in other surveys. In an IDU survey in Togliatti, 36% of IDUs reported injecting with needles and syringes previously used by someone else in the last four weeks (26).

Table 14. Needle sharing activity

Group	Proportion population	Sharing partner change rate	Sharing acts (pp)	95%CIs	Sharing acts (L4w)	95%CIs
new						
1	94.6%	0.19 (l4w) 2.28 (lyr)	2.09	1.88 – 2.31	2.42	2.19-2.67
2	5.4%	2.62 (l4w) 31.38 (lyr)	1.48	0.998-1.97	9.30	3.86-14.74
total						
1	93.0%	0.26 (l4w) 3.14 (lyr)	2.13	1.88-2.39	0.54	0.47-0.61
2	7.0%	3.30 (l4w) 39.57 (lyr)	1.79	1.54-2.05	5.98	4.66-7.30

Figure 11. Sharing partner change rates calculated from new and total numbers of reported partners in the last four weeks and multiplied by 12 to give in the last year.



The IDU survey asked individuals whether at the last time they shared a needle they cleaned it first and if they did how they cleaned it. If we assume that all methods of cleaning are effective the proportion of people reporting using cleaned needles was 93.9%. If we assume that all methods apart from cleaning with cold water are effective, the proportion of people using effectively cleaned needles was 20.2%. If we assume that what individuals report doing the last time they shared a needle was typical, we can calculate rates of cleaning for each activity class (for both new sharing partners and total sharing partners). Using new sharing partners the proportion reporting cleaning using all methods was 84.4% for class 1 and 90.9% for class 2, and the proportion reporting cleaning with all methods except cold water was 26.3% for class 1 and 9.1% for class 2. Using total sharing partners these proportions are 87.9% for class 1 and 86.1% for class 2, and 24.2% for class1 and 16.7 for class 2 respectively. This indicates that if cleaning with cold water is not effective at removing the risk

of HIV transmission a large proportion of the IDU population may be at risk when sharing needles and the higher activity class is at greater risk.

3.3. Modelling high and low risk behaviours

In Russia, the early HIV epidemic has been concentrated in injecting drug users (IDUs) although health officials believe that heterosexual spread, particularly in sex workers and their clients, has been increasing in recent years (2;3), enhancing the possibility of a more widespread epidemic. In concentrated HIV epidemics most infection occurs in the context of high risk behaviours, such as injecting drug use and commercial sex work. However, infection can be spread from such individuals to those with low risk behaviour fuelling a more pervasive epidemic. Additionally, high risk behaviour can be transitory, and those likely to be infected with HIV because of past behaviours may be missed by targeted interventions. We have developed an deterministic model of HIV transmission in high and low risk populations with injecting drug use (IDU) transmission in the high risk population and sexual transmission in both the high and low risk groups to examine the impact of sexual mixing between these risk groups and the transitory nature of risk behaviour and different excess mortality profiles among IDUs.

3.3.1. Model description

The model used divided the population into four groups; low and high risk men and low and high risk women. High risk was defined as “ever having injected” and low risk as “never having injected”. Injection associated transmission was set to occur only between members of the high risk group, whereas sexual transmission was set to occur both within the high and low risk groups and between groups. A full mathematical description of the model is given in an appendix at 3.7.

3.3.2. Model Parameter estimates

Model parameter estimates used are summarized in Table 15. These were derived from data from the IDU Behavioural Survey (IDU survey) conducted in Barnaul, Volgograd and Moscow for the characteristics of the high risk population, and the Household Survey conducted in Altai Krai and the Russian Longitudinal Monitoring Survey (RLMS) for the characteristics of the low risk population. In the household survey, 1.7% of men and 0.4% of women reported ever having injected drugs, while in the RLMS, 3.1% of men and 0.5% of women reported ever having injected drugs. A combination of these data was used to give the initial fraction of the population in the high risk group as 2.9% of men and 0.5% of women (the RLMS is a larger survey). Of the 88 men who reported ever injecting drugs in the RLMS, 12 (or 0.4% of the total male population of the RLMS) reported injecting drugs in the last four weeks. None of the women reported injecting in the last four weeks.

The numbers of new partners over a 12 month period reported in the household survey was used to define the sexual partner change rate for men at 1.2. The rate for women from the survey was 0.6, however the partner change rate for women is set in the model for balancing purposes and as a result the rate used was 1.3. For the high risk population the partner change rates were taken from the IDU survey and were 3.5 for men and 102.8 for women. These partner change rates for the high risk population include those individuals who reported having ever sold sex (29.4% of women).

Table 15. Table of model parameter estimates

	Men and Women	Men	Women
Initial total population	10,000,000		
Fraction high risk		0.03	0.005
Initial infected prop (high risk)		0.0005	0.001
Timestep	0.1		
Birth rate	0.0098		
Death rate	0.01452		
Excess mortality	0.05808		
Progress1	2		
Progress2	0.125		
Progress3	0.5		
AIDS death rate	1		
Start high risk behaviour		0.01	0.01
Cease high risk behaviour		0.14	0.19
Partner change rate (high risk)*[2]		3.5	102.8
Partner change rate (low risk)*[3]		1.2	0.8 (set by model)
Mixing	0.5		
Sexual transmission probabilities		W→M	M→W
Stage 1		0.025	0.05
Stage 2		0.0005	0.001
Stage 3		0.025	0.05
AIDS		0	0
Rate of sharing needles	3.87*		
IDU transmission probabilities			
Stage 1	0.1		
Stage 2	0.001		
Stage 3	0.1		
AIDS	0.1		

* this rate of needle sharing is calculated from the IDU survey data. However, it does not give an epidemic so we use the rate of 50 suggested by our Russian partners.
*[2] this is calculated using the number of new sexual partners from the IDU survey. If the same rate is calculated with total partners we get 5.47 for men and 125.18 for women.
*[3] this is calculated using the number of new sexual partners from the household survey. If the same rate is calculated with total partners we get 2.53 for men and 1.40 for women.

The IDU survey contains information on the duration of injecting career to date (as all respondents are current IDUs). The mean duration of injecting to date for men is 7.21 (median 6, range 0-44) and for women is 5.18 (median 4, range 0-27). This therefore gives the minimum duration of injecting career and the reciprocal of this gives the maximum rate of cessation of high risk behaviour (0.14 for men and 0.19 for women). Rates of starting high risk behaviour were set at 0.01 per year for both sexes.

The numbers of people with whom respondents shared needles or syringes with for the first time in the last 4 weeks reported in the IDU survey was used to define the rate of needle sharing at 3.87 per year. However, with this degree of sharing needles no HIV epidemic is observed in the model. This may indicate that there is no HIV epidemic in the regions characterised by the data because no one is sharing needles. It may alternatively indicate that IDUs have changed their injecting behaviour and reduced the number of times they share needles or syringes, possibly as a result of the HIV epidemic and dissemination of information about the risks associated with sharing. Alternatively, it may be a result of the IDU survey not capturing the highest risk individuals. In order to explore possible epidemics, the annual rate of sharing based on the expert opinion of Russian partners of 50 was used.

The sexual transmission probabilities are set per partnership and transmission is assumed to be half as likely from women to men as from men to women. No transmission is assumed to occur during AIDS to reproduce reduced sexual activity during illness. The IDU transmission probabilities are also per partnership and transmission is assumed to occur during AIDS. The

progress rates are set to give the average duration in each stage of HIV infection as 6 months in stage 1, 8 years in stage 2, 2 years in stage 3 and 1 year in AIDS.

The birth and death rates for Russia for 2005 were taken from the US Census Bureau International Data Base. Injecting drug users are characterised by higher rates of both morbidity and mortality than the general population. Studies have shown the difference in mortality rates for IDUs and the general, age-matched population varying between a five-fold increase to a 14-fold increase in mortality rate for IDUs over the general population (27-31). The UNAIDS Reference Group on Estimates, Modeling and Projections recommend that the default excess mortality for IDUs should be 1% when using EPP {UNAIDS Reference Group for Estimates Modeling and Projections, 2005 #84}. The rate of excess mortality used here is a five-fold increase on the mortality rate (corresponding to the results of Goedert and colleagues (27)), resulting in a rate of 0.05808. A range of different excess mortality rates is explored in the model.

3.3.3. Results

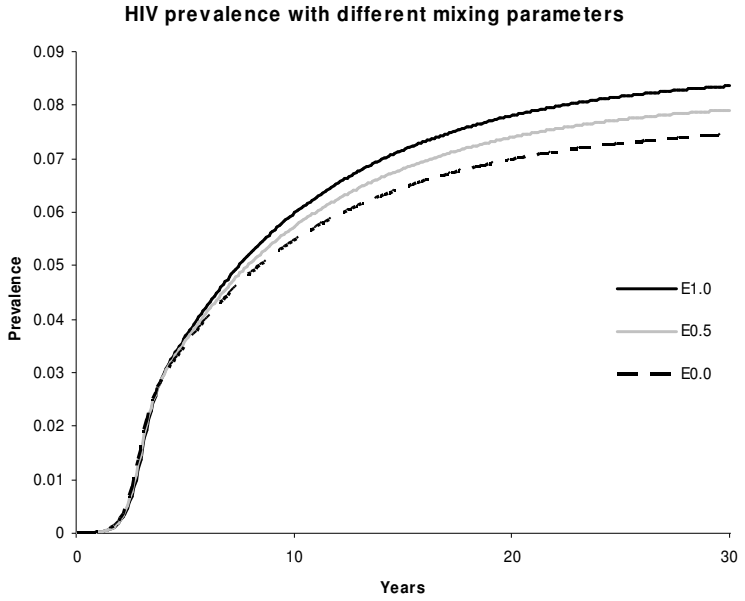
We explore the characteristics impact of different patterns of sexual mixing between low and high risk groups, different rates of starting and ceasing high risk behaviour (drug injection), different rates of excess mortality among high risk group members and the effect of sex work on projected HIV prevalence over a 30 year timeframe.

3.3.3.1. Effect of sexual mixing pattern

With the ceasing and starting parameters set to give the duration of injection careers observed in the IDU survey (as a minimum) the sexual mixing parameter was explored. When the parameter is equal to 1.0 (denoted by E1.0) the mixing is completely random and dependent on the size of the population in each risk group. A mixing parameter of 0.0 (denoted by E0.0) indicates assortative mixing where people in the high risk population only have sexual contacts with other people in the high risk population. A mixing parameter of 0.5 (denoted by E0.5) indicates a combination of the two types of mixing. Results are shown in Figure 12.

Changing the sexual mixing between individuals of high and low risk has very little impact on the HIV epidemic because the majority of transmission occurs through IDU contact (in the high risk population). The impact of changing sexual mixing is greater on the low risk population (random mixing gives 5.6% prevalence, a mixing parameter of 0.5 gives 5.1% and assortative mixing gives 4.6% prevalence in the low risk population after 30 years) than the high risk population (random mixing gives 82.9% prevalence, a mixing parameter of 0.5 gives 83.0% and assortative gives 83.0% prevalence in the high risk population after 30 years).

Figure 12. Prevalence in total population with different mixing parameters.



3.3.3.2. Impact of rate of ceasing and rate of starting high risk behaviour

The duration of injecting observed in the IDU survey gives a minimum length of career as the respondents are all current IDUs. The impact of increasing the length of injecting careers on the HIV epidemic is explored by decreasing the rate of ceasing high risk behaviour. The duration of injecting for men is changed and the duration of injecting for women is set in relation to the length of career for men keeping the ratio found in the IDU survey constant. Results are shown in Figure 13.

The impact of reducing rates of cessation of high risk behaviour is small because the prevalence in the high risk population is already high (around 77% after only 5 years) and therefore keeping people in the group longer has little effect on the prevalence. The small change observed is likely to be a result of previously high risk individuals re-joining the low risk population and increasing the prevalence in this group as they are more likely to have been infected during the period of high risk behaviour.

Individuals ceasing high risk behaviour have a two-fold effect. Firstly by ceasing high risk activity they reduce their likelihood of becoming infected. However, they are more likely to have become infected while in the high risk group and therefore may increase prevalence in the low risk when they cease high risk activity. To explore the impact of people ceasing high risk behaviour on the prevalence of HIV in the general low risk population, HIV transmission to the low risk population was removed from the model and the prevalence of HIV in the low risk population was compared with the model that included HIV transmission to this group. The results are shown in Figure 14.

Figure 13. Prevalence in total population with different rates of ceasing high risk behaviour

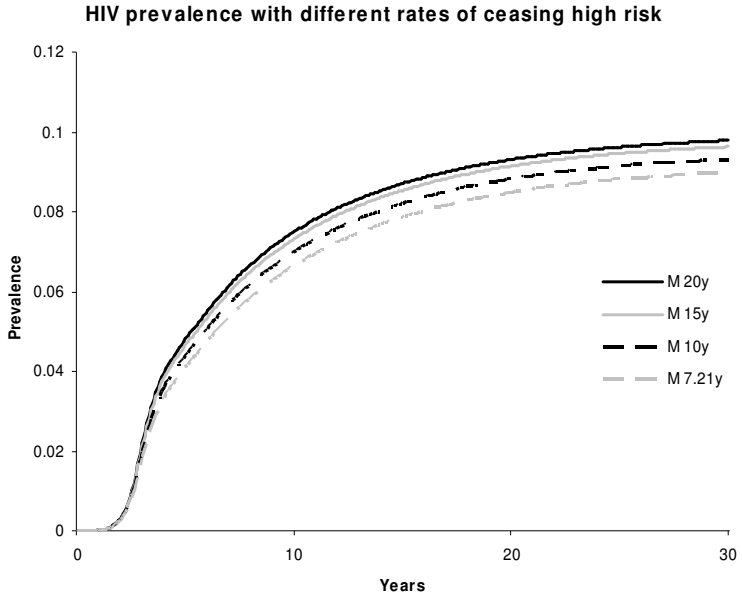
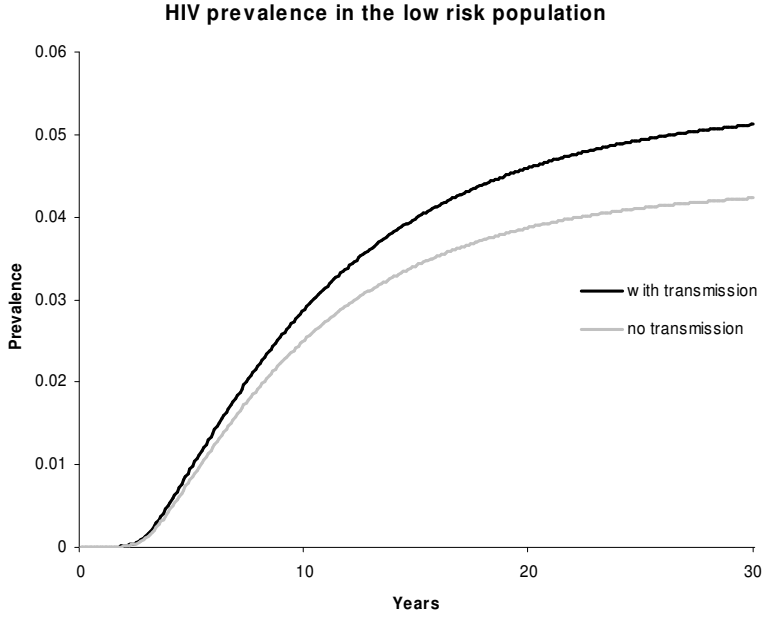


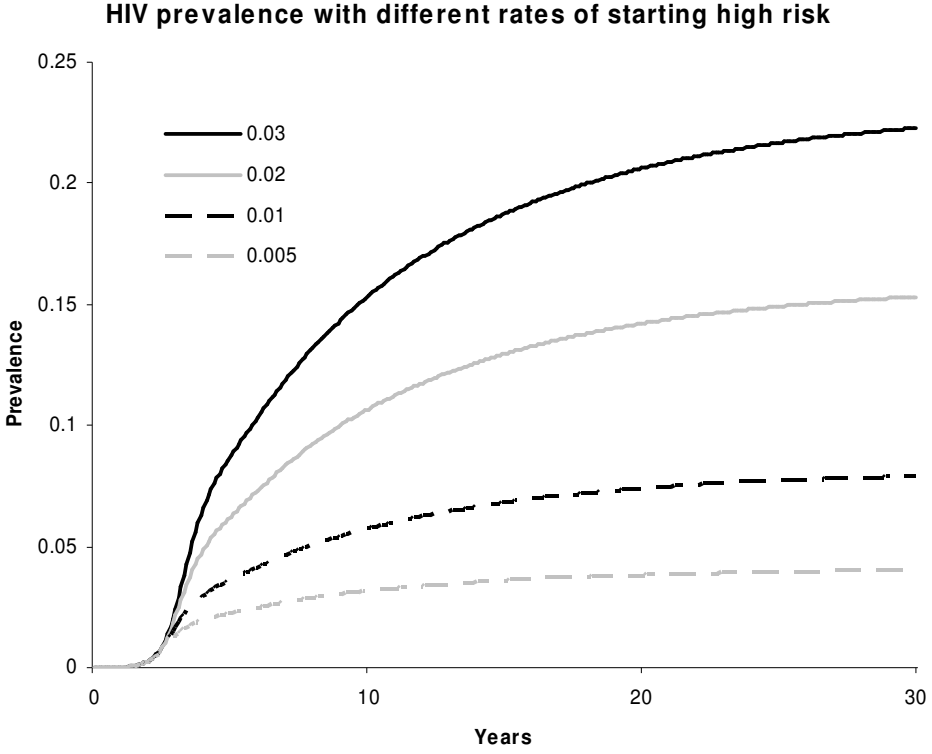
Figure 14. Prevalence in the low risk group with and without transmission to the low risk group



Without transmission to the low risk population HIV prevalence in this group still reaches 4.2% after 30 years compared to 5.1% after 30 years with transmission. This is therefore solely a result of individuals ceasing high risk behaviour and returning to the low risk population infected, thereby inflating the prevalence in this population.

It is clear from the previous results that the majority of transmission occurs in the high risk population. The impact of high risk individuals was examined further by changing the rate of starting high risk behaviour while keeping the rate of ceasing high risk behaviour constant at the maximum from the IDU survey. Results are shown in Figure 15.

Figure 15. Prevalence of HIV in total population with different rates of starting high risk behaviour (changed both sexes the same, original setting was 0.01).

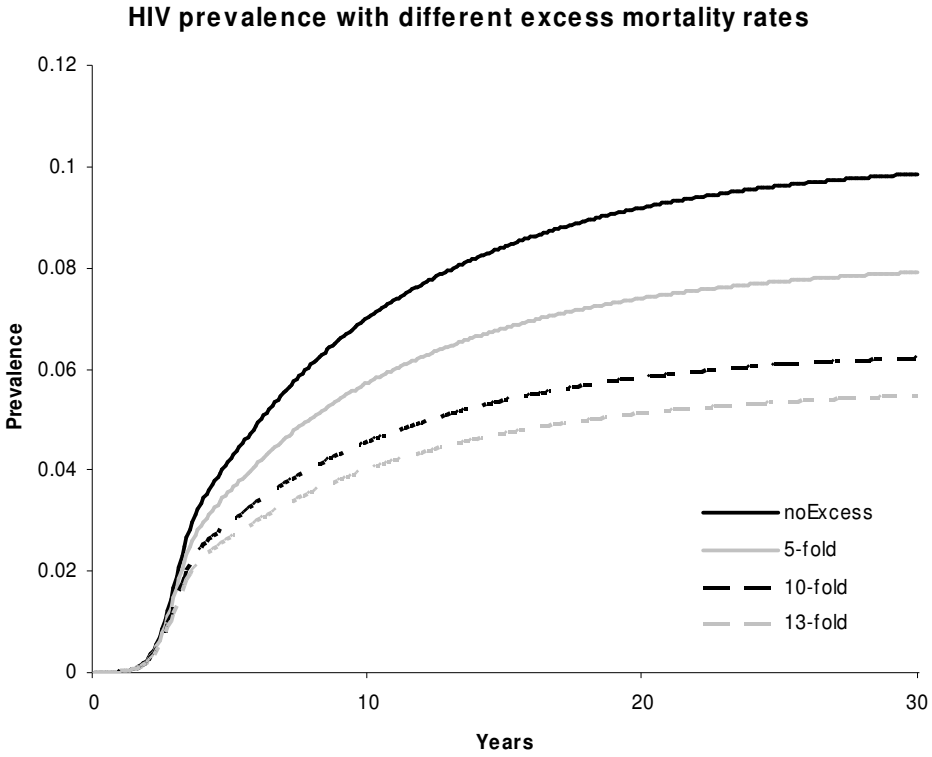


Changing the rate of starting high risk behaviour has a large impact on the epidemic, confirming the importance of high risk individuals and IDU transmission to the epidemic.

3.3.3.3. Impact of different levels of mortality

As previously observed, injecting drug users are characterised by higher rates of morbidity and mortality than the general population. Using different rates of excess mortality for the high risk population the impact of this higher mortality can be observed. Results are shown in Figure 16.

Figure 16. Difference in total prevalence with different excess mortality rates.



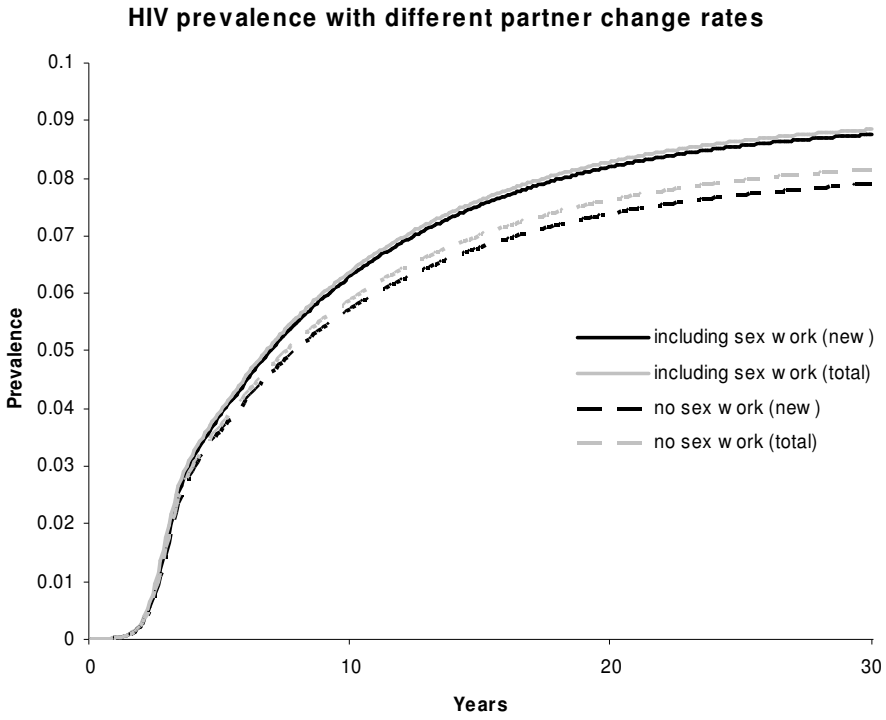
Total prevalence in the population reaches 7.9% after 30 years in the scenario with a five-fold increase in mortality for high risk individuals. When excess mortality is removed, so high risk populations experience the same death rates as the general, low risk population, prevalence reaches 9.9% after 30 years. With the UNAIDS recommended 1% excess mortality, prevalence reaches 9.5% after 30 years and with a 10-fold and 13-fold increase in mortality for high risk populations HIV prevalence reaches 6.2% and 5.5% respectively after 30 years.

3.3.3.4. Impact of rates of partner change

Total partner change rates were calculated both using the number of new partners reported in the last year and the total number of partners reported in the last year. Partner change rates for the high risk population (calculated from the IDU survey) were estimated both including and excluding sex work activity. The impact of these different partner change rates on prevalence are shown in Figure 17.

There is a clear difference in the epidemics produced by the different rates of partner change including and excluding sex work activity. The impact of the different rates of partner change is greater on the low risk population as this is the population most affected by sexual transmission of HIV. HIV prevalence with different partner change rates.

Figure 17. HIV prevalence with different partner change rates



3.3.4. Conclusions

The degree of sharing needles and syringes observed in the IDU data do not produce an epidemic in the model. As already noted this may be because there is no epidemic in the regions or because behaviour has changed, or it may be a result of the survey not capturing the high risk individuals. With the rate of sharing estimated by our Russian colleagues an HIV epidemic is observed. The epidemic is concentrated in the high risk population and is driven by IDU transmission with sexual transmission causing a small HIV epidemic in the low risk population (about 1% after 30 years – the difference between the epidemics with and without transmission in the low risk population).

The prevalence observed in the low risk population is largely driven by high risk individuals ceasing high risk behaviour and returning to the low risk population, bringing with them a higher probability of being HIV positive and inflating prevalence in the low risk group. It is therefore important that surveillance monitors HIV infection outside high risk groups. The degree of turnover of high risk populations means that a generalised epidemic occurs rapidly as previously high risk individuals return to the low risk population.

The impact of changing rates of cessation of high risk activity is small because prevalence in this group is high and increasing the length of time individuals stay in this group has little effect on this prevalence. In contrast, changing the rate of starting high risk behaviour is large (changing the rate of starting from 0.01 to 0.02 has the effect of increasing total prevalence after 30 years from 7.9% to 15.3%), indicating the importance of the high risk population and IDU transmission to the epidemic.

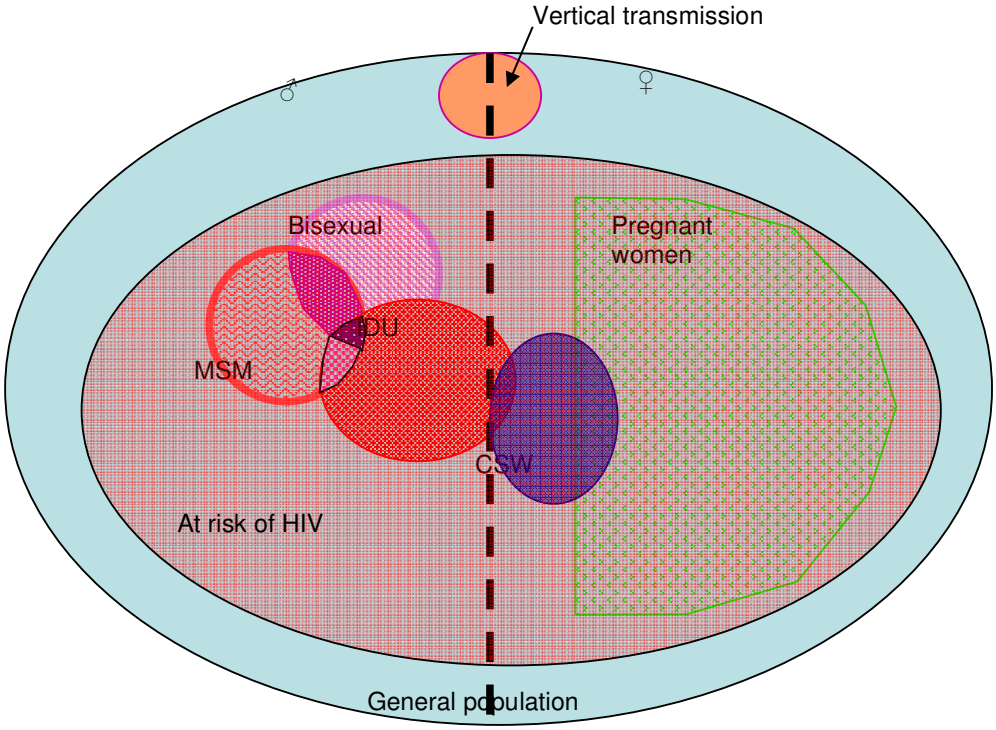
3.4. Modelling the epidemiology and control of HIV in local Russian populations.

The available data describing patterns of risks within Russia suggests that key to understanding the epidemic is the interaction between groups with different potential routes of transmission. Through a consultation process with Russian partners the essential groups in HIV epidemiology were defined and a model structure to capture HIV epidemiology agreed on. It is important to recognize that the model describes individuals in the context of their risks of acquiring and transmitting HIV infection, not according to their likelihood of falling within a population surveyed in studies of HIV prevalence. Hence in interpreting surveillance data careful consideration is required of how the modeled population groups maps onto the populations covered by sentinel surveillance.

3.4.1. Description of the model

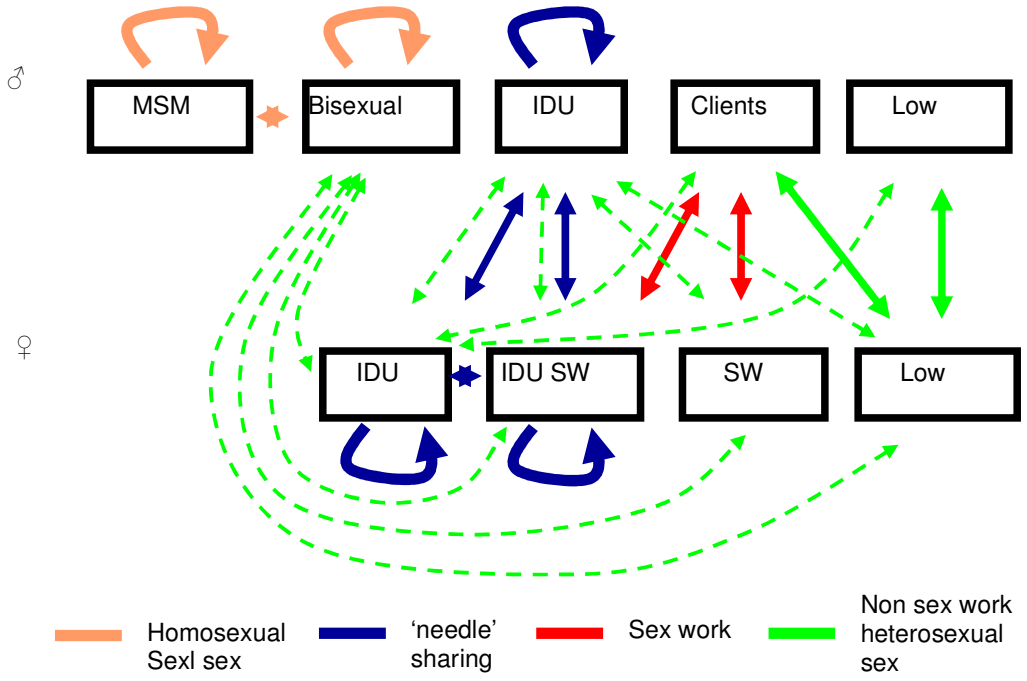
The universe of HIV risk is schematized in Figure 18, where bisexual and homosexual men intersect with IDUs and both are part of the population of sexually active men. MSM are defined as exclusive homosexuals who will not have sexual contacts with women but may have injecting contacts with women. Heterosexual contacts can be with sex workers or non-sex workers. Not everyone in the population is sexually active or injecting (notably children who can be infected through vertical transmission).

Figure 18. The universe of HIV risk



The essential groups to model and the key transmission routes to include are illustrated in Figure 19. The groups include 5 categories of men: homosexuals; bisexuals; injecting drug users; clients of sex workers and low risk men and 4 categories of women: injecting drug users; sex workers; sex workers who are also injecting drug users and low risk women. The routes of transmission described are men who have sex with men (MSM) contacts (gay sex); sharing injecting drug use equipment and heterosexual sex including commercial and non-commercial sexual contacts. In the model bisexual men and male IDUs will have a fraction of their heterosexual contacts with sex workers.

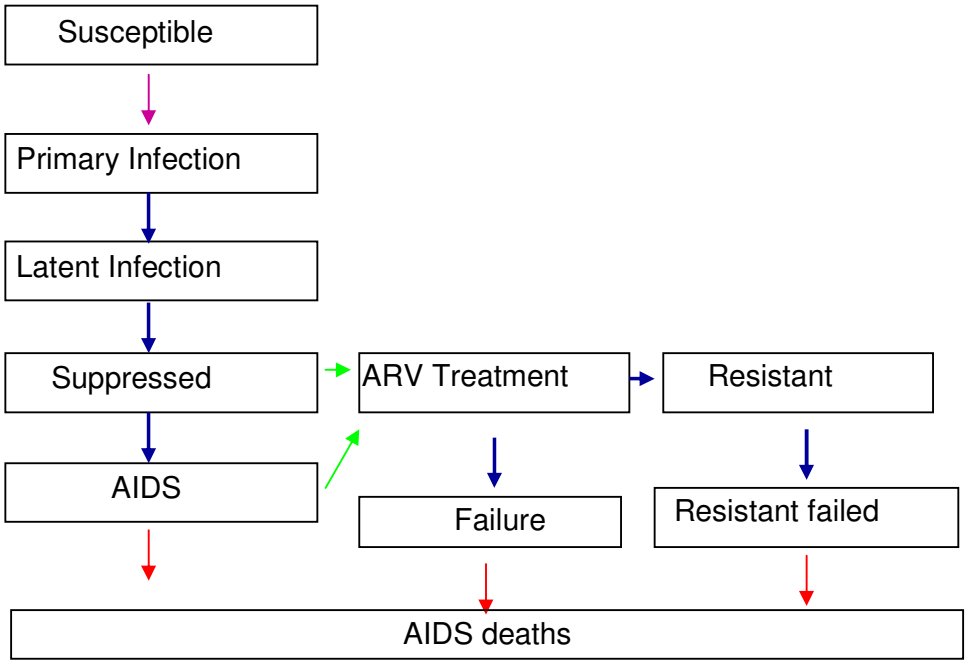
Figure 19. Risk groups and routes of transmission modeled



The natural history of HIV is described by flows through states of infection with the different categories allowing a long and variable incubation period for AIDS. It is assumed that HIV can have different transmission probabilities according to stage of HIV infection. With higher risks of transmission associated with primary infection and later stages of infection due to the higher viral loads associated with these stages. Treatment is simply described with individuals who are immune suppressed or who have AIDS eligible for antiretroviral treatment as available. Those on treatment are assumed to no longer progress unless they fail. This failure takes two forms – first due to toxicities and inability to manage the treatment regime some individual will fail and progress to AIDS and death; second resistance virus evolves and lead over time to failure of the drugs. This scheme is illustrated in Figure 20.

Both behavioural and treatment interventions can be modeled with behavioural and treatment components implemented separately. The model also includes STD prevalence which is assumed to represent the range of STI infections and is a product of the incidence of new infections and their duration. The presence of an STI is assumed to increase susceptibility to HIV infection. Interventions reducing STI incidence or duration will alter these prevalences.

Figure 20. Model groups describing the natural history of HIV/AIDS:



A full mathematical description of the model is given in Appendix 2 at 3.8.

3.4.2. Model Parameter Estimates

Parameters used and how to run the model devised in consultation with Russian Partners. Model parameters are input through a spreadsheet. Parameter values used are presented in Table 16, Table 17 and Table 18 below. The initial population is divided into the two sexes and the fractions in particular risk groups calculated. Thereafter recruitment of new adults into the population was distributed according to these fractions (Table 16).

Interventions can be modeled with behavioural and treatment components implemented separately. The intervention is assumed to move to scale linearly over a period defined by the user who specifies when the intervention starts to be implemented and when it is at its full capacity (Table 16). The prevalence of an STI is taken to represent the full range of STI infections and is the product of the incidence of new infections and their duration. The presence of an STI is assumed to increase susceptibility to HIV infection (Table 16). Interventions reducing STI incidence or duration will alter this prevalence. The initial prevalence of HIV infections in a particular at risk population is the starting point for the spread of HIV and depends upon the start date of the simulation (Table 16).

The rate of entry into the model is a function of the existing population size and defines the per capita replacement rate and was set at 0.04. Life expectancy is the inverse of the rate of leaving the adult population and was set at 45 for non IDUs and 20 for IDUs.

The IDU contact rate is the number of times per year individuals share needles or injecting drug equipment (depending upon the transmission probability assigned) with new sharing partners (Table 16). The rate of sex partner change per year is the number of new sexual partners acquired per year on average. Rate of sexual partner change per year must balance for both male and females hence if we know one the other can be calculated.

Table 16. Parameter estimates: populations time variables and STI / Initial HIV prevalence

Parameter	Value
Total population	100 m
Sex Ratio	48
Percent Men MSM	80
Percent Bisexual	8
Percent men IDUs	4
Fraction IDUs women	30
Percent Men SW clients	20
Percent women sex workers	3
Percent IDU women sex workers	20
Start of Epidemic	1990
Time step	0.083
Start Introducing Treatment	2050
Treatment Scaled up	2050
Start prevention intervention	2050
Prevention intervention scaled up	2050

		STI Incidence per capita &	STI duration yrs	STI Prevalence %	Initial HIV Prevalence %	IDU Contact Rate Per yr	Partner Change Rate Per yr
Men	MSM	30	0.2	0.06	0.2	0	10
	Bisexual	30	0.5	0.15	0.2	0	10
	IDU	20	0.5	0.1	7	50	3
	Client	5	0.5	0.025	0.5	0	15
	Low Risk	1	0.5	0.005	0	0	0.03
Women	IDU	30	0.5	0.15	7	50	2.83
	SW IDU	40	0.5	0.2	7	50	69.2
	SW IDU	20	0.1	0.02	1	0	69.2
	Low Risk	1	0.5	0.005	0.02	0	0.63

Transmission within a partnership depends upon the number of contacts within that partnership which depends upon the type of sex, commercial, non-commercial heterosexual and MSM, and is different from needle sharing episodes (Table 17). Again there are constraints placed by having to have similar numbers in the same partnership. Condom use and needle cleaning is assumed to reduce numbers of exposures.

Table 17. Parameter estimates: risk and protective behaviours

		Condom Use % acts	Injection Cleaning Rate	Sex acts per partner	Needle sharing / person
Men	MSM	15		4	
	Bisexual	15		4	
	IDU	15	90	104	5
	Client	15		2	
	Low Risk	15		104	
Women	IDU	15		104	
	SW IDU	15	90	2	5
	SW IDU	15	90	2	5
	Low Risk	15		104	

Parameter estimates relating to the disease stage flows described in 3.4.1 and Figure 20 are presented in Table 18.

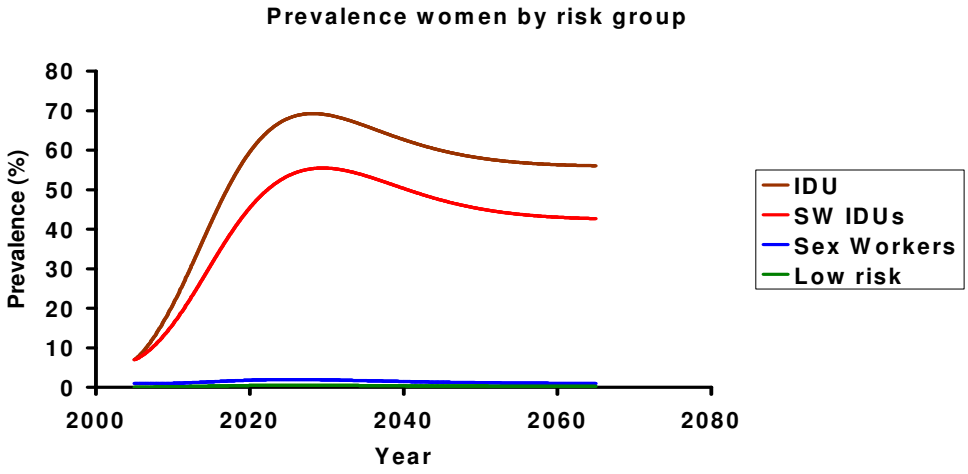
Table 18. Parameter estimates: disease progression and associated transmissibilities

	Time in Stage (yrs)	Rate failing / resistance	Relative transmissibility (relative to incubating stage)
Stage			
Primary	0.5		10
Latent	8		1
Suppressed	1.5		5
AIDS	1		5
Treated			0.01
Failed	1	0.1	1
Resistant treated			0.2
Escaped treatment (resistance)	1	0.2	0.5

3.4.3. Model Results

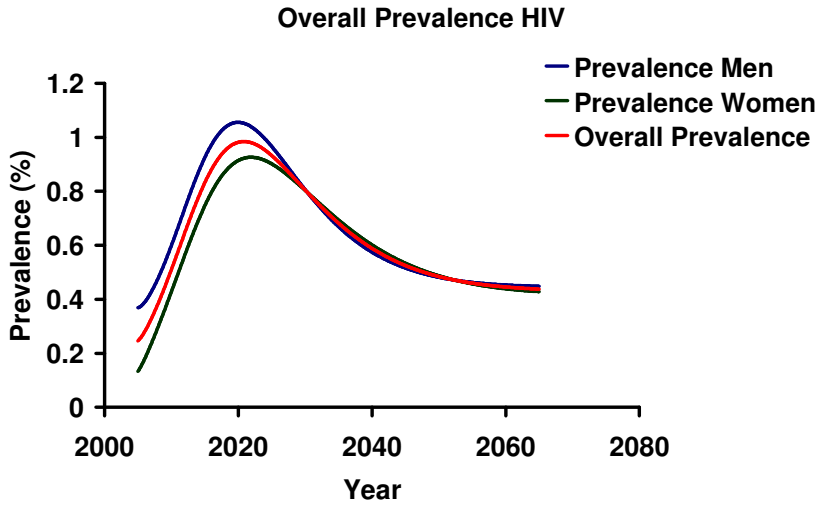
Model parameters were estimated on the basis of earlier literature reviews and from expert opinion amongst Russian participants in a workshop (for a description of model parameters and how to run the model please see appendix). The model parameters specified in this way with current prevalences of infection in risk groups generated an epidemic concentrated in injecting drug users, shown in Figure 21.

Figure 21. Projected prevalence among women by risk group



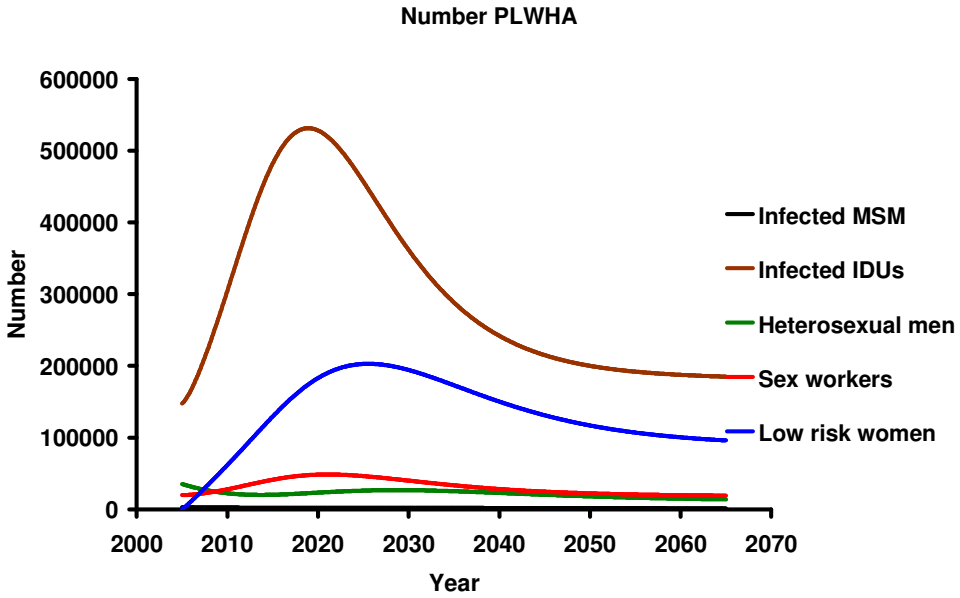
Prevalence in the total populations of men and women are shown in Figure 22. Despite the high prevalence generated amongst IDUs, because this is a limited fraction of the overall population, levels of infection do not exceed 1%. This is in stark contrast to many larger scale epidemics predicted for Russia:

Figure 22. Projected prevalence in total populations of men and women



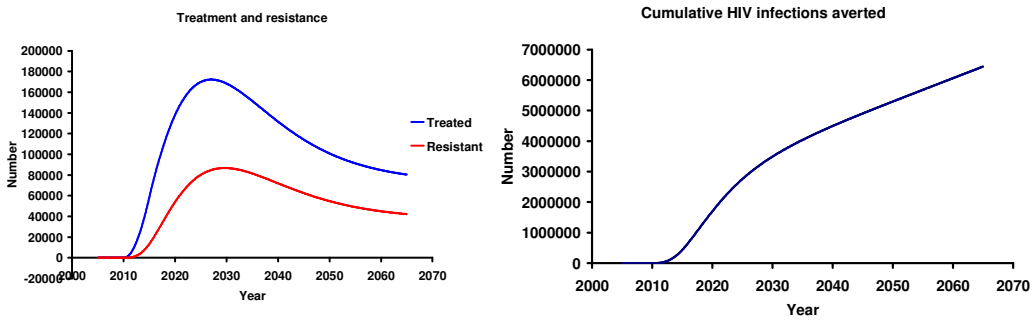
Absolute numbers in different model groups are illustrated in Figure 23 below; based on a modeled population size of 100,000,000. Despite the infection remaining concentrated among IDUs, there are numerous infections in low risk women who are the sex partners of clients of injecting drug using sex workers:

Figure 23. Projected evolution of absolute numbers of prevalent HIV infections in different groups



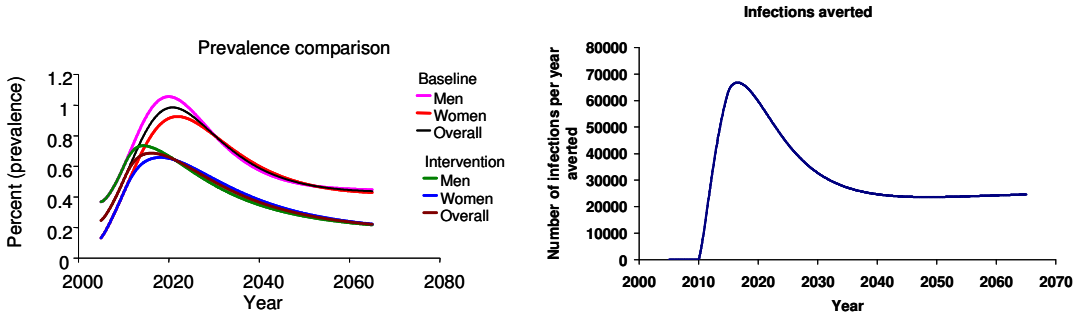
The impact of treatment can be to both prolong life and to reduce the transmission of virus through the direct influence of reduced viral load. Figure 24 illustrates the impact of putting 50% of patients on antiretroviral treatment over a 5 year period starting in the year 2010. The figure shows both the number of individuals being treated and the number of resistant infections present at any one time. The concomitant cumulative number of HIV infections presented is also shown.

Figure 24. Projected impact of antiretroviral treatment intervention.



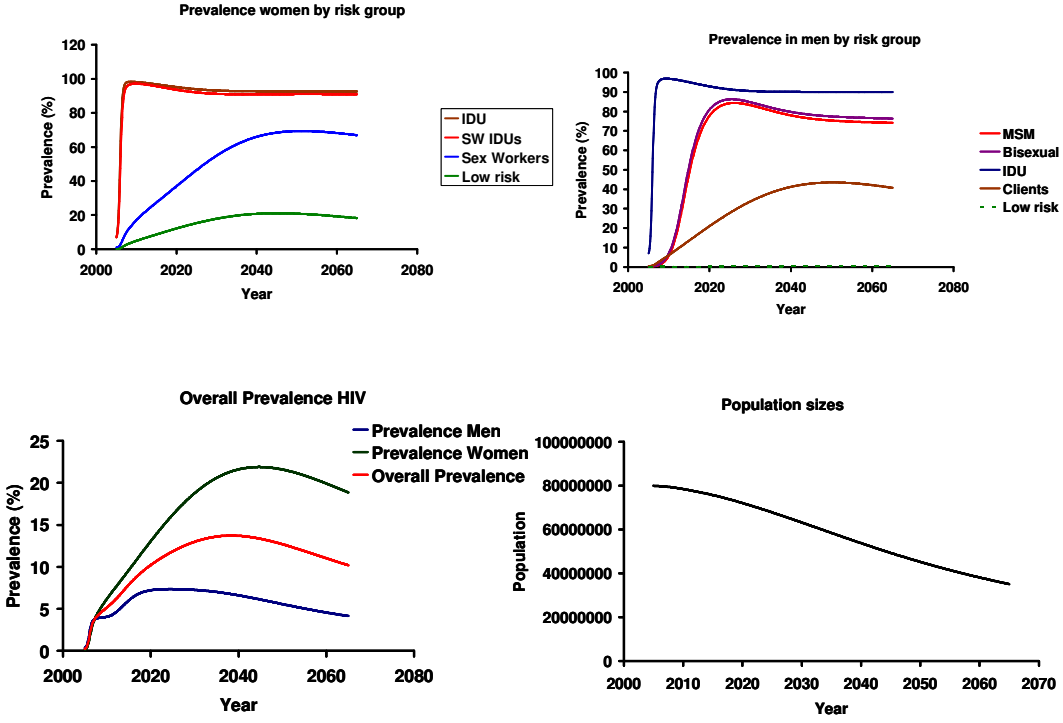
In conditions where the predominant route of transmission is through the sharing of injection equipment it is only through intervening in this group that prevention can work. Figure 25illustrates the epidemiological impact of introducing a 70% reduction in the use of unclean needles by injecting drug users alongside the impact of treatment and also starting in 2010.

Figure 25. Impact of a harm reduction programme combined with antiretroviral treatment intervention starting in 2010



Further, with moderate changes in parameter values larger scale HIV epidemic are possible. The simulations presented in Figure 26 illustrate the spread of infection though risk groups assuming a five-fold higher transmission probability across all routes and circumstances of transmission:

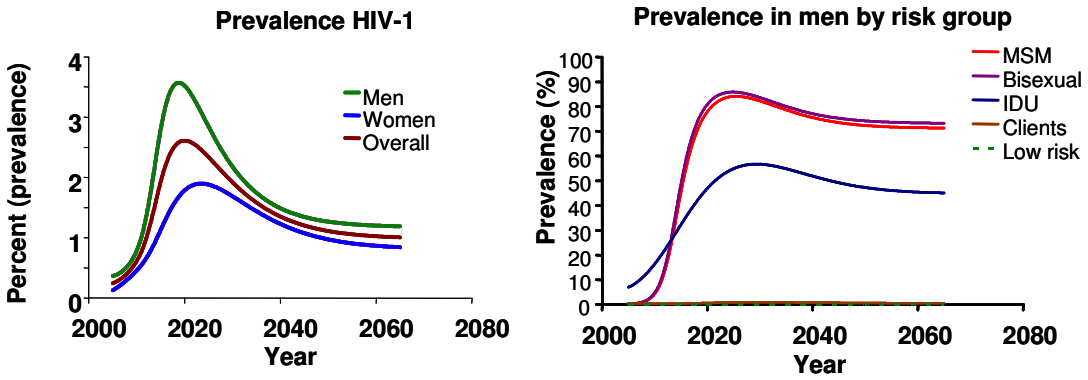
Figure 26. Impact of 5 fold higher transmission probabilities over baseline: all transmission routes.



This wide ranging alteration in risk leads to a large epidemic. However, more subtle changes can lead to increases in risk within particular risk groups. For example an increase to 50 in the

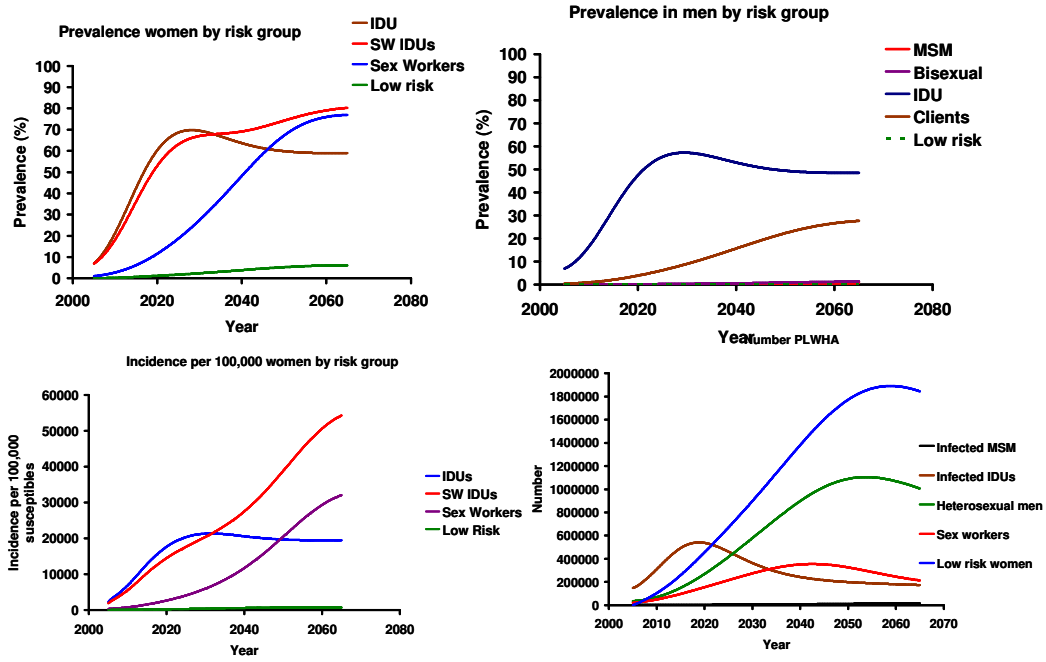
rate of sex partner change of MSM increases the spread of infection in this risk group as illustrated in Figure 27.

Figure 27. Impact of increasing rate of sex partner change among MSM to 50 per annum



An increase in the risks associated with sex work (doubling the number of sex workers the average client visits to 30 and increasing the number of sex acts per sex worker client relationship to 10) can also lead to an epidemic of heterosexually transmitted HIV over a long time scale. Projections are shown in Figure 28.

Figure 28. Impact of increased use by men of commercial sex workers as sex partners



3.4.4. Discussion

The development of a mathematical model in collaboration with local experts on the epidemiology and biology of HIV has allowed for the creation of a user friendly model of HIV transmission dynamics that can be distributed to those working to control the HIV epidemic locally. Further, the collection of local data in two regions of Russia and the parameterization of the model suggest that contrary to earlier projections the wide spread of HIV infection through the Russian population is highly unlikely. With high numbers of injection 'partners' and frequent sharing of injection equipment the spread of infection through the IDU population is likely, which will lead to many subsequent cases of infection acquired through sex. Many of these will be in those with low risk behaviours themselves. However, observed behaviours are unlikely to lead to widespread epidemics, even in injecting drug users. Why is this, given the extensive spread already observed in IDUs in Russia? A number of hypotheses immediately arise: 1) Social desirability bias leads to much under-reporting of high risk behaviours; 2) The highest risk behaviours are restricted to a subset of IDUs that were not accessible using the sampling frame of the current studies; 3) The local behaviours in Volgograd and Altai Krai are quantitatively different from those observed in high prevalence regions such as Togliatti; 4) The spread of HIV in other locations and the concern generated has lead to behaviour changes in the populations understudy. The latter two hypotheses would generate a diverse set of HIV epidemics through the Russian population, whilst the possibility of the first two would warrant further work on study design to identify populations not currently observed or to elicit more truthful responses from participants.

The reassurance generated by our predictions should be limited since they depend on a number of poorly estimated parameters. To illustrate this we show the scale of epidemic generated with a five fold increase in the transmission probability per sexual partnership. However, a number of other parameter changes could lead to wide spread in particular risk groups. For example, a large rise (to 50 new partners per year) in the number of partners per year of MSM could lead to an epidemic amongst this population taking overall prevalence to higher levels of 2 to 3 percent amongst men. This large rise however would not have to take place across the MSM population. Heterogeneity in sexual behaviour of MSM could lead to a core group of MSM with a high risk of acquiring HIV and then transmitting it to less risky MSM.

3.5. Modelling the impact of migration in Russia on the spread of HIV through high and low risk populations

The diversity of population and places in Russia means that applying one model to the whole country is not realistic. Movement of population around the country, particularly movement of high risk populations, is likely to have a significant effect on transmission of HIV. A simple metapopulation model of HIV transmission was developed to examine the impact of migration on the spread of HIV through high and low risk populations in different regions.

3.5.1. Description of the model

The model describes a sexually active population aged 15-59 divided by gender, high and low risk behaviour, migrants and non-migrants and HIV status across 7 regions or patches. Migration is characterised by rates of immigration and emigration, with emigrants being divided between regions according to proportion of immigrants set for each region. HIV transmission occurs through injecting drug use, heterosexual contact or homosexual contact. A mathematical specification of the model is presented in below. .

The model was parameterised using official Russian data obtained from the State Statistics Committee (GosKomStat) for Federal Okrugs. Demographic data such as the population size and sex ratio and also data on the number of migrants from and to each region was obtained from GosKomStat, and mortality rates were estimated using the Institute of Public Health original FAIS-program. Data on the sizes of risk groups were not available so we used estimates of the number of IDUs, based on double the number of registered IDUs in each

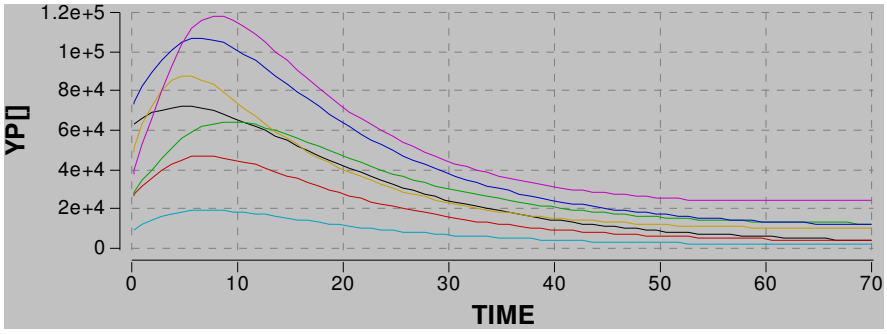
region, and the number of registered cases of sexually transmitted diseases in each region to estimate the size of risk groups in each region. The number of registered HIV cases in each region for 2002 was used for the initial model conditions.

In this model a risk contact is assumed to mean contact through used needles, heterosexual contact and homosexual contact and the transmission rate per contact was set to 0.3. The risk contact rates were set to 100 per year for high risk men and 200 per year for high risk women and 0.2 per year for low risk men and women. Mixing was assumed to be uniform across the population groups. Also, it was assumed that a third of HIV infected individuals changed their risk behaviour after infection. The increase in mortality rates due to HIV infection and high risk activity is equal to 1.1 and the duration of the HIV infected period is an average of 10 years with the duration of AIDS of 3 years.

3.5.2. Results

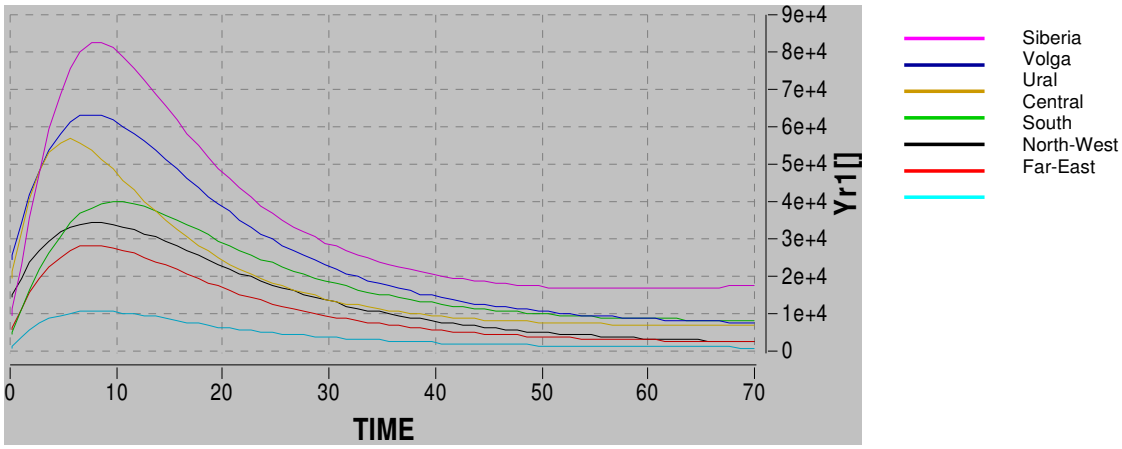
The number of HIV infections in each okrug can be projected from these parameters and are shown in Figure 29.

Figure 29. HIV infections in each Federal Okrug over time (years after 2002; all risk groups)



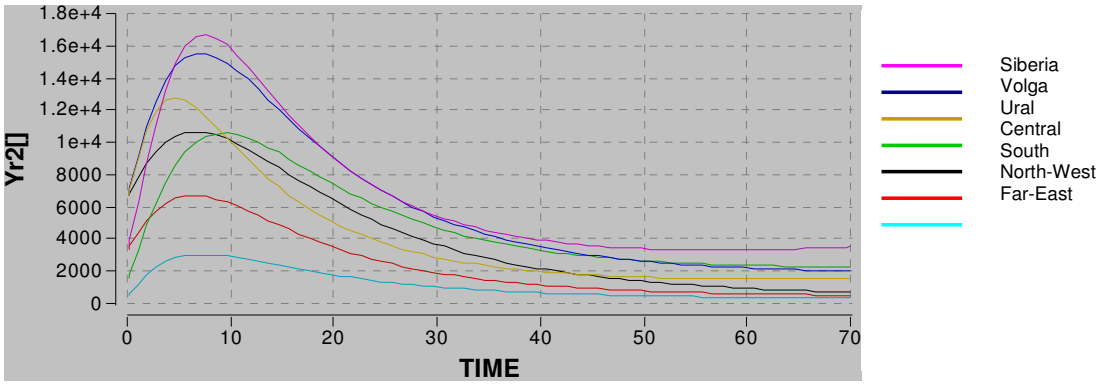
The largest epidemic is predicted for Siberia Okrug using these parameters. The projections can be examined for different groups: for instance, those for high risk men and high risk women are shown in Figure 30 and 0 by Okrug.

Figure 30. HIV infections in each Federal Okrug over time (years after 2002; high risk men)



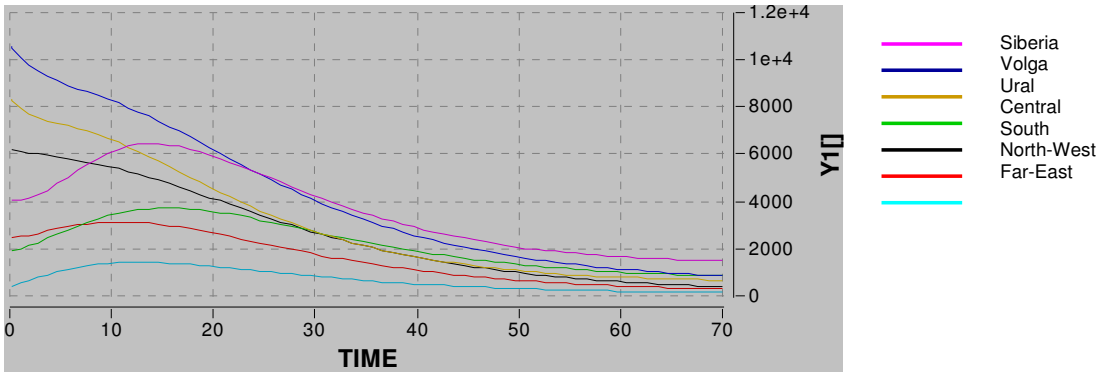
The main difference between the projections for high risk men and for the total population is observed in the Central Okrug which experiences lower numbers of cases (figure). The pattern observed is among high risk women.

Figure 31. HIV infections in each Federal Okrug over time (years after 2002; high risk women).

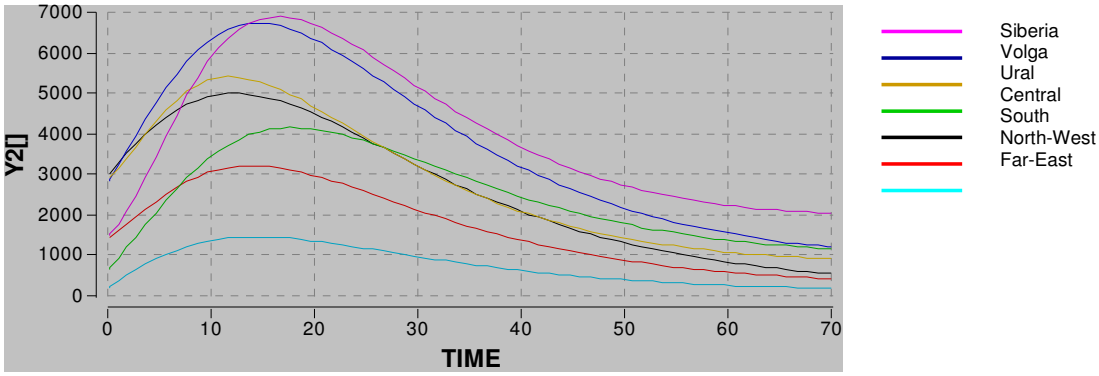


Projected epidemics in low risk populations are much smaller, as would be expected, but follow the same general pattern.

Figure 32. HIV infections in low risk women in each Federal Okrug over time (years after 2002; low risk men).

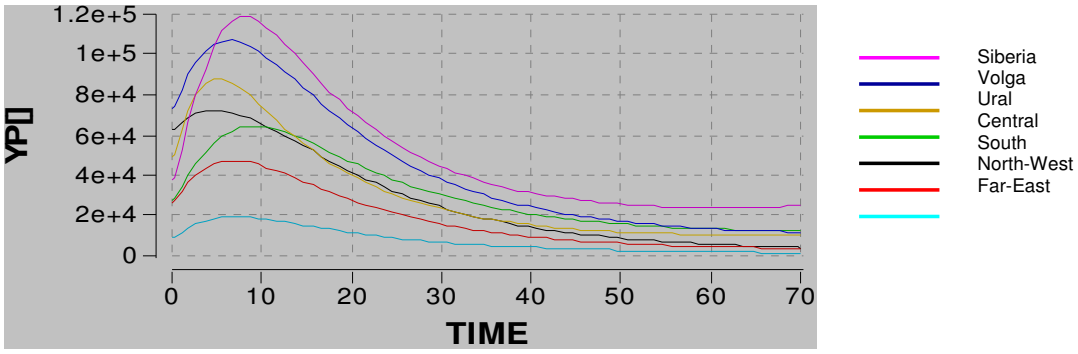


Three Okrugs show a different pattern for low risk men. In Central, Volga and Ural Okrugs numbers of HIV infections decline immediately after 2002 and do not show any of the increase observed for other population groups. This may be a result of problems with parameters. HIV infections in high risk women in each Federal Okrug over time (years after 2002; low risk women).



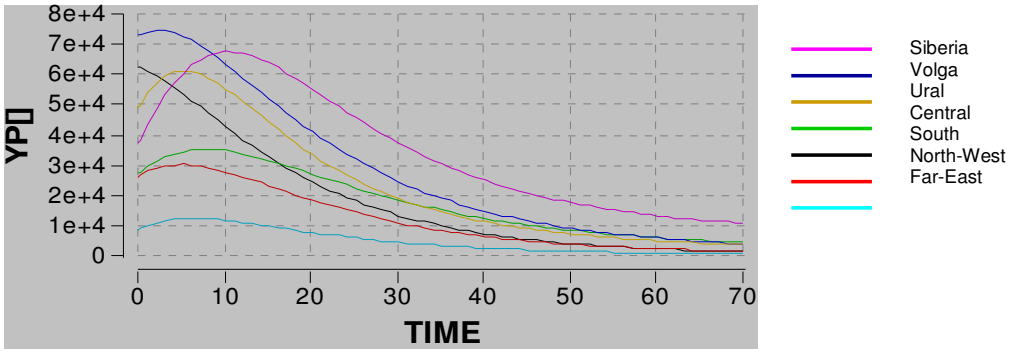
Using this model we can explore the different impacts of migration (Figure 33) and changes in risk behaviour (Figure 34).

Figure 33. Total HIV infections in each Federal Okrug over time (years after 2002; without migration).



If the numbers of risk contacts is halved (Figure 34) in each region the numbers of HIV infections in each region is reduced. In addition the order of regions in terms of the numbers of HIV infections is also changed with Volga Okrug now having the largest epidemic. By contrast there is very little difference between the epidemics produced with and without migration. It is clear that using these parameters and assumptions the effect of migration is considerably less than the effect of changing risk behaviour on the future HIV epidemic.

Figure 34. Total HIV infections in each Federal Okrug over time (years since 2002; numbers of risk contacts halved)



3.6. Conclusions

The future of the emerging HIV epidemics in Russia is difficult to project, mainly as a result of the varying quality of surveillance data and information on prevailing patterns of risk behaviour. In this chapter we have explored previously published projections for Russia and have used models to explore epidemic trajectories using model parameter estimates derived from the behavioural surveys and other primary research undertaken during the course of the Knowledge Programme. In using this data we have developed a simple transmission model and used it to examine the interactions between high risk IDUs and the general population; have explored the possible utility of network structures to the future of HIV modeling; and have developed a model of HIV transmission dynamics in collaboration with local experts that captures the different populations at risk of HIV and their interactions. This model has been used to generate tentative epidemic projections. We have also explored a simple metapopulation model that can be used to look at the impacts of migration on the HIV epidemic.

Previous projections of the future of the HIV epidemic in Russia give results so varied that they are very difficult to interpret. As well as lack of information about risk behaviours, there is also considerable uncertainty over both the size and turnover of high risk populations. The models used here indicate the potential importance of both the size and turnover of high risk population. The model of IDUs and the general population shows an epidemic concentrated in the high risk IDU population. Prevalence in the low risk general population is driven by high risk individuals who cease their high risk behaviour and return to the low risk population, bringing with them a higher probability of being HIV positive. Further, the more extensive model developed in collaboration with Russian partners indicates that small changes in parameters describing transmission can have a considerable impact on the HIV epidemic.

The behavioural surveys undertaken in this Knowledge Programme provide some information on both sexual and injecting drug use behaviour in the general population and the harder to reach IDU population. However, as shown in an exploration of possible sexual and sharing partner change rates, considerable heterogeneity in behaviour is observed and characterising this heterogeneity is problematic. The rates of needle sharing reported in the IDU behavioural survey were not sufficient to produce an HIV epidemic in our models. This may indicate that there will only be a limited HIV epidemic in this population because of a lack of risk behaviour, it may also indicate a change in behaviour as a result of greater awareness of risk. Alternatively, it may be a result of the IDU survey not capturing the highest risk individuals. As this result is in contrast to that found in other studies further exploration of the distribution of risks of this high risk population is needed.

The models used do not attempt to capture the extent of heterogeneity in either sexual or injecting drug use behaviour but both approaches highlight the potential importance this heterogeneity and indicate that further attempts to explore its impacts on HIV transmission are needed. An exploration of sexual and injecting networks observed in both the general population and higher risk populations may be beneficial in capturing this. However, as observed earlier in this report much research is required to determine the most appropriate methods for modeling networks.

Finally, predictions of the HIV epidemic produced by the models in this chapter are relatively reassuring. In one sense they are possibly also conservative given that the rates of sharing used to parameterise the models were considerably higher than that reported in the IDU behavioural survey. However, we should still be concerned as many of the parameters used are poorly estimated and model results show that small variations in parameters may have a considerable effect.

The models developed provide a tool with which to explore the potential impact of interventions. This has only been done illistrutively this chapter. Further work using our models to assess the relative impact and effectiveness and cost-effectiveness of different intervention packages for HIV control are explored in CHAPTER 5.

3.7. Appendix 1: full description of model described in 3.3

The model used divided the population onto is divided into four groups; low and high risk men and low and high risk women. High risk was defined as “ever having injected” and low risk as “never having injected”. Injection associated transmission was set to occur only between members of the high risk group, whereas sexual transmission was set to occur both within and between high and low risk groups

The state variables of the model are denoted by $X^s_{k,i}$ where k represents gender, i denotes the risk group, i=1 for high risk and i=2 for low risk, and s indicates the HIV infection status, where s=0 refers to susceptibles and s=1 to 4 the stages of HIV infection where stage 4 denotes AIDS. The model is defined by the following ordinary differential equations.

For low risk individuals:

$$\frac{dX^0_{k,2}}{dt} = 0.5\nu N + \kappa_k X^0_{k,1} - (\phi_k + \mu)X^0_{k,2} - X^0_{k,2}c_{k,2}\sum_{m=1}^{2}\left(\rho_{k2m}\left.\sum_{s=1}^{4}\left[\beta^s_k X^s_{k',m}\right]\right/\sum_{s=0}^{4}\left[X^s_{k',m}\right]\right)$$

$$\frac{dX^1_{k,2}}{dt} = \kappa_k X^1_{k,1} - (\phi_k + \mu + \sigma_1)X^1_{k,2} + X^0_{k,2}c_{k,2}\sum_{m=1}^{2}\left(\rho_{k2m}\left.\sum_{s=1}^{4}\left[\beta^s_k X^s_{k',m}\right]\right/\sum_{s=0}^{4}\left[X^s_{k',m}\right]\right)$$

$$\frac{dX^s_{k,2}}{dt} = \kappa_k X^s_{k,1} - (\phi_k + \mu + \sigma_s)X^s_{k,2} \qquad \text{for } s = 2\text{-}4$$

For high risk individuals:

$$\frac{dX^0_{k,1}}{dt} = \phi_k X^0_{k,2} - (\kappa_k + \mu + \mu'_k)X^0_{k,1} - X^0_{k,1}c_{k,1}\sum_{m=1}^{2}\left(\rho_{k1m}\left.\sum_{s=1}^{4}\left[\beta^s_k X^s_{k',m}\right]\right/\sum_{s=0}^{4}\left[X^s_{k',m}\right]\right)$$

$$- X^0_{k,1}\gamma\left[\left.\sum_{s=1}^{4}\left[\theta^s\sum_{u=1}^{2}X^s_{u,1}\right]\right/\sum_{s=0}^{4}\left[\sum_{u=1}^{2}X^s_{u,1}\right]\right]$$

$$\frac{dX^1_{k,1}}{dt} = \phi_k X^1_{k,2} - (\kappa_k + \mu + \mu'_k + \sigma_1)X^1_{k,1} + X^0_{k,1}c_{k,1}\sum_{m=1}^{2}\left(\rho_{k1m}\left.\sum_{s=1}^{4}\left[\beta^s_k X^s_{k',m}\right]\right/\sum_{s=0}^{4}\left[X^s_{k',m}\right]\right)$$

$$+ X^0_{k,1}\gamma\left[\left.\sum_{s=1}^{4}\left[\theta^s\sum_{u=1}^{2}X^s_{u,1}\right]\right/\sum_{s=0}^{4}\left[\sum_{u=1}^{2}X^s_{u,1}\right]\right]$$

$$\frac{dX^s_{k,1}}{dt} = \phi_k X^s_{k,2} - (\kappa_k + \mu + \mu'_k + \sigma_s)X^s_{k,1} \qquad \text{for } s = 2\text{-}4$$

where ν is the birth rate, *N* is the total population size, κ_k and ϕ_k are the sex specific rate of starting and ceasing high risk behaviour respectively, μ is the normal death rate and μ_k' is the sex specific excess rate of death associated with being a member of the high risk group, $c_{k,i}$ is the rate of sexual partner change defined by gender and risk behaviour group, ρ_{kim} is the probability that an individual of gender *k* and risk group *i* has sexual contact with an individual of the opposite gender in risk group *m*, β_k^s is the transmission probability through sexual contact from sex *k'* to *k* which depends on the stage of infection *s*, γ is the rate of injecting partner change, θ^s is the transmission probability through IDU which depends on the stage of infection s, and σ_s is the rate of progression to the next stage of HIV infection (or to death from AIDS in stage 4).

The rates of sexual partner change are set for high risk men and women and low risk men and are therefore constrained for low risk women to be:

$$c_{2,2} = \left[\left(\sum_{i=1}^{2} c_{1,i} N_{1,i}\right) - c_{2,1} N_{2,1}\right] \Big/ N_{2,2}$$

The sexual mixing of men is defined on a scale from assortative to random by ε:

$$\rho_{1,i,j} = \delta_{i,j}(1-\varepsilon) + \varepsilon \frac{c_{2,j} N_{2,j}}{\sum_{w=1}^{2} (c_{2,w} N_{2,w})}$$

This constrains the mixing of women to form reciprocal partnerships:

$$\rho_{2,i,j} = \left(\rho_{1,j,i} c_{1,j} N_{1,j}\right) / \left(c_{2,i} N_{2,i}\right)$$

3.8. Appendix 2: full description of model described in 3.4

The Following ordinary differential equations define the patterns of infection and disease in the nine different at risk populations. The state variables are denoted $X_{r,s}^{i}$ where the superscript *i* refers to whether the population has been directly affected by the intervention with 1 denoting those outside the intervention and 2 those who have been changed by it. The subscript *r* refers to the risk group: 1 homosexual; 2 bisexual; 3 male injecting drug users; 4 clients of sex workers; 5 other sexually active men; 6 female injecting drug users; 7 female injecting drug users who are also sex workers; 8 sex workers; 9 other sexually active women. The subscript *s* refers to the classification with respect to infection: 1 susceptible; 2 primary infection; 3 latent infection; 4 immune suppressed; 5 AIDS; 6 receiving ARV treatment; 7 having failed treatment; 8 treated with resistant virus; and 9 failed with resistant virus.

$$\frac{dX^1_{r,1}}{dt} = b\theta_r N'(1-\kappa_r(t)) - (\mu_r + \lambda^1_r + \upsilon_r(t))X^1_{r,1}$$
$$\frac{dX^1_{r,2}}{dt} = \lambda^1_r X^1_{r,1} - (\mu_r + \sigma_1 + \upsilon_r(t))X^1_{r,2}$$
$$\frac{dX^1_{r,3}}{dt} = \sigma_1 X^1_{r,2} - (\mu_r + \sigma_2 + \upsilon_r(t))X^1_{r,3}$$
$$\frac{dX^1_{r,4}}{dt} = \sigma_2 X^1_{r,3} - (\mu_r + \sigma_3 + \upsilon_r(t) + \tau_r(t))X^1_{r,4}$$
$$\frac{dX^1_{r,5}}{dt} = \sigma_3 X^1_{r,4} - (\mu_r + \sigma_4 + \upsilon_r(t) + \tau_r(t))X^1_{r,5}$$
$$\frac{dX^1_{r,6}}{dt} = \tau_r(t)(X^1_{r,4} + X^1_{r,5}) - (\mu_r + f + \phi + \upsilon_r(t))X^1_{r,6}$$
$$\frac{dX^1_{r,7}}{dt} = fX^1_{r,6} - (\mu_r + \sigma_5 + \upsilon_r(t))X^1_{r,7}$$
$$\frac{dX^1_{r,8}}{dt} = \phi X^1_{r,6} - (\mu_r + \sigma_6 + \upsilon_r(t))X^1_{r,8}$$
$$\frac{dX^1_{r,9}}{dt} = \sigma_6 X^1_{r,8} - (\mu_r + \sigma_7 + \upsilon_r(t))X^1_{r,9}$$

$$\frac{dX^2_{r,1}}{dt} = b\theta_r N'\kappa_r(t) + \upsilon_r(t)X^1_{r,1} - (\mu_r + \lambda^2_r)X^2_{r,1}$$
$$\frac{dX^2_{r,2}}{dt} = \lambda^2_r X^2_{r,1} + \upsilon_r(t)X^1_{r,2} - (\mu_r + \sigma_1)X^2_{r,2}$$
$$\frac{dX^2_{r,3}}{dt} = \sigma_1 X^2_{r,2} + \upsilon_r(t)X^1_{r,3} - (\mu_r + \sigma_2)X^2_{r,3}$$
$$\frac{dX^2_{r,4}}{dt} = \sigma_2 X^2_{r,3} + \upsilon_r(t)X^1_{r,4} - (\mu_r + \sigma_3 + \tau_r(t))X^2_{r,4}$$
$$\frac{dX^2_{r,5}}{dt} = \sigma_3 X^2_{r,4} + \upsilon_r(t)X^1_{r,5} - (\mu_r + \sigma_4 + \tau_r(t))X^2_{r,5}$$
$$\frac{dX^2_{r,6}}{dt} = \tau_r(t)(X^2_{r,4} + X^2_{r,5}) + \upsilon_r(t)X^1_{r,6} - (\mu_r + f + \phi)X^2_{r,6}$$
$$\frac{dX^2_{r,7}}{dt} = fX^2_{r,6} + \upsilon_r(t))X^1_{r,7} - (\mu_r + \sigma_5)X^2_{r,7}$$
$$\frac{dX^2_{r,8}}{dt} = \phi X^2_{r,6} + \upsilon_r(t)X^1_{r,8} - (\mu_r + \sigma_6)X^2_{r,8}$$
$$\frac{dX^2_{r,9}}{dt} = \sigma_6 X^2_{r,8} + \upsilon_r(t))X^1_{r,9} - (\mu_r + \sigma_7)X^2_{r,9}$$

Where *b* is the rate of entry into the sexually active population which is a function of the number of women in the population *N´* which is the sum of women in each of the 4 female activity groups:

$$N' = \sum_{i=1}^{2}\sum_{r=6}^{9}\sum_{s=1}^{9} X_{r,s}^{i}$$

The fraction of individuals entering each of the 9 risk groups is given by the parameter θ_r and a risk group dependent fraction $\kappa_r(t)$ enter the population having received intervention at time t leaving the remained in the non-intervention population from which they can move at a risk group dependent rate $v_r(t)$. The rate of removal from the population in the absence of AIDS μ_r (i.e. the background death rate) can also depend on the risk group in as much as injecting drug users can be assumed to have a different death rate from non injectors. The parameter σ_q denotes the rate of progress to the next stage of disease or to death. Only those with advanced immune suppression $s= 4$ or with AIDS $s=5$ are assumed to be eligible for antiretroviral treatment which they are moved onto at the risk group dependent rate $\tau_r(t)$. Both the rate of entering the prevention intervention group and the rate of receiving antiretroviral treatment are a function of time so that the introduction and coverage of the intervention can be introduced at an appropriate time in the epidemic. It is assumed that treatment failure at a rate f is not synonymous with the evolution of drug resistant HIV virus which can lead to failure and progress to AIDS again at the rate σ_6.

The incidence of HIV λ_r^i is dependent on the intervention category and the risk group and is defined differently for each risk group. Examples of risk for exclusive MSM, bisexuals, and male injecting drug users illustrate the formulation of these forces of infection:

$$\lambda_1^i = c_1^i \omega_1 \left[\rho \left(\sum_{i=1,2} \left\{ \psi_{1i}(t) \frac{\sum_{s=2}^{9}\sum_{i=1}^{2} \beta_{1s}'^{i} X_{1,s}^{i}}{\sum_{s=1}^{9}\sum_{i=1}^{2} X_{1,s}^{i}} \right\} \right) + (1-\rho) \left(\sum_{i=1,2} \left\{ \psi_{2i}(t) \frac{\sum_{s=2}^{9}\sum_{i=1}^{2} \beta_{2s}'^{i} X_{2,s}^{i}}{\sum_{s=1}^{9}\sum_{i=1}^{2} X_{2,s}^{i}} \right\} \right) \right]$$

$$+ (1-\omega_1) \left\{ \begin{array}{l} \rho \left\{ \omega_1 \left(\sum_{i=1,2} \left\{ \psi_{1i}(t) \frac{\sum_{s=2}^{9}\sum_{i=1}^{2} \beta_{1s}'^{i} X_{1,s}^{i}}{\sum_{s=1}^{9}\sum_{i=1}^{2} X_{1,s}^{i}} \right\} \right) + (1-\omega_1) \left(\sum_{i=1,2} \left\{ \psi_{2,i}(t) \frac{\sum_{s=2}^{9}\sum_{i=1}^{2} \beta_{1s}^{i} X_{1,s}^{i}}{\sum_{s=1}^{9}\sum_{i=1}^{2} X_{1,s}^{i}} \right\} \right) \right\} \\ + (1-\rho) \left\{ \omega_2 \left(\sum_{i=1,2} \left\{ \psi_{1,i}(t) \frac{\sum_{s=2}^{9}\sum_{i=1}^{2} \beta_{2s}'^{i} X_{2,s}^{i}}{\sum_{s=1}^{9}\sum_{i=1}^{2} X_{1,s}^{i}} \right\} \right) + (1-\omega_2) \left(\sum_{i=1,2} \left\{ \psi_{2,i}(t) \frac{\sum_{s=2}^{9}\sum_{i=1}^{2} \beta_{2s}^{i} X_{2,s}^{i}}{\sum_{s=1}^{9}\sum_{i=1}^{2} X_{1,s}^{i}} \right\} \right) \right\} \end{array} \right\}$$

Here c_r^i is the rate of acquisition per year of sexual partners of the risk group which is intervention specific, ρ is the proportion of MSM partnerships supplied by exclusively MSM and $1-\rho$ the proportion supplied by bisexuals. The proportion of exclusive and bisexual MSM who have another STI is denoted by ω_1 and ω_2 respectively. The risk group specific fraction of sexual partnerships supplied by those in each of the two intervention groups depends upon both the proportion of the population in the intervention group at a specific time and the relative rate of partner change of those within and those without the intervention group and is denoted $\psi_{ri}(t)$.The proportion of sexual partners that are HIV infected determines the risk of transmission acquiring infection with the transmission probability per partnership, β_{rs}^i for those without an STI and $\beta_{rs}'^i$ for those with an STI, dependent upon the risk group of the partner, the stage of HIV infection and the intervention group of the partner.

The transmission probability per partnership is a function of the number of unprotected acts within the partnerships of each risk group:

$$\beta_{rs}^i = 1 - (1-\alpha_{rs})^{a_r(1-\pi_{ri})}$$

Where α_{rs} is the risk group and stage of infectiousness dependent probability of acquiring infection per act of sexual intercourse and a_r is the number of acts within the partnerships and π_{ri} is the risk and intervention group specific number of sex acts protected by a condom.

The risk of acquiring infection for bisexuals depends upon both their contacts with exclusive and bisexual MSM and from women including sex workers, IDU sex workers and low risk women. For simplicity it is assumed they don't have contacts with exclusive IDU women and are not themselves IDUs. Thus, the risk for bisexuals is given by the equations:

$$\lambda_2^i = \gamma_1 + \gamma_2$$

$$\gamma_2^i = c_2\delta\left\langle \begin{array}{l} \omega_2\left[\rho\left(\sum_{i=1,2}\left\{\psi_{1i}(t)\frac{\sum_{s=2}^{9}\sum_{i=1}^{2}\beta_{1s}'^{i}X_{1,s}^{i}}{\sum_{s=1}^{9}\sum_{i=1}^{2}X_{1,s}^{i}}\right\}\right)+(1-\rho)\left(\sum_{i=1,2}\left\{\psi_{2i}(t)\frac{\sum_{s=2}^{9}\sum_{i=1}^{2}\beta_{2s}'^{i}X_{2,s}^{i}}{\sum_{s=1}^{9}\sum_{i=1}^{2}X_{2,s}^{i}}\right\}\right)\right] \\ +(1-\omega_2)\left\{\begin{array}{l}\rho\left\{\omega_1\left(\sum_{i=1,2}\left\{\psi_{1i}(t)\frac{\sum_{s=2}^{9}\sum_{i=1}^{2}\beta_{1s}'^{i}X_{1,s}^{i}}{\sum_{s=1}^{9}\sum_{i=1}^{2}X_{1,s}^{i}}\right\}\right)+(1-\omega_1)\left(\sum_{i=1,2}\left\{\psi_{2i}\frac{\sum_{s=2}^{9}\sum_{i=1}^{2}\beta_{1s}^{i}X_{1,s}^{i}}{\sum_{s=1}^{9}\sum_{i=1}^{2}X_{1,s}^{i}}\right\}\right)\right\} \\ +(1-\rho)\left\{\omega_2\left(\sum_{i=1,2}\left\{\psi_{1i}(t)\frac{\sum_{s=2}^{9}\sum_{i=1}^{2}\beta_{2s}'^{i}X_{2,s}^{i}}{\sum_{s=1}^{9}\sum_{i=1}^{2}X_{1,s}^{i}}\right\}\right)+(1-\omega_2)\left(\sum_{i=1,2}\left\{\psi_{2i}(t)\frac{\sum_{s=2}^{9}\sum_{i=1}^{2}\beta_{2s}^{i}X_{2,s}^{i}}{\sum_{s=1}^{9}\sum_{i=1}^{2}X_{1,s}^{i}}\right\}\right)\right\}\end{array}\right\} \end{array}\right\rangle$$

where δ is the fraction of a bisexuals sex partners that are men

$$\gamma_2^i = c_2^i(1-\delta)\left\langle \omega_2\left[\begin{array}{l}(1-\chi_2)\left(\sum_{i=1,2}\left\{\psi_{9i}(t)\frac{\sum_{s=2}^{9}\sum_{i=1}^{2}\beta'^{i}_{9s}X^{i}_{9,s}}{\sum_{s=1}^{9}\sum_{i=1}^{2}X^{i}_{9,s}}\right\}\right)+\chi_2\xi\left(\sum_{i=1,2}\left\{\psi_{7i}(t)\frac{\sum_{s=2}^{9}\sum_{i=1}^{2}\beta'^{i}_{7s}X^{i}_{7,s}}{\sum_{s=1}^{9}\sum_{i=1}^{2}X^{i}_{7,s}}\right\}\right)+\\ \chi_2(1-\xi)\left(\sum_{i=1,2}\left\{\psi_{8i}(t)\frac{\sum_{s=2}^{9}\sum_{i=1}^{2}\beta'^{i}_{8s}X^{i}_{8,s}}{\sum_{s=1}^{9}\sum_{i=1}^{2}X^{i}_{8,s}}\right\}\right)\end{array}\right]\right\rangle$$

$$+(1-\omega_2)\left\{\begin{array}{l}(1-\chi_2)\left(\begin{array}{l}\omega_9\sum_{i=1,2}\left\{\psi_{9i}(t)\frac{\sum_{s=2}^{9}\sum_{i=1}^{2}\beta'^{i}_{9s}X^{i}_{9,s}}{\sum_{s=1}^{9}\sum_{i=1}^{2}X^{i}_{9,s}}\right\}\\ +(1-\omega_9)\sum_{i=1,2}\left\{\psi_{9i}(t)\frac{\sum_{s=2}^{9}\sum_{i=1}^{2}\beta^{i}_{9s}X^{i}_{9,s}}{\sum_{s=1}^{9}\sum_{i=1}^{2}X^{i}_{9,s}}\right\}\end{array}\right)\\ +\chi_2\xi\left(\begin{array}{l}\omega_7\sum_{i=1,2}\left\{\psi_{7i}(t)\frac{\sum_{s=2}^{9}\sum_{i=1}^{2}\beta'^{i}_{7s}X^{i}_{7,s}}{\sum_{s=1}^{9}\sum_{i=1}^{2}X^{i}_{7,s}}\right\}\\ +(1-\omega_7)\sum_{i=1,2}\left\{\psi_{7i}(t)\frac{\sum_{s=2}^{9}\sum_{i=1}^{2}\beta^{i}_{7s}X^{i}_{7,s}}{\sum_{s=1}^{9}\sum_{i=1}^{2}X^{i}_{7,s}}\right\}\end{array}\right)+\\ \chi_2(1-\xi)\left(\begin{array}{l}\omega_8\sum_{i=1,2}\left\{\psi_{8i}(t)\frac{\sum_{s=2}^{9}\sum_{i=1}^{2}\beta'^{i}_{8s}X^{i}_{8,s}}{\sum_{s=1}^{9}\sum_{i=1}^{2}X^{i}_{8,s}}\right\}\\ +(1-\omega_8)\sum_{i=1,2}\left\{\psi_{8i}(t)\frac{\sum_{s=2}^{9}\sum_{i=1}^{2}\beta^{i}_{8s}X^{i}_{,s}}{\sum_{s=1}^{9}\sum_{i=1}^{2}X^{i}_{8,s}}\right\}\end{array}\right)\end{array}\right\}$$

Where χ_2 is the proportion of bisexual sexual partnerships that are with sex workers and ξ is the proportion of partnerships supplied by sex workers that are supplied by injecting drug using sex workers.

Injecting drug users have the risk of acquiring infection from other injecting drug users through sharing needles or through sexual contacts. For simplicity it is assumed that male IDUs, female non-sex worker and sex worker IDUs all have the same rates of sharing and the same risk of acquiring infection from their drug use, whereas their sexual risk can differ. Male IDUs are assumed to reserve a fraction of their sexual partnerships *M* for other IDUs and a fraction of their sexual partnerships are with sex workers.

The incidence of infection for male IDUs is given by:

$$\lambda_3^i = \gamma_3 + \gamma_4 + \gamma_4'$$

where

$$\gamma_3^i = \zeta \left\langle x_3 \sum_{i=1,2} \left\{ h_{3i}(t) \frac{\sum_{s=2}^{9}\sum_{i=1}^{2} g_s^i X_{3s}^i}{\sum_{s=1}^{9}\sum_{i=1}^{2} X_{3,s}^i} \right\} + x_6 \sum_{i=1,2} \left\{ h_{6i}(t) \frac{\sum_{s=2}^{9}\sum_{i=1}^{2} g_s^i X_{6s}^i}{\sum_{s=1}^{9}\sum_{i=1}^{2} X_{6,s}^i} \right\} + x_7 \sum_{i=1,2} \left\{ h_{7i}(t) \frac{\sum_{s=2}^{9}\sum_{i=1}^{2} g_s^i X_{7s}^i}{\sum_{s=1}^{9}\sum_{i=1}^{2} X_{7,s}^i} \right\} \right\rangle$$

Here ς is the rate of sharing injecting equipment; x_r is the proportion of needle sharing done by each of the three injecting risk groups; Within risk groups the sharing is split by intervention status according to the proportion $h_{ri}(t)$. The transmission probability per needle sharing contacts depends upon the transmission probability per act of sharing unclean equipment and the number of times unclean equipment is shared:

$$g_{rs}^i = 1 - (1 - \eta_s)^{e_r(1-\pi_{ri})}$$

The risk of acquiring infection sexually is given by the two values $\gamma_4 + \gamma_4'$:

$$\gamma_4^i = c_3^i \left\langle \omega_3 \left[\begin{array}{l} \mathrm{M} \left[\begin{array}{l} (1-\chi_3) \left(\sum_{i=1,2} \left\{ \psi_{9i}(t) \frac{\sum_{s=2}^{9}\sum_{i=1}^{2} \beta_{9s}'^i X_{9,s}^i}{\sum_{s=1}^{9}\sum_{i=1}^{2} X_{9,s}^i} \right\} \right) + \chi_3 \xi \left(\sum_{i=1,2} \left\{ \psi_{7i}(t) \frac{\sum_{s=2}^{9}\sum_{i=1}^{2} \beta_{7s}'^i X_{7,s}^i}{\sum_{s=1}^{9}\sum_{i=1}^{2} X_{7,s}^i} \right\} \right) + \\ \chi_3 (1-\xi) \left(\sum_{i=1,2} \left\{ \psi_{8i}(t) \frac{\sum_{s=2}^{9}\sum_{i=1}^{2} \beta_{8s}'^i X_{8,s}^i}{\sum_{s=1}^{9}\sum_{i=1}^{2} X_{8,s}^i} \right\} \right) \end{array} \right] \\ + (1-\mathrm{M}) \left(\sum_{i=1,2} \left\{ \psi_{6i}(t) \frac{\sum_{s=2}^{9}\sum_{i=1}^{2} \beta_{6s}'^i X_{6,s}^i}{\sum_{s=1}^{9}\sum_{i=1}^{2} X_{6,s}^i} \right\} \right) \end{array} \right] \right\rangle$$

$$\gamma_3^i = c_3^i \left\langle (1-\omega_2)(\mathrm{M}\left\{ \begin{array}{l} (1-\chi_3)\left(\begin{array}{l} \omega_9 \sum\limits_{i=1,2} \left\{ \psi_{9i}(t) \dfrac{\sum\limits_{s=2}^{9}\sum\limits_{i=1}^{2} \beta'^{i}_{9s} X^{i}_{9,s}}{\sum\limits_{s=1}^{9}\sum\limits_{i=1}^{2} X^{i}_{9,s}} \right\} \\ +(1-\omega_9) \sum\limits_{i=1,2} \left\{ \psi_{9i}(t) \dfrac{\sum\limits_{s=2}^{9}\sum\limits_{i=1}^{2} \beta^{i}_{9s} X^{i}_{9,s}}{\sum\limits_{s=1}^{9}\sum\limits_{i=1}^{2} X^{i}_{9,s}} \right\} \end{array} \right) \\ +\chi_3\xi \left(\begin{array}{l} \omega_7 \sum\limits_{i=1,2} \left\{ \psi_{7i}(t) \dfrac{\sum\limits_{s=2}^{9}\sum\limits_{i=1}^{2} \beta'^{i}_{7s} X^{i}_{7,s}}{\sum\limits_{s=1}^{9}\sum\limits_{i=1}^{2} X^{i}_{7,s}} \right\} \\ +(1-\omega_7) \sum\limits_{i=1,2} \left\{ \psi_{7i}(t) \dfrac{\sum\limits_{s=2}^{9}\sum\limits_{i=1}^{2} \beta^{i}_{7s} X^{i}_{7,s}}{\sum\limits_{s=1}^{9}\sum\limits_{i=1}^{2} X^{i}_{7,s}} \right\} \end{array} \right) + \\ \chi_3(1-\xi) \left(\begin{array}{l} \omega_8 \sum\limits_{i=1,2} \left\{ \psi_{8i}(t) \dfrac{\sum\limits_{s=2}^{9}\sum\limits_{i=1}^{2} \beta'^{i}_{8s} X^{i}_{8,s}}{\sum\limits_{s=1}^{9}\sum\limits_{i=1}^{2} X^{i}_{8,s}} \right\} \\ +(1-\omega_8) \sum\limits_{i=1,2} \left\{ \psi_{8i}(t) \dfrac{\sum\limits_{s=2}^{9}\sum\limits_{i=1}^{2} \beta^{i}_{8s} X^{i}_{8s}}{\sum\limits_{s=1}^{9}\sum\limits_{i=1}^{2} X^{i}_{8,s}} \right\} \end{array} \right) \end{array} \right\} \\ +(1-\mathrm{M})\left\{ \left(\begin{array}{l} \omega_6 \sum\limits_{i=1,2} \left\{ \psi_{6i}(t) \dfrac{\sum\limits_{s=2}^{9}\sum\limits_{i=1}^{2} \beta'^{i}_{6s} X^{i}_{6,s}}{\sum\limits_{s=1}^{9}\sum\limits_{i=1}^{2} X^{i}_{6s}} \right\} \\ +(1-\omega_6) \sum\limits_{i=1,2} \left\{ \psi_{6i}(t) \dfrac{\sum\limits_{s=2}^{9}\sum\limits_{i=1}^{2} \beta^{i}_{6s} X^{i}_{6s}}{\sum\limits_{s=1}^{9}\sum\limits_{i=1}^{2} X^{i}_{6s}} \right\} \end{array} \right) \right\} \right\rangle$$

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CHAPTER 4. Economics of the HIV epidemic in the Russian Federation

4.1. Introduction

The World Health Organisations annual reports since 2000 have emphasised the central importance of links between health and economy, at both the individual and societal level ([4],[5],[6],[7]). Within the context of attempts to deliver integrated programmes and policies for the prevention and treatment of HIV/AIDS and the mitigation of its impact these links are especially important[8] . Firstly, epidemics of HIV/AIDS can be driven by economic conditions which may encourage dangerous risk environments, high risk behaviours and population mixing as well as constraining the capacity of individuals to protect themselves. Secondly, HIV epidemics have been shown to impact economic development at both the macro- and microeconomic levels through losses in productivity, changes in size and deployment of household budgets, and direct effects on businesses. Thirdly prevention and treatment programmes require resources, and effective programmes require efficient use of those resources to support delivery of interventions.

In this chapter we report four related studies carried out within the context of the DFID Knowledge Programme: Knowledge for Action in HIV/AIDS in the Russian Federation which address different aspects of the link between HIV and economy. The first study is a survey designed to investigate the social and economic characteristics of the people belonging to the high risk groups of injecting drug users (IDUs) and commercial sex workers (CSWs). This survey reports economic social demographic and health behavioural characteristics of these populations in some detail. The second is an illustrative case study which examines the impact of HIV on a medium sized firm operating in labour intensive section of the Russian economy. The third, reports an HIV sub accounts study which aimed to identify sources of funding for HIV-related activities and to establish current allocation of financing for HIV/AIDS prevention and treatment activities by major financing organizations, providers and functions. The fourth is a multimethods situation assessment of contextual and health systems factors which influence programme delivery in Volgograd oblast.

4.2. Survey of the social and economic characteristics of injecting drug users and sex workers

4.2.1. Survey objectives

This study was designed to investigate the social and economic characteristics of the people belonging to the high risk groups of injecting drug users and sex workers. The motivation for this study was the lack of knowledge about groups that were considered at high risk of being or becoming infected with HIV and their economic survival strategies.

4.2.2. Methods

A questionnaire was designed with sections on injecting risk behaviour, family status, employment, consumption, migration and sexual behaviour. The final instrument was written after piloting the questions in Moscow, Barnaul and Volgograd.

The sample was collected using Respondent Driven Sampling (RDS). In this approach an initial small number of individuals belonging to the risk groups (in this case injecting drug users or sex workers) are identified. These are called the ‘seeds’. They are interviewed in their own right and are then given coupons with which to recruit other members of the risk group. If an individual is interviewed after presenting a coupon, the person who was originally issued that coupon receives a small reward. In our sample valid persons had either injected drugs or sold sex within the last 30 days, or both. The RDS method is quite new and a number of claims have been made for it that may not stand up in the long term. However it does have the definite advantage that the final composition of the sample does not depend on

the original seeds and hence you are not reliant on your initial choice. Another reason that the RDS method was adopted was because we felt that it might be able to reach those with the highest risk behaviours for acquiring and transmitting HIV, and the highest rates of HIV.

Fieldwork was carried out in Barnaul and Volgograd between the 15th August and the 9th September 2004. The fieldwork teams consisted of two persons from Moscow who had previous experience of such surveys and six locally engaged fieldworkers. The fieldwork was continued 400 respondents had been recruited in each site.

The Figure 35 shows the breakdown between IDUs, sex workers (SW), men and women in the combined Barnaul and Volgograd sample

Figure 35. IDU/ Sex work characteristics of the survey sample

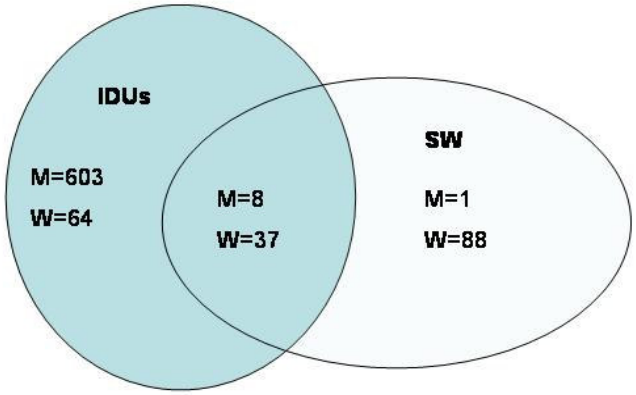


Table 19 shows the age distribution of the sample in the two regions.

Table 19. Age distribution of the survey sample

	Mean	Median	Inter quartile spread	Range
Barnaul				
Male IDU	24.3	23	8	16-55
Female IDU	24.5	24	7	17-39
Female SW	26.4	26	7	17-48
Female IDU/SW	23.8	24	6.5	17-33
Volgograd				
Male IDU	24.2	24	7	16-44
Female IDU	24.06	23	10	15-34
Female SW	21.4	20	5	15-30
Female IDU/SW	21	21	3	18-27

4.2.3. Results

4.2.3.1. Risk Behaviour

In what follows we report findings for both IDUs and sex workers. Individuals who were both IDUs and sex workers are not considered separately but are included in both the groups for the purposes of reporting. (84% n=591) reported injecting Heroin. The mean age at which they first injected was 18. Over half the sample of drug users had injected in the two days

before they were interviewed. Of those who had injected in the last four weeks, the mean number of times injected was 15. Just over half (51%) of IDUs had ever used a needle that they knew had been already used by someone else. Just over 20% of the sample had shared a needle within the four weeks prior to the interview. The main source of needles was pharmacies in both Barnaul (89%) and Volgograd (96%). IDUs in Barnaul were more likely to source needles from family, friends and dealers or used those they found (8%) than IDUs in Volgograd (2%).

Among sex workers, the mean number of clients in the last four weeks for vaginal sex was 60 even after extreme outliers were removed. Non-IDU sex workers had significantly higher numbers of clients than sex workers who were also IDUs. Only 15 sex workers had sold anal sex in the last 30 days. There is some evidence that IDU sex workers were more likely to sell anal sex but the sample size is very small.

Sex workers were asked what proportion of their clients was 'new'. It is not clear that this question was properly interpreted as in several cases the number of new clients exceeded the total number of clients. However where the answers made sense it seems that, on average, 50% of their clients were 'new'. They were also asked what proportion of clients during the last month they had used a condom. Again this question may have been a misinterpreted as condom use exceeding the number of clients in some cases. In any case there is evidence that sex workers report using condoms for approaching 100% of sexual contacts. We observed no difference be between IDU and non IDU sex workers in rates of condom use. The median amount charged for vaginal sex was 250 RR among both IDU and non-IDU sex workers. A small number of sex workers (18) were prepared not to use a condom if the client paid extra. The supplemental fee was usually 100% of the normal charge.

IDUs reported an average of 4.5 non-paying sex partners during the previous 12 months while for whilst for sex workers the median was 1.. About half of sexual partners were new. For the highest risk groups, those with more than 10 sexual partners in the last year 66% of partners were new. Condoms were used 60% of the time. However there was no evidence that individuals reporting more than 10 sex partners had higher levels of injecting risk behaviour with 20% of both this group and the remainder of the sample reporting having shared injecting equipment within the previous four weeks.

From this section we can conclude that there is little difference in risk behaviour between sex workers who are IDUs and those that are not. If the evidence on condom use with clients is to be believed sex workers are aware of the risks of unprotected sex. IDU sex workers seem to be at much higher risk of HIV than non IDU sex workers through injection; with a considerable proportion having shared needles in the four weeks prior to interview

4.2.3.2. Social characteristics

Sixty five percent of the sample were single, 12% married and a further 16% lived with their partner. Of the IDU sample, 21% had children with the mean number being 1.26. Of the sex worker population, 38% had children with the mean number being 1.31. Seventy six percent of sex workers had completed secondary school and 29% had also completed special school. IDUs tended to have a slightly higher level of education with 81% and 36% having completed secondary and special school respectively. Around 6% of both groups had attended higher education.

Many IDUs had at least one vocational qualification, mainly in the skilled manual rather than professional occupations. Popular qualifications include car repairs, driving, machine tending and building trades. Sex workers reported a more diverse range of qualifications, including lawyers, hairdressers, theatre directors and one gynaecologist.

Table 20 shows that the majority of both IDUs and sex workers live with family members rather than on their own or with friends. The totals in this table sums to more than 800 both because some subjects are both IDUs and sex workers and because some live with both friends and family.

Table 20. Living status of sample

Living status	Sex worker	IDUs
Live Alone	13% (18)	10% (76)
Live with friends	15% (21)	1% (10)
Live with Family	57% (82)	77% (573)
Live with partner	10% (14)	9% (65)
Live with others	6% (9)	2% (18)
Total	100 (144)	100 (742)

The majority of IDUs (90%) live in accommodation owned by themselves or their family whereas a higher proportion of sex workers (32%) lived in accommodation rented by themselves or their families. This significant difference might indicate that sex workers come from families with less wealth. People were asked to estimate the market value of their accommodation and over half were able to do so. The median value was 600,000 roubles. This was the same in both Barnaul and Volgograd. Sex workers lived in less valuable properties than IDUs. Their flats or houses were also smaller (4 rooms as compared to 5).

The results from this section indicate that those from high-risk groups are for most part living with other family members – typically their birth family. Sex workers are slightly less likely to live with their family than IDUs but they are also more likely to live in rented rather than owned accommodation. This might suggest the reasons they became sex workers were economic.

4.2.3.3. Economic characteristics

Only 32% of the sample reported a regular income, excluding money earned selling sex or drugs. A higher percentage of IDUs (34%) than sex workers (21%) reported having a regular job. Fifty percent of those without a job were looking for a job. However, unemployed sex workers were less likely to be looking for work.

A small proportion of working IDUs were self employed. The majority of these worked in the small trades sector as builders, decorators, auto mechanics and similar. Very few sex workers reported being self employed; those that did were mainly buying and selling goods.. The median income from self employment during the previous 30 days was 6,250RR (≈$214) and the mean 8,436RR (≈$289)

The jobs of those that reporting employment were almost exclusively of blue collar or skilled manual type, with a high proportion working in building trades, as driver and so on; and some traders. Very few respondents were professionals. We have some information on hours and days worked and most people had fairly standard 9 to 5 jobs. The mean monthly income was 5,770RR (≈$197) and the median was 5,000RR (≈$171). Using information on normal hours and days worked in the last month the hourly wage has a median of 27 and a mean of 33 RR. This is roughly equivalent to $1 an hour. Wages in Volgograd are slightly but not statistically significantly higher.

Very few people reported more than one job. Around a quarter of the sample reported being are owed money by their current employer. The median amount was 5,000 roubles, which is also the median monthly income.

Respondents were asked about assets owned by themselves or their household. The level of asset ownership appeared fairly low. Only one in ten households had a computer, one in four a car, and one in three had use of a dacha. There was little variation in ownership between sites, but some evidence that sex workers had even lower ownership of assets such as a car, and with only 42% live in homes with telephones.
The sample respondents were asked to place themselves into one of a number of categories which they felt fitted them best. Their responses are shown in Table 21. As can be seen most of them saw themselves as involuntary unemployed.

Table 21. Responses to question: "what best describes you at this moment?"

Response	Freq.	Percent	Cum.
HE Student	31	3.88	4.25
Pupil	8	1	5.25
Student: special school	61	7.63	12.88
Not working: sick	18	2.25	15.13
Pensioner	1	0.13	15.25
Child care leave	5	0.63	15.88
Homeworker/carer	6	0.75	16.63
Unemployed: Looking for work	266	33.25	49.88
Unemployed: Not looking for work	150	18.75	68.63
Farmer	1	0.13	68.75
Contract employee	174	21.75	90.5
Self Employed	66	8.25	98.75
Other	10	1.25	100
Total	800	100	

Their reported sources of income, other than regular work are presented Table 22 below. The first two columns are numbers and percentages of those who received money from each source as an important income component, and the last two columns give median income from that source during the previous week and the number of subjects who reported this. There may be some tendency for those surveyed not to list specific illegal activities such as selling drugs but 35% claim that illegal activity forms at least part of their income. Also most of that total earned money in the last 7 days from illegal activities and the median amount was 2000 RR.

Table 22. Other sources of income. What are important sources and have you received income from that source during previous 7 days.

	Important source		Last 7 days	
	%	N	median	N
Irregular work	40	307	1500	199
Government benefits	8	65	350	35
Begging	1	4	200	1
Selling drugs	1	6	2250	4
Drug deals	7	52	600	37
Other illegal activities	35	271	2000	198
Selling sex	16	125	3000	117
Selling goods	13	101	1500	55
Parents give money	50	385	500	288
Friends give money	29	223	500	122
parents loan money	30	235	500	107
Friends loan money	39	303	500	129
Community support	1	9	1000	1
Other			1750	4

It is clear that support from friends and family is one of the main sources of income. The last two columns show how current this support is with the median amount received and the number of those who received anything in the last seven days. This would suggest that support from family and friends, though common, is not sufficient and that illegal activities are the most lucrative source of funds. Even irregular work seems to be a poor source of funding,

although remember that the *monthly* income for regular work has a median of 5,000 roubles so 1500 roubles a week is reasonable pay relatively. Table 23 shows what respondents spent money on in the previous 14 days, and how much. The most common item was cigarettes and most people spent money on transport within the city. Cigarettes, market clothes, taxis, shoes and gambling are all important items of expenditure. The median total expenditure of sex workers was twice that of non sex workers (i.e. IDU non-SWs).

Table 23. Conventional expenditure in previous 14 days

Item of conventional expenditure	%	N	Median RR
Clothes (from boutique)	13	105	1000
Clothes (from market)	21	170	800
Shoes	17	136	910
Shoe repairs	7	54	77.5
Cigarettes/ tobacco	93	746	200
Entertainment (clubs, concerts theatres.)	15	125	500
Soap/ toiletries	36	289	100
Cosmetics	14	115	200
Transport fuel	14	113	500
Public transport (local) (not Taxi)	75	605	100
Transport tickets (national or international)	3	27	200
Taxis	39	312	300
Syringes	73	580	50
Condoms	38	151	60
Furniture	1	6	5000
Domestic products, e.g. cleaning products, crockery	12	96	84
Gambling	26	207	400
Payment for mobile Phone	28	227	300
Internet	1	10	125
Other	3	20	300

We also explored some of the more unconventional ways people spent money. In terms of total expenditure buying drugs was by far the most important though a considerable proportion of the sample also paid off some debt. Thirteen percent of the sample reported paid off police and a smaller number paid other administrative bribes or protection.

In terms of overall spending, drugs was the most important item with 83% of the sample spending a median of 1000 roubles in the last seven days.

This section demonstrates that people in these risk groups have a number of strategies for economic survival. Although few have regular work many receive support from parents and friends, have irregular jobs or engage in illegal activities to earn money. Relatively few report either selling drugs or facilitating drug deals. In terms of expenditure, money goes on fairly standard items with tobacco, clothes and drugs as major single items of expenditure. Although we haven't differentiated between the spending patterns of sex workers and drug users at this stage it seems sex workers have more cash to spend even though in terms of assets they are poorer.

Table 24. Unconventional expenditure in last 7 days

Item of unconventional expenditure	%	n	Median
Bought Drugs	83	630	1000
Bought medicine	31	237	70
Bought treatment	4	33	255
Repaid debt	30	228	500
Lent money	22	165	400
Paid off police	13	100	500
Other bribe	1	6	269
Paid protection	5	36	2000
Bought sex	5	41	500

4.2.3.4. Where IDUs and sex workers come from

A preconception often heard in Russia when discussing drug users and sex workers is that they are more likely to be drawn from groups who have migrated to these parts of Russia to find work. There is no reason that our sampling strategy would not find such groups unless they form entirely self contained networks of drug users and sex workers.

Among our respondents 81% reported having been born in the town where they we interviewed them. A further 7% were born in the oblast or krai. This did not differ greatly between Volgograd and Barnaul. However a significant difference between IDUs and sex workers in this respect. Among IDUs 86% had been born in the city they now lived, compared with only 59% among sex workers. A further 15% of sex workers had been born in the same oblast/krai; 15% elsewhere in Russia; and 9% had been born in a former Soviet republic. Overall ninety seven percent of respondents (93% of sex workers) had a 'propusk': that is a right to live in the city and importantly, a right to receive medical treatment (supposedly) free.

The sample was fairly stable in terms of place of residence. Among IDUs 90% had moved once or less in the last two years. Sex workers were slightly more mobile with 92% having moved four times or less in the last two years and 95% of the sample have lived in their current region for at least two years. Few people (70) had ever lived abroad. The most common country for those that had was Kazakhstan.

It is clear that the vast majority of those in these risk groups were born in the city where they lived with the remainder are mainly from the surrounding region. A very small percentage has come from other regions of Russia and even fewer from abroad.

4.2.4. Summary

Findings were based on analysis of a dataset of 800 injecting drug users and sex workers. The data was collected in Barnaul and Volgograd in August and September 2004. There seem to be little difference between the sites on most variables. Injecting drug users are typically reasonably well educated, live with their parents in a family owned dwelling. If they are employed they are skilled manual workers. They were born in the city where they now live and have not lived anywhere else.
They spend money on a variety of the usual consumables but their main spending is on drugs. Given the average wage drugs must take up a great deal of their income. In addition to work they earn money from a variety of activities some of them illegal. A lot of them rely on support from family and friends.

Sex workers seem to have a lower educational achievement than IDUs and, although evidence is not strong, it all points to them living in less secure accommodation with fewer assets. However, sex work appears quite lucrative with earnings of 12,000 roubles (≈$490) a month, well over twice median earnings. This might explain why they don't feel pressure to take risks in relation to unprotected sex. The data suggests high rates of condoms use. What is more surprising is that sex workers who are also IDUs do not seem to have any different characteristics to non-IDU sex workers.

This analysis is basically univariate and needs to be followed up to more closely examine the differing patterns of behaviour, economic, social, sexual and drug related. Also comparisons with data representative of the general population of these cities will put some of these results into more context.

4.3. HIV/AIDS sub accounts in Altay Krai and Samara Region

4.3.1. Introduction to the sub accounts study

An effective response to the HIV/AIDS epidemic requires substantial resources and efficient allocation of these resources to cost-effective interventions. HIV/AIDS sub accounts are systematic, periodic and exhaustive accounting of the financing sources from the public and private sectors and the expenditures for HIV/AIDS prevention and treatment. The HIV/AIDS sub accounts can be used to analyse (i) the current financing sources and the trends in resource use, and (ii) how these resources are allocated.

As most HIV-prevention and control programmes involve multi-sectoral approaches, HIV/AIDS sub accounts are designed to track HIV/AIDS-related expenditures in both the health and non-health sectors (such as education, legal, penitentiary, social protection, mass media) as well as the financing from national, international, and nongovernmental organisations (NGOs). If implemented on a regular basis, HIV/AIDS sub accounts can be used to track HIV/AIDS-related expenditure trends and how the expenditures are targeted. They also offer the possibility compare structure and expenditure for HIV/AIDS in different countries. In addition, HIV/AIDS sub accounts, when combined with information on intervention effectiveness, can be used to ascertain whether current resources are efficiently allocated. This intelligence can inform evidence-based decision making and help enhance allocative efficiency.

In the Russian Federation, which has the largest number of people living with HIV/AIDS (PLWHA) in Europe and Central Asia,[1,2] HIV/AIDS sub accounts have not previously been prepared. We report findings of a study from Altai krai and Samara regions of Russia. The study was also implemented in Volgograd region, but data analysis from this region is not yet complete. The study employed internationally adopted approaches for NHA[3] and HIV/AIDS[4,5,6] sub accounts, but modified these, taking into account the Russian context and laws governing budgeting and reporting of costs and incomes.[7,8]

4.3.2. Aims of the research

The aims of the research were to:

(i) Estimate the current allocation of financing to HIV/AIDS prevention and treatment activities by major financing organizations, providers and functions
(ii) Generate policy-relevant information on financing and resource allocation to support policy dialogue and enhance evidence-based decision making.

4.3.3. Methods

The study was conducted consecutively in three Russian regions, Altay krai, Samara oblast and Volgograd oblast, in five stages. The first stage involved development of the research protocol and analysis of published literature on NHA framework and that for HIV/AIDS sub accounts. The second stage comprised of analysis of regulatory documents, laws and decrees in the Russian Federation to identify (i) rules and regulations governing budgeting

and financial reporting in the public sector generally and the health sector specifically, (ii) financial data collected at federal and regional levels in the health system, (iii) financial data collected at federal and regional levels for HIV/AIDS and related areas, (iv) financial reporting for HIV/AIDS services.

The third stage involved development of methodologies for HIV/AIDS sub accounts study for Russia, drawing on the internationally approved approaches and methods used for NHA and HIV/AIDS sub accounts, but aligning these with the Russian regulations and definitions. In this stage, analytical tools and data collection instruments were developed and tested with Russian experts for contextual appropriateness. This was followed by a mapping exercise in each region, during which public, private, health and non-health organisations involved in HIV-prevention and control were classified by type, and their roles defined. A representative sample of these organisations was selected for data collection. In each region, health professionals from the organisations selected were trained in data collection methods and to familiarize them with the data collection instruments. We collected data on the funding sources and amount of funding from each funding organisation; on the level and proportion of funds allocated to providers; and the amount of funding allocated to different services and functions.

The final stage of the study involved data analysis and triangulation.

4.3.4. HIV/AIDS financing in the Russian Federation

In 2003, in the Russian Federation, total expenditure for health care amounted to Russian Roubles (RR) 570 billion (US$ 20 billion) (Table 25). Of this, RR 391.5 billion (US$ 13.5 billion USD) was from the public sources. In 2003, total health expenditure was 6.2 percent of the GDP and the per capita expenditure on health was RR 2,990 (103 US$).[9,10]

Table 25. Summary statistics for HIV/AIDS sub accounts in the Russian Federation (2003) and regions

Parameter	Figures for the Russian Federation
Estimated number of people living with HIV/AIDS (aged up to 49 years) (end of 2003)	420 000 – 1,400 000
Incidence in Adults (15 to 49 years) (2003)	0.6-1.9%
Per Capita Health Expenditure (2003)	RR 2,990 (103 US$)
Total Health Expenditures (2003)	RR 570 billion (20 billion US$)
Total HIV/AIDS-related health expenditures (2003)	RR 5.985 billion (206 million US$)
Total donor financing for HIV/AIDS (2003)	RR 102.3 million (3.7 million US$)
Total expenditure on health as % of GDP	6.2%

Source: The World Health Report 2005

The “Federal Programme on Prevention and control of disease of social character” covers diabetes mellitus, tuberculosis, immunization, cancer care, STI, HIV and disaster-preparedness and has earmarked funding of RR9.2 billion (~US$ 300 million) for the period 2002–2006. Of this, RR 2.8 billion (approximately US$ 0.12 per person per year) is allocated to the federal HIV programme (Table 26), around two-thirds of which is allocated for pharmaceuticals and diagnostics.

In 2003, in the Russian Federation, the funding from the federal sources for the “HIV/AIDS control” sub-programme was RR 126.7 million (US$4.87 million). In the same period, international donor funding for HIV/AIDS-related activities was RR 102.3 million (US$3.7 million): used to finance State Programme on HIV/AIDS control, the NGO sector, as well as the federal and regional AIDS centres.

Table 26. Funds allocated to federal programmes in the Russian Federation for control of diseases "of social importance" for the years 2002–2006

Financing in millions	Russian Roubles (million)	US Dollars (million)
Tuberculosis	33 825	1128
Diabetes	25 984	870
Cancer services	22 021	734
Sexually transmitted illness	5244	174
HIV/AIDS	2774	93
Disaster medicine	1385	46
Preventable illness	974	33

In Russian regions, funds for HIV/AIDS prevention and control activities come from (i) Territorial governments; which includes the Federal Government (Federal MOH), state/provincial governments (regional budgets), local/municipal governments (municipal budget) (ii) Social security funds; including compulsory health insurance funds (federal and regional funds, which includes the Territorial Health Insurance Fund (THIF)), and (iii) Household payments; user fees and voluntary and/or private health insurance schemes.
In most regions, there is a multi-sectoral response to the HIV/AIDS problem, typically involving, to a varying extent, the education, juridical, penitentiary, social protection systems and the mass media.

Direct regional funding for HIV/AIDS prevention and control is determined by the budget allocated to the 'regional HIV/AIDS control programme'. Other public expenditure on HIV/AIDS is indirect: comprising of the share of the operational budgets, cost of equipment and capital allocated to infrastructure maintenance in different healthcare and non-healthcare structures. NGOs receive most of their funding from donors with limited funding from the public sector. In our study, we considered direct and indirect HIV/AIDS-related funding from health care budget, household payments (user fees and voluntary and/or private health insurance schemes) and donors.

4.3.5. Resource allocation for HIV/AIDS in Altay krai and Samara region

There are substantial differences in these two regions as regards socio-economic characteristics, stage of the epidemic and HIV control activities. In 2003, HIV incidence rate in Altay krai was 0.4%, whereas that in Samara region was estimated to range between 0.7 to 1.4% of the general population: one of the highest rates in the Russian Federation.

4.3.5.1. Funding sources for HIV/AIDS related activities

In 2003, total health care expenditure in Altay krai were RR 4.882 billion (US$168.3 million) and per capita expenditures to RR 1881.7 (US$65). In the same year, the total health expenditure in Samara region was RR 4.88 billion (US$162 million). In 2003, in Altay krai, only 0.95 percent of the health expenditure was targeted to HIV/AIDS-related activities, as compared with 1.3 percent of the total health expenditure in Samara (Table 27).

Table 27. Summary figures for HIV/AIDS sub accounts in Altay krai and Samara region (2003)

	Altay krai	Samara region
Estimated Population Living with HIV/AIDS (Aged 0-49 years) (end of 2003)*	3,001	23,137
Incidence (2003)*	0.4%	0.7-1.4%
Per Capita Health Expenditure (2003)	RR 1881.7 (US$65)	
Total Health Expenditure (2003)	RR 4.882 billion (US$168.3 billion)	RR 4.879 billion (US$168.2million)
HIV/AIDS-related health expenditure without donor funding (2003)	RR 46.01 million (US$1.6 million)	RR 50.02 million (US$1.7 million)
Total expenditure on HIV/AIDS-related activities, including donor financing (2003)	RR 49.144 million (US$1.6 million)	Not available
Expenditure on HIV/AIDS as a proportion of total health expenditure	0.95%	1.3%
Sources of Funds Distribution:		
Total health funds (2003):		
Public	93%	
Private	5%	
Donors	2%	
HIV/AIDS-related funds (2003):		
Public	79%	
Private	15%	
Donors	6%	

Source: *WHO 2005; regional statistics, HIV/AIDS sub accounts study

In 2003, direct funding for regional "HIV/AIDS Control Programme" in Altay krai was RR 500,000 (US$17,241) and in Samara region RR 25.050 million (US$0.726 million).The rest of the funding was indirect. In Altay krai, in 2003, the public sector financing accounted for 79% of total HIV/AIDS-related funding, private sector 15% and donor funding was 6% of the total. In Samara region, for 2003, only data on the public sector financing was available.

The proportion of financing from various public financing agents varies in the two regions. In Altay krai, the majority of the public sector funding allocated to HIV/AIDS (57% of public sector funds) comes from the municipal budget. That from the regional budget accounts for 19% of the total public sector funding, with smaller proportions from the Territorial Health Insurance Fund (13%) and the federal budget (11%). In contrast, in Samara region, funds from the regional budget account for 49% of the public funding for HIV/AIDS, followed by the federal budget (30%) and the Territorial Health Insurance Fund (20%), but that from the municipal budget accounts for only 1% of the total public sector funding (Table 28). This difference can be attributed to the large regional HIV/AIDS control programme in Samara.

Table 28. Table 4. HIV/AIDS public sector funds flow in Altay krai and Samara region in 2003 (RR000)

Region	Public Sector Financing Agents				
	Total (RR 000)	Federal budget	Regional budget	Municipal budget	Compulsory Health Insurance Funds
Altay krai	38,702.32	4,302.75	7,288.09	22,120.36	4,991.11
Percent		11%	19%	57%	13%
Samara region	50,024.25	15,222.71	24,737.29	294.80	9,769.45
Percent		30%	49%	1%	20%

4.3.5.2. Funds Flow from Financing Agents to Providers

4.3.5.2.1. Funds flow from public sources to providers

In 2003, the majority of the public sector funds for HIV/AIDS related activities were spent on hospital services: accounting for 74% of the expenditure in Altai krai and 56% in Samara region. In Samara, the figure for hospital expenditure is lower than that in Altai krai, due to the one-off investment in blood safety initiatives funded from regional sources (Table 29).

Table 29. HIV/AIDS public sector funds flow to Health Care Providers in Altay krai and Samara region in 2003 (RR 000)

Providers	Public Sector Financing Agents				
	Total (RR000)	Federal budget	Regional budget	Municipal budget	Compulsory Health Insurance Funds
Altay krai					
General Hospitals	28,427.56	4,193.79	1964.18	17,823.63	4,445.95
Outpatient care centres	3,081.91	108.96	1552.14	875.65	545.16
Blood banks	6,548.03		3,771.77	2,776.26	
Ambulance services	644.82			644.82	
Total RR Altay	38,702.32	4,302.75	7,288.09	22,120.36	4,991.11
Samara region					
General Hospitals	28,107.98	14,837.58	6,666.70	253.56	6,350.14
Outpatient care centres	6,005.45	385.13	5,267.58	41.24	311.50
Blood banks	15,910.82		12803.01		3,107.81
Total RR Samara	50,024.25	15,222.71	2,4737.29	294.80	9,769.45

The proportion of funding from THIF for HIV/AIDS related activities accounted for 13% of public sector funding in Altay krai and 20% of that in Samara. These proportions are low when compared with THIF expenditures in Russia for general health services, which amount to 40% of the total health expenditures. The funds from the THIF allocated to HIV/AIDS related activities are used to pay salaries of personnel in general hospitals who are involved in these activities. THIF does not cover other expenditures related to HIV/AIDS.

4.3.5.2.2. Fund flows from non-public sources to providers

In our study, we estimated the user fees paid for HIV-related services and private/voluntary insurance related to HIV. We estimate that, in 2003, expenditure by private households accounted for 15% of total HIV/AIDS financing. However, we were not able to estimate out-of-pocket payments by PLWHA for over the counter purchases of drugs: as these expenditures are not captured by routinely collected data, and capturing this data would require a survey of a representative sample of PLWHA, which was beyond the scope of our study. Therefore, our figures underestimate the private expenditures by households on HIV-related activities and drugs.

Around 82% of the private expenditure was out-of-pocket and only 18% was from private insurance. Despite the underestimate of figures, out-of-pocket expenditures are still a significant proportion of the total health expenditures for HIV/AIDS and pose a substantial financial risk to PLWHA. Mechanisms to pool this risk and reduce this burden on PLWHA must be explored.

As with the public sector expenditure on providers, a large proportion of the funds from non-public sources are for hospital services: accounting for 65% of the total private expenditure (Table 30).

Table 30. HIV/AIDS non-public sector funds flow to health providers in Altay krai in 2003 (RR000)

Providers	Non-Public Sector Financing Agents		
	Total (RR 000)	Private employer insurance programmes	Private households' out-of-pocket payment
General Hospitals	4,747.88	1,317.20	3,430.68
Outpatient centres	526.04		526.04
Blood banks	2,033.92		2,033.92
Total (RR 000)	7,307.84	1,234.25	5,990.64
Percent of total	100	18	82

4.3.5.2.3. Fund flows from donors to providers

International donor agencies are a further source of funding for HIV/AIDS activities. In 2003, donor funding in Altay krai was RR 3.134 million (US$ 108,070): accounting for 6% of the total funding for HIV/AIDS activities (table 3 and figure 1). Most of this donor funding (80%) was allocated to NGOs, with the remaining 20% allocated to the regional AIDS centre (Table 31).

Table 31. HIV/AIDS donor funds flow to health providers in Altay krai

Providers	Donor funding (RR 000)
HIV/AIDS clinics	387.36
Rest of the world (NGOS)	2,495.61
Total	**3,134.01**

4.3.5.3. Funds flow from financing agents to functions

The two regions differ in terms of the HIV/AIDS related functions/services they provide and the proportions of funds allocated to these. In Altay krai, in 2003, over 47% of the HIV/AIDS funds were allocated to curative services: to remunerate human resources working in these units, to treat concomitant problems (such as opportunistic diseases), and to provide ARV (Table 32). In contrast, in Samara, curative care accounted for 10% of total spending on HIV/AIDS related activities.

The expenditure for diagnostic services (for VCT, and screening in laboratories, provider units and blood banks) accounted for 26% of the HIV/AIDS-related expenditure in Altay krai and 47% of that in Samara. The high expenditure on diagnostic services in Samara can be attributed to the regional programme on HIV/AIDS related activities, which almost exclusively targeted improvement of HIV/AIDS diagnostics in the region.

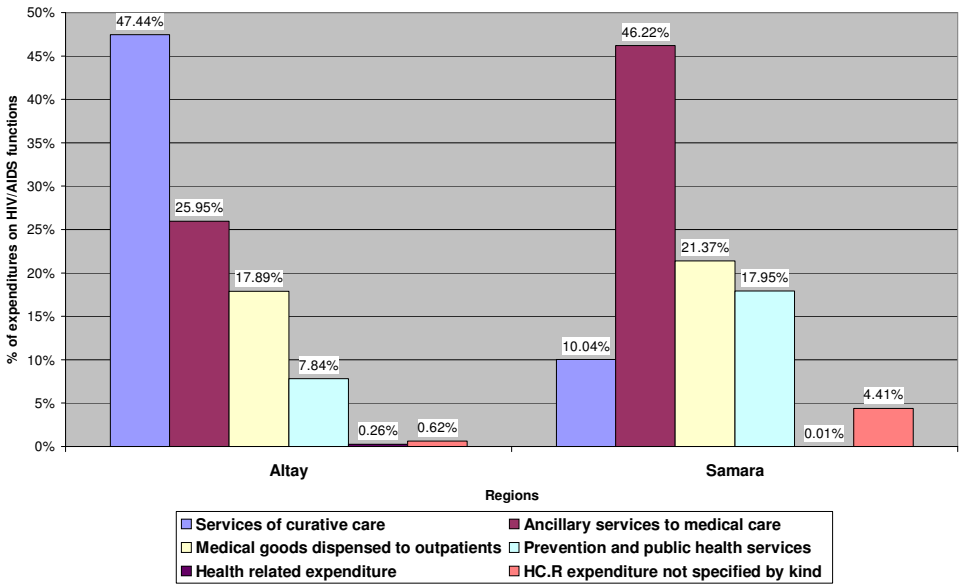
Around 18% of total funds for HIV/AIDS related activities in Altay and 21% of those in Samara were allocated to medical goods dispensed in outpatients, which included diagnostic test systems, over the counter drugs purchased by households to treat HIV-associated opportunistic diseases, but excluded ARV or drugs privately purchased from non-state pharmacies (Table 32 and Figure 36).

Only 7.8% of the total HIV/AIDS-related funding in Altay and 18% of that in Samara region were allocated to prevention and public health activities. This expenditure included screening of blood donors and blood products (Table 32 and Figure 36).
In both Altay krai and Samara region, resources allocated to health-related services, which mostly included education and training of health personnel, were minimal (Table 32 and Figure 36).

Table 32. Health expenditures on HIV/AIDS-related functions in Altay krai and Samara region in 2003 (RR 000)

Services/Functions	Altay krai (RR000)	Samara region (RR000)
Curative services	21,829.35	5,024.73
• Inpatient curative care	8,952.04	1,169.26
• Outpatient curative care	12,877.31	3,853.63
Diagnostic services	11,939.49	23,123.22
Medical goods dispensed in outpatients	8,231.59	10,691.44
Prevention and public health services	3,607.30	8,977.62
Health-related services	121.92	3.15
Not specified by kind	286.45	2,204.09
Total HIV/AIDS Funds	**46,010.17**	**50,024.25**

Figure 36. Expenditure on HIV/AIDS-related functions in Altay krai and Samara region (2003)



4.3.5.4. Comparing expenditures on HIV/AIDS-related functions in Altay krai and Samara region in 2003

Detailed analysis of total health expenditures, disaggregated by function, reveals substantial differences between Altay krai and Samara region (Table 33). In Altay krai, 47% of the total HIV/AIDS funds are used for curative services (19.5% of total inpatient services and 26.5% to curative outpatient services). Around 17.3% of the total HIV/AIDS-related expenditure is allocated to ARV, 8.4% to treating opportunistic infections, 15.6% to other inpatient and outpatient curative services and 5.7% to prevention of mother to child vertical transmission (MTCT) (Table 33).

In Samara region, 10% of the total expenditure on HIV/AIDS is allocated to curative services (2.3% to inpatient and 7.7% to curative outpatient services). The funds allocated to ARV accounted for 4.7% of the total expenditure on HIV/AIDS, with a further 5.3% allocated to treating opportunistic infections, STIs and other curative services (Table 33).

The majority of the expenditure for ancillary services, which account for 26% of the HIV/AIDS-related expenditure in Altay krai and 47% in Samara, are allocated in both regions to laboratory diagnostics for HIV (Table 33). The medical goods and non-durables dispensed in

outpatients account for 18% of total funds in Altay and 21% in Samara (Table 32 and figures 3 and 4). In Altay, this amount comprised of 2.2% allocated to over the counter drugs, 4.9% to diagnostic test systems, and 10.9% to other medical goods (such as needles, syringes, condoms and non-durable materials). In Samara, this amount comprised of 19.6% allocated to diagnostic systems for HIV with minimal expenditure for syringes, needles and condoms (Table 33).

Only 7.8% of the total HIV/AIDS related funding in Altay and 18% in Samara region were allocated to prevention and public health activities (figures 4.3 and 4.4): comprising in Altay, 2.5% for blood safety and 5.3% to prevention programmes such as VCT, IEC, and STI education; and in Samara 15% for blood safety and 3% to prevention programmes (Table 33).

4.3.5.5. Allocation funds from public, private and donor fund allocated to functions (Altai krai only)

In 2003, in Altay krai, the donor support for HIV/AIDS related activities was through two large programmes: (i) “Comprehensive Partnership Strategies for HIV/STI Prevention among Young People in the Russian Federation”, co-financed by the UK DFID, implemented by a number of UN agencies and coordinated by United Nations Development Programme (UNDP); (ii) “Knowledge for Action against HIV in Russia” programme, funded by the UK DFID and implemented by Imperial College London. The reported donor spend in 2003 was RR 3.134 million. Both programmes focused on HIV/AIDS/STI prevention, and some financing was allocated to purchasing commodities and equipment to diagnose and treat opportunistic diseases and STIs.

Over 50% of the funding from public sources was allocated to curative care (52%), 25.2% to diagnostics (ancillary services) and only 5.6% to preventive and public health care (Table 34). In contrast, 71% of the funding from donor sources was allocated to prevention, 8% to diagnostics and only 3.8% to curative care. Private expenditure was more evenly distributed, with 23.5% allocated to curative care, 29.7% to diagnostics (including costs of HIV and STI tests for non-Russian citizens in Russia), 26.3% to medical goods dispensed in outpatients and 19.8% to prevention: the latter predominantly for self-referrals to HIV/AIDS and STI centres for voluntary counseling and testing and post-exposure prophylaxis (Table 34 and Figure 37).

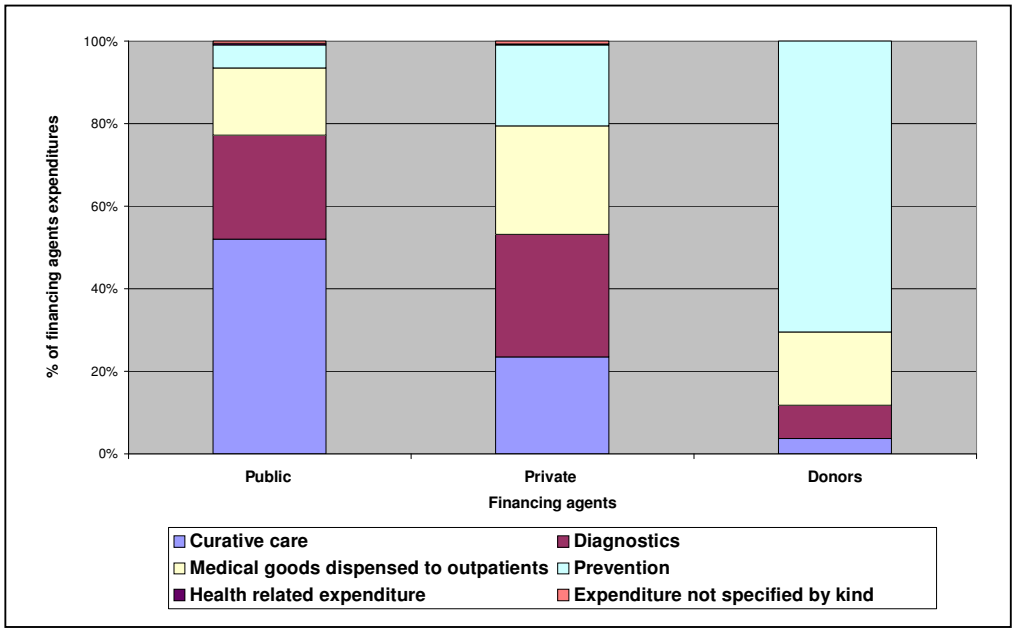
Table 33. Allocation of HIV/AIDS-related Health Funds by Functions in Altay krai and Samara region in 2003 (RR 000)

Services/Functions	Altay Krai (RR 000)	Samara Region (RR 000)
Services of curative care	**21,829.35**	**5,024.73**
Inpatient curative care	**8,952.05**	**1,169.26**
ARV Treatment	*4,929.22*	
OI Treatment	*187.86*	*607.18*
STI Treatment	*104.23*	
Prevention of MTCT	*81.25*	
All other inpatient curative care	*3,649.49*	*562.59*
Day cases of curative care		**1.84**
OI Treatment		*1.84*
Outpatient curative care	**12,877.30**	**3,853.63**
ARV Treatment	*3,013.68*	*2,359.28*
OI Treatment	1,771.41	*72.02*
STI Treatment	*1,811.58*	*120.91*
Prevention of MTCT	*2,527.47*	
All other outpatient curative care	*3,641.28*	*56.90*
Outpatient dental care	*111.88*	*4.03*
All other HIV/AIDS-related outpatient curative care		*1,210.89*
Ancillary services to medical care	**11,939.49**	**23,123.22**
Primary laboratory HIV diagnostics	*8,874.06*	*410.31*
Confirmation of the HIV diagnosis	*391.79*	*14014.29*
All other HIV/AIDS-related clinical laboratory services	*2,075.63*	*7,944.16*
Patient transport and emergency rescue		*294.84*
All other miscellaneous ancillary services	*598.01*	*459.62*
Medical goods dispensed in outpatients	**8,231.59**	**10,691.44**
Prescribed medicines		*129.75*
Over-the-counter medicines	*1,026.88*	
Test systems	*2,256.01*	*9,818.08*
Syringes	*160.24*	*7.63*
Condoms		*72.09*
Other medical HIV/AIDS-related nondurables	4,840.31	*663.89*
Prevention and public health services	**3,601.33**	**8,977.62**
School health services	**185.22**	
Prevention of communicable diseases	**3601.33**	**8,862.73**
VCT		*1,102.29*
Blood Safety	*1,157.39*	*7,489.75*
Post Exposure Prophylaxis		*1.68*
Informational Educational Programmes	*241.09*	*1.90*
STI Prevention Programme	*388.30*	
Needle Exchange Programmes (excluding medical devices)		*164.13*
Condom distribution programs (excluding medical devices)		*27.45*
All other HIV/AIDS prevention and public health services (includes VCT in Altay)	*1814.55*	*75.53*
Prevention of non-communicable diseases		**114.89**
Drug abuse prevention		*114.89*
Health related expenditure	**121.92**	**3.15**
Expenditure not specified by kind	**286.45**	**2204.09**
Total HIV/AIDS Health Funds	**46,010.15**	**50,024.25**

Table 34. Funds Flow from HIV/AIDS-related Financing Agencies to Functions in Altay krai in 2003 (RR000)

Services/Functions	**Public sector** (RR 000 and % of total)	**Private sector** (RR 000 and % of total)	**Donors** (RR 000 and % of total)
Curative care	20,115.3 (52%)	1,714.1 (23.5%)	117.5 (3.8%)
Ancillary services to medical care	9,769.9 (25.2%)	2,169.6 (29.7%)	252 (8%)
Medical goods dispensed in outpatients	6,313.4 (16.3)	1,918.2 (26.3%)	552.8 (17.6%)
Prevention and public health services	2,160.4 (5.6%)	1,441 (19.8%)	2,211.7 (70.6%)
Health-related functions	107.7 (0.3%)	14.2 (0.2%)	
Not specified by kind	235.7 (0.6%)	50.8 (0.7%)	
Total HIV/AIDS Funds	**38,702.3**	**7,307.8**	**3134**

Figure 37. Proportion of Financing Agents spending on HIV/AIDS-related functions in Altay Krai (2003)



4.3.5.5.1. Allocation of donor funding by functions in Altay krai

The donor funding has targeted vulnerable groups, such as the intravenous drug users (IDUs) and commercial sex workers (CSWs). In Altay krai, in 2003, around 70% of the donor funding was spent on prevention activities which targeted school health services, informational educational programmes and STI prevention programmes, but less than 4% was spent on needle exchange programmes and condom distribution (Table 35).

4.3.5.6. Funds flow from the providers to functions

HIV/AIDS sub accounts study demonstrates that the largest share of total HIV/AIDS funding is allocated to hospitals (68% in Altay krai and 56% in Samara) (Table 36). In the Russian Federation, both hospitals and polyclinics provide curative services.

Table 35. Allocation of the Donor Funds by Functions in Altay krai in 2003 (RR000)

Services/Functions	Amount (RR000s)	Proportion of total
Services of curative care	117.52	4%
Inpatient curative care	0.31	
Outpatient curative care	117.21	
OI Treatment	117.21	
Ancillary services to medical care	251.97	8%
Confirmation of HIV diagnosis	251.97	
Medical goods dispensed to outpatients	552.84	18%
Syringes	353.52	
Condoms	117.52	
Other medical HIV/AIDS-related non-durables	5.50	
Prevention and public health services	2,211.68	70%
School health services	185.22	
Prevention of communicable diseases	2,000.13	
Informational Educational Programmes	75.53	
STI Prevention Programme	98.11	
Needle Exchange Programmes (excluding medical devices)	15.98	
Condom distribution programmes (excluding medical devices)	15.98	
All other HIV/AIDS prevention and public health services	1794.53	
Prevention of non-communicable diseases		
Drug abuse prevention	26.33	
Total HIV/AIDS Donor Financing	**3134.01**	100

HIV/AIDS-related services are mostly provided in outpatients. The hospitals and outpatient care centres spend most of their funds on curative services. In Altay krai, general hospitals spend 52% of their funds on inpatient and outpatient curative services, and in Samara 9.2% (as much of the funding is spent on diagnostic services and goods). Around 35% of outpatient funding in Altay and 11% in Samara are allocated to curative services and, as in general hospitals, most of the outpatient funding is allocated to diagnostics (Table 36 and Figure 38).

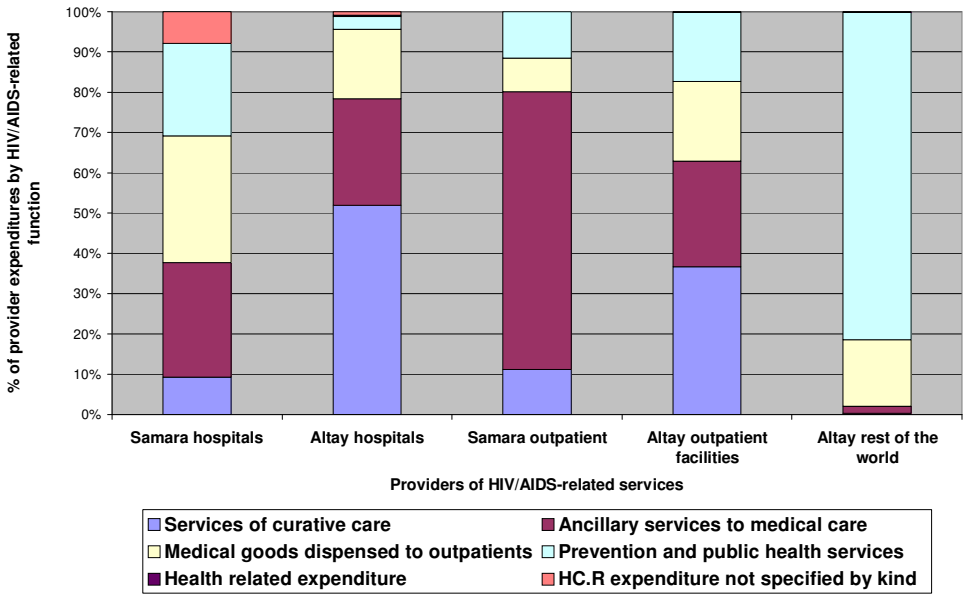
In Altay, 59% of all curative services are provided as outpatient and 41% as inpatient care. Similarly, in Samara 55% of curative services are provided in outpatients and 45% in inpatient facilities. Both hospitals and outpatient facilities spend comparatively high proportion of their income on diagnostic tests for HIV infection (Table 36 and Figure 38).

The category “Rest of the world” includes the NGOs which are involved in HIV/AIDS related activities in Altay krai. These mostly provide preventive services. In 2003, the NGOs funding accounted for 6% of the total HIV/AIDS-related funding in Altay krai. The NGOs spent RR 2.549 million on prevention: more than that spent by hospitals and outpatient facilities (RR 1.048 million and RR 2.216 million respectively). This asymmetry in expenditure patterns reflects inefficiencies in resource allocation in public providers.

Table 36. Allocation of HIV/AIDS-related Funds by Functions in Altay krai and Samara region in 2003 (RR000)

Services/Functions	General Hospitals		Outpatient care centres		Rest of the world (NGOs)
	Altay	Samara	Altay	Samara	Altay
Services of curative care	17,243.32	2,585.19	4,696.45	2,439.54	7.10
Inpatient curative care	8,945.26	1,169.26			7.10
Day cases of curative care		1.84			
Outpatient curative care	8,298.06	1,414.09	4,696.45	2439.54	0
Ancillary services to medical care	7,352.08	8,007.30	4,780.98	15,115.92	58.40
Medical goods dispensed to outpatients	7,374.97	8,857.96	638.40	1,833.48	516.78
Prevention and public health services	814.83	6,452.41	3,342.35	2,525.21	2,548.51
Health related expenditure	103.76	1.03	14.94	2.12	3.22
Expenditure not specified by kind	286.47	2,204.09			0
Total HIV/AIDS Funds	**33,175.43**	**28,107.98**	**13,473.12**	**21,916.27**	**3,134.01**

Figure 38. Allocation of provider expenditures by HIV/AIDS-related functions



4.3.6. Summary of HIV/AIDS sub accounts

The study demonstrates that a low proportion of the total health expenditure is allocated to activities related to HIV/AIDS: accounting for 0.94% of the total health expenditure in Altay krai and 1.3% of the total in Samara region. Given the trajectory of the epidemic in Russia, and the high prevalence level in Samara (of 1.4% of general population) the amounts spent on HIV/AIDS related activities are low.

In 2003, in Altay krai, public funds accounted for 79% of all HIV/AIDS financing, households contributed 15% and the donors the remaining 6%: although difficulties in data capture mean that household and NGO expenditures are underestimated.

In the two regions studied, the sources of funding from the public sector agencies vary substantially. For HIV/AIDS related activities, the THIF contributes a small proportion of the finances from public sources: 13% in Altay and 20% in Samara. This share is low, when contrasted with the comparable CHI contribution to general health services as a proportion of

the total health expenditure in the Russian Federation. Direct contributions from the regional health budgets to regional HIV/AIDS programmes vary even more substantially: RR 500,000 in Altay (US$17,241) (where most of the funding for HIV comes from municipalities) and RR 25.050 million in Samara (US$0.726 million), where there is limited funding from municipalities.

The extent of public-private mix for funding is difficult to estimate, as the out-of-pocket expenditure on ARV drugs by PLWHA is not captured by the data collected by various agencies. In 2003, in Altay, 79% of the total funding was from public sources, 15% private sources and 6% from donor agencies. However, the contributions of the private sector and the donors are underestimated. Surveys of PLWHA are needed to estimate the true nature of out-of-pocket private expenditure ARV drugs and other HIV/AIDS related services.

The HIV/AIDS sub accounts analysis demonstrates that most of the funding from the public sources was allocated to curative care (both inpatient and outpatient) and diagnostic services, with relatively small proportion of funds allocated for prevention, public health interventions and ARV. Around 70% of the total expenditure for HIV/AIDS-related activities in Altay and over 60% in Samara was allocated to curative care and diagnostics, with only 8% in Altay and 17% in samara allocated to preventive activities (but in Samara a significant proportion of the funds for 'preventive' activities were allocated to blood safety and diagnostics).

In Altay, in 2003, the share of the resources allocated to preventive services accounted for only 5.6% of the overall funding from the public sources for HIV/AIDS related activities, but 70% of the total financing by donors. Although the donor funding in Altay krai accounted for only 6% of the total funding for HIV/AIDS, more financial resources were allocated by the donors to prevention activities when compared with that from the public sources.

In Samara region, over 40% of the HIV/AIDS budget is spent on diagnostic services. The regional programme on HIV/AIDS control, which in 2003 amounted to RR25.050 million (accounting for 50% of the total expenditure for HIV/AIDS in the region), was almost exclusively targeted at improving HIV/AIDS diagnostics.

In both regions, substantial proportion of the resources for HIV/AIDS are allocated to hospital based services: accounting for 68% in Altay krai and 56% in Samara. In turn, both hospitals and outpatient care centres spend majority of their funds on curative services. However, most of the services in hospitals and outpatient centres are of ambulatory in nature: hence, most of the HIV/AIDS-related services are provided as outpatient and not inpatient services—in Altay krai, 59% of all curative services are provided in outpatients and 41% as inpatient care, while in Samara, 55% of the curative services are provided in outpatients and 45% in inpatient facilities.

The current emphasis on curative care and diagnostic services and the proportions of the resources spent on these activities are allocatively and technically not efficient. Greater proportion of the available funds should be allocated to more cost effective interventions and those that improve longevity and quality of life for PLWHA: namely, prevention and public health activities and ARV treatment.

4.3.7. References

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4.4. Economic impact of illness on the Russian Firms: the case of a power plant in Altai Krai

4.4.1. Introduction

HIV and AIDS impact on countries, organizations, households and individuals. If not controlled, HIV/AIDS adversely affects the welfare of countries through its negative effects on economic growth and social capital.[9, 10, 11, 12, 13, 14, 15]

Studies from Western countries, which explored the cost of HIV-infected workers to firms [16,17, 18] demonstrated that costs were incurred due to increased expenses related to insurance premiums, welfare benefits, lost productivity, and costs associated with hiring and termination of employment for these individuals. These studies concluded that there were limited empirically-derived data on the scale of HIV-related costs specific to businesses in different settings and lack of well-designed, validated and replicable analytical frameworks for conducting comprehensive cost analysis from a business perspective.

In Africa, where HIV prevalence levels in the general population reach 25%, firms are affected due to HIV-related morbidity among staff. In these firms the additional burden to the wage bills can reach 5.9% of the total payroll costs. Loewenson and Whiteside identify five factors which influence HIV-related morbidity and impact of the performance and economics of the firm: (i) the number of HIV-infected among the staff; (ii) role of the infected people in the company; (iii) the structure of production process and the ability of the firm to cope with staff absence due to sickness; (iv) social and health benefits package offered by the company; (v) the impact of HIV-AIDS on the overall business environment, other companies and the government. [19, 20]. Studies showed that the companies in the transport sector were the most vulnerable to impact of HIV/AIDS on the workforce and profits and the firms working in the financial sector were the least vulnerable[21, 22]. The most significant cost to firms was the cost of time lost due to illness. Firms, which provided substantial employee benefits and operated in labour-intensive sectors were the hardest hit — and the impact depended on the type and cost of the benefits package offered and the extent to which this benefit package attracted qualified workers, influenced retention of staff and encouraged workforce productivity.

However, the situation in Russia is different to that in Africa. Although the Russian Federation faces one of the fastest growing HIV epidemics in the world, current prevalence levels, among adults aged 18-49 years, are estimated by UNAIDS to be 0.3—1.2%. This relatively low prevalence has meant that organisations/firms have yet to face substantial financial burden due to illness related to HIV/AIDS. However, as the prevalence of HIV increases, the economic and social impact on the firms is likely to increase. Different studies estimate that prevalence of HIV in the Russian population will increase from current levels to between 2—16% by 2015. Given these projections, addressing HIV/AIDS should be a priority for Russia.[23] In the Russian context, although studies have analysed the macroeconomic impact of HIV/AIDS, the potential impact on organizations has not been adequately explored.

4.4.2. Aim of the study

The study aimed to estimate the financial risks and the economic burden posed by the HIV-AIDS epidemic for a medium-sized firm in Altai krai of the Russian Federation : the site of a collaborative research project involving Russian and UK based scientists.[24]

4.4.3. Methods

From a number of possible organisations in Altai Krai, we identified a medium-sized organisation, situated in a large urban area, in a labour-intensive sector of the economy. Permission was sought from the senior management of the organisation to undertake the study.

We undertook primary and secondary research, employing both qualitative and quantitative methods of inquiry. Qualitative research involved key informant interviews to understand the

organisation, production function, human resource rules, firm policies and attitudes to HIV and the extent of other illnesses in the workforce. Quantitative research involved economic analysis and modeling.

Economic analysis adopted the firm's perspective. Illness in the workforce can adversely influence firm productivity and lead to economic burden due to: (i) declining worker performance; (ii) absenteeism due to temporary or permanent illness or caring for family members who are ill; (iii) provision of material support to workers who are ill; (iv) recruitment new staff to replace those who are ill; (v) cost of social insurance contributions; (vi) payment of benefits to the worker or to the family to cover funeral costs. In addition, firms incur costs due to obligations specified in labour and social protection laws, for instance, costs related to: a) occupational safety measures; b) compulsory social insurance, c) disability benefits, d) legal disputes and arbitration costs related to the workforce, e) training and staff development; f) recruitment and reallocation of staff; g) termination of employment; h) work-place activities for health promotion and disease prevention. The study explores how these factors apply to a Russian firm.

The Russian labour market is quite segmented and the costs vary over skill levels of employees. We explore how the firm manages different employee groups. We estimate costs for different employees, taking into account varying wage levels for unskilled and skilled workers, costs incurred when replacing skilled and unskilled workers and disparate training costs for these groups. In Russia, currently, it is difficult to distinguish between the economic losses due to HIV-related morbidity and other illnesses. Information on HIV infection among staff is confidential and not disclosed to employers. Testing for HIV is voluntary, except in some situations which are specified in the Federal regulations: for example, in health workers who deal with high-risk groups and HIV-infected individuals, those involved in HIV testing, HIV-related research, as well as those who work with contaminated biological materials.[25] Given the stigma associated with HIV/AIDS, the psychological impact of HIV on the workforce, and potential productivity losses, firms may use non-health reasons to terminate the employment of an HIV-infected person. Although, in theory this termination may lead to litigation and consequent costs to the firm, in practice, in the Russian Federation, termination of employment is not difficult and litigation occurs rarely. Therefore, in the Russian context, most of the costs will be direct costs due to costs of the illness and lost productivity.

We used the data gathered from the interviews and available company documents to estimate the costs (in absolute terms, as well as per employee / per sick employee / and per workday) related to all diseases. Costs external to the plant, such as those incurred by the health care system (public and private) when managing an HIV-infected individual, costs to social insurance, and costs to households, were not included in the cost calculations but are briefly discussed. The methodology drew on a framework developed in a study of firms in African countries with high prevalence of HIV.[12] This framework was adapted to the Russian context, piloted and refined prior to application in the study.

We developed a compartmental Markov model for HIV to estimate cost to the firm per HIV-infected worker and per illness episode. The model assumed different scenarios in relation to the progression of the HIV epidemic. We used the estimates of the HIV epidemic in Russian adults over a 10 year period (2005–2015) using outputs of a number of epidemiological models [8, 26, 27, 28] Using these estimates, we developed scenarios to predict the potential number of cases of HIV in the adult workforce and consequent economic impact on the firm. We compared, over a period of ten years, the costs due to HIV/AIDS-related illness and the costs of HIV prevention and control activities.

4.4.3.1. Cost estimations

Actual net cost to the firm related to illness was estimated using the formula:

$$C_D = N_S \times \sum_i p_i \times C_i \qquad (1),$$

Where C_D is the total cost to the firm of illness per year, N_S the total number of staff at the firm, p_i the probability of occurrence of the i^{th} cost factor per person, and C_i the average cost of the i^{th} factor. To account for all the different categories of employees (management, specialists, and workers), the formula is further expanded to:

$$C_D = \sum_j N_j \sum_i p_{i,j} C_{i,j} \qquad (2)$$

Where j indexes job categories.

We considered the following potential factors as sources of cost and selected those which were relevant to the situation at the Power Plant: (i) temporary loss of the ability to work (sick-leave) ; (ii) visits to the health centre at the plant; (iii) additional holiday leave paid by the firm related to illness ; (iv) inpatient care, and rehabilitation; (v) recruitment of staff using internal resources (vi) hiring staff using external recruiters (vii) supplementary health insurance; (viii) training and retraining of staff to replace ill staff members, and; (ix) training and retraining of staff on the job.

From the data obtained from the Plant, we calculated the average cost of one episode of each of the relevant cost factors by dividing the total annual costs of the Plant related to i^{th} factor by the annual number of episodes of that factor. For example, the average pay per sick leave is calculated by dividing the total annual amount paid for all sick-leave by the number of episodes of sick-leave for the staff.

We calculated the average probability of a given illness-related cost factor by dividing the number of episodes of the factor by the average number of staff. The average cost of disease per staff member was calculated as a sum of the product of the average cost for each cost factor divided by the occurrence rate for that factor. The average cost per episode of sickness was calculated by the total costs related to illness divided by the number of episodes of illness.

In our model, we assumed that the workers are readily replaceable (given the low prevalence rates for illness and availability of work force), and the morbidity at the plant, which is very low, does not affect the firm output.

4.4.4. Results

4.4.4.1. Characteristics of the firm

The Power plant is a subsidiary of a regional Joint Stock Holding Company (JSC). [19] The JSC, established in 1993, is part of a large Russian industrial conglomerate called Unified Energy Systems. The JSC, which employs 8,000 staff, operates in the Russian energy market and as an enterprise has to earn profits to stay in business. The JSC has a regional subsidiary with three power plants of varying production capacity. The Power Plant included in the study is the smallest among the three power plants, and produces about 2% of the electric energy output and 5.5% of the total heat output for the parent holding company. The Power Plant has around 300 staff and is categorised (according to Russian business classification) as a medium-size organisation. The Plant employs continuous work cycle to produce heat and electricity, which it distributes to customers.

Availability of labour means that the company is able to replace workers who are temporarily absent due to illness or other reasons with semi-skilled staff on short term contracts. There

are very few critical areas in the production cycle, such as *operational management of energy dispatch,* where an absent worker has to be immediately replaced by appropriately qualified personnel. Although temporary illness affects labour costs, the output is rarely affected. Staff costs (in particular salaries and costs related to sickness) are tightly managed.

A key objective of the human resource function is to crate a "core human resource potential", by retaining the most active and qualified specialists, who are considered as the "gold reserve". These are the employees who "carry" the corporate culture, are committed to ongoing development, and are able to adapt to organizational change.

4.4.4.1.1. Training and retraining

The holding company has in-house training facilities. It provides training and retraining on a regular basis to augment the skills and knowledge of its staff in areas required by the company.

4.4.4.2. Characteristics of the human resources

The Power Plant uses its own classification of the employees for internal management purposes: managers account for 14% of the total workforce, administrative staff 6%, workers 65% and specialists 15% of the total (Table 37).
Most of the workers are aged between 25 to 60 years. Around 1% is younger than 25 years, 25% are between 25 to 35 years, 26% between 26-45 years, 40% between 45 and retirement age, and 8% are beyond the retirement age.

Table 37. Human resources and their characteristics

Parameter	Plant total or average	Categories of beneficiaries				
		Managers	Specialists	Workers	Support	Temporary
The number of staff	281	38	43	189	11	-
Category of staff (as a % of total)		14	15	67	4	0
Average payroll, monthly (RR) ($)	5,089 (175.5)	6,377 (220)	6,535 (225.3)	4,608 (159)	3,133 (108)	-
The number of workers dismissed in 2003	106	12	4	79	11	-
The number of workers hired in 2003	58	12	6	40	-	-
The number of workers hired using external recruiters	-	-	-	-	-	-
The cost of hiring one staff (person/days)	N/A	N/A	N/A	N/A	N/A	N/A
The number of staff sent to training and retraining in total, including (below)	63	9	26	28	-	-
Training episodes	8	5	0	3	-	-
Retraining episodes	55	4	26	25	-	-
Deaths among staff, including cases where material assistance was provided:	-	-	-	-	-	-
The number of staff eligible for medical service at an on-site health centre	270	38	43	189	-	-
The number of staff who received material support in relation to illness during the year	1	-	-	1	-	-

The average gross salary is around 5,000 RR (US$170). This comprises net payment plus taxes but also includes additional payments to staff who work extra hours to replace those on sick-leave or who are absent due to other reasons (Table 37).

4.4.4.3. Health benefits and management of illness episodes

Although JSC policy is to provide supplementary medical insurance to those working in hazardous conditions, the Power Plant does not provide such benefits due to the high cost of supplementary health insurance. This practice is in line with other medium-size enterprises in Russia (personal correspondence, Y. Lunin, 2005) which prefer to provide own health facilities and rehabilitation centres.

The staff at the Power Plant use the company health centre for minor occupational injuries and burns; which are occupational hazards, as the work involves dealing with coal dust and hot ash at high temperatures. Twice a year, all the personnel working at the Plant have medical screening and examination. Those who are found to be unfit are referred for further medical treatment or rehabilitation at sanatoria. Typically, all the personnel receive preventive care, such as immunisation against tetanus and diphtheria but not for influenza (due to costs which amounts to around $10 per staff member and over $3,000 per vaccination campaign per annum). For most regular health problems, the staff use general medical services provided at a polyclinics near their residence. These services are covered by 'The State Programme of Guaranteed Services' which is funded through budget sources and compulsory health insurance.
The Plant requests medical screening of all potential employees to ensure those employed are in good health. This helps to minimise the risk of days lost due to ill health. There is, however, no pre-employment screening for HIV. In our model we assumed that the prevalence of HIV in the new recruits is the same as that for the general adult population. The Plant health services stated that they would introduce HIV screening if the prevalence increased. They expected that the "newly hired workers would not object" to such screening (personal communication from the head of health service, the Power Plant, 2005).[20]

Staff turnover is high. In 2003, on average, it was 29.2% of the total number of employees. This figure ranged from 11.6% for specialists, 31.5% for general workers, 31.6% for managers and 100% for support staff. In 2003, the high staff turnover was, in part, due to the termination of the contracts of a number of staff aimed at reducing human resource costs. In 2003, the number of staff dismissed from the workforce was twice the number that was recruited. Other factors which contribute to high staff turnover are the hazardous occupational conditions for the workers and the low salaries (according to Russian regional data, in 2002, Altai krai had an average monthly wage of RR 2,600 [US$ ~90]). Usually, the employees are not dismissed for reasons related to illness. Most employees who leave the company do so at their own will. If an employee leaves the company due to ill health, human resources department do not inquire into the nature of the illness. (Personal communication, Director of Human Resources at the Power Plant, 2005)

A key objective of the senior management of the Power Plant is to maintain a required level of production despite the high staff turnover. To achieve this goal the Plant has established an internal and external "reserve pool" of specialists, senior and branch managers who can be employed at short notice if needed. Those included in the reserve pool are specialists who may be employed elsewhere but are regularly trained to ensure their knowledge and skills correspond to the needs of the rapidly changing business environment. The purpose of the reserve pool is "preparedness": to enable the company to manage "crisis situations" and be able to quickly fill key vacancies which require semi-skilled and highly skilled (specialist) personnel. The reserve pool is used mainly for substituting top managers, branch managers and lead specialists.

Given the high staff turnover, the plant often has job vacancies. Recruiting unskilled workers is not difficult, but there is a shortage of skilled workers, such as turners, operators of equipment and instruments, and welders — finding skilled specialists can take up to one year so the company uses the reserve pool it has developed to access skilled workers when needed. To find new employees, the plant usually announces positions in the local newspapers, checks with human resource department of the parent holding company or

engages private recruitment agencies. The plant does not pay a fee to recruitment agencies, which charge the candidates.

Death at work is a rare event. During the interviews, the medical staff and human resource were able to recall only one case of a death at the Plant. If a worker dies, benefits are paid by state social services and not by the enterprise. The enterprise can, however, provide material support, but this is not compulsory. There are typically no legal proceedings related to dismissal of staff or other reasons. Hence, the model developed to estimate economic costs does not include legal costs.

If the company terminates the employment of a worker on health grounds, this often relates to instances where the worker is disabled. In this case, the firm follows the process prescribed in labour laws and transfers the care of the patient to health and social services. There are very few cases of dismissal due to disability. In 2003, there was only one dismissal, when the provided material assistance of RR 1,200 (~US$45).

At the Plant, the employees have no benefits which provide payments related to sickness, hospitalisation or rehabilitation (Table 38).

Table 38. Health and social benefits available to employees

Parameter	Plant total	Categories of beneficiaries				
		Managers	Specialists	Workers	Support	Temporary
Supplementary health insurance		-	-	-	-	-
Medical services provided in company: Number of eligible personnel	270	38	43	189	-	-
Additional paid holidays in relation to sickness, hospitalisation or rehabilitation		-	-	-	-	-
Payments related to dismissal due to disability or other medical reasons, (in RR, for the reported year) , ($)	1,200 (41.4)	-	-	1,200 (41.4)	-	-

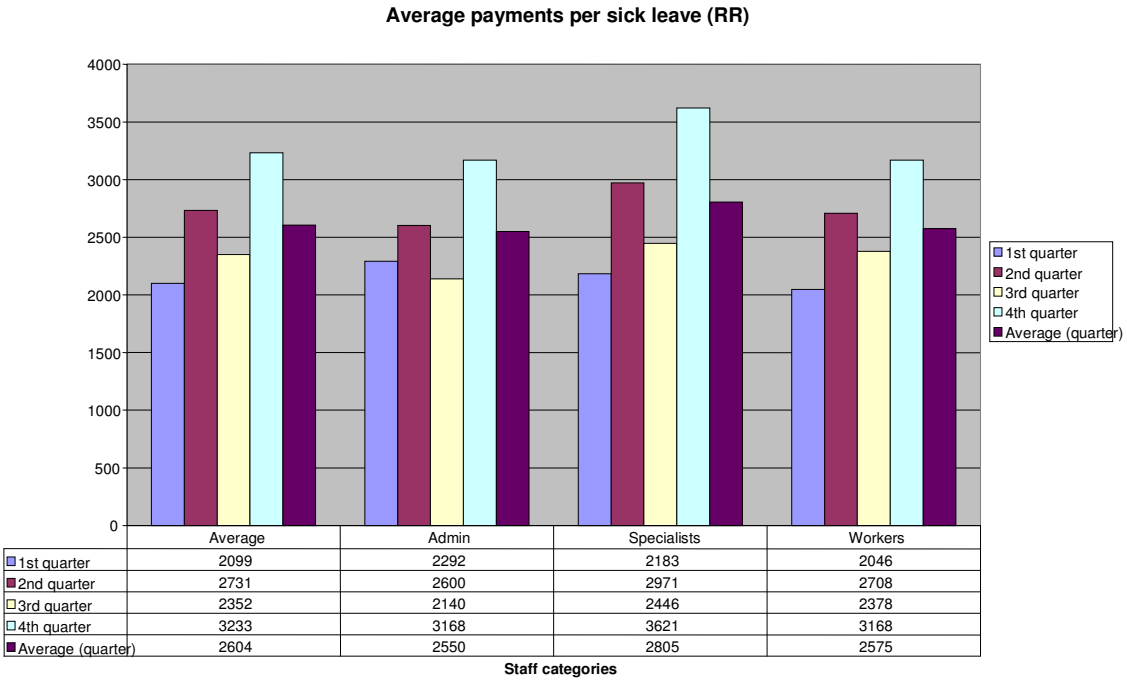
In 2003, over 50% of the employees took some sick leave: accounting for a total of 2,458 days (Table 39). For the 300 employees, this represents 3.3% of the 74,400 total work days in 2003 (based on 248 statutory work days per year).

When ill, an employee can miss work by staying at home, or interrupt work and leave after a visit to the health centre at the Plant. In such instances, other staff members will temporarily replace the absent employee. The costs of additional hours/shifts are met by the Plant, which remunerates the workers who undertake additional work according to the salary of the absent person. During sick leave, the salary cost of the absent worker is covered by the Federal Social Insurance Fund (SIF) and the plant pays wages only for the first two days of absence due to illness. The Plant can use the unpaid wages beyond the two days to remunerate workers who substitute for the absent workers: hence, there is little net effect on salary costs.

Prior to 2005, the Federal Social Insurance Fund covered all payments for sick-leave. In turn, all employers contributed 4% of the payroll for social insurance. Since 2005, the contributions to Social Insurance Fund have been reduced to 2% of the payroll and a cost-sharing scheme introduced for sick-leave payments. In this new scheme, the employer covers the first two days of the sick-leave and the SIF the remainder. Costs of rehabilitation or treatment at sanatoria, if recommended after a medical examination, are shared between the SIF, the trade union of the worker and the individual worker herself.

In 2003, the average payment per episode of sick-leave paid by the SIF was RR 2,604, amounting to 51.2% of an average monthly salary (Figure 39).

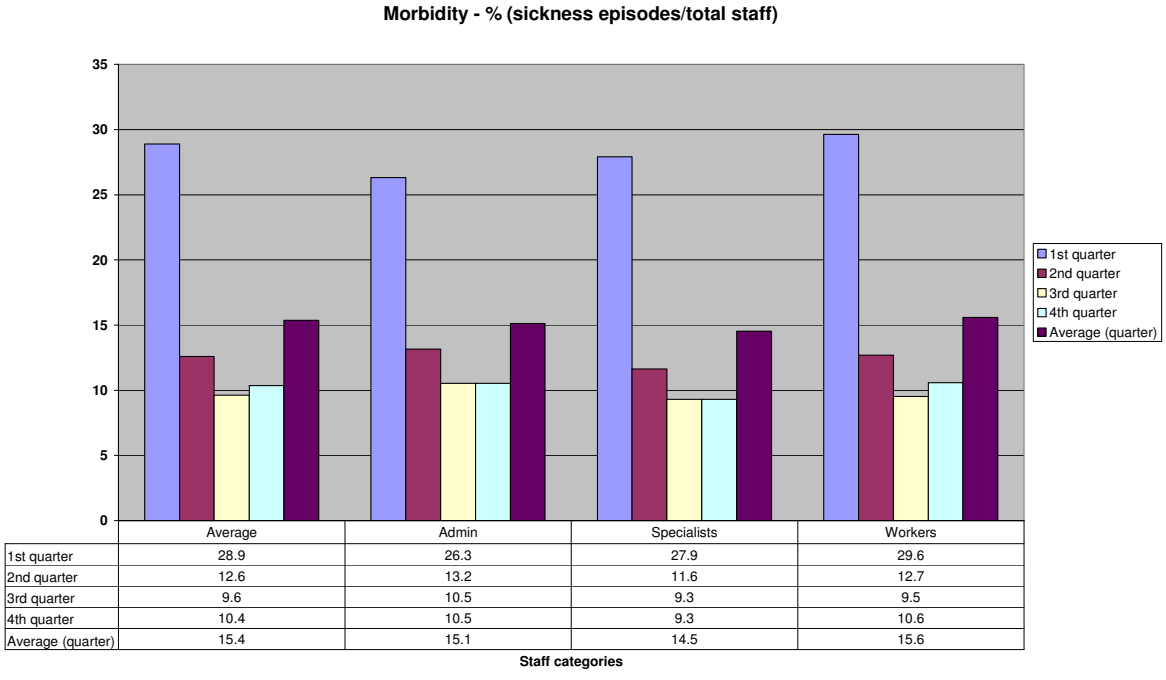
Figure 39. Average payment per sick leave



	Average	Admin	Specialists	Workers
1st quarter	2099	2292	2183	2046
2nd quarter	2731	2600	2971	2708
3rd quarter	2352	2140	2446	2378
4th quarter	3233	3168	3621	3168
Average (quarter)	2604	2550	2805	2575

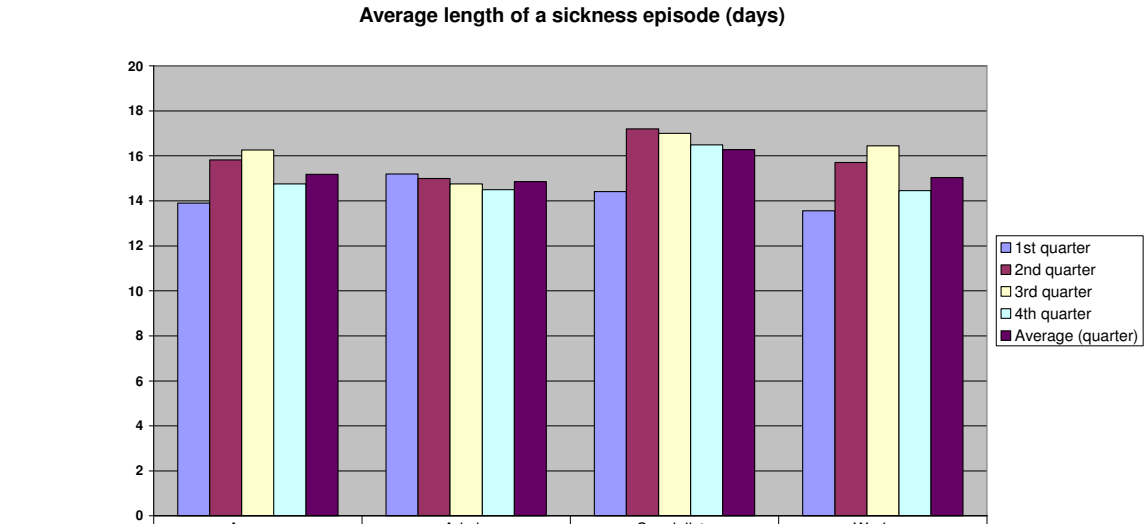
The illness episodes were highest in the first quarter (January to March) and evenly distributed in the rest of the three quarters (Figure 40). The length of illness episodes did not vary by season (Figure 41).

Figure 40. Illness episodes by quarter



	Average	Admin	Specialists	Workers
1st quarter	28.9	26.3	27.9	29.6
2nd quarter	12.6	13.2	11.6	12.7
3rd quarter	9.6	10.5	9.3	9.5
4th quarter	10.4	10.5	9.3	10.6
Average (quarter)	15.4	15.1	14.5	15.6

Figure 41. Average length of a sickness episode



	Average	Admin	Specialists	Workers
1st quarter	13.9	15.2	14.4	13.6
2nd quarter	15.8	15.0	17.2	15.7
3rd quarter	16.3	14.8	17.0	16.4
4th quarter	14.8	14.5	16.5	14.5
Average (quarter)	15.2	14.9	16.3	15.0

In 2003, the wages paid by the SIF to staff on sick-leave amounted to around RR 408,000 ($14,069) (Table 39) or 2.4% of the total payroll costs — but this proportion ranged from 1.9% of the payroll costs for the specialists, 2% for the managers and 2.7% for the workers. If the Plant were to meet the wage costs for the first two days for the employees absent due to illness, this would have accounted for 0.32% of the payroll (0.26% for managers, 0.25% for the specialists and 0.37% for the workers.

Table 39. Number of illness episodes, days lost and cost of illness to the plant per annum

Parameter	Plant total	Categories of beneficiaries				
		Managers	Specialists	Workers	Support	Temporary
The number of workers on paid sick leave	166	23	25	118	-	-
The number of paid days for workers on sick leave	2,458	344	393	1,721	-	-
Amount of money paid to workers on sick leave (from the social fund): in RR and ($)	408,230 (14,077)	57,152.2 (1,971)	65,316.8 (2,252)	285,761 (9,854)	-	-
Cost of external recruiters	-	-	-	-	-	-
The number of cases of dismissal where severance payment was made	1	-	-	1	-	-
Amount of money paid in relation to each dismissal: in RR and ($)	1,200 (41.4)	-	-	1,200 (41.4)	-	-
Cost related to training and retraining in RR 000 and ($) including:	38.8 (1,338)	9.4 (324)	20.3 (700)	9.1 (314)	-	-
Training: in RR 000 and ($)	6,2 (214)	5,2 (179)	0	1 (34.5)	-	-
Retraining: in RR 000 and ($)	32,6 (1,124)	4,2 (145)	20,3 (700)	8,1 (279.3)	-	-
Cost of supplementary health insurance (RR)	-	-	-	-	-	-
Cost of providing on-site medical service (includes drugs and supplies only): in RR 000 and ($)	74,128.2 (2,556)	10,378 (358)	11,860.5 (409)	51,889.7 (1789)	-	-
Payment for additional holidays in relation to disease, hospitalization, or rehabilitation	-	-	-	-	-	-
Additional payments for extra-hours of work to replace temporarily sick workers (RR)	-	-	-	-	-	-
Additional payment for on the job training of newly hired staff)	-	-	-	-	-	-
Monthly payroll in RR 000 and ($)	**1,430.0 (49,310)**	**242.3 (8,355)**	**281.0 (9,690)**	**870.9 (30,031)**	**34.5 (1,190)**	**0.0**
Annual payroll, ($)	**591,720**	**100,260**	**116,280**	**360,372**	**14,280**	

The absence levels due to illness were the highest in the first quarter (January to March): accounting for 47% of the total days lost in 2003 and 40% of the sick pay to workers (Table 40).

Table 40. Number of illness episodes, days lost and cost of illness to the plant, by quarter in 2003

Parameter	Plant total	Categories of beneficiaries				
		Managers	Specialists	Workers	Support	Temporary
1st quarter						
The number of workers on paid sick leave	78	10	12	56	-	-
The number of paid days for workers on sick leave	1084	152	173	759	-	-
Amount of money paid to workers on sick leave : in RR, ($)	163,705 (5,645)	22,918.7 (790)	26,192.8 (903)	114,594 (3952)	-	-
2nd quarter						
The number of workers on paid sick leave	34	5	5	24	-	-
The number of paid days for workers on sick leave	538	75	86	377	-	-
Amount of money paid to workers on sick leave : in RR, ($)	92,857 (3,202)	13,000 (448)	14,857.1 (512)	64,999.9 (2.241)	-	-
3rd quarter						
The number of workers on paid sick leave	26	4	4	18	-	-
The number of paid days for workers on sick leave	423	59	68	296	-	-
Amount of money paid to workers on sick leave : in RR, ($)	61,145 (2.108)	8,560.3 (295)	9,783.2 (337)	42,801.5 (1,476)	-	-
4th quarter						
The number of workers on paid sick leave	28	4	4	20	-	-
The number of paid days for workers on sick leave	413	58	66	289	-	-
Amount of money paid to workers on sick leave: in RR, ($)	90,523 (3,121)	12,673 (437)	14,483.7 (499)	63,366.1 (2185)	-	-
Annual average						
The number of workers on paid sick leave	166	23	25	118	-	-
The number of paid days for workers on sick leave	2458	344	393	1721	-	-
Amount of money paid to workers on sick leave: in RR, ($)	408,230 (14,077)	57,152.2 (1,764)	65,316.8 (2,252)	285,761 (9,853)	-	-

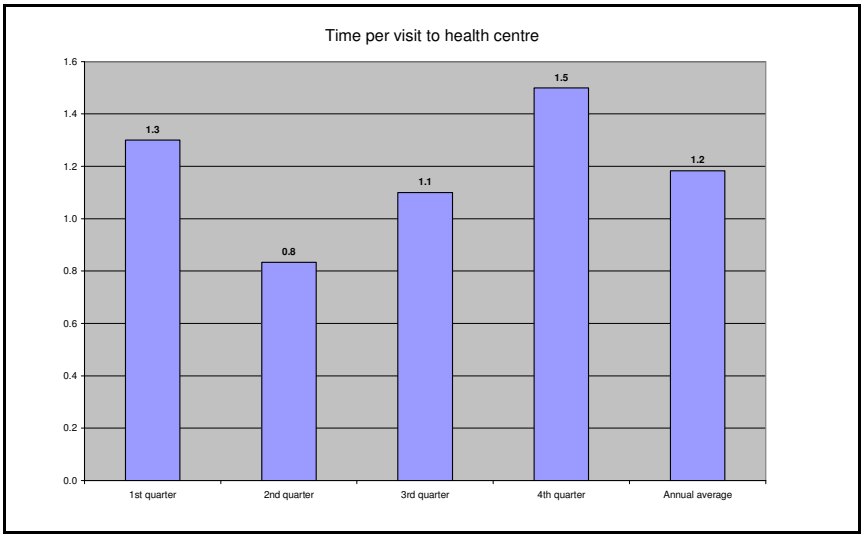
The Plant operates a small health centre, staffed by a salaried feldsher (an equivalent of a nurse-practitioner). The centre is fully funded by the plant and provides service to the employees of the Plant, as well as an additional 1247 staff from other units of the holding company. In 2003, this health centre provided around 6,700 episodes of care and 7,900 hours of health services. The average number of visits to the centre per employee per annum was around 25, but ranged from 11.6 visits per worker to 52.4 visits per manager (Table 41).

Table 41. Number of visits to the health centre in 2003

	Total	Administrative	Specialists	Workers
The number of episodes of in-house health service use in relation to sickness (visits per year)	6,676	1,992	2,492	2,192
Total time of services (hours, annually)	7,896.5	2,357.2	2,946.4	2,592.9
Percentage of visits by categories of staff	100.0	29.84	37.33	32.83
The number of visits of the staff members for in-house health services (visits per year) under the assumption of equal access to service by categories of staff (visits per year)	1032	308	385	339
Average time per episode per employee (hours)	1.2	1.2	1.2	1.2
The rate of use of services by staff (episodes per year)	3.8	8.1	9.0	1.8

The frequency of service encounters is relatively stable during the year, but the time spent per visit varies and is usually longer in the colder months of the first and last quarters. (Figure 42).

Figure 42. Time per visit to health centre



The Plant has information on the cost of in house medical services, including the cost of pharmaceuticals and supplies, the salary of the feldsher and the cost of maintaining the unit.

4.4.4.4. Training, skills upgrading and re-training of human resources

The Plant uses two main streams of training: one at the branches of the 'Sectoral Institute of Upgrading of Qualification' (the Institute) and the other at the holding company facilities. When needed, the Institute is contracted to provide training services. Training at the holding company is carried out on a regular basis. According to the human resource department at the Plant, the average cost of training per employee is in the region of RR18,000 to 20,000 ($643—$714). In addition, the company meets costs of transportation, per diems and hotel accommodation related to training. The volume of training provided in 2003 is shown in Table 42.

The training patterns, skills upgrading and re-training reflects the patterns of staff turnover. About 70% of the newly recruited employees receive training. The average period between training courses for each employee is about 4.5 years (longer than the average duration of employment for most staff in the company).

Table 42. Training of staff

Parameter	Average	Managers	Specialists	Workers	Support
Number of trained staff as a % of total number of staff	22.4	23.7	60.5	14.8	-
Number of trained staff as a % of newly recruited staff	108.6	75.0	433.3	70.0	-
Periodicity of training (years)	4.46	4.22	1.65	6.75	-

In 2003, 63 members of staff, from all categories, were sent to training courses (23.3% of the total number), to familiarise staff with organisational changes at the Plant and to establish a reserve pool to replace those leaving the plant (Table 43).

Table 43. The structure of costs related to training (RR000), ($)

	Total	Managerial and admin	Specialists	Workers
Proportion of costs on training, skills upgrading and re-training (%)	100	24.2	52.3	23.5
Training	16 (552)	13.4 ()	0	2.6 (89.7)
Skills upgrading	63.7 (2,197)	8 (276)	39.7 (1,103)	16 (552)
Re-training	20.4 (462)	2.8 (96.6)	12.6 (434.5)	4.9 (169)

The figures in Table 43 include the costs of training to establish a reserve pool and to replace those employees who are absent due to illness. Most of the skills upgrading costs relate to ongoing training to encourage organisational change and innovation. The other two types of training costs — for training and re-training — mostly relate to training of workers to replace permanently or temporarily absent staff. In 2003, training and retraining costs were RR 38,800 (Table 39) and accounted for 0.23% of the payroll costs. On average, the training cost per worker was RR 325 (~US$11.2), per specialist RR 780.8 (US$26.9), per managerial staff RR 1,044.4 (US$36) and per employee RR 615.9 (~US$21). The average costs by category of personnel are shown in Table 44.

Table 44. Average costs of staff training per annum

	Total	Managerial and admin	Specialists	Workers
Average costs of training, per staff : in RR, ($),including	615.9 (21.2)	1,044.4 (36)	780.8 (26.9)	325 (11.2)
Training : in RR, ($)	775.0 (26.7)	1,040 (35.9)	0	333.3 (11.5)
Skills upgrading : in RR, ($)	588.1 (20.3)	1,033.3 (35.6)	770 (26.6)	326.3 (11.3)
Retraining : in RR, ($)	607.7 (21)	1,100 (38)	816.7 (28.2)	316.7 (10.9)

* Exchange rate: RR/$ ~ 29
The training covers approximately 70% of the new employees.

4.4.5. Current impact of HIV and illness on the firm

4.4.5.1. Perception of costs and economic impact

In 2003, the enterprise was not affected by HIV-related illness. Given the low prevalence levels in Altai krai there may be a maximum of two to three HIV-infected people working at the Plant, although there are no known cases. Therefore, HIV currently is not perceived to be a problem. The company considers the main illness-related cost to be the staff training and health centre costs: rather than that due to social security or sick pay. This is not surprising as the firms make mandatory contributions to social and health insurance systems, which in turn, meet the costs of illness when workers are sick — the Social Insurance Fund pays the wages

of the workers during sick-leave and also provides disability benefits, The Health Insurance Fund and the government health budget meet the costs of health services. Hence, the direct cost of illness to the plant is low.

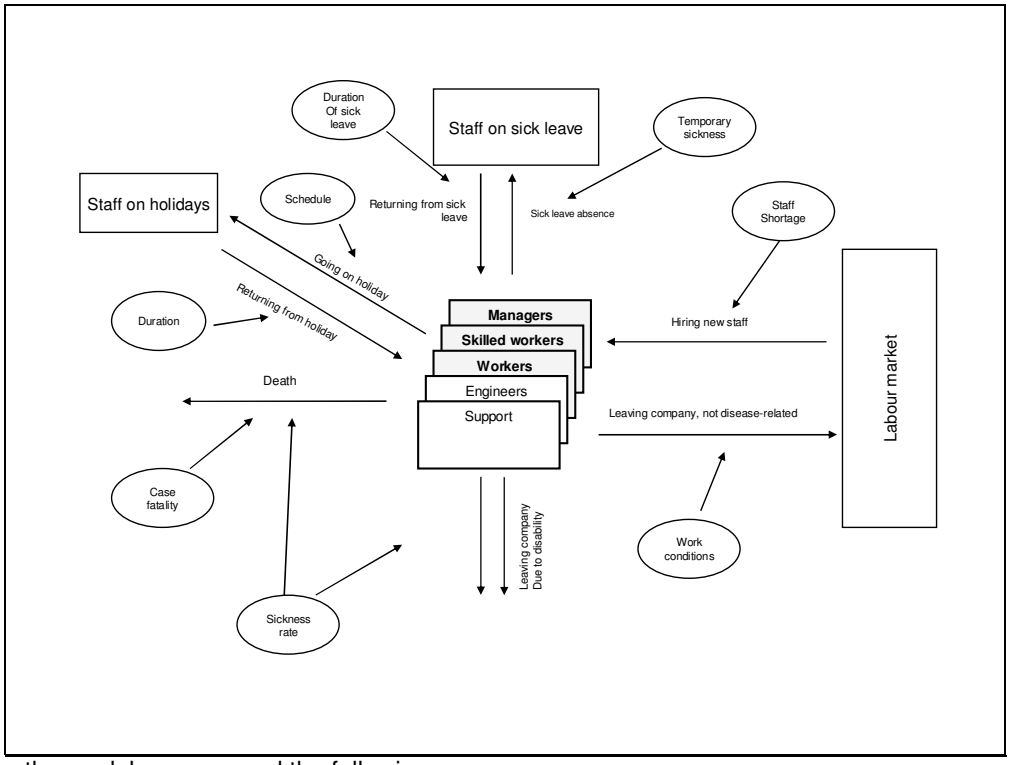
The Plant, as with other Russian firms, offers fixed term contracts to their employees. The company experienced no problems in replacing unskilled workers who left the company. Further, in the short term, the presence of a reserve pool, which is used to replace skilled workers who are temporarily absent, acts as a buffer to compensate for the loss of skilled employees. Hence, the system of fixed-term contracts, social insurance, and publicly funded health system protect firms against illness of employees and do not create incentives for enterprises to invest in health benefits of their staff. The costs of additional benefits related to health, e.g. those related to supplementary health insurance, are not significant.

Hence, the costs incurred due to illness are low and the turnover is high due to reasons other than illness. Therefore, the company seems to be indifferent to the problem of HIV. If the HIV prevalence increases, the firm can require screening of potential employees and reject applicants with positive HIV-tests. In this case the cost would relate to time incurred in finding the right person.
Therefore, it is necessary to model future potential impact of HIV, given different prevalence estimates, and to explore the possible impact on the firm.

4.4.6. Scenario modelling

We identified two key factors which will lead to illness-related-costs for the Power Plant : increased staff turnover and the cost of training. A compartmental model was developed to analyse the economic impact of HIV-related illness. The model can be used to estimate how changes in HIV-prevalence and subsequent illness amongst the employees of the company influence costs of HIV-related disease. The model represents the perspective of the firm and does not address the dynamics of the labour market. Prevalence of HIV in the population is low (in 2003, adult HIV prevalence rate was estimated to be 0.9% in Russia and 0.4%in Altai Krai): so the level of HIV-related morbidity would be small compared to morbidity from other causes. In the model, the increased levels of HIV do not affect age and sex composition of staff or the patterns of new hires (Figure 43).

Figure 43. Model elements



For the model we assumed the following:

(i) **Epidemiology**: HIV-related disease would lead to an additional level of illness amongst the Plant employees. For simplicity and due to availability of limited information, in the model, we assumed that the level of morbidity not related to HIV would remain stable over time and will not depend on HIV-related morbidity. We only considered HIV-related illness in the newly recruited employees, who may have been infected prior to employment. Given the high staff turnover at the Plant, we assume that the duration of employment is shorter than the duration of time when an HIV infected individual progresses from one phase of illness to the next. Therefore, the state of health of individuals with HIV is assumed to be stable during their period of work at the Plant.

(ii) **Economic parameters**. We used the payroll as the common denominator to estimate: a) the costs related to illness in proportion to the payroll; b) the proportion of the payroll allocated to the social fund for sick-leave payments; c) plant's capacity/budget allocated for training; d) capacity of the staff on duty to temporarily substitute those on sick leave absence.

(iii) **Processes:** The model distinguishes between processes which affect costs but which are not entirely attributable to illness and those which are due to illness alone. For example, staff turnover is influenced by the occupational conditions at the plant and the low attractiveness of the plant as a long-term employer. Therefore, the training and retraining costs which relate to staff turnover are not only due to illness but are also influenced by other factors. On the other hand, costs due to sick leave are related to illness alone.

(iv) **Formulas**: We used published estimates for HIV prevalence in Russia. We made assumptions on how the changes in HIV prevalence would influence employment patterns within the organisation — in relation to the frequency of sick leave and staff turnover. The model is not age structured and does not include different stages of HIV.

For the period 2005 to 2015, we identified three scenarios for the HIV epidemic in the general population: (i) low growth in incidence and prevalence; (ii) medium growth in incidence and prevalence and (iii) rapid growth in incidence and prevalence. In the period 2005 to 2015, we

assumed a linear growth of the prevalence of HIV. We also assumed that the staff employed at the plant are representative of the general adult population and exhibit a mortality pattern that mirror the general adult population.

The future predicted level of illness at the plant is estimated as the current level of morbidity (in 2005) plus the added illness from HIV, which is unknown. We made assumptions on the probability of falling ill and taking sick leave. We took this additive approach for the reason of simplicity given the absence of HIV at the plant.

$$N_{SL} = \sum_j p_j \times N_{staff} + \sum_k p_k^{HIV} \times N_{HIV}(t),$$

i.e. the number of staff taking sick leave N_{SL} is proportional to the number of staff at the plant N_{Staff}, and (p_j) probability of sick leave due to the current pattern of illness (all conditions that lead to illness and sick-leave). The probability of taking sick-leave for non-HIV health risks is time-invariant, and the additional probability of sickness due to HIV in the group of HIV-infected is time-dependent, as the epidemic is evolving and the number of HIV infected individuals among the staff would grow. Hence, the morbidity from HIV is assumed to be additive to the morbidity from other diseases: i.e. people have independent risks of developing HIV-related illness episode and non-HIV related illness episode.

Employees with HIV would have a higher risk of being ill than those without HIV. However, the risk of being ill with HIV which leads to sick leave is unknown. We included this risk as an uncertain parameter in the model and made assumptions. Given the difficult work conditions and high turnover of staff, we assumed that people reaching pre-AIDS stage would leave the company voluntarily and therefore not incur cost associated with sick leave. These assumptions are reasonable given limited data availability.

4.4.6.1. Uncertainties in the model

Given the absence of data or empirical evidence, the model includes a number of uncertain parameters: included as scenarios, assumptions, or in sensitivity analysis. These include: (i) The prevalence of HIV in general population: we assumed that the prevalence amongst the workers at the plant is the same as that in general adult population; (ii) The risk of illness episodes in the group of HIV-infected staff: the number of illness episodes per year and the length of sick leave, and; (iii) The proportion of staff voluntarily leaving the company due to HIV-related illness.

4.4.6.2. Model results

Table 45 shows scenarios, given different assumptions of HIV prevalence: obtained from published data, estimates by UNAIDS (2004) and those predicted by Prof Garnett and colleagues (personal communication, 2005).[29, 22]

The model output suggests that wage costs due to illness will be less than the contributions paid by the workers. Actuarial balance will be adversely affected after 10 years, if the 'worst case scenario' for the epidemic occurs. The introduction of cost-sharing scheme for the firms in January 2005, when enterprises have the responsibility to meet the wage costs for the first two days of each episode of sick-leave, will result in a 15%-20% reduction in the total wage costs to the Social Fund. These costs will be met by the firms but the change will not have a significant impact on the enterprise. With cost-sharing arrangements, the enterprises will have a choice of investing in the improvement of health conditions of their staff or incurring expenses due to cost-sharing.

We identified several thresholds which may be important for the firms:

(i) **Threshold 1: Perspective of the Social Insurance Fund – Reaching the actuarial balance with social insurance contributions and sick leave payments.**

This threshold is reached when the spending by the Social Insurance Fund on sick-leave payments exceeds the sum collected from the deductions of workers' salaries (as social insurance contributions for the Social Insurance Fund). This scheme is designed to work like insurance, but the contribution levels (specified by the Government) are not frequently revised. As the sick pay reaches the level of contributions, both the Social Insurance Fund and the Government will be financially affected. This level is unlikely to be reached in the next 10 years.

(ii) **Threshold 2: Reaching the budget limit for training**

There is a need to train newly recruited staff. The enterprise has a pre-defined budget for training. As this budget limit is approached, the company management would be concerned and forced to act.

(iii) **Threshold** 3. Inability to replace temporarily absent workers

The normal practice to substitute for those on temporary sick-leave is to ask other staff to work overtime. There is a limit on the number of additional hours that can be worked by the current employees. As this limit is approached the plant management would have to take different course of action. HIV-related morbidity, which is additional to current morbidity levels due to other causes, will impact on the firm if prevalence levels are high, if turnover is high and if it is difficult to replace absent employees.

The results of the model predictions are presented in Table 45. The cost of HIV-related disease to the plant is low due to very low benefits paid by the company. The firm is protected by the Social Insurance Fund and the health services which absorb the costs of illness and sick pay.

Table 45. Scenario modeling: figures presented as % of the payroll

Scenarios	Loss to Social Fund, relative to payroll, all diseases	Loss to firm for sick leave	Loss to firm for training, including disease related *	Loss to firm for medical service provided
Current situation, the comparator case (a)	2.4%	0.32%	0.23% 0.023% *not all related to disease, mostly to screening and health maintenance mainly due to the risks of minor occupational injuries*	0.43%
Current situation, the comparator case additional cost that may be related to HIV (b)	0.014% *assuming there is one HIV infected, each sick leave reported is for one person*	0.002%	0.28%	0.02% - 0.06%
Scenarios: progression of the epidemic (Projections of HIV prevalence in adult population by 2015 (in 10 years)), (nn%) figures show the estimates of the monthly probability of going to sick leave of people with HIV at the plant and the cost to the firm and to social fund related to all disease including HIV [nn%] show the proportion of costs related to HIV For the cost of training the (nn%) is for % of HIV infected who leave the company due to disease and therefore training costs can be attributed to disease				
2015, 4% of adult population	(10%) 2.57% [0.20%] (20%) 2.77% [0.39%] (30%) 2.97% [0.59%] (50%) 3.16% [0.78%]	(10%) 0.35% [0.03%] (20%) 0.37% [0.05%] (30%) 0.40% [0.08%] (50%) 0.43% [0.10%]	(25%) 0.026% [0.003%] (50%) 0.028% [0.006%] (75%) 0.031% [0.01%] (100%) 0.034% [0.012%]	
2015, 8% of adult population	(10%) 2.77% [0.39%] (20%) 3.16% [0.78%] (30%) 3.55% [1.17%] (50%) 3.95% [1.57%]	(10%) 0.37% [0.05%] (20%) 0.43% [0.10%] (30%) 0.48% [0.16%] (50%) 0.53% [0.21%]	(25%) 0.028% [0.006%] (50%) 0.034% [0.012%] (75%) 0.040% [0.018%] (100%) 0.046% [0.024%]	
2015, 16% of adult population	(10%) 3.16% [0.78%] (20%) 3.95% [1.57%] (30%) 4.73% [2.35%] (50%) 5.51% [3.13%]	(10%) 0.43% [0.10%] (20%) 0.53% [0.21%] (30%) 0.63% [0.31%] (50%) 0.74% [0.42%]	(25%) 0.034% [0.012%] (50%) 0.046% [0.024%] (75%) 0.058% [0.035%] (100%) 0.070% [0.047%]	

* The probability of a staff member taking sick leave within a given year is < 59% (under the assumption that every reported sick leave episode is for one person and there are no repeat sick leaves)

* From the data collected, all training is related to staff development and compensation of non-disease-related turnover and therefore cannon be attributed to morbidity, the firm's overall budget for training is 0.23% of the payroll

* Cost of training of new recruits cannot all be attributed to illness; we roughly assumed (as we do not have data on this matter) the volume of turnover related to training to be around 10% of the total turnover for non-HIV individuals (therefore training related to disease is 0.23*10% = 0.023%)

If the epidemiological situation remains at the current levels, there will be no changes in the pattern of expenditure. The number of HIV infected employees at the plant will be one to three individuals with limited financial consequences to the plant.

4.4.7. Conclusions, discussion and lessons learnt.

The financial burden of HIV-related illness to the plant is very low and will likely remain so within the next decade, even if the worst case scenario for the epidemic materialises. This is because the volume and cost of services currently provided to HIV infected individuals are very low and the firms are cushioned from the economic impact of HIV.

Most of the wage costs associated with HIV-related or other illnesses are absorbed by the Social Insurance Fund, which is funded through the compulsory social insurance contributions by employers. Costs of the medical services to the firm are low, as these costs are mainly absorbed by health services. HIV programmes currently receive a very low proportion of the health budget, amounting to less than 1% of the total health expenditure.[30]. The impact of the HIV epidemic is further cushioned by labour management tools employed by the company, such as fixed contracts, use of recruitment agencies, and the reserve pool for specialist staff, similar to organisational models suggested in Atkinson's model of the flexible firm. [31]

Some of the findings are generalisable to other Russian organisations. For instance, there are uniform legal and regulatory requirements for social and health benefits mandated by the government: namely social insurance, health insurance and state health service provision. These collectively cushion the firms from the impact of HIV as the costs are absorbed by the social insurance and health system.

The company in this study is located in a densely populated area with a large pool of potential human resource to replace the staff members who are ill. It operates efficiently despite a very high turnover rate among its workers. To replace managerial and skilled technical staff, the company has developed risk mitigation strategy by establishing a reserve pool. Therefore, financially, the company does not appear to be vulnerable to HIV in the next ten years. However, a company in an area of high HIV prevalence, without flexible labour markets and a lack of a reserve pool may be differently affected. Thus, the conclusions from this study cannot be readily generalised to companies operating in different industries and under dissimilar local labour market conditions. In particular, one might expect different results in the following settings:

a. company towns with developed concentrated HIV epidemic (e.g. some known small company-towns with local outbreaks of HIV);

b. large cities with generalised epidemic that started early in the 1980s (e.g. Irkutsk and Kaliningrad); companies with permanent staff and low turnover (e.g. companies in small towns with high-tech industries which require highly-skilled and trained staff).

Further, if there is an increase in the levels of sick-leave, the SIF might start to require higher contributions: this would increase wage costs to the firm.

A study looking at a wider context than that of a single firm might identify further impacts. For example, with increased prevalence and higher health system costs contributions to the mandatory health insurance might have to increase. This would also increase wage costs.

A worsening HIV epidemic may reduce the attractiveness of the country and hence the firms to outside investors.

The study is a useful illustrative case, demonstrating an analytical framework which can be applied to other companies. The study questionnaire and the model originally designed for the study can be tailored to the needs of a particular company, taking into consideration the organisational epidemiological profile and the costs associated with HIV related illness.

The methodology has allowed the research team to understand and present the main management processes related to human resource management and the factors which affect the economy of the company due to staff turnover and illness. The study has also identified areas where major uncertainties exist and where further research should be undertaken.

Our collaborative research was hampered by security concerns. In two large companies (a large car manufacturing plant and a large chemical technology plant in areas of high HIV prevalence) where initial agreements had been reached to undertake a collaborative research using Moscow based, local and UK based researchers, the company management had to consult corporate security authorities for disclosure of data for the study. Regretfully,

collaboration was declined exclusively on security grounds. This is understandable as the financial information relating to large and strategically important companies tend to be classified information. The senior management of these two companies, did not appear too concerned with the level of HIV amongst their staff, but were interested in other health-related problems such as occupational disease and seasonal flu epidemic. The future threat of HIV was heavily discounted due to uncertainties about the course of epidemic and HIV seemed to be beyond the immediate horizon of the senior managers of these enterprises.

4.4.8. References

4.4.9. Analysis of how the health system context shapes HIV programmes and how programmes shape context: case study from Volgograd, Russia

4.4.10. Introduction

Organisational interventions in health care are often complex: their design and implementation are shaped by pragmatic responses to local context. The success or failure of organisational interventions in health is often influenced, or even determined, by contextual and health system factors.[32,33] One way of overcoming this complexity of organisational interventions has been to adopt vertical programmes that typically focus on a single disease or intervention: for example HIV/AIDS control programmes. These programmes are often established in parallel with existing health systems, with lines of accountability quite separate from them. Further, the design and structuring of vertical programmes share core elements that are standardised, and objectives that are specific and readily measurable: with the aim of decontextualising the intervention and reducing the impact of health system constraints on programme implementation. However, vertical programmes often lead to fragmentation and duplication of services with reduced likelihood of their effective integration into the broader health system. This increases the risk of governments diverting resources away from other vertical areas or the health system, with adverse effect on the 'added value' of these programmes, and reducing the chances of long-term programme sustainability.[34,35] In particular, with vertical programmes, the question of sustainability is of critical importance. Many constraints faced by vertical programmes have their roots not in the technical content of the programme but in the structures, policies, and organisational frameworks within which they are working.[36]

Strengthening of and more comprehensive engagement with health systems are identified as necessary starting points for scaling up HIV/AIDS interventions and are priorities for the World Health Organization (WHO) to achieve "3 by 5" objectives. [37,38,39] Addressing contextual and health systems issues, embedding vertical programmes into existing health systems and scaling up interventions by using available infrastructure increase prospects for programme sustainability and enable more effective responses to communicable disease epidemics.[40,41]

As with implementation, analysis and evaluation of organisational interventions in health are also intrinsically difficult,[42] demanding analytical approaches and evaluation strategies that take into account the intrinsic performance of the intervention, the broad context and the health systems within which the intervention is embedded.[43,44] However, despite the acknowledged need, there is a lack of approaches and tools which assess interventions while placing them within their health system and broader context. [45] Instead, analytical approaches have tended to focus on assessing either the vertical programme or health system elements, but not both. Rapid assessment approaches, which use a mix of qualitative and quantitative methods of inquiry, are offer a less-costly way of evaluating complex health interventions [46,47,48,49] and manuals developed by WHO and the Joint United Nations Programme on HIV/AIDS (UNAIDS) have been used for rapid assessment of HIV/AIDS programmes. [50,51] However, these manuals do not address the challenge of complexity and take a limited view of the health system and the wider context within which the programme is situated. Similarly, tools which assess health systems tend to focus on performance[52], health system elements[53,54], or are used to analyse stakeholder or political economy of health systems.[55,56] However, these are too generic to offer useful insights into specific disease challenges.

This case study used the Systemic Rapid Assessment and Monitoring toolkit to simultaneously assess the broad public health context, the health care systems, and to analyse the features of an HIV control programme in Volgograd region of the Russian Federation. The toolkit employs a multi-methods approach to analysis and has two linked elements applied simultaneously: a 'horizontal' element analyses the health system within which the infectious disease programme is embedded from a variety of perspectives and a 'vertical' element analyses the HIV programme components. [2,14.] We describe here contextual and health system factors which influenced programme design and implementation.

4.4.11. Methods

Analysis was undertaken by four researchers based in England and occurred in three stages. First, published data, documents and routinely collected quantitative data, obtained from local counterparts, were analysed. Second, key informants, purposively selected and further recruited by snowballing technique,[57] were interviewed during a field visit over four days. Third, further data were collected and analysed for triangulation and to fill gaps. [2,14]

Key informants were selected to ensure diversity and included: policy makers from the regional and local health departments; health professionals from regional AIDS, narcology, sexually transmitted illness and tuberculosis centres; managers from regional health departments, staff from regional economic, finance and information departments, medical personnel, non-governmental organizations, members of the youth committee, representatives of local media, patient groups, HIV-positive patients and local businesses. Interviews were recorded by contemporaneous note taking. The research team reviewed findings in daily meetings to identify emerging themes and triangulate findings. We interviewed 25 persons and held four focus groups with 22 people (Table 46). No further interviews were taken once saturation was reached and no new information was emerging from the interviews.

Table 46. Key informants interviewed

Key informants	Data generation method
1. Chief Doctor of the AIDS Centre and deputy director (n=2)	Interview
2. Director and Deputy Director of the Narcology Service (n=2)	Interview
3. General, Deputy General & Financial Directors of Voltyre tyre factory (n=3)	Interview
4. Director of human resources Voltyre tyre factory	Interview
5. Deputy director of finance Voltyre tyre factory	Interview
6. Chief Doctor, Chief Deputy, Chief Sister, Chief Epidemiologist of City Hospital No. 1, Volzsky (n=4)	Focus Group
7. Chief Director of Elpis (NGO)	Interview
8. Chief Doctor of the regional HIV service	Interview
9. Chief Doctor of the Oblast Station for Blood Transfusion,	Interview Observation
10. District Narcologist, Head of the Rehabilitation Centre, Psychologist in the Rehabilitation Centre, Deputy Director for Treatment and Deputy Director of the Narcology Service (n=5)	Focus Group
11. Director of AIDS Committee	Interview
12. Psychologist at AIDS Centre	Interview
13. NGO Maria – director and six volunteers (n=7)	Focus Group
14. Antenatal clinic – Director, deputy director, head of infectious disease (n=3)	Interview
15. Six media representatives (n=6)	Focus Group
16. Director of oblast regional dispensary	Interview
17. Head of regional medical statistics, and two staff members (n=3)	Interview
18. Chief doctor of the regional TB service	Interview
19. Director of regional HIV laboratory	Interview
20. Director of Narcology service	Interview
21. Director of infectious diseases department of the regional SES	Interview
22. Chief medical officer of the Penitentiary System (GUIN)	Interview

Number of new HIV notifications in Volgograd 2001-2004

A 'framework approach' was used to identify, categorise and analyse emerging sub-themes derived from the main themes defined in the toolkit.[26] Data emerging from interviews were validated internally through triangulation with data from documentary, routine, and other sources gathered prior to and during the fieldwork and discussions with key stakeholders.

4.4.12. Results

4.4.12.1. Socio-cultural Context

Volgograd is overwhelmingly ethnically Russian and its population Russian Orthodox. The region was the site of several battles with German forces during the Second World War and although victorious, experienced significant loss of life. Not surprisingly, the population express strong patriotic sentiments as captured by the comments of the regional director of health services:

> "We [in Volgograd] won the battle against the Germans during the Great War here. It was East–West cooperation that won the 2nd World War and together we will fight to overcome the AIDS epidemic."

The social, religious and cultural context of Volgograd create a complex normative environment, significantly influence the response of the authorities and health services to HIV and shape attitudes to spending state funds for HIV-positive individuals, as articulated by a senior policy maker:

> "We have so many war veterans and pensioners who do not have enough money to buy food. Why should the state fund treatment for individuals with HIV who do nothing for the society, choose to inject drugs or are prostitutes."

HIV still raises fear in many who see the epidemic as "a plague of the 20th century." There is also substantial stigma associated with HIV and it is considered to be a "special" and "terminal disease" affecting marginalised populations. According to NGOs who work in the HIV area, substantial segments of the population want HIV-positive individuals to be isolated.

> "The majority of people think HIV positive people should be isolated for their own good."

> "Fortunately we do not have many HIV patients that require isolation. But it is not like isolation for lepers…sort of like quarantine."

According to several respondents although the media is generally supportive there are several journalists who have a negative attitude towards HIV programmes:

> "We get support from the media but have to be careful. Some journalists change information before it is published. There is much misinformation on HIV and this scares people."

Consequently, there is still social exclusion of many of the HIV-positive individuals to the extent that the Regional AIDS Centre is called Dispensary Number 1 to guard confidentiality and reduce risk of negative impact on HIV-positive individuals. For instance, some doctors are still unwilling to see commercial sex workers or HIV positive individuals and one of the local NGOs has established a network of 'trusted doctors, psychologists and social workers' where clients are referred.

In Volgograd, at first, the emerging epidemic of HIV was framed principally as an issue of drug-control and 'sociopathic behaviour' and seen as a problem which was 'imported' from abroad. Consequently, prior to 2004, policy responses were frail with multi-sectoral policies and harm reduction programmes constrained. Early in the epidemic, rapid introduction of harm reduction programmes with needle exchange schemes led to substantial resistance from the public and policy makers and the harm reduction programmes had to be stopped. It has not been possible to introduce needle exchange programmes in the state sector since except for schemes run by NGOs. Although evidence for benefits is known to many policy makers and senior managers there is a fear of backlash if such programmes are introduced again. According to several respondents these problems arose due to international agencies:

> " [this] fundamental mistake was due to members of international organisations who were young, inexperienced and eager to do something but would not listen to the voice of reason. This set us back in Volgograd by five years and only now is the Regional AIDS Centre and other organisations able to introduce multisectoral policies to combat HIV."

These sentiments were shared by several of the respondents and captured in the words of a senior policy maker:

> "… [it was] the external consultants who did not understand the context and societal attitudes. The focus of early harm reduction was on needle exchange which was not right. Rapid introduction of needle exchange programmes galvanised the opposition who considered HIV to be a problem of drug users, prostitutes and homosexuals and objected to any public funds to be spent on HIV control. We should have concentrated harm reduction efforts on counseling, information dissemination and outreach activity before needle exchange."

In effect the HIV programme has shaped the context, which in turn has shaped the programme so that in harm reduction programmes funded from public sources there is no needle exchange.

HIV is now perceived by many as a societal problem and there are efforts to develop integrated policy-making procedures that involve many stakeholders, with a focus on marginalised groups whose needs receive little attention elsewhere. However, harm reduction programmes still do not include needle exchange schemes. A policy maker describes this transition in attitudes:

> "Initially, the epidemic was brought into Russia by foreigners and began among marginalised social groups such as IDUs, prisoners, homosexuals. There were also hospital outbreaks of HIV infection, later it moved to CSW. Currently there is a spill over of the epidemic to general population through heterosexual contacts. Now, it is everyone's problem. We are implementing harm reduction programmes, with emphasis on education, counseling and even condom distribution. But, introducing needle exchange programmes at this stage is inappropriate and would undermine all we have done in the last five years."

Many respondents recommended implementing harsher measures to deal with opiate drug users, but interestingly, a gentler approach was advocated for alcohol abuse: on the basis that drinking is an integral part of Russian culture.

> "The society will support stricter measures against drug use. But it is different for those who are alcoholics because of the Russian tradition. They are to be pitied"

Although the attitudes towards treating IDUs have changed, feelings against drug use run high, as articulated by a health professional

> "Personally, my view is that drug users should be treated and drug dealers should be shot"

Significant segments of the society, including the business sector still do not perceive HIV to be a threat, as commented by the deputy director of a large industrial enterprise:

> "… [We, as an industrial group] are aware of the situation in Volzhski, but in our enterprise do not even want to think about the threat of HIV."

According to media representatives attitudes of the youth towards HIV vary. Most do not consider HIV to be a stigma and consider it to be a societal problem. Around one half do not consider HIV to be a threat to them and engage in risky behaviour, which is encouraged by "irresponsible publications in the tabloid media":

> "… there is propaganda of free love on TV which encourages uncontrolled and irresponsible sex"
> " … parts of the media, especially the yellow press [referring to tabloids] are loaded with sex and glorify irresponsible and unhealthy behaviour."

These sentiments were echoed by a doctor at a women's consultation clinic:

> "There are no family values any longer. Moral values are lost. Upbringing of children has changed and there is no organisational structure for the youth. People want to have wild sex with people they hardly know… The owners of the media push sex to make money and profit from lowering the morals of the youth.…The media is my number one enemy: they don't like me because I criticise their sexual propaganda."

4.4.12.2. The Political Context

The Regional Governor takes a direct interest in the HIV control programme, and according to senior health officials, "… is not happy with pilots and wants to adopt programmes which have worked elsewhere rather than experiments."

There is strong opposition to harm reduction programmes, which recommend needle exchange or methadone substitution regimes:

> "We've been taught… that taking drugs is bad. Now, how does it look when the doctor with his own hand gives these drugs to the patient?"

> "…. there are several programmes the Western organisations try to impose on us."

4.4.12.3. The Legal Context

Volgograd Health Services follow the recommendations of the Federal Laws, which set out in detail core actions/interventions to achieve HIV/AIDS control in Russia, but do not specify how programmes should be organised.[58,59] The Federal Law, "On Prevention of Spreading in the Russian Federation of Disease Caused by Human Immunodeficiency Virus (HIV Infection)", which was enacted in 1995 and sought to balance preventive measures to protect the public with provisions aimed at safeguarding human rights, recommended public dissemination of information including use of the mass media; epidemiological surveillance; manufacture and distribution of resources for prevention, diagnosis and treatment; access to counseling and testing; access to free care and medication; and social support for people living with AIDS.

The Federal Laws are interpreted strictly: the Russian Criminal Code and the 1998 Federal Law on narcotics specify that those who use narcotics or psychotropic substances, show an inclination, or aid their use can be prosecuted but make no exception to counseling or advice to intravenous drug users (IDUs) to reduce risk of HIV acquisition and transmission.[60,61] Although harm reduction programmes to combat HIV were recommended in a Ministry of Health edict in 1999,[62] in Volgograd, the harm reduction programmes do not include syringe or needle exchange schemes.

Some aspects of HIV prevention are included in the regional Concept for Healthy Life Style Promotion. This document is currently being discussed within the regional parliament.

Senior professionals from the Regional AIDS and Narcology Centres were of the opinion that the laws related to HIV prevention, treatment, care and mitigation have significant gaps which create barriers to successful programme implementation. In particular, the absence of legal provision which "enable more decisive action against high-risk groups such as IDUs and CSWs was mentioned:

> "Although we can arrest people with mental illness who pose risk to themselves and others, there is no law to arrest drug users or commercial sex workers."

4.4.12.4. Health System Organisation

The organisation of HIV control in Volgograd mirrors that observed in other Russian regions.[2] In line with the recommendations of Federal Laws, Regional HIV Interagency Council, established in 1998, acts as the multisectoral coordinating agency for HIV/AIDS and is responsible for developing the Regional AIDS Strategy.[63]

The Council has 22 member agencies, including Regional Governors Office; Regional AIDS Centre, narcology services, TB services, dermatovenereology services; Regional Youth Committee and the Commission on Drug control, which are represented by chiefs or first deputies of these organisations. The membership of the Council is decided by the Regional Vice-governor. Vulnerable groups have no direct formal representation on the Council.

The Regional AIDS Strategy is informed by Federal Laws and defines the HIV programme, policies, activities and financing.[64] It is submitted to the Regional Health Department, the Health Care Committee of the regional Duma (parliament). The regional budget for HIV control is approved by the regional Duma.

Seven vertical subsystems, (which are organisationally and financially separate from general health services and from each other, and all have different reporting systems), provide services to HIV-positive individuals and include: the AIDS centre; 'narcology' services, that deal with individuals who have substance abuse problems; dermatovenereology departments, which deal with sexually transmitted illness (STIs); women's services, which provide services to prevent mother-to-child vertical transmission; tuberculosis (TB) services, which deal with HIV-associated-TB and TB-associated-HIV; infection disease departments, and; mental health services.

Regional AIDS Centre is responsible for co-ordinating and monitoring HIV Programme activities articulated in the HIV Strategy. In turn, the Centre reports to the Regional HIV/AIDS Committee which oversees the implementation of the HIV Strategy. The Regional AIDS Centre also reports to the South Federal Okrug Centre for Prevention and Control of AIDS and Associated Infectious Disease (the Okrug Centre is one of the six supra-regional AIDS Centres that are part of the Federal level AIDS Centres), and the Federal Service for HIV/AIDS.

The 'Prophylactic Centre', which is part of the Regional Health Department, is responsible for coordination of health promotion. Among other health promotion activities this centre is responsible for implementation of IEC interventions within the education system and for the general population.

The sanitary-epidemiological service, which has undergone major restructuring, also has responsibility for HIV. Within the new organisational structure of the regional SES the problem of HIV is the responsibility of the Infectious Diseases Department. The activities related to HIV are combined with those for hepatitis B and C. The department, which has very limited resources and employs 22 staff, is responsible for the control of 37 most dangerous infections. The personnel of the department are highly qualified and have extensive experience in infectious disease prevention programmes.

Although Federal regulations articulate the need for close collaboration between subsystems[32], separate organisational structures, financing streams and reporting requirements lead to operational gaps in the care process, as identified by senior officers from the AIDS and Narcology Centres.

> "The ante natal clinics and narcology clinic are cooperating with us well …….but we have some problems with the tuberculosis service"
> "Coordination with the Narcology Control Committee (a Federal Agency) was not easy as they have federal accountability… the establishment of Interagency Commission for Drug Abuse has helped improve relations."

4.4.12.5. Health System Financing and Resource Allocation

Volgograd allocates around 1% of the total health expenditure to HIV.[65] Funding from federal sources has gradually declined and on average the region receives around 10% of the funds requested from the federal sources. (Table 47).

Table 47. Financing Of HIV Control Activities (in 000 Russian Roubles)

Source of funds	Expenditure by year (in total and activities)								
	2001	Prevention	ART	2002	Prevention	ART	2003	Prevention	ART
Federal budget	8,110.00	150	780	18,223.00	200	814	8,258.00	250	3624
Regional budget	22,503.00	500	1683	18,678.00	600	1051	16,271.00	1120	2361
Municipal part of regional budget	*20,320.00*	*250*	*0*	*17,027.00*	*450*	*0*	*10,151.00*	*1120*	*71*
Donor funding	450.00	450	0	900.00	900	0	15,000.00	15000	
Total	31,063.0	1,100.0	2,463.0	37,801.0	1,700.0	1,865.0	39,529.0	16,370.0	5,985.0
% of total		3.54	7.93		4.5	4.93	41.4	15.14	

The Regional HIV Programme which is approved by the regional governor and articulated in the Regional HIV Strategy[33] for the period 2004-2006. The funding committed to the programme for the biennium was RR 11,750,000 ($1 = ~RR25). In 2004 the funding approved in the Oblast Budget Law was RR 5,873,000. Of this, RR 4,387,000 (74.7%) was actually executed. This amounted to approximately US$0.12 per person per year. In 2004, the amount of funding requested for purchase of ARV medication was 3,557,000, but of this only 46.8% of the total requested (RR 1,665,000) were financed.

In 2003, around 41% of the budget for HIV control was allocated to prevention activities although bulk of this funding comes from donor agencies. Around 29% of the funding from public sources was earmarked for prevention activities and 15% to ARV, which is not sufficient to treat all those in need of ARV. Shortfall in funding for ARV means that only 78 out of 4,400 HIV-positive people in the region receive combination antiretroviral therapy. In addition, all pregnant women have access to chemotherapy to prevent vertical transmission from mother to child. The rest of the HIV-positive people are expected to purchase drugs themselves and cannot afford to do so.

The budgeting for HIV services is not informed by needs assessment or scenario planning based on epidemiological projections, as identified by the director of the AIDS Centre:

> "The only guidelines are the number of patients we have and the number of new patients we expect next year"

There is, currently, no accurate way of estimating future increases in HIV incidence but the officials in the region believe that strengthening management capacity, implementing second generation surveillance systems, behavioural surveys and use of modeling will enable forecasting of HIV incidence and service needs.

4.4.12.6. Service Delivery

Although there are visible efforts to mount a multisectoral response, involving both the state sector and the civil society to manage HIV/AIDS, integration between activities are suboptimal, with risk of establishing services which duplicate each other. For instance, in response to the potential HIV epidemic, the regional AIDS Centre had plans to establish a new centre to treat HIV-positive patients with concomitant illness, while the narcology and the TB services were both also planning to expand their activities for HIV-positive persons and establish specialised units to manage HIV-positive patients.

At the AIDS Centre, HIV-related activities focus on four key areas: (i) case detection and laboratory investigations of HIV and marker diseases (such as hepatitis B and C); (ii) multi-sectoral work with other services (e.g. narcology); (iii) providing antiretroviral treatment to a relatively small group of patients (including children); (iv) safety in medical facilities (Volgograd was one of the Russian regions which was the site of an early outbreak of HIV infection due to nosocomial transmission, which affected children at medical facilities).

Harm reduction activities provided by the state sector do not include syringe and needle exchange programmes and tend to be limited in breadth. However, two NGOs are actively involved in HIV prevention activities and do provide harm reduction programmes that comprise IEC, condom distribution and needle exchange. The NGOs work in close collaboration with the Regional AIDS Committee and the centre. One of the NGOs (MARIA which employs 51 staff) is independent and the other (ELPIS) is an NGO that is linked to the Regional AIDS Centre. In addition to these NGOS the Red Cross and the Russian Orthodox Church also contribute to the HIV control efforts. The policy makers ascertain that the model in Volgograd, where NGOs are associated with government organisations, has a number of benefits such as: stability, financial sustainability (especially when there are no external grants), and provision of incentives to health professionals who work in public organisations to undertake additional work and augment their income. In contrast, they argue that the stand

alone-NGOs excessively depend on grant funding, which is unpredictable, focus on achieving the objectives of the funding agency and do not adequately coordinate their activities with the mainstream HIV control.

Voluntary counseling and testing for HIV (VCT) is available in the Regional AIDS Centre and the dermatovenereology dispensaries. VCT It is free of charge for both the general population and high-risk groups. In addition, many of the health care facilities of the region offer voluntary testing for HIV. However, HIV testing in organisations attracts a fee. For instance, the AIDS Centre did provide HIV testing for inmates in prisons, but due to shortage of financing this testing programme has stopped. The proportion of HIV tests linked to VCT represents a small proportion of the total tests for HIV and in 2004 accounted for 0.9% of the total number of HIV tests.

There are 11 laboratories including a reference laboratory, financed from local (municipal or city) budgets, which are located in infectious disease hospital, AIDS Centre, STI clinics and four blood transfusion centres that perform HIV tests. In 2004 there were 566,733 HIV tests performed on 519,776 individuals, representing 19.4% of the oblast population, with 3200 positive tests (a yield of 0.56%). The number of tests performed in 2004 was 2% higher than that in 2003.

All HIV seropositive patients are monitored for progression of their illness. However, antiretroviral therapy (ART) is heavily rationed and available free of charge only to a small group of patients. Currently 80 patients receive triple therapy and are regularly monitored for side effects and control of disease. Those who need ART but are unable to access free treatment cannot afford to pay for treatment.

There is a well-established narcology service that provides outpatient and inpatient services to deal with problems of substance abuse and collaborated closely with other agencies both at local and federal level. The director states that interagency collaboration, especially as regards management of IDUs, has improved in the last year although gaps in legislation exist:

> "… [in the last three years] there was much duplication and overlap of roles and responsibilities as regards IDUs. Since the Department of Illegal Drugs Control (a federal agency) was replaced by the Interagency Commission for Drug Abuse the coordination has improved. But there are gaps in the legislation to deal with IDUs and the way the law is interpreted."

Dermatovenereology services provide testing and treatment of sexually transmitted illness. The services attract user charges although this is not considered by the service providers to be a barrier to access.

There is a network of women's services with women's consultation centres and women's clinics where antenatal care and deliveries take place. There is a well-established programme to prevent vertical mother-to-child-transmission which started in 2001. All pregnant women are tested for HIV, hepatitis B and C, Syphilis and TORCH (toxoplasmosis, rubella, cytomegalovirus, herpes simplex). The number of children born to HIV-positive mothers increased from 37 in 2002 to 45 in 2004. The attitudes to managing HIV positive mothers have improved but there are few incentives to encourage staff to manage pregnant women who are HIV positive:

> "In 1994, when we had the first HIV case [after delivery] we burnt all the linen, we even painted the room, but we have now adapted and there is no stigma."

> "The biggest problem is that we have high demand but few surgeons. The staff receive additional payment of RR 20 for delivering HIV-positive women: hardly an inducement. The problem is increasing as we have more women with HIV."

Referral and counter-referral between different services are poorly managed and there is often a reluctance to care for patients who are HIV-positive.

> "What referral system?"

> "Each service tries to prove that it is not responsible for the HIV patient."

4.4.12.7. International Collaboration

The Region actively collaborates with international agencies such as the UNDP, UNICEF, International Labour Organisation (ILO), UNFPA, UNOCDP, WHO, and the UK DFID to implement HIV control programmes. The perceptions of the key informants on the benefits of involvement of international agencies varied. The positive influence was to broaden understanding about AIDS.

> "They helped to change our perceptions of HIV from a medical to a social problem".

However, the perceptions shared by several key respondents were that the agencies had independent agendas, failed to coordinate their work with local agencies and to accommodate local needs and priorities when planning and prosecuting programmes.

> "They need to agree with the Federal level before coming into an area... This is not a lawless country. They need to respect the Russian Laws rather than push their agendas."

4.4.12.8. Other barriers which hinder HIV control efforts

In addition to contextual and health system factors, which hinder HIV programme implementation, key respondents identified lack of financing, need to secure agreement of the federal level for any major changes in control efforts, professional inertia, low salaries for staff and excessive administrative burden (collecting data and reporting).

4.4.13. Conclusion

We demonstrate a complex political economy in which efforts to control HIV sit. Our analysis, based on a rapid assessment, shows that key barriers to effective scale up of effective HIV interventions are: the societal views of harm reduction programmes; ambiguities in the civil and criminal laws which can be interpreted differently by various agencies and prevent implementation of prevention programmes; multiple and vertically organised health services that deal with HIV, which have separate lines of financing and operate as sub-systems without optimal co-ordination and joint working, absolute shortage of funds for ARV; and inefficient allocation of available resources. Unless these barriers are addressed, attempts at scaling up HIV prevention and treatment activities will be seriously constrained. This complex environment and organisational arrangements affects the way the rules, norms and enforcement mechanisms are interpreted to generate institutional change and programme responses.[66]

Varying interpretations of the Federal Laws, the local socio-cultural and politico-economic context, values of health professionals and administrators, some of whom see HIV as a problem of drug use, influence the response to HIV/AIDS epidemic. In particular, initial attempts by international agencies to introduce needle exchange programmes without adequate analysis of contextual factors have led to emergence of societal resistance to HIV prevention programmes and hindered the efforts of the local authorities in addressing the HIV epidemic. This resistance needs to be cautiously negotiated if harm reduction programmes, which include needle exchange activities, are widely scaled up.

A key lesson emerging from this case study for Russia and other countries, which are attempting to address the HIV epidemic, is that technical solutions alone are not adequate to mount an effective scaled-up response: the political economy, legal environment, organizational structure, institutional relations and the economics and financing of the health system all impact on the response. A simplistic analysis of the context and health system elements when implementing HIV control programmes may lead to the most important sources of the problem being missed or overlooked, and lead to suboptimal programme results and 'policy resistance'.[67] One way to reduce this policy resistance is to adopt 'systems thinking' and a more holistic view of problems, which requires a detailed analysis of the context and drawing of lessons for effective responses. [2, 35,36]

Our approach has certain limitations. The assessment is rapid, involving limited resources and context specific: aimed at identifying issues that must be addressed locally. Although our

analysis offers a generalisable conclusion on the importance of simultaneous and joint analysis of the health systems context and the vertical programmes, the findings themselves are clearly context-specific and hence may be of limited generalisability. However, these features may also be seen as strengths, making it possible to rapidly identify key context-specific issues.

We suggest that if HIV programmes are to be effective and sustainable they need to be informed by evaluations of the impact on HIV programmes of broader health systems. Understanding the health system context and embedding HIV programmes within them is a necessary prerequisite to achieve sustained success.

4.5. Summary

The first study, described the findings of a survey which was designed to investigate the social and economic characteristics of the people belonging to the high risk groups of injecting drug users (IDUs) and commercial sex workers (CSWs). The survey yielded novel findings, which contrast with widely held beliefs: for instance, injecting drug users are typically reasonably well educated and live with their parents in a family owned dwelling and not a poorly educated group.

The second study examined the impact of HIV on a medium sized firm operating in labour intensive section of the Russian economy. The case study findings indicate that currently, HIV/AIDS has very low financial effect on the firm and poses minimal economic risk. This is because of low prevalence levels of HIV and the social welfare system which protects the firms as the wage costs of sick leave are met by the Social Insurance Fund and health care costs are met by the State Guaranteed Services covered by the Compulsory Health Insurance Scheme. Scenario analysis, which projects financial impact to the firm with higher HIV prevalence levels as a result of worsening epidemic, fails to demonstrate substantial financial impact as the form is protected from costs, which are absorbed by the state social and health system.

The HIV sub accounts study aimed to identify sources of funding for HIV-related activities and establish current allocation of financing to HIV/AIDS prevention and treatment activities by major financing organizations, providers and functions. The study demonstrates low financing levels for HIV and inefficient resource allocation, in that, significant proportion of the funds from federal and regional sources are allocated to hospitals, diagnostic services and treating concomitant illnesses, rather than preventive activities or anti retroviral treatment. In contrast, the majority of funding from international agencies is allocated to preventive services.

The case study of Volgograd based on a rapid assessment of contextual and health systems factors which influence programme delivery revealed a complex political economy in which efforts to control HIV sit and identifies key barriers to effective scale up of effective HIV interventions, namely: the societal views of harm reduction programmes; ambiguities in the civil and criminal laws which can be interpreted differently by various agencies and prevent implementation of prevention programmes; multiple and vertically organised health services that deal with HIV, which have separate lines of financing and operate as sub-systems without optimal co-ordination and joint working, absolute shortage of funds for ARV; and inefficient allocation of available resources. The study concludes that unless these barriers are addressed, attempts at scaling up HIV prevention and treatment activities will be seriously constrained.

The studies in this chapter indicate the importance of analysing economic and health systems factors. In particular, identifying socio-economic characteristics of risk groups enables better targeting of HIV-related activities to these segments of the population. The study of the firms shows that the social and health systems will bear significant proportion of the burden of HIV and calls into question sustainability of this approach: given that the public sector expenditures on health and social support systems are already constrained and by acting as a buffer for private firms the public system will face further funding pressures. HIV sub accounts study demonstrates that the current expenditure levels are low and allocatively

inefficient and suggests that resources can be more optimally used to address the HIV epidemic. Finally, rapid analysis of the broad context and the health system shows that technical solutions, which do not take into account contextual and health systems factors that create barriers to introduction and effective scale up of interventions, alone are not enough to address the epidemic. A systems approach to managing HIV problem is needed, and as yet, in the Russian Federation such an approach is not widespread.

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CHAPTER 5. Analysis of incremental cost-effectiveness of HIV prevention interventions in Altai krai

5.1. Introduction

Economic evaluation of interventions to prevent and control HIV/AIDS can help to identify interventions those that will be most efficient and beneficial in terms of cost and outcome and can provide an important provide an evidence base to for decision makers to support for effective and efficient resource allocation.(1). Three broad approaches to economic evaluation of health interventions are available which differ primarily in the way in which outcomes are measured. Cost benefit analysis measures outcomes of interventions in purely monetary terms, cost effectiveness analysis measures outcomes in natural measures appropriate to the intervention (such as HIV infections averted or AIDS deaths prevented for HIV intervention) and cost-utility analysis which measures outcomes in terms of a universal unit; applicable across different disease specific domains, such as the Quality Adjusted Life Year (QALY) or Disability Adjusted Life Year (DALY).

Whatever approach is used, economic evaluation of HIV prevention programmes should: clearly define the audience, the problem or question to be analysed, strategies/interventions to be evaluated; describe the perspective of the analysis, relevant time frame and analytic horizon, analytic methods and the type of analysis; identify relevant costs and outcomes; specify discount rate; identify sources of uncertainty; describe the summary measures to be reported (2):

In this chapter we present results of a cost effectiveness analysis using numbers of HIV infections prevented as the natural unit of intervention outcome. Cost effectiveness varies according to the type of interventions and the country in which the interventions were implemented.

5.2. Purpose and aim Aims and objectives

The main problem to be addressed by economic evaluation is to provide cost-effectiveness information for different interventions to support policy makers in finding ways to deliver an optimal mix of interventions for sustainable large-scale HIV prevention programmes in target groups such as intravenous drug users (IDUs). Implementation of these programmes are usually constrained by lack of political will, health systems factors, pressure on healthcare budgets and the limited availability of human resources with appropriate skill sets.

The aim of this study is to compare the effects of different prevention programmes implemented in Altai Krai and Volgograd Region of Russia using incremental cost-effectiveness analysis.

5.3. Methods

5.3.1. Overview

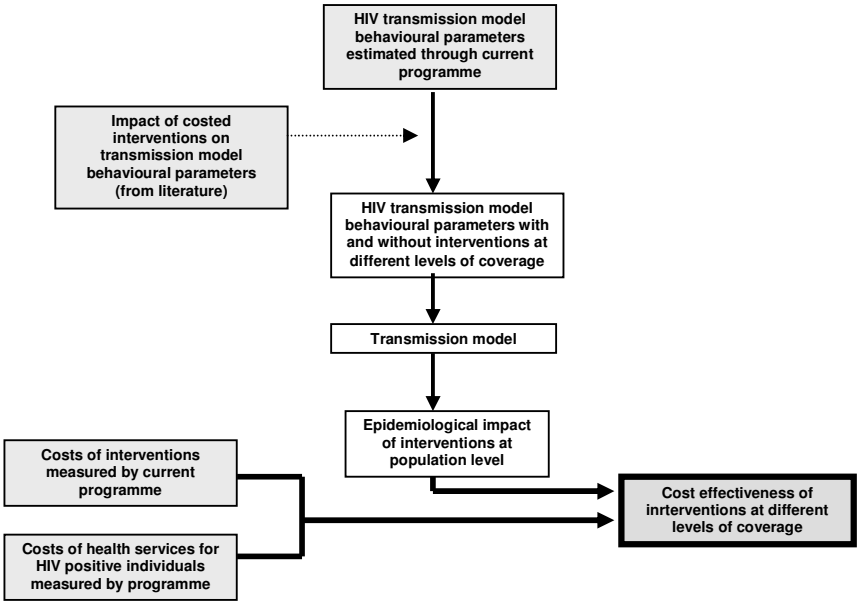
We used information describing costs of HIV interventions obtained through the HIV sub-accounts study (see sections above), with estimates of the impact of different interventions derived from the literature applied in model presented earlier , and developed as part of this programme to conduct an economic evaluation of selected preventive interventions grounded in the Russia health system and epidemiological context. This is presented schematically in 0.

We evaluated selected prevention interventions which were implemented in the project regions in 2003. We evaluated: a) condom distribution targeted at commercial sex workers (CD CSW); b) combined of needle exchange and condom distribution targeted at (NE+CD CSW), and c) needle exchange and condom distribution targeted only at injecting drug users who are also engaged in commercial sex work (NE+CD CSW IDU).

The analysis of costs of interventions was conducted from a societal perspective as the interventions studied were financed from sources external to the health system and provided

by NGOs outside the health system. Analysis of the *financial* effects of interventions (that is changes to costs accrued from service savings as a result of fewer HIV cases in the population) were considered only as health service costs. The timeframe of the model was determined by the epidemiological parameters of HIV infection in the Russian Federation with the start of epidemic in 1997. The modeling for HIV transmission dynamics used the model presented in xxxxx using a time horizon until 2025, and in line with this, the analytic horizon for economic analysis was set to 2025. We employed an incremental cost-effectiveness analysis for comparing different options of implementation of HIV prevention interventions.

Overview of cost-effectiveness analysis



5.3.2. Cost Measurement

We evaluated prevention interventions implemented in the project regions in 2003, which included: condom distribution (CD) targeted to the CSWs; combination of needle exchange (NE) and condom distribution targeted to IDUs; and NE + CD targeted to IDUs who also engaged in commercial sex work (IDU CSWs).

The analysis of costs of interventions was conducted from a societal perspective as the interventions studied were financed from sources external to the health system and provided by NGOs outside the health system. Analysis of the effects of interventions took a health service perspective.

The timeframe of the model was determined by the epidemiological parameters of HIV infection in the Russian Federation with the start of epidemic in 1997. The modeling for HIV transmission dynamics had a time horizon until 2025, and in line with this, the analytic horizon for economic analysis was set to 2025.

We employed the incremental cost-effectiveness analysis for comparing different options of implementation of HIV prevention interventions.

The economic costs of interventions were estimated on the basis of cost accounting exercise for the NGOs which implemented the intervention programmes in the project regions in 2003

Cost breakdown were measured and allocated within the included the following categories: Capital costs — (i) buildings, (ii) equipment, (iii) transport; and Recurrent costs— (iv) personnel, (v) operation and maintenance, (vi) materials and other costs.

The costs of equipment and transport were annualized using a 10% discount rate. The cost of buildings was estimated on the basis of annual rent, using market prices for 2003. Costs were allocated by interventions on the basis of utilisation of resources of each type for each intervention. The annual cost per unit of coverage was estimated using the utilisation data available from NGOs which implemented the interventions.

The costs of associated with managing HIV cases HIV were estimated on the basis of data collected as part of the HIV sub accounts study. As the analysis adopted a health service perspective, it included only the costs of healthcare providers financed from government sources of funding. Costs of activities financed by international donor organisations (e.g. research) as well as costs of non-healthcare organisations were excluded from the analysis. The breakdown of HIV costs included the same categories as for prevention interventions with allocation into four categories:

(i) (i) Costs related to HIV incidence: this category included the laboratory costs related to confirmation of HIV diagnosis.

(ii) (ii) Costs related to the overall number of HIV-infected: this category included the costs of treating co-morbidities and STI in HIV-infected persons. The cost of ARV treatment was excluded because in 2003 it was mostly used for post-exposure prophylaxis of medical personnel who had needle stick injuries, rather than for treatment of HIV infection.

(iii) (iii) Costs related to the overall number of infected women: i.e. costs related to prevention of mother-to-child transmission of HIV.

(iv) (iv) Costs not related to HIV incidence and prevalence: this category included laboratory costs related to screening, costs of ARV treatment, cost of maintenance of general hygiene norms within healthcare facilities, and costs not classified by type. Costs falling into this category were excluded from analysis.

For each of these categories the annual costs per utilisation unit were derived on the basis of data on the numbers of people in corresponding categories in 2003, which was available from the AIDS centres. We used UK guidelines to apply annual discount rates for all costs of 5% (sensitivity analysis for 0% - 10%).

5.3.3. Projected population level impact of interventions

To explore the cost effectiveness of any intervention, estimates of the 'efficacy' or effectiveness of the intervention is needed. Efficacy is the change brought about by the intervention under trial conditions (such as randomised controlled trial), and effectiveness is the impact of this intervention when applied in the real world. Contextual factors, such as socio-cultural characteristic of communities, influence outcomes of an intervention in different settings: for instance, an intervention promoting safer sex may result in different changes in sexual risk depending on community attitudes towards sex (3). Whether or not behaviour change has an impact on HIV incidence depends on the epidemiological context (3).

In our models of HIV transmission dynamics, the proximate determinants of HIV spread, the contact rate, the transmission probability and the duration of infectiousness infectious need to be altered to reduce the incidence of infection. Often, the behavioural or biological changes in these proximate determinants are used to infer that HIV incidence will be altered rather than direct evidence of changes in HIV incidence. We projected the effects of different interventions on population rates of HIV infection by applying estimates, derived from review of the literature, of the impact of different interventions on the parameter estimates for proximal determinants specified in our model, using parameter estimates derived from the empirical work carried out in Russia during the course of the programme to provide baselines.

Therefore, for economic analysis, we used the number of infections averted as projected by the transmission model as the measure of impact of interventions. This was calculated by subtracting projected infections with and without the intervention to the time horizon of 2025.

We again used UK guidelines for the discount rates for effects, applying an annual discount rate of 2.6%, (sensitivity analysis for 0% - 10%) for future infections prevented. and for costs 5% (sensitivity analysis for 0% - 10%)

The reported data items for each evaluated prevention programme include: (i) Incremental cost-effectiveness ratios; (ii) Number of infections averted; (iii) Discounted number of infections averted; (iv) Total incremental costs; (v) Discounted total incremental costs

5.3.4. Effect of interventions on proximal determinants of infection

To explore the cost effectiveness of any intervention, estimates of the 'efficacy' or effectiveness of the intervention is needed. Efficacy is the change brought about by the intervention under trial conditions (such as randomised controlled trial), and effectiveness is the impact of this intervention when applied in the real world. Contextual factors, such as socio-cultural characteristic of communities, influence outcomes of an intervention in different settings: for instance, an intervention promoting safer sex may result in different changes in sexual risk depending on community attitudes towards sex.[3] Whether or not behaviour change has an impact on HIV incidence depends on the epidemiological context.[3]
In our models of HIV transmission dynamics, the proximate determinants of HIV spread, the contact rate, the transmission probability and the duration infectious need to be altered to reduce the incidence of infection. Often, the behavioural or biological changes in these proximate determinants are used to infer that HIV incidence will be altered rather than direct evidence of changes in HIV incidence.
There is a remarkably limited volume of rigorous studies which assess the efficacy and effectiveness of HIV interventions are remarkably few (.4). To assess the potential impact of interventions we need to estimate how much these interventions alter the proximate determinants of HIV transmission. We Drawing drew on a number of systematic reviews of HIV interventions and other studies we to summarise the existing evidence on effectiveness of HIV prevention interventions on behaviour change which influence numbers of sexual partners, onset of sexual activity, condom use, injecting drug use, and sharing needles and equipment when injecting drugs. (3-6)

5.3.4.1. NEP – needle exchange programs and outreach

A syringe exchange programme in Kyrgyzstan, within three years, led to fourfold decline in needle sharing, threefold decline in needle reuse and threefold increase in condom use.(7). The results are summarized in Table 48(see table).

Table 48. The effect of a syringe exchange programme in Biskhek, Kyrgyzstan(7)

	At program start in 2000	In May 2003
Needle sharing	68%	14%
Needle reuse	98%	30%
Condom use	14%	46%

A four year study of needle and syringe exchange in Nepal resulted in fourteen fold decline in equipment sharing by IDUs, but there was no change in practice of unsafe sex (8). In the same study, the average number injections per month decreased from 24 to 17 ($p<0.001$), (6), and the average number of times of needle sharing per month declined from 13 to 8 ($p=0.0003$). Although, the average number of people with whom needles were shared fell from 2.8 to 2.4 this reduction was not statistically significant.
Studies which explored the effectiveness of outreach-based strategies in reducing drug use and reuse of needles show that outreach programmes had a positive impact on the proportions of people injecting drugs, the frequency of drug injecting and the reuse of both needles and injecting paraphernalia (see 0table) (.9).

Table 49. The effectiveness of outreach-based strategies in reducing drug use and needle practices (9)

Behavioural outcome	Number studies	Median at baseline	Range of change at follow-up	Median change at follow-up
Stopped injecting drugs at time of follow-up	5	100% injected	24-31% stopped injecting	26% stopped injecting
Reduced drug injection frequency	7	73 injections per month	11-62 fewer injections per month	28 fewer injections per month
Stopped/reduced reuse of needles/syringes	4	37% reused syringes	14-43% fewer IDUs re-used syringes	19% fewer IDUs re-used syringes
Stopped/reduced reuse of cookers, cotton, rinse water	4	67% reused equipment	16-34% fewer IDUs re-used equipment	27% fewer IDUs re-used equipment

Kumar et al. (,10), who explored impact of HIV/AIDS education and distribution of bleach and condoms amongst IDUs in India demonstrated 38% decrease in frequency of needle use in the intervention group, as compared with 32% decrease in comparison group (p=0.01), 47% reduction in needle sharing in the intervention group as compared with 35% in comparison group (p=0.01). There were no significant differences between groups in the number of casual or commercial sex partners.

5.3.4.2. Condom distribution

Cited in the review done by Grassly et al. ,(3), Egger and colleagues (11) found that condom provision in motel rooms in Nicaragua increased use of condoms for commercial sex (OR 1.31, CI 1.09-1.75), and for non-commercial sex (OR 1.81, CI 1.14-2.81). A study in India, which used condom distribution and HIV testing/counseling and targeted sex workers and madams over 24 months, led to statistically significant changes: in the intervention group, the frequency of always-using-condoms increased from 3% of sexual contacts to 28% ($p<0.001$) as compared with no change in the controls and the frequency of sometimes-using-condoms increased from 31% to 70% in CSWs ($p<0.001$) and from 36% to 53% in the madams ($p<0.01$) .(12).

In Indonesia, Ford and colleagues, who studied a six-month HIV education, pimp training, condom sales/distribution for sex workers and clients and found condom use with clients increased 18-75% and 29-62% ($p<0.01$) in two intervention sites and 47-60% in control. (13). Fox and colleagues, who in Honduras studied condom distribution and HIV education for sex workers over a six-month period demonstrated an increase in mean reported condom use from 64% to 70% ($p<0.05$), but during the program condom use as reported in diaries was even higher at 90% .(14).

Targeted condom promotion for sex workers in Kenya individual and group counseling over 12 months increased occasional condom use from 10% to 80%: group counseling led to an increase from 9% to 70%, whereas use in the control group increased from 7% to 58%. Condom use resulted in threefold reduction in risk of HIV infection (OR 0.34, $p<0.05$).) (15). Jackson et al., who used STD screening with treatment and condom promotion, over 12 months, amongst male truck drivers in Kenya, found that extramarital sex declined from 49% to 36% ($p<0.001$) and sex with sex workers declined from 12% to 6% ($p=0.001$), but with no change in reported condom use (.16). A similar study in Congo, which used STD screening with treatment and condom promotion in sex workers over 36 months in the Democratic Republic of Congo, demonstrated an increase in regular condom use in sex with clients from 10% to 68%.% (17). STD treatment and condom promotion amongst Bolivian sex workers, over a period of 42 months, resulted in an increase in self-reported-condom-use from 36% to 74% ($p<0.001$) .(18).

In Thailand The national HIV prevention program in Thailand, which included the '100% condom program', targeting FSWs and men, found that between 1989 and 1993, reported use of condoms in commercial sex increased from 14% to 94%, while male factory workers reported increased condom use in most recent intercourse with FSW from 90% in 1993 to 100% in 1996 ($p<0.05$) (.19), this also increased in male STD clinic attendees from 64% to 76%. For FSWs there was no significant change, as condom use was already high with reported use greater than 95%.% (20).

In South Africa, social marketing of condoms in women aged 17 to 20 years, over a 12 month period, led to an increase in the adjusted probability of ever-using-condoms from 57% to 73% ($p=0.068$) in the intervention group and no change in the control population. The adjusted probability of using-condom-during-last-intercourse increased from 38% to 53% ($p=0.084$) in the intervention group and from 12% to 27% ($p=0.03$) in comparison group. Social marketing of condoms to South African miners also led to statistically significant changes: those who had four or more partners in the preceding year declined from 25% to 13% ($p<0.01$); the proportion whose last partner was spouse increased from 56% to 70% ($p<0.01$); and condom use in the last intercourse with spouse increased from 18% to 26% ($p=0.05$). Although condom use with other partners increased, this was not significantly different from the baseline level. (21). Van Rossem et al., who studied social marketing of condoms over a 13 month period in Cameroonian youth, for men in intervention groups observed a significant reduction from 29% to 20% ($p=0.004$) in onset of sexual activity before age 15 (.22). However, this was not significantly different from the change in the control group. A significant reduction of 10% to 4% ($p=0.001$) in onset of sexual activity before age 15 was observed in women and this reduction was statistically different from the control group. Women reporting ever-using-condoms increased from 58% to 76% ($p<0.001$) in intervention group, but not in the control group ($p=0.001$).

A study in Kenya and Tanzania, which explored influence of voluntary counseling and testing, and which employed client-centred HIV prevention counseling over 12 months, found significant reductions in reported risk behaviours, but failed to detect a significant reduction in the incidence of HIV infections. Their findings are summarized in Table 50 (23).

Table 50. Results of a trial of Voluntary counseling and testing in Kenya and Tanzania (23)

	Estimates (and 95% CI)	
	Kenya	**Tanzania**
Condom use per sex act		
Before intervention	19% (16-21)	26% (23-29)
After intervention	83% (80-87)	88% (78-98)
Condom efficacy		
Before intervention	95% (93-97)	90% (87-93)
After intervention	95% (93-98)	97% (95-99)
Average number sex acts PP		
Before intervention	54 (49-59)	54 (48-59)
After intervention	43 (36-50)	36 (30-42)
Average number sex partners		
Before intervention	1.22 (1.14-1.29)	1.13 (1.07-1.20)
After intervention	1.32 (1.22-1.42)	1.34 (1.24-1.44)

Bentley et al., who studied VCT and condom provision in HIV-seronegative men in India, found that consistent condom use in sex with CSWs was 2.8 times more likely ($p<0.0001$)

after six months, 3.6 times more likely after 18 months (p<0.001); and 4.7 times more likely after 24 months (p<0.001) (.24).
In Rwanda, Allen et al., who explored the impact of VCT and condom provision in discordant couples found that, after one year, condom use had increased from 4% to 57% (.25). In a separate study the researchers were able to demonstrate that VCT and condom provision amongst childbearing women led to an increased reporting of ever-using-condoms from 7% to 22% .(26).

5.3.4.3. Summary of the impact of interventions

Bollinger and colleagues reviewed best estimates of changes in risk behaviours for different interventions in different developing country populations, and their findings are presented in Table 51 (see table). Unfortunately, many cells remain empty and some estimates rely on studies which are few in number and are in atypical populations (.4).

Table 51. Best estimates of impact of intervention on changes in risk behaviours (.4). (High risk includes sex workers, medium risk includes those people with multiple sex partners and low risk includes those people with a single sex partner)

Table 52.

	Condom use (reduction in non-use)			STI treatment seeking (reduction in non-treatment)			number of sex partners (reduction in numbers)			age at first sex (increase in years)
Type/Method of intervention	high risk	medium risk	low risk	high risk	medium risk	low risk	high risk	medium risk	low risk	medium risk
Mass Media	na	-17	-17	na			na			
VCT	-49.5	-33.9	-16.2	na			na	0	na	na
Community Mobilisation	na	-11.8	-3.2	na			na		na	-0.25
CSW peer counseling	-38.6	-42.5	na		na	na	-3.3		na	na
School-based programs	na	-34	na	na		na	na	-33	na	0.3
Out-of-school young	na		na	na		na	na		na	
workplace programs	-39	-34	-1.3					-23	na	na
condom social marketing	-21.1	-10.6	-5	na	na	na	na	na	na	0.12
condom distribution	-56.7	-10	-5.3	-11	na	na	-35	na	na	na
IDU peer outreach	-26	na	na		na	na	-33	na	na	na
MSM peer outreach	-32.8	na	na		na	na	+16.9*	na	na	na
STI treatment	-54	-14	na	-47	-22	na	-50		na	na

*based on one study [27].
Note: High risk includes sex workers, medium risk includes those people with multiple sex partners and low risk includes those people with a single sex partner

The summary of a range of studies on different types of interventions show that the size of the effect varies according to time, place and target population.

5.4. Description of the economic evaluation model

The economic evaluation model calculates total incremental cost for each of the three prevention programmes. For outcomes, the model uses the outputs of the epidemiological model. The model simulates cash flows generated by resources of six types described in section 0. The cash flow depends on the parameters of scale and resource requirements. The scale is modeled as the target coverage level for the intervention multiplied by the number of people in the target group for the intervention. The size of the target groups is calculated by the epidemiological model. Resource requirements are represented by the cost per unit of demand for each type of resources for each type of intervention.

Savings related to the changes in HIV transmission due to interventions are calculated as the cost of living with HIV, which for a given population is estimated using cumulative number of infections averted within the evaluation timeframe of the model. This cost consists of: (i) the cost of diagnosing HIV in number of cases, which is estimated using the number of infections averted; (ii) the cost of treating of co-morbidities in the number of HIV-positive people, which is estimated using the difference in the overall number of HIV-infected; (iii) the cost of preventing of vertical HIV transmission in the number of cases, which is estimated using the difference in the overall number of HIV-infected women

The difference between cost of intervention and related savings in the health sector represents the total incremental cost of the intervention. This cost after discounting is included in the numerator of C/E ratio. The discounted number of infections averted represents the denominator of the C/E ratio.

The Incremental incremental cost-effectiveness ratio for each evaluated prevention programme is calculated by dividing the change in simulated health outcomes by the change in costs with and without interventions:

$$ICER_i = \frac{Incremental\ Cost}{Incremental\ Effect} = \frac{C_i - C_0}{E_i - E_0}$$, where

$ICER_i$ - incremental cost-effectiveness ratio for programme *i*

C_i - discounted total cost attributed to the programme *i*

C_0 - discounted total cost of HIV (no intervention)

E_i - discounted total health outcome attributed to the programme *i*

E_0 - discounted total health outcome for the case of not implementing the programme *i*

The reported data items for each evaluated prevention programme include: (i) Incremental cost-effectiveness ratios; (ii) Number of infections averted; (iii) Discounted number of infections averted; (iv) Total incremental costs; (v) Discounted total incremental costs

5.5. Results

5.5.1. Intervention costs

The costs of interventions were estimated using cost-accounting and utilization data collected from NGOs involved in the implementation of prevention interventions in Altay krai. In 2003, there were several projects focused on implementation of prevention interventions, which focused on condom distribution and needle exchange. The costs were allocated to needle exchange and condom distribution interventions in proportion to utilisation of relevant resources. The costs per unit of coverage were obtained by dividing total intervention cost by the number of clients in each relevant category who participated in the prevention programmes in 2003. Table 53 represents shows the breakdown of costs by categories by interventions.

Table 53. Economic costs of interventions (RR 000, 2003)

Cost Category		Needle Exchange		Condom Distribution	
		Total Annual Cost	Cost per Unit of Coverage	Total Annual Cost	Cost per Unit of Coverage
Capital	Buildings	29.00	0.0283	17.64	0.0283
	Equipment	18.66	0.0182	11.35	0.0182
	Transport	15.41	0.0151	15.41	0.0247
Capital Total		*63.06*	*0.0616*	*44.39*	*0.0713*
Recurrent	Materials	566.92	0.5542	93.71	0.1504
	Operation & Maintenance	21.72	0.0212	13.21	0.0212
	Other	15.66	0.0153	9.53	0.0153
	Personnel	104.14	0.1018	63.35	0.1017
Recurrent Total		*708.45*	*0.1383*	*179.79*	*0.1382*
Grand Total		**771.50**	**0.7542**	**224.19**	**0.3598**

5.5.2. Health Service costs for management of HIV cases. HIV costs

The health service costs for management of HIV cases cost of HIV was were estimated using data collected in the HIV/AIDS sub accounts study which allowed detailed estimation of costs disaggregated by sources of funding, health system functions and cost categories (.28). As the evaluation adopted a health service perspective, the following classes of costs were considered not relevant and excluded from the analysis: (i) costs financed from international donor sources (HF.3) as these are already accounted for in the cost of interventions; (ii) costs incurred by providers outside of the healthcare system, such as NGOs and penitentiary system; (iii) costs related to ARV treatment; (vi) costs of prevention programmes; (v) costs related to HIV screening programme. The functional classifications defined in the HIV/AIDS sub accounts were used to identify HIV costs according to the prevention categories defined in the HIV/AIDS sub accounts, namely: mother-to-child prevention, diagnosis of HIV and treatment of co-morbidities.

Table 54 represents the breakdown of HIV costs by types of resources, as defined in our economic model. An utilisation coefficient was introduced to adjust resource requirements to current level of utilisation of available resources.

We calculated cost per unit of utilisation for Maternal to child transmission (MTCT)TCT, HIV diagnosis and treatment of co-morbidities. This enabled us to estimate cost savings per HIV infection averted. We used these estimations to simulate health system savings for different scenarios of level of scale up (coverage) by prevention intervention: namely 20%, 40%, 60% and 80% coverage levels which enabled us to estimate number of HIV infections averted at each coverage level.

Table 54 presents the breakdown of HIV costs by types of resources, as defined in our economic model. An utilisation coefficient was introduced to adjust resource requirements to current level of utilisation of available resources.

Table 54. Economic costs of HIV (RR 000, 2003)

Cost Category	Total Cost	Utilisation Coefficient	Allocated Cost	Cost per Unit
Prevention of vertical transmission				
Capital				
Buildings	924.34	0.50	462.17	3.4235
Equipment	79.81	0.50	39.90	0.2956
Transport	39.47	0.50	19.74	0.1462
Total Capital	*1043.62*		*521.81*	*3.87*
Recurrent				
Personnel	1855.10	0.70	1298.57	9.6190
Other	117.15	0.85	88.49	0.6555
Materials	985.51	1.00	985.51	7.3001
Operation & Maintenance	248.91	0.50	124.45	0.9219
Total Recurrent	*3206.67*		*2497.03*	*18.50*
Total for Prevention of vertical transmission	**4250.29**		**3018.84**	**22.36**
Diagnostics				
Capital				
Buildings	525.82	0.50	262.91	0.7164
Equipment	433.83	0.50	216.91	0.5910
Transport	37.77	0.50	18.88	0.0515
Total Capital	*997.42*		*498.71*	*1.36*
Recurrent				
Personnel	2919.46	0.60	1751.68	4.7730
Other	331.01	0.60	198.61	0.5412
Materials	80.68	1.00	80.68	0.2198
Operation & Maintenance	384.67	0.50	192.34	0.5241
Total Recurrent	*3715.83*		*2223.30*	*6.06*
Total for Diagnostics	**4713.25**		**2722.01**	**7.42**
Treatment of co-morbidities				
Capital				
Buildings	913.44	0.50	456.72	0.1553
Equipment	83.47	0.50	41.74	0.0142
Transport	113.92	0.50	56.96	0.0194
Total Capital	*1110.83*		*555.42*	*0.19*
Recurrent				
Personnel	4066.97	0.70	2846.88	0.9683
Other	301.52	0.70	211.07	0.0718
Materials	270.11	1.00	270.11	0.0919
Operation & Maintenance	376.21	0.50	188.10	0.0640
Total Recurrent	*5014.81*		*3516.16*	*1.20*
Total for Treatment of co-morbidities	**6125.64**		**4071.57**	**1.38**

5.5.3. Effect of interventions on proximal determinants of infection

5.5.4. Efficacy of interventions

Empirical evidence on the efficacy of prevention interventions shows great variability of efficacy indicators, at times, with conflicting research findings. Therefore, we conducted several simulations with efficacy parameters varying from 25% to 75% for each intervention and for each of the selected coverage levels.

The Epidemiological model includes four parameters, related to the efficacy of selected types of interventions: (i) increase in condom use by sex workers, (ii) decrease in partner numbers by sex workers, (iii) increase in the use of clean needles in IDUs, and (iv) decrease in the partner numbers for sharing needles. Empirical evidence on the efficacy of prevention interventions shows great variability of efficacy indicators, at times with conflicting research findings. Therefore, we conducted several simulations with efficacy parameters varying from 25% to 75% for each intervention and for each of the selected coverage levels. The combinations used to define "optimistic" and "pessimistic scenarios are shown in Table 55.

Table 55. Combinations of efficacy parameters used in simulations

Intervention	Scenario	Increase in Condom Use (Sex Work)	Decrease in Partner numbers (Sex Work)	Increase in the Use of Clean Needles	Decrease in Partner Numbers (IDUs)
CD targeted to CSWs					
	Pessimistic	25%	75%		
	Optimistic	75%	25%		
NE+CD targeted to IDUs					
	Pessimistic	25%	25%	25%	25%
	Optimistic	75%	75%	75%	75%
NE+CD targeted to IDU CSWs					
	Pessimistic	25%	25%	25%	75%
	Optimistic	75%	25%	75%	25%

5.5.5. Projected population level impact of interventions

The combinations of the efficacy parameters which result in the minimum and maximum of simulated ICERs for each intervention type were selected for comparison of cost effectiveness. The simulations were done for coverage levels of 20, 40, 60 and 80% and combination of efficacy parameter levels presented in Table 56.

Figure 44 Figure 44 shows results of these simulations for condom distribution intervention. The cost effectiveness of this type of intervention is influenced by (i) the increase in condom use by sex workers and (ii) decrease in partner numbers by sex workers. Figure 44 shows that the same level of cost-effectiveness can be achieved either by increasing the scale of an intervention (coverage) or increasing the quality of the services provided (which would result in greater efficacy). The figure also shows that as the coverage level increases the variation in the range of cost per case averted for different efficacy levels decreases.

Effect of needle exchange and condom distribution interventions in IDUs and CSW+IDUs depends on all of the four abovementioned efficacy parameters. The simulations show a trend similar to condom distribution alone: i.e. as the coverage increases the variation in the range

of cost per case averted for different efficacy levels decreases. Hence, at higher coverage levels there is decreased sensitivity to efficacy level, or at low coverage levels there is high sensitivity to efficacy of interventions.

We estimated cost, outcomes and cost-effectiveness, by simulating optimistic and pessimistic scenarios for (i) Condom distribution targeted to CSWs (ii) Needle exchange and condom distribution targeted to IDUs (iii) Needle exchange and condom distribution targeted to IDUs who are also commercial sex.

5.5.6. Cost effectiveness

On the basis of sensitivity analysis described in the previous section pessimistic and optimistic scenarios were simulated for each intervention type. Table 58 represents the results of the simulations. Incremental cost-effectiveness ratio varied from 10,450 to -1,580 Russian Roubles (2003 prices) per infection averted depending on the type of intervention and efficacy scenario. Negative ICER indicates savings within the health system.

Figure 45 and Figure 46 show the cost-effectiveness plane for pessimistic and optimistic scenarios. The results demonstrate clearly for each intervention type in either scenario the dominance of options with higher coverage levels. Hence reaching high coverage levels for interventions is critical to achieving cost effectiveness.

The results also show that, despite high sensitivity to efficacy parameters, in the optimistic scenario, for a wide range of coverage, the relative cost-effectiveness of interventions (CD for CSWs, NE+CD for IDUs and IDUs that are CSWs) does not substantially change (Figure 46).

Needle exchange and condom distribution for IDUs who are also commercial sex workers dominates other options. However the interventions in this group produce low epidemiological effect in terms of number of infections averted (Table 58, Figure 45 and Figure 46).

Needle exchange and condom distribution targeted at IDUs is more cost effective than condom distribution to CSWs (Table 58, Figure 45 and Figure 46). Needle exchange and condom distribution targeted at IDUs produces considerable effect with relatively low increase in the cost (Table 58, Figure 45 and Figure 46). For these interventions in this target group, in the pessimistic scenario, savings for the health system are realised at coverage levels beyond 60%. However, in the optimistic scenario, NE and CD targeted at IDUs produces cost savings for the health system at coverage levels of 35% and beyond (Table 58 and 0).

For the pessimistic scenario, condom distribution to commercial sex workers does not produce savings for the health system, although many infections are averted at diminishing returns to scale (Table 58 and Figure 45). In contrast, in the optimistic scenario, condom distribution to commercial sex workers produces savings for the health system, but costs increase in a linear manner, in line with benefits (Table 58 and 0).

We estimated cost, outcomes and cost-effectiveness, by simulating optimistic and pessimistic scenarios for (i) Condom distribution targeted to CSWs (ii) Needle exchange and condom distribution targeted to IDUs (iii) Needle exchange and condom distribution targeted to IDUs who are also commercial sex workers.
The combinations of the efficacy parameters which result in the minimum and maximum of simulated ICERs for each intervention type were selected for comparison of cost effectiveness. The simulations were done for coverage levels of 20, 40, 60 and 80% and combination of efficacy parameter levels presented in Table 56.

Table 56. Combinations of efficacy parameters used in simulations

Scenario	Increase in Condom Use (Sex Work)	Decrease in Partner numbers (Sex Work)	Increase in the Use of Clean Needles	Decrease in Partner Numbers (IDUs)
Intervention				
CD targeted to CSWs				
Pessimistic	25%	75%		
Optimistic	75%	25%		
NE+CD targeted to IDUs				
Pessimistic	25%	25%	25%	25%
Optimistic	75%	75%	75%	75%
NE+CD targeted to IDU CSWs				
Pessimistic	25%	25%	25%	75%
Optimistic	75%	25%	75%	25%

Figure 44. Sensitivity of ICER to changes in efficacy parameters for condom distribution interventions in CSWs

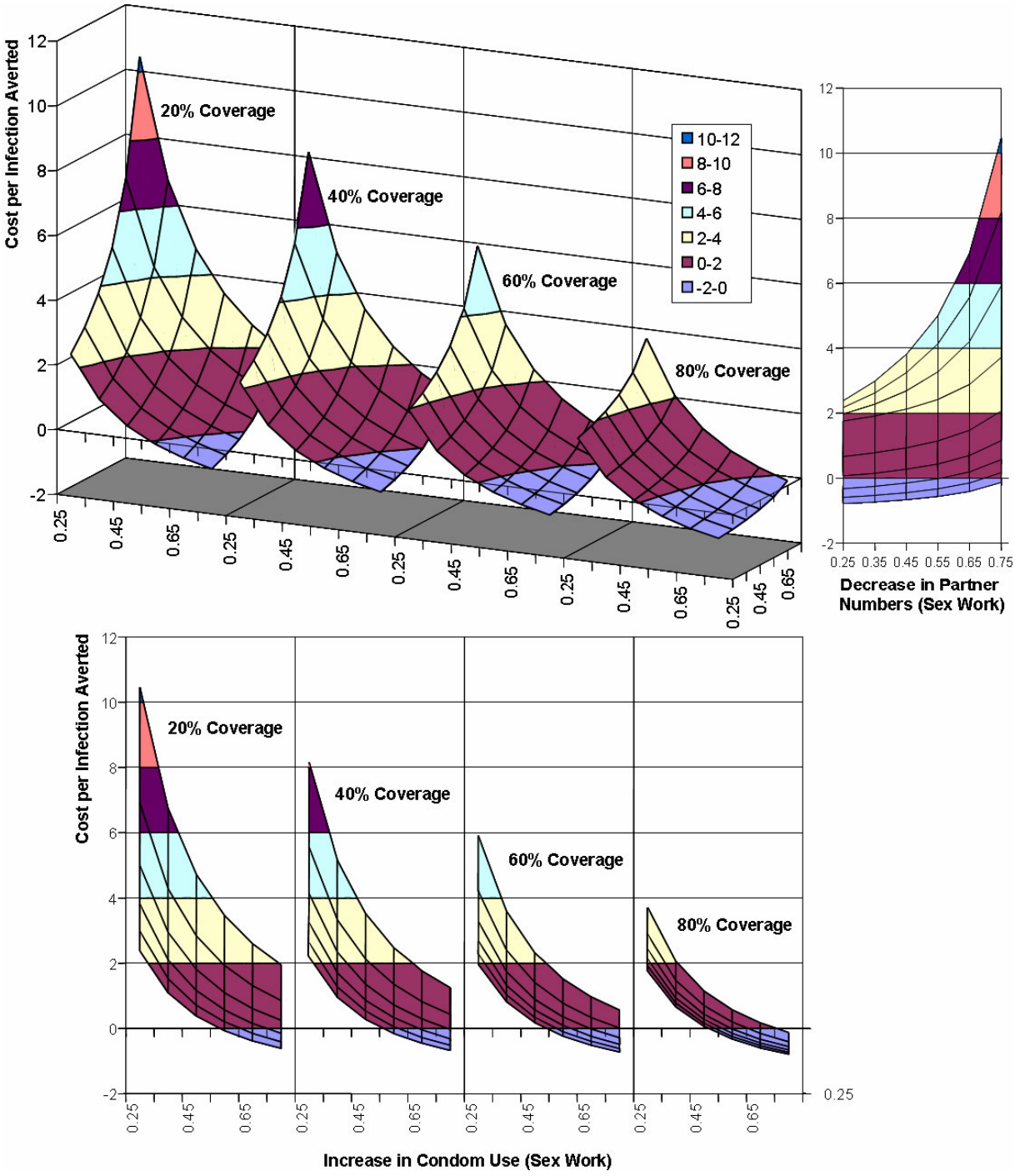


Table 57. Results for pessimistic and optimistic scenarios

Efficacy scenario Intervention

Coverage	ICER (RUR 000, 2003/IA)	Number of infections averted	Discounted infections averted	Total incremental costs (RUR 000, 2003)	Discounted incremental costs (RUR 000, 2003)
Pessimistic					
CD targeted to CSWs					
20%	10.45	7,424.44	5,224	85,675.20	54,615
40%	8.16	18,119.57	12,784	162,541.59	104,297
60%	5.91	34,680.79	24,547	223,523.05	145,047
80%	3.71	63,305.25	44,984	251,481.91	167,093
NE+CD targeted to IDUs					
20%	0.32	10,711.52	8,354	3,445.74	2,656
40%	0.18	22,181.08	17,279	3,475.28	3,119
60%	0.04	34,404.72	26,782	-95.68	1,175
80%	-0.1	47,323.66	36,847	-7,548.73	-3,579
NE+CD targeted to IDU CSWs					
20%	0.46	400.69	293	100.45	133
40%	0.11	929.71	678	-140.26	77
60%	-0.27	1,690.05	1,228	-1,003.08	-327
80%	-0.69	2,928.48	2,124	-3,171.17	-1,470
Optimistic					
CD targeted to CSWs					
20%	-0.61	60,707.63	43,284	-58,671.59	-26,390
40%	-0.67	124,721.84	89,120	-127,971.31	-59,343
60%	-0.72	192,006.21	137,544	-208,572.18	-99,499
80%	-0.78	262,333.99	188,478	-301,452.54	-147,899
NE+CD targeted to IDUs					
20%	0.53	10,590.72	8,657	8,701.73	4,595
40%	-0.17	26,185.84	20,972	-3,761.17	-3,542
60%	-0.82	49,616.03	39,074	-49,453.16	-31,967
80%	-1.41	85,490.25	66,507	-148,593.66	-93,860
NE+CD targeted to IDU CSWs					
20%	-1.46	1,443.04	1,063	-2,779.91	-1,551
40%	-1.49	3,007.96	2,215	-5,911.38	-3,309
60%	-1.53	4,712.52	3,470	-9,457.56	-5,314
80%	-1.58	6,578.69	4,844	-13,516.73	-7,633

5.5.7. Cost effectiveness

On the basis of sensitivity analysis described in the previous section pessimistic and optimistic scenarios were simulated for each intervention type. Table 58 represents the results of the simulations.

Incremental cost-effectiveness ratio varied from 10,450 to -1,580 Russian Roubles (2003 prices) per infection averted depending on the type of intervention and efficacy scenario. Negative ICER indicates savings within the health system.

Figure 45 and 0 show the cost-effectiveness plane for pessimistic and optimistic scenarios. The results demonstrate clearly for each intervention type in either scenario the dominance of options with higher coverage levels. Hence reaching high coverage levels for interventions is critical to achieving cost effectiveness.

The results also show that, despite high sensitivity to efficacy parameters, in the optimistic scenario, for a wide range of coverage, the relative cost-effectiveness of interventions (CD for CSWs, NE+CD for IDUs and IDUs that are CSWs) does not substantially change (0).

Needle exchange and condom distribution for IDUs who are also commercial sex workers dominates other options. However the interventions in this group produce low epidemiological effect in terms of number of infections averted (Table 58, Figure 45 and 0).
Needle exchange and condom distribution targeted at IDUs is more cost effective than condom distribution to CSWs (Table 58, Figure 45 and 0). Needle exchange and condom distribution targeted at IDUs produces considerable effect with relatively low increase in the cost (Table 58, Figure 45 and 0). For these interventions in this target group, in the pessimistic scenario, savings for the health system are realised at coverage levels beyond 60%. However, in the optimistic scenario, NE and CD targeted at IDUs produces cost savings for the health system at coverage levels of 35% and beyond (Table 58 and 0).
For the pessimistic scenario, condom distribution to commercial sex workers does not produce savings for the health system, although many infections are averted at diminishing returns to scale (Table 58 and Figure 45). In contrast, in the optimistic scenario, condom distribution to commercial sex workers produces savings for the health system, but costs increase in a linear manner, in line with benefits (Table 58 and 0).

Table 58. Results for pessimistic and optimistic scenarios

Efficacy scenario Intervention Coverage	ICER (RUR 000, 2003/IA)	Number of infections averted	Discounted infections averted	Total incremental costs (RUR 000, 2003)	Discounted incremental costs (RUR 000, 2003)
Pessimistic					
CD targeted to CSWs					
20%	10.45	7,424.44	5,224	85,675.20	54,615
40%	8.16	18,119.57	12,784	162,541.59	104,297
60%	5.91	34,680.79	24,547	223,523.05	145,047
80%	3.71	63,305.25	44,984	251,481.91	167,093
NE+CD targeted to IDUs					
20%	0.32	10,711.52	8,354	3,445.74	2,656
40%	0.18	22,181.08	17,279	3,475.28	3,119
60%	0.04	34,404.72	26,782	-95.68	1,175
80%	-0.1	47,323.66	36,847	-7,548.73	-3,579
NE+CD targeted to IDU CSWs					
20%	0.46	400.69	293	100.45	133
40%	0.11	929.71	678	-140.26	77
60%	-0.27	1,690.05	1,228	-1,003.08	-327
80%	-0.69	2,928.48	2,124	-3,171.17	-1,470
Optimistic					
CD targeted to CSWs					
20%	-0.61	60,707.63	43,284	-58,671.59	-26,390
40%	-0.67	124,721.84	89,120	-127,971.31	-59,343
60%	-0.72	192,006.21	137,544	-208,572.18	-99,499
80%	-0.78	262,333.99	188,478	-301,452.54	-147,899
NE+CD targeted to IDUs					
20%	0.53	10,590.72	8,657	8,701.73	4,595
40%	-0.17	26,185.84	20,972	-3,761.17	-3,542
60%	-0.82	49,616.03	39,074	-49,453.16	-31,967
80%	-1.41	85,490.25	66,507	-148,593.66	-93,860

Efficacy scenario Intervention Coverage	ICER (RUR 000, 2003/IA)	Number of infections averted	Discounted infections averted	Total incremental costs (RUR 000, 2003)	Discounted incremental costs (RUR 000, 2003)
NE+CD targeted to IDU CSWs					
20%	-1.46	1,443.04	1,063	-2,779.91	-1,551
40%	-1.49	3,007.96	2,215	-5,911.38	-3,309
60%	-1.53	4,712.52	3,470	-9,457.56	-5,314
80%	-1.58	6,578.69	4,844	-13,516.73	-7,633

Figure 45. Comparison of cost-effectiveness of interventions, pessimistic scenario

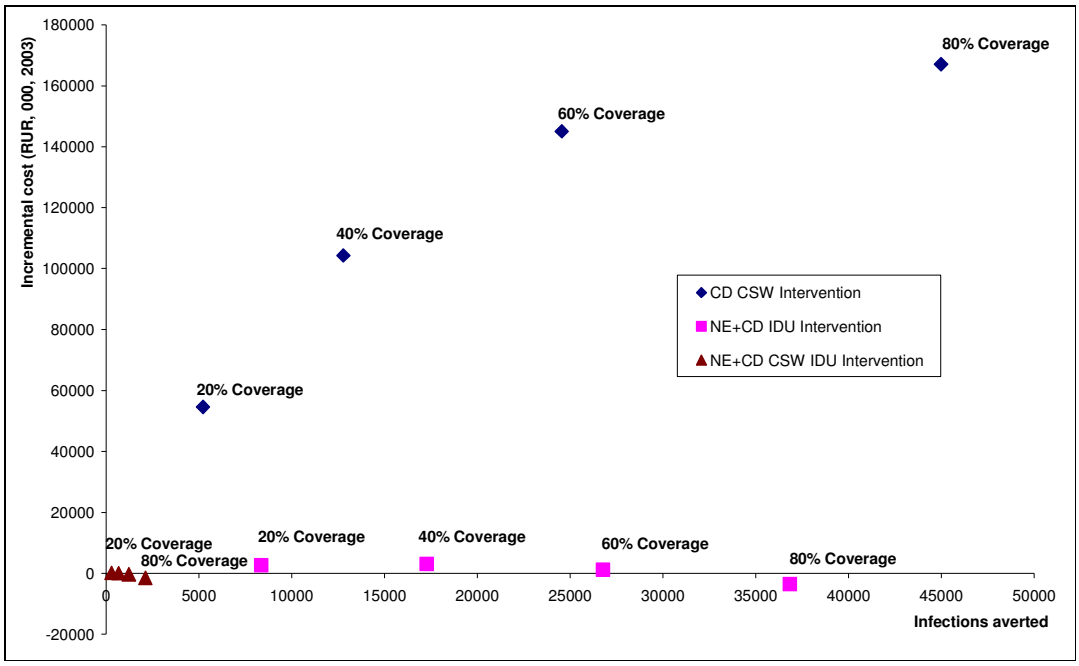
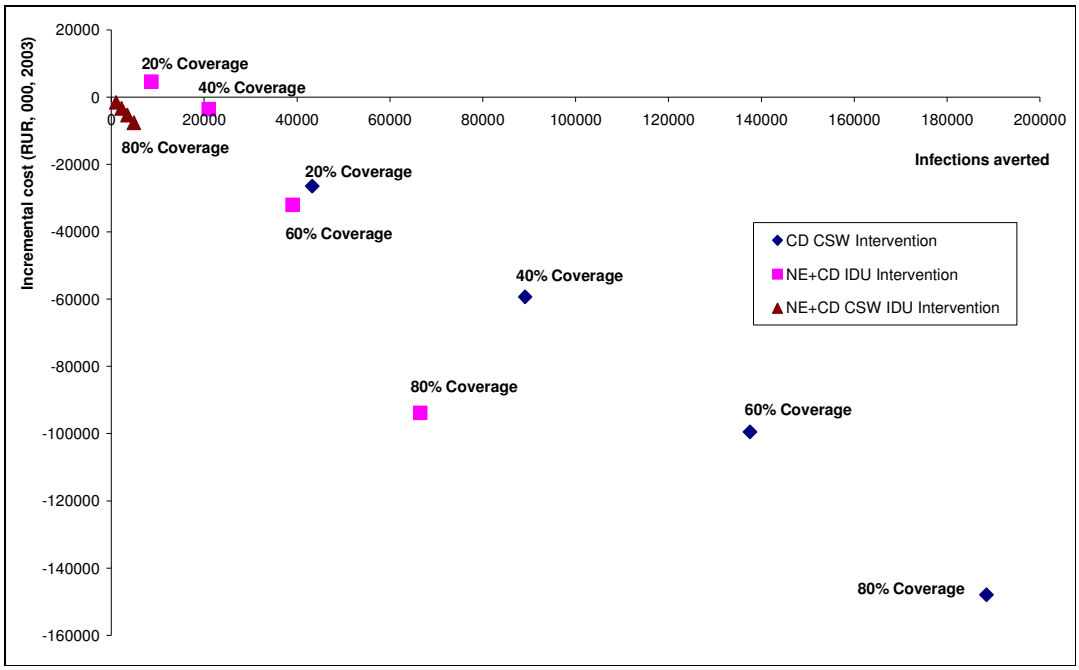


Figure 46. Comparison of cost-effectiveness of interventions, optimistic scenario



5.6. Conclusions and policy implications

The model and simulations show that cost-effectiveness of prevention interventions is extremely sensitive to the efficacy parameters. In turn, these parameters (i.e. the efficacy of interventions) are influenced by organisational and contextual factors and particular local settings where an intervention is implemented.

Increase in cost effectiveness can be achieved by both increases in the scale of interventions and improvement of the efficacy of interventions. Scaling up interventions is a more effective strategy to pursue, as with increases in scale (coverage) the impact of variations in efficacy on cost-effectiveness considerably declines. Further, for the parameters tested in the model, for a wide range of parameter values, the options with higher coverage levels always dominate in terms of cost effectiveness.

However, there is a risk that rapid increases in the scale of operations can result in substantial decline in the overall quality of services. In addition, scale-up may be constrained by availability of resources – especially human and financial resources. Hence, while scaling up it is important to ensure that quality is not adversely affected.

The results show that needle exchange and condom distribution targeted to IDUs who are also commercial sex workers is the most cost-affective intervention among the modeled prevention interventions. However, these interventions in this target group produces low number of infections averted, most probably, due to predominance of intravenous route of transmission of HIV in the country. Interventions in IDUs and CSWs, despite being less cost effective, produce relatively large epidemiological effect.

Needle exchange and condom distribution targeted at IDUs is more cost effective than condom distribution to CSWs. Needle exchange and condom distribution targeted at IDUs produces considerable effect with relatively low increase in the cost. For these interventions in this target group, in the pessimistic scenario, savings for the health system are realised at coverage levels beyond 60%. However, in the optimistic scenario, NE and CD targeted at IDUs produces cost savings for the health system at coverage levels of 35% and beyond.

For the pessimistic scenario, condom distribution to commercial sex workers does not produce savings for the health system, although many infections are averted at diminishing

returns to scale. In contrast, in the optimistic scenario, condom distribution to commercial sex workers produces savings for the health system, but costs increase in a linear manner, in line with benefits

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CHAPTER 6. HIV/AIDS response in Russia: Opportunities for strengthening national and local actions

6.1. Introduction

Policies and actions implemented and undertaken by governments, non-governmental organisations (NGOs), private sector and international donors in response to HIV/AIDS can have an important influence on the course and scale of the epidemic and its impact experienced in any country (1). The complexity of legal, economic and social forces shaping the risk environment and driving HIV/AIDS epidemics requires a multidimensional response. Policies in relation to HIV are, therefore, often numerous and with multiple foci (2) addressing the many factors that directly or indirectly lead to the spread of HIV or increase people's vulnerability to the infection (3). The modern principles of an effective HIV response laid out in the UNGASS Declaration (4) and the Global AIDS Strategy Framework (5) demand policies which integrate education, prevention and care and tackle HIV-related risks, vulnerability and impact.

Moreover implementing interventions in health which work within the context of prevailing structures of organisation of social institutions presents many challenges. The success or failure of a health intervention is often influenced, or even determined, by contextual and health system factors (6;7). One way of overcoming these challenges has been to deliver interventions through vertical programmes, which typically focus on a single disease or intervention: for example HIV/AIDS control programmes. However, vertical programmes often lead to fragmentation and duplication of services, reducing the likelihood of their effective integration with the broader health system. This increases the risk of governments diverting resources away from other vertical areas or the health system, with adverse effect on the 'added value' of these programmes, and reducing the chances of long-term programme sustainability (7:8).

The UNAIDS Report of 2004 argues that since the beginning of the 21st century HIV/AIDS leadership and resources has markedly increased (9). But the challenge is still great and the epidemic continues to grow threatening international development. Thus many senior political leaders from countries where prevalence of HIV is relatively low and the epidemic is concentrated in high-risk groups, remain detached from the HIV response(9). Prevention efforts in many settings have been inadequate and generally ineffective (9). Access to antiretroviral treatment and other HIV-related care remains abysmally low (9).

Russia is not an exception to this challenge (10;11). The most recent decree of the Chief Sanitary Doctor of the Russian Federation issued in April 2005 points out a number of weaknesses in the Russian system of HIV response (10). It argues that heads of administration in a number of territories of the Russian Federation are sparing :

> "insufficient attention to issues of counteracting HIV infection prevalence… Harm reduction programs and other modern technologies of HIV prevention among the most vulnerable population groups are implemented into practice too slowly").
>
> "Specialized educational programs to combat HIV and drug addiction in schools… are developed slowly"
>
> "Still the challenge of HIV/AIDS treatment availability… is very acute, and many of treatment and rehabilitation facilities are not ready to provide high-quality medical care to those patients with HIV/AIDS who have got severe disease"

The policy literature and experience suggest that successful attempts to improve public policy and to make policy responsive to the needs of the population requires an understanding of what the policy comprises, how it is made and implemented, and the way in which contextual factors determine and influence the policy failure or success (12;13). By developing and applying our ability to analyse these issues, we can hope to improve our capacity to make policies work in the way they were intended to work; if we can see what is behind a policy and

the system in which the policy operates, we can begin to judge how best it might be implemented (14). This view provides the rationale for the policy and health system research studies implemented within the framework of the Knowledge programme and which we report in this chapter. Because the studies overlap in terms of the topics and research questions which they address, in what follows we present the methods used study-by-study; but describe the results topic by topic.

6.2. Key issues

As proposed above policy on HIV/AIDS has many different foci. Within the scope of the Programme we were not able to examine all aspects of the response to HIV/AIDS in Russia. Instead we concentrated on what, in our view, were the most important issues to understand, in order to make the current policies more effective and efficient. Thus our key research questions are:

- What are the views of stakeholders as to the nature and importance of the HIV epidemic ?
- what are the attitudes of stakeholders towards different types of interventions and services;
- what do stakeholders view as the systemic and contextual barriers to an effective HIV response
- what information is available to stakeholders for policy making and how is this communicated ?

6.3. Studies and methods

Here we report results of five studies implemented at federal and regional (Altai and Volgograd) levels. Using different methodologies the different studies operationalised the key issues identified in 6.2 as a subset of research questions / objectives for the study.

6.3.1. Study 1: Analysis of HIV institutional stakeholders.

This study was implemented at the federal level and in both programme regions. It focused on three key objectives:

(1) to identify and map federal and regional organisational stakeholders who were or could potentially be involved in HIV response;

(2) to assess stakeholders' perceptions of and attitudes towards the HIV/AIDS epidemic and response including the following:

- perceptions of the HIV situation, its impact and significance for Russia,
- views on the role of different stakeholders in HIV response and on multisectoral co-operation and coordination;
- attitudes towards various HIV interventions; and
- views on financing of HIV/AIDS services;

(3) to assess the nature, sources and types of HIV-related information available to stakeholders and used in policy-making;

Data were collected between February 2004 and June 2005 using qualitative semi-structured interviews with 154 organisational stakeholders (66 in Volgograd, 66 in Altai and 22 in Moscow). Respondents were selected by snowball and purposive sampling.

In the regions the data were collected in four rounds. In round 1 subjects interviewed were the members of the Intersectoral Committees on AIDS. In rounds In rounds 2 and 3 we interviewed representatives of government organisations and local NGOs who had been identified by the members of the Intersectoral Committees as either involved in, or having the potential to influence HIV policies and interventions. In round 4 we interviewed private sector

stakeholders, with subjects purposively selected to include the largest regional enterprises based on the number of employees and the annual taxable income.

At the federal level subjects interviewed included members of the HIV/AIDS Co-ordination Council, members of the State Duma, government officials, academics and representatives of Moscow-based NGOs involved in HIV/AIDS activities.

Interviews were conducted using specially designed and pre-tested topic guides. With the consent of interviewees, the interviews were tape-recorded. These recordings were later transcribed, and transcripts analysed according to a pre-defined system of thematic codes.

6.3.2. Studies 2 and 3: Population and behavioural surveys

The data on the perception of the epidemic by the population were collected through the Russian Longitudinal Monitoring Survey (RLMS) and the Household survey in Altai Krai.

The RLMS is a nationally representative survey of the Russian population. It is based on a stratified random sample of households and individuals. The survey has been carried out in Russia annually since 1992. Different sections of the survey deal with health, nutrition, education, economic status, employment, expenditure and other characteristics. In 2001 and 2003 a module was added to the main survey to investigate sexual behaviour and attitudes towards HIV/ AIDS among the sexually active population. This module was distributed only to those between the ages of 14 and 49 who had also participated in the main survey. The data reported here were collected through this module and describe respondent's knowledge of the risks of catching HIV, sources of information and attitudes towards treatment and how they have changed between 2001 and 2003. There were 6115 and 5807 persons in the samples in Rounds 12 and 10 respectively with 46% and 45% of them being male. The age/sex characteristics of the respondents in the two samples are shown in Table 59.

Table 59. RLMS sample characteristics

	2001 (ROUND 10)				2003 (ROUND 12)			
age group	Number	Percent	Men	percent male	Number	Percent	Men	percent male
<20	968	16.7	449	46%	1,023	16.7	502	49%
20-24	894	15.4	383	43%	923	15.1	384	42%
25-29	875	15.1	414	47%	974	15.9	471	48%
30-34	715	12.3	317	44%	827	13.5	381	46%
35-39	719	12.4	361	50%	705	11.5	339	48%
40-44	846	14.6	365	43%	794	13.0	367	46%
>=45	790	13.6	347	44%	869	14.2	376	43%
Total	5807	100			6,115	100		

The Household and Behavioural Survey in Altai Krai asked similar, but not identical questions to the RLMS. Respondents here were between the ages of 14 and 49. The overall sample size was 1397. The sample characteristics are shown in Table 60.

Table 60. Altai Krai population survey: Sample characteristics

Age group	Number	Percent	Men	percent male
<20	277	20%	126	45%
20-24	264	19%	115	44%
25-29	135	10%	64	47%
30-45	451	32%	178	39%
>=45	270	19%	122	45%
Total	1397	100		

6.3.3. Study 4- Analysis and mapping of Drug treatment services

This is a multi-method study undertaken to map and describe drug treatment services in two cities (Barnaul and Volgograd). The rationale was to assess clients' and practitioners' perceptions of and attitudes towards drug treatment services and the feasibility of improving community-based drug treatment interventions as an effective tool in HIV prevention.

The study employed four complimentary methods:

(i) Drug treatment service mapping;
(ii) In-depth interviews with drug injector clients of drug treatment services;
(iii) In-depth interviews with service providers; and
(iv) Treatment surveys.

The study focused on the following key issues:

(i) existing drug treatment, after-care and community-level follow-up services;
(ii) referral mechanisms to other agencies and linkages with harm reduction programmes;
(iii) levels of knowledge and awareness of services by the clients;
(iv) experiences of; acceptability and satisfaction with services;
(v) range, scope coverage and quality of services; and
(vi) barriers to accessing the services.

The participants of the in-depth study with clients of drug treatment services were recruited through local drug treatment facilities, needle exchange programmes, and drug users' networks using the snowball technique. The criteria for participation were: 1) to have injected drugs; and 2) to have experienced drug treatment (including self-treatment).

Subjects for the study with providers were recruited through local drug treatment services by purposive sampling. 38 semi-structured interviews were conducted. The sample include 4 representatives of the local drug treatment administrations; 24 drug treatment providers; representatives from administrations of the two cities, the State Drug Control Committee, the Youth Committee, the regional Drug Addiction Committees, and representatives of three NGOs working with injectors.

Drug treatment survey participants were recruited from in-patient and out-patient drug treatment facilities. The criterion was having ever injected drugs. The survey was self-administered. The data were analysed in SPSS version 11.5 for Windows (SPSS Inc., Chicago, Illinois). Chi-square tests were performed to explore the differences between the cities and between variables.

6.3.4. Study 5- Health system and its impact on HIV services.

This study aimed to identify the key health system and contextual factors influencing HIV programme delivery. The study drew on the methodology used for rapid situational assessments and was implemented in Volgograd in three phases: (1) analysis of relevant published literature, documents and routine data from the region; (2) interviews with key informants and; and (3) further collection and analysis of available data.
Analysis of findings focused on the political economy in which efforts to control HIV sit, the legal environment, health system elements (organisation, financing, resource allocation, provider payment system, service provision), public health control, epidemiological trajectories, cultural responses, the political environment, and extent of multisectoral working in response to the HIV epidemic.

6.4. Results

6.4.1. Perception of HIV/AIDS by stakeholders influencing HIV policies and interventions.

The institutional stakeholder study explored perceptions of HIV/AIDS as a public problem nationally and in the two regions studied. Firstly, we asked respondents to name up to three general and up to three health-related problems and examined the place of HIV/AIDS among other policy priorities identified. Secondly, we asked respondents' own opinion on to how important HIV/AIDS was compared to other public issues. Thirdly, we asked them how serious, they thought, HIV/AIDS was taken by the government and by the population in Russia as a whole and in the two regions.

6.4.1.1. Importance and impact of HIV/AIDS

When asked about the importance of HIV/AIDS directly over 99% of interviewees regarded it as either "one of the most important" or a "very important" public issue. The answers were similar between the stakeholder groups and between the regions. Also, most respondents disagreed with the statements that *"the problem of HIV prevalence in the Russian Federation is largely overestimated"*; that "*AIDS is dangerous only for other risk groups*" and that "*HIV/AIDS is a medical problem, and it ought to be solved within the healthcare system exclusively*". The majority agreed that "*It is important to talk and write about HIV/AIDS as much as possible*".

However when HIV/AIDS was examined within the framework of other regional priorities its significance became less obvious. Regional respondents reported several dozen different policy priorities for their communities and there was no evidence of any formal process for prioritization of these issues or deciding funding levels to address them. HIV/AIDS was named less frequently than many other policy issues. For example among 189 answers describing general regional priorities in Volgograd Oblast, HIV/AIDS was mentioned only 11 times. Socio-economic issues such as unemployment, debt payment and closure of factories have been given higher priority than health issues in general and than HIV/AIDS specifically[lxviii]. Although health and high risk behaviours were mentioned by a large number of respondents as important problems, drug abuse, alcohol dependence, smoking and tuberculosis were named much more frequently than HIV/AIDS (15;16).

> "It depends on the point of view. From the medical point of view it is perhaps not a priority, at least for today, because the prevalence in the population does not exceed one percent. We have a lot of other diseases that are much more significant, in their dangers and their consequences; as well as in their prevalence".
>
> "I believe that HIV/AIDS infection has to be among the priorities, among the first ten….Well, you know, it is like probably an iceberg, it may be somewhere, when you touch it, it looks somewhere over there".
>
> "I would not say that (HIV/AIDS) it is no priority at all, but those problems that I have mentioned if you have noticed, they are in the ranking order, even for me AIDS is somewhere in the third group of problems. Because so far neither AIDS mortality, nor AIDS incidence, nor budget expenditures associated with it can not be even closely compared to all the other things"

The health issue identified as very important by almost all regional respondents was that of poor access and quality of the healthcare services. Many respondents saw this broader issue as a significant barrier to delivering an effective response to HIV. A number of respondents argued that the healthcare reforms undertaken in the late 1980s and early 1990s hade been confusing, contradictory and incomplete and had not improved access to or quality of services.

We also asked respondents to what they thought were the three main negative effects HIV/AIDS would have in Russia and their own regions in the future. The majority named *increase of premature mortality*", "*decrease of natural population growth*", "*decrease in number of population capable of working*" and "*increase of state expenditures for healthcare*". Less certainty has been expressed in relation to the impact of AIDS on the Russian economy, levels of poverty, the number of orphans and political process. Only a few regional informants argued that HIV/AIDS would lead to a "*decrease in gross domestic product*", or an "*increase in number of the poor*", or an "*increase in number of orphans*" or "*political instability*" in their regions. Between 20% and 30% of informants in different rounds of the regional studies either disagreed or could not judge whether "*AIDS threatens Russia's economical growth*" [lxix].

When asked about the attitude of the government institutions towards HIV/AIDS, respondents expressed different opinions. Around 30% of government stakeholders and over a half of non-governmental stakeholders suggested that "*they (government) do not take this seriously*". A large number of respondents argued that "*state structures are giving global emphasis to that problem*" and that the government's commitment was in words rather than deeds.

> "The problem is not funded as much as this is needed…. (and)…. no decisive measures… are undertaken".

Ninety nine percent of respondents in both regions described financial resources available to address HIV/AIDS as either "*not too large*" or "*extremely insufficient*". Many argued that AIDS was only taken seriously by healthcare professionals and "*those within state structures that are addressing this problem directly*".

The health system study in Volgograd found that, in 2004, HIV funding approved in the Oblast Budget Law was RR 5,873,000, but only RR 4,387,000 (74.7%) was actually delivered. This amounted to approximately US$0.12 per person per year. The study also found that funding from federal sources had gradually declined over recent years and that, on average, the Volgograd Oblast received only around 10% of the funds requested from the federal level.

At the same time a number of respondents, particularly at the federal level pointed out progress was being made.

> "rather long-term work is starting to bear fruit, and we see that… this problem is gradually being understood; not all is as quick as we would desire, but there is clear transition towards such understanding".

However, some regional respondents argued that this was an artifact of external influences rather than a home grown shift.

> "accentuated attention to the problem of HIV/AIDS is related only to large inflow of money from abroad. There is no talk about… serious attitude towards the problem in this case".

6.4.1.2. Impact on public and private sector organizations

Respondents were also asked how the growing epidemic "*would influence the activities of your organization*" and "*to which extent employees of your organization are vulnerable to HIV*". Regarding the impact of AIDS on the institutions, opinions were different in different stakeholder groups. Most members of the Intersectoral Committee on AIDS and NGOs reported that *the* problem of AIDS is affecting" and would continue to affect their organizations. They suggested that this influence would largely result from increased HIV/AIDS related work and from increased demands on budgets for this. They also suggested that this would squeeze resources for other health problems.

> "We were working and we will be working. We will be working even more"

> "We have to and I must say, to start working very actively not only with resolving medical questions, but also participating in various programs that exist in the territory of the city"

> "With the increase in number of patients, with the increase of incidence there will be funds, they must be reallocated to address this problem…. for other problems, for addressing those problems there would be less funding".

Among government institutional stakeholders who were not members of the Intersectoral Committee on AIDS, opinion varied as to the impact on their organization. Many of them thought that the epidemic was having little impact.

"(HIV/AIDS)….*is not affecting activities of our organization so far, thanks God*" or that it does not affect them "directly".

Most private sector stakeholders did not believe that the epidemic would affect them in the future. Similar results were shown by the health system study. It found that significant segments of the society, including the business sector still did not perceive HIV to be a threat, as commented by the deputy director of a large industrial enterprise:

> "… we, as an industrial group] are aware of the situation in Volzhski, but in our enterprise we do not even want to think about the threat of HIV."

6.4.1.3. Vulnerability of staff

A large proportion of regional respondents believed that their employees were vulnerable to HIV. However, very few of them related the vulnerability to behavioural risks. Most respondents particularly those in government institutions believed that their employees were not at risk as a result of their behaviour.

> "(they are)….. absolutely invulnerable. Because they are all intellectually developed, they will not expose themselves to becoming infected with AIDS".

Rather, the perceived risk of acquiring HIV was linked to either direct professional contacts with HIV-positive people or to what the respondents called "*acquiring HIV by chance*" through which implied unsafe medical procedures, dental practices or manicure services:

> "Vulnerable.., they are vulnerable ….because they deal with HIV-infected people, work with them and nobody is protected against such person attacking, biting, or doing something else".

> "Naturally, vulnerable, like anyone, for instance a dentist, a pedicurist... "

The possibility of behavioural risks such as injecting drugs or multiple unprotected sexual contacts were recognized by only a few respondents. Among private sector respondents indicated that there was little thinking, talked about the risk of HIV amongst their employees:
"*Oh, we never even had such a lecture (on HIV/AIDS)…. , nothing. We've got posters here at the traumatology room. We have got a medical worker, but I have never heard anything discussed out loud or in conversations in the corridor"*.

6.4.2. Knowledge and perception of HIV/AIDS among the general population.

6.4.2.1. Knowledge of HIV/AIDS

Respondents to the stakeholder study argued that, as with the government, the Russian population did not perceive the problem seriously enough. This view was shared by a 50-70% of respondents in different stakeholder groups in the regions. In fact, institutional stakeholders' views on the general population's perceptions of HIV/AIDS were remarkably consistent.

> "until not long ago the majority of the population believed and probably they still believe that this disease is related to and bound up with high risk groups.. and that this problem has a very indirect relation to themselves".

Some argued that AIDS was a serious problem only for those whose families or friends were directly affected. Many respondents believed that the perception of HIV/AIDS varied between different age groups. However there was no unanimity as to what these variations were. Some argued that believed that older people had a clearer understanding of the issue.

"today this problem is better perceived by people of middle and senior age".

Others took a contrary view, arguing that the problem of AIDS was closer to younger people and that they therefore they took it more seriously.

A number of respondents said that the attitudes towards AIDS in Russia had changed for the worse over time.

> "some time ago they (the population) used to treat this much more seriously than now, that… people… start to care much more about other problems, they got used to this word, to this phenomenon".

Similar findings were obtained through analysis of the RLMS data. The RLMS asked if the respondent had discussed HIV with anyone in the four weeks preceding the study. There were fewer people discussing the issue amongst themselves in 2003 as compared to 2001 (Table 61). Interestingly, although the ranking of discussants was identical in both years (with sex partner coming fourth), the biggest fall was in those discussing HIV with their family.

Table 61. RLMS: Discussions about HIV in last 4 weeks

	2001 (ROUND 10)		2003 (ROUND 12)	
Question: Discussed	**% yes**	**n**	**% yes**	**n**
Has discussed HIV with anyone in last 4 weeks	13.8%	744	8%	461
i. with sex partner		138		88
ii. with friend		301		174
iii. with family		214		90
iv. with medical worker		101		71
v. with co worker		229		148

The RLMS also asked questions about people's knowledge of the main ways of becoming infected with HIV. Findings are presented in Table 62, and show that that the knowledge about HIV-related risks was largely correct. There was little difference between the two years apart from responses to the question *"can mother to child transmission of HIV be prevented?"* which had a far higher percentage answering "yes" in 2003. In addition to the quantitative questions each respondent was asked to write down how people could avoid HIV infection, generating several thousand text answers. The most frequent answers were "use a condom" and "have only one partner". Few respondents referred to the risk of injecting drugs or ways that IDUs could protect themselves.

Table 62. RLMS: knowledge of HIV transmission and prevention

	2001 (ROUND 10)		2003 (ROUND 12)	
	% yes	n	% yes	n
Can people avoid HIV infection?	93%	4529	92%	4646
Can someone who looks healthy have HIV?	97%	4650	96%	4709
Can using a condom reduce the risk of HIV infection?	95%	4638	95%	4867
Can having one partner only reduce HIV risk?	95%	4917	96%	5123
Can you catch HIV through sharing cutlery?	34%	1336	34%	1380
Infected mother can pass it onto child at birth?	98%	4636	97%	4636
Baby can be infected through breast milk?	74%	2271	71%	2172
Can HIV infection be prevented from passing from mother to child?	34%	983	49%	1351
How can HIV infection be prevented from passing from mother to child?				
drugs before birth		405		603
don't breast feed		321		425
caesarian -section		206		319

People's knowledge levels were also examined in the household survey in Altai Krai (Table 63). It is worth noting that this table is not strictly comparable with Table 62 as it includes those who answered "don't know". But when that is taken into account the numbers for Altai are very similar to those obtained nationally from the RLMS.

Table 63. Altai Krai household survey: knowledge of HIV transmission and prevention

	True	False	Don't know
Having one uninfected partner who has no other partner reduces the risk of catching HIV	60%	14%	19%
Using a condom in each sexual contact reduces the risk of catching HIV	81%	6%	8%
HIV can be transmitted from a HIV infected mother to her child during pregnancy	78%	6%	12%
HIV can be caught by sharing a cigarette with someone who is HIV positive	16%	57%	21%
HIV can be caught by sharing a meal or cutlery with an infected person	15%	60%	19%
HIV can be caught via a mosquito bite	27%	35%	32%

6.4.2.2. Importance of HIV/AIDS

The household survey in Altai Krai also examined how respondents rated the importance HIV/AIDS in relation to other health challenges faced by the region by seeking of 10 health issues. The results are shown in Table 64.

Table 64. Altai Krai: Ranking of health issues

	Very Important (%)	Somewhat Important (%)	Important (%)	Not Important (%)	Sample n
TB	1%	4%	28%	55%	1204
Cancer	1%	3%	22%	61%	1208
HIV	2%	4%	17%	64%	1202
Health access	1%	7%	25%	48%	1118
Alcoholism	2%	10%	31%	43%	1185
Smoking	6%	18%	29%	29%	1131
Accidents	5%	22%	29%	18%	1033
Cardiovascular	2%	9%	32%	37%	1106
Diabetes	4%	15%	29%	26%	1011
Drugs	1%	3%	14%	67%	1187

In this Table the percentages are those of the whole sample, i.e. 1397 but the number in the final column is the total of those that gave an opinion. As found in the study of institutional stakeholders study HIV came quite low down the list with 63.7 percent of the sample regarding it as 'unimportant'. However, in contrast with the decision-makers' views the issue of 'drugs' was regarded as equally unimportant. The most important health problems identified by the population were taken to be smoking and accidents followed by diabetes. The least important were HIV and drugs. Cancer also received a low ranking.

The respondents in the Altai household survey were also given some statements with which they were invited to agree or disagree. The results here were less clear and more difficult to interpret than in the stakeholder study. On the one hand there was support for keeping HIV/AIDS as a priority, with the overwhelming majority believing that there was a need for more discussion and written debate about AIDS. (Table 65).

Table 65. Altai Krai: Household survey

Statement	Agree	Disagree	Neither	Don't know
The problem of HIV spreading in Russia has been exaggerated	18%	63%	9%	11%
It is necessary to talk and write more about AIDS	81%	7%	5%	7%
AIDS is a problem of the healthcare sector and should be dealt with by medical professionals	38%	45%	6%	11%
HIV/AIDS is a serious threat to the Russian economy	50%	21%	20%	10%

Interestingly 48% of the survey sample stated that they had changed their behaviour in some way as a result of HIV. If this finding is correct this might indicate that in contrast to the view of regional decision-makers, people are taking the epidemic seriously.

6.4.3. HIV interventions: opportunities for and barriers to effective delivery

Here we examined the perception of different HIV policies and interventions by both decision-makers and the population. Although our particular focus was on harm reduction, sex education, provision of antiretroviral treatment (ART) and drug treatment services, we also touched upon examined a wider range of HIV activities in order to explore what HIV stakeholders and the population thought about the overall HIV response.

In the Altai household survey respondents were asked why they thought the HIV problem was not being addressed adequately. The results showed that the majority put blame very firmly

on the spread of drug use with the lack of financial resources, individual unwillingness to change behaviour and poor government commitments coming next (Table 66).

Table 66. Altai krai : Opinions on HIV problem was not solved

Why has the HIV problem not been solved	Major reason	Minor reason	Not important	Don't know
Drug use	83%	6%	1%	9%
Not enough money on prevention	63%	23%	4%	9%
People unwilling to change behaviour	60%	24%	6%	10%
Not Government priority	57%	29%	4%	10%
Poverty is increasing	57%	24%	10%	10%
Health professionals have insufficient knowledge	42%	34%	13%	11%

6.4.3.1. Harm reduction interventions and barriers to scaling-up

The institutional stakeholder study found that the majority of respondents were familiar with both the concept of Harm reduction (HR) and with HR projects implemented in their regions. The awareness was higher among those stakeholders who were directly involved in making and implementing decisions on HIV/AIDS (members of the Intersectoral Committees on AIDS and local NGOs). But even among government organisations that did not deal with HIV/AIDS on a day-to-day basis and more interestingly in the local business community, awareness of HR interventions was relatively high.

The study found that although most respondents were aware of HR and needle and syringe exchange (NSE) activities, not all of them were in favour of their expansion and scaling up. Views were roughly equally divided with about one third of respondents being for, one third being against the scaling up. The remaining third had not formed their opinion on HR or found it difficult to comment on the issue. But this division of views was not the same in all stakeholder groups. There were more supporters of HR among government organisations represented on the Intersectoral Committees on AIDS and among private sector stakeholders. A very interesting finding was a large number of HR opponents among NGOs and CSOs, particularly in Volgograd Oblast. More than half of them were categorically against scaling up of HR and NSE (17).

We identified four main arguments expressed by the respondents in support of the expansion of HR and NSE services in Russia:

(i) The problem of drug use in Russia was widely spread and could not be resolved within a short period of time. Therefore organisation of HIV prevention services for drug-users was desirable.
(ii) Contaminated syringes could facilitate the spread of the infection and exacerbate the epidemic even further, and this needed to be prevented.
(iii) An uncontrolled epidemic could threaten the future of Russia and needed to be stopped as soon as possible by HR activities.
(iv) HR projects with associated outreach components were the only effective way to contact hard-to-reach populations of drug-users.

Further, the stakeholder study identified eight main reasons, which in respondents' views prevented the development of HR in Russia and in their regions[lxx]. These included:

(i) Lack of financial resources and technical capacity to deliver HR programmes
(ii) Lack of information on how HR programmes operate and whether they are effective.
(iii) Perception of HR as an approach imposed from outside, and culturally unacceptable and contradictory to the national mentality
(iv) Opposition of certain interest groups and the public opinion in general.
(v) Unwillingness of IDUs to use the services due to the fear of stigma and prosecution
(vi) Mistakes made in advocacy and delivery of HR interventions at the early stages of the epidemic had resulted in HR being seen purely as distribution of needles and

syringes alone thus HR was seen as promoting and facilitating the spread of drug-use.

(vii) Marginalisation and stigmatisation of IDUs and denial of their rights to appropriate healthcare

(viii) Lack of legal clarity and regulatory framework on HR.

> "You know, it seems to me that very often a harm reduction program is substituted with one single concept, of s needle and syringe exchange program"

The population survey in Altai showed results similar to the stakeholder study. Around 30% of respondents supported; 40% opposed and 30% were not sure about the development of HR and NSE.

The findings of the qualitative study of Drug treatment services in Altai and Volgograd were also consistent with those from the institutional stakeholder study. Most service providers interviewed recognised the importance of delivering harm reduction messages. However they reported difficulty in providing harm reduction messages in abstinence-oriented treatment facilities. There was a widely spread opinion among drug treatment personnel and policy-makers that harm reduction *"cuts both ways*". On the one hand, it reduces harm but on the other hand, it promotes drug use. As a result there was little linkage between drug treatment and harm reduction services. We found that provision of harm reduction information to clients was not included in the drug treatment protocols. There were no referrals reported to harm reduction programmes by providers though HIV prevention information was reported to be available in drug treatment facilities in the form of posters and lectures.

> "You know, this is my personal opinion. But it is also supported by many colleagues here and in Moscow; I mean the State drug control agency. Those measures that are aimed at, for example, distribution of sterile syringes are also involvement. Direct involvement into drug use. At the same time you are involving them into that… This cuts both ways. I understand that this argument can be endless, and each side is right in its way. For example, I believe that this is direct involvement into drug use. That's it. Because those who deal with this problem are choosing the lesser of two evils. Saving population from AIDS, they are involving more and more people into youth drug addiction".

Attitude towards harm reduction were more favourable in Altai than in Volgograd. There was also more understanding in need of substitution treatment programs among Altai service providers:

> "But the largest problem is that this state and these law-makers do not allow us use replacement therapy. Still replacement therapy is making its own way in a perverted form. An example is youth starting to use the combination of alcohol with psychoactive substances. [And] this process is hard to control".

The health system study in Volgograd found that the emerging HIV epidemic was framed principally as an issue of drug-control and 'sociopathic behaviour' and seen as a problem '*imported*' from abroad. Consequently, prior to 2004, policy responses were frail with multi-sectoral policies and harm reduction programmes experiencing constrains. The rapid introduction of HR with NSE schemes led to substantial resistance from the public and policy-makers and the development of HR programmes had, in some cases to be stopped. This study found that the benefits of HR and NSE were known to policy makers and senior managers. But there was still a fear of backlash if such programmes were reintroduced or scaled up. Several respondents indicated that they believed that many problems with delivering HR arose from to the mistakes of international agencies:

> "the fundamental mistake was due to the members of international organisations who were young, inexperienced and eager to do something but would not listen to the voice of reason. This set us back in Volgograd by five years and only now the Regional AIDS Centre and other organisations are able to introduce multisectoral policies to combat HIV."

> "Doctors don't have, at lease did not have any common position in this problem… We are treating a patient, we are saying that drug use is not allowed in any way, under no conditions, and right here we would distribute syringes, i.e. this is a little complicated. To put it mildly: unacceptable. We had a long discussion about this theme when we were making decision about possibility of entering this process, but on the other hand we understand that there are some positive aspects".

> "Well, in Russia with the support form Soros foundation more than 70 territories have participated in these programs. And starting with around 1998 a lot of material have been read where it is written that this is all good. But effectiveness; there are no strictly defined criteria of there programs' effectiveness. That is why this all is not very clear to us. So it happens so that persuading other agencies, organizations, the law makers that this is essential is very complicated. There is nothing to lean on, no facts and no figures. We are getting the monthly bulletin "Harm reduction in Russia", a very good resource, very well written, but again only general phrases. All is not very clear."

> "[it was] the external consultants who did not understand the context and societal attitudes. The focus of early harm reduction was on needle exchange which was not right. Rapid introduction of needle exchange programmes galvanised the opposition who considered HIV to be a problem of drug users, prostitutes and homosexuals and objected to any public funds to be spent on HIV control. We should have concentrated harm reduction efforts on counselling, information dissemination and outreach activity before needle exchange".

> "The program is not very well organized in principle, built and is implemented on unprepared soil instead of adapting the program to Russian conditions".

The institutional stakeholder study asked informants what could be done to facilitate scaling up of HR and NSE in Russia. About 10% of respondents believed that there was no need to change the existing policy and to expand the provision of HR at all. They argued that political and financial resources needed to be directed towards other, alternative measures to prevent the epidemic. These are to focus on more conservative approaches to HIV prevention with the emphasis on punitive anti-drug laws, abstinence and 'moral upbringing'.

The participants of the health system study in Volgograd also recommended implementing harsher measures to deal with opiate drug users. But interestingly, a gentler approach was advocated for alcohol abuse: on the basis that drinking is an integral part of Russian culture:

> "Society will support stricter measures against drug use. But it is different for those who are alcoholics because of the Russian tradition. They are to be pitied".

Those who believed that there were opportunities to improve the policies and scale-up HR suggested that the key would be creation of positive "public opinion" by providing more information about the projects and their objectives, conducting a proper evaluation of the existing services and generating data on their effectiveness. A number of respondents believed that harm reduction could be supported only if funding for HIV/AIDS prevention were increased and if the activities targeting high risk groups were included in the official government AIDS programme. A large number of respondents believed that there was an urgent need for clarification of the legal status, regulations and standards for provision of HR and NSE.

6.4.3.2. Drug treatment challenges

The challenges in providing drug treatment care identified by service providers and policy-makers included:

(i) Lack of resources, which impacted quality and efficacy of treatment and made services unattractive to clients;

(ii) Lack of psychosocial services and rehabilitation programs; {maybe explain what 'psychosocial services are}
(iii) Focus on primary prevention with little emphasis on the development of better and more accessible treatment services in designing strategies which address drug use issue;
(iv) Lack of evidence-based practice in services provision and poor access to research materials and scientific resources.

Drug treatment service providers participating in the Drug service study estimated that only one in ten drug injectors use their facilities. Participants from Volgograd found it more difficult to get to drug treatment services when one needs it than the respondents from Barnaul (75.7% vs. 61.5%, p<.05).

We asked former and current drug injectors of potential barriers in accessing treatment in both cities studied. The following three main barriers were identified:

(i) Compulsory registration of a drug user associated by respondents with loss of employment, difficulty in getting employment, breaches in confidentiality (including fear of being reported to police) and stigma.

(ii) Inability to pay. The practice of out-of-pocket payments for medication and longer stay in treatment was widely reported in both regions studies. This limits access to treatment only to those clients who can pay for the services. It was argued that the most vulnerable clients such as drug users with severe addiction, unemployed and socially disintegrated individuals either cannot enter treatment or receive treatment of poor quality.

(iii) Perceived low treatment efficacy. Many respondents noted that treatment does not help in reducing or moderating drug use, it is a "*waste of money*", and periods of remission are short. Participants mentioned that the stay in treatment might be enough to overcome withdrawal symptoms but is not enough to overcome craving for drugs.

Overall around 40% of the study participants were satisfied with the treatment services they received. The majority of participants (80%) reported that they would recommend the services to their friends. Respondents from Barnaul were more likely to perceive drug treatment services as helpful and responsive to drug users' needs than the respondents from Volgograd. (68.3% vs. 49.5%, p<.001).

The study identified an urgent need for the development of rehabilitation programmes for IDUs. We found that those who went through rehabilitation programmes were 2.6 times more likely to be satisfied with the services compared to those who had no rehabilitation experience (p<.05). Gender, age, place of residency, and length or frequency of injecting were not associated with satisfaction reported.

The Drug treatment study provided interesting insights into HIV testing and interactions between healthcare and social services. About three quarters of respondents reported being tested for HIV during their last treatment episode, but only 30% received information on HIV prevention in drug treatment facilities. Almost none received HBV vaccination. About twice as many Volgograd participants were tested for HCV compared with Barnaul. Only 3% of respondents indicated that they were referred to other medical services during the last treatment episode. Help from social workers was received by 4% of Volgograd and 22% of Barnaul informants.

6.4.3.3. Sex education in schools

The general view on the status of sex education schools in Russia among institutional stakeholders was that it was wholly inadequate.

> "In general, we have got no sexual education. We are not implementing any programs in sexual education".

Though differently worded this view was found in both regions studied and in all 4 Rounds of interviews. At the same time almost 88% of respondents believed that there was a need to introduce sex education in schools. Some saw sex education as an integral part of the formation of the child as an individual and as an essential element of the child's psychological development. Many linked sex education as linked to broader public health issues, particularly, prevention of sexually transmission diseases (STDs) and unwanted pregnancies.

Opinions regarding the age at which sex education should be delivered varied. Some believed that children required sex-related information as early as at the age of 5 and suggested starting sex education in nurseries. Others thought that the best age was between 12 and 14. They argued that this was the average age of starting sexual relationships in Russia. Many respondents argued that there was a need to differentiate the type of education and the type of information provided depending on the age.

We asked stakeholders why the implementation of sex education programmes in school had experienced resistance. The first reason identified was the "traditional Russian attitude towards sexual education". Many respondents argued that sex was "a taboo topic" and that the society would not support such programmes. It was very common for respondents to agree that sex education was useful and desirable but argue that *public* opinion was against it". However the results of the household survey in Altai showed that 78% of respondents supported sex education in schools, with only 2% indicating that they were against such programmes (18).

However, "public opinion" includes no only the views of citizens but also the views of powerful institutions and groups.

> "(Programmes of sex education in schools)…… are contradicting moral norms of our society. Contradicting our mentality, in general contradicting Orthodox Church traditions".

This view was particularly common among representatives of faith-based organisations.

All respondents, irrespective of whether they supported or opposed sex education, stated that the quality of training materials, methods of teaching, guidelines and skills of trainers were central to changing education policies in the future. Many argued that the existing materials were "rude", "unethical" and/or developed without involving parents.

> "Personally I believe that it has to be carried out in families, no matter what. And speaking about sexual education in front of a large audience, well, this is not always ethical so to speak, and it could be above all that we do not have experts who are capable of doing this… Yes, we do not have specialization in sexual education itself... That is having no program and methodological support and qualified specialists, this is the most important problem"

Several informants said that the lack of teachers trained to teach about sex was an important constraint on delivery of the programmes. It was argued that many school-teachers were from the older generation and were not prepared to discuss the issues of sexuality with their pupils[lxxi].

> "Well, our population is probably not mature for that. Because teachers are still aged women, brought up during the Soviet era; in general they believe that this is something to be ashamed of, that this is not something to talk about, that it is better to hide away from that".

> "Social level is low. In general, and it must be confessed, it seems to me that the teachers now are falling short of the occasion".

Others pointed out that school health education programmes were not embedded in Russian systems, but rather imported.

> "in our time this program is carried out under the aegis or WHO, UNICEF and the Population Foundation, it is approved at international level, but not at Russian state level, and not at oblast level, and not at city level. That is we are using others' experience. At the present moment such Russian program still does not exist".

Resistance to the development of school sex education was seen also to arise from the views of political leaders.

> "many of… statesmen believe that sexual education is sexual profligacy. That we are pushing youth to early sexual debut, extreme sexual behaviour. That is why resistance is very significant".

In relation to who could facilitate the development of sex education in Russia the respondents mentioned different education authorities such as, the Ministry of Education, regional and city departments of education; federal and regional legislators, regional and city Administrations, Youth authorities, Family issues authorities and NGOs providing services for young people.

6.4.4. Provision of anti-retroviral treatment and care and attitudes to people living with HIV/AIDS

Firstly we explored what regional and federal policy-makers thought about provision of highly active anti-retroviral treatment (HAART) in Russia as it stood at the time of the study and as it could develop in the future. Secondly using the institutional stakeholder study, health system analysis and the population surveys we examined issues of stigma attached to HIV/AIDS and discrimination against PLWHA.

6.4.4.1. Anti retroviral treatment

The majority of stakeholders agreed that the government should provide HAART to people with AIDS and that the treatment should be free at the point of use. At the same time many respondents pointed out to the scarcity of the financial resources available to the government and the need to address other public problems. It was argued that although ideally HAART should be provided to all patients in need, it was unrealistic to expect this in the current financial and economic circumstances.

In relation to who should be entitled to free ART and how these patients should be selected, the opinions varied. The majority of those who supported selective ART programmes argued that the priority should be given to children, pregnant women and those who were infected accidentally (through medical procedures or blood transfusion). The division of people into those "*who were infected not through their own fault"* and thus *"deserved"* treatment and those who did not was common and noted in all stakeholder groups. Many respondents argued that those who "*get it, let's say, due to sexual dissipation, due to crimes*" (IDUs, sex-workers and men having sex with men (MSM)) should have to pay or co-pay for the treatment. Others said that the choice should be based on the ability to pay: the low income groups should receive ART free of charge, whereas those who could afford paying had to pay themselves.

> "You know when you see hungry children, when there is a lack of budget funding to treat really sick people who are disabled, handicapped, etcetera, you start thinking that those two categories, I would personally spend the funds for the others, who got in trouble not at their free will".

> "Drug addicts and prostitutes should not be given money for treatment, and all the others should".

> "Here it goes in categories; if rich enough, you may treat yourself. And if, how to say, from such social circles… I would simply… they will not provide treatment for themselves, this means there we need to provide state support, otherwise we do not get less problems like that".

The current state of ART provision was examined by the health system study in Volgograd. In 2004, the amount of funding requested for purchase of ARV medication in Volgograd Oblast was RR 3,557,000, but of this only 46.8% of the total requested (RR 1,665,000) were financed. This was 15% of all state funding for HIV/AIDS allocated by the region. This is not sufficient to treat all those in need of ARVs. As a result only 78 out of 4,400 HIV-positive people in the region were receiving combination antiretroviral therapy. In addition, all pregnant women have access to chemotherapy to prevent vertical transmission from mother to child. Other PLWHA are expected to purchase drugs themselves, but cannot afford to do so.

The institutional stakeholder study asked respondents to identify organisations that could influence policies on scaling up of ART. Almost all respondents named the federal government, the President, the State Duma and the healthcare authorities. A number of respondents said that the international community was influential with some arguing that in the immediate future international agencies were the only potential sources of funding for ART programme implementation on a large scale. Most respondents said that the adequate financial resources and enforcement of implementation of the AIDS laws were the essential prerequisites for ART provision. A few mentioned mass media as an important factor in bringing the issue of treatment into the political agenda.

6.4.4.2. Attitudes to PLWHA and stigma

We found that the level of stigma attached to HIV/AIDS and PLWHA was high. While referring to PLWHA the interviewees often used derogative and/or patronising expressions such as "poor people", "sick people", "unlucky people" and "doomed to death". Some of those who were against the universal ART coverage argued that the treatment was expensive and the country could not afford spending its limited financial resources on those who "*will still die sooner or later" and that it is "roughly speaking a senseless waist of money*". Some acknowledged that stigma was a real issue.

> "According to television, to mass media information, they are getting serious problems. As far as we know, they are not even treated like humans and in general people are trying to avoid them; unfortunately I have no expertise in this, they have their own organizations, which unite HIV-infected and probably they are trying to do all they can for ones of their kind."

Similar results were obtained by the health system analysis. This study found that HIV still raises fear in many who see the epidemic as "a *plague of the 20th century"* and it is considered to be a "*special*" and "*terminal disease*" associated with the marginalised populations who are perceived to be useless for the society:

> "We have so many war veterans and pensioners who do not have enough money to buy food. Why should the state fund treatment for individuals with HIV who do nothing for the society, choose to inject drugs or are prostitutes."

The health system study found that there was still social antagonism towards HIV-positive individuals to the extent that the Regional AIDS Centre in Volgograd was called "Dispensary Number 1" to guard confidentiality and reduce risk of the negative impact on HIV-positive individuals. It was stated that some doctors were still unwilling to see commercial sex workers or HIV positive individuals so that a local NGO had to establish a network of '*trusted doctors, psychologists and social workers*' where these populations were referred to.

According to some NGOs a large proportion of the population wants HIV-positive individuals to be isolated:

"The majority of people think HIV positive people should be isolated for their own good."

Many respondents in the health system study were in favour of legal provisions which "enable more decisive action against high-risk groups such as IDUs and CSWs:

"Although we can arrest people with mental illness who pose risk to themselves and others, there is no law to arrest drug users or commercial sex workers."

The same study however found that with the development of the epidemic the degree of stigma towards PLWHA among health professionals had reduced, as one respondent from a maternity hospital said:

"In 1994, when we had the first HIV case [after birth delivery] we burnt all the linen, we even painted the room, but we have now adapted and there is no stigma."

The findings of the RLMS survey were consistent with the conclusions of the two other studies. RLMS found a considerable degree of stigma associated with the disease (Table 67). Only 15% of respondents would buy vegetables from a HIV infected grocer. The overwhelming majority would keep it a secret if a family member were diagnosed with HIV. Thirty four percent of informants supported isolating of HIV+ people from society with 28% being against it and 37% being not sure about the answer. There was very little difference between the answers in 2001 and 2003 (Table 67)(19).

Table 67. RLMS: attitudes towards PLWHA

	2001 (ROUND 10)		2003 (ROUND 12)	
	% yes	n	% yes	n
Personally know/knew someone with HIV/AIDS?	5%	270	5%	298
Shared dishes with PLWHA?	1%	68	1%	54
Would care for family member with HIV?	87%	3513	85%	3560
Could an HIV+ teacher still work in school?	38%	1426	37%	1507
Would you buy vegetables from a HIV+ grocer?	13%	542	15%	610
If a family member was HIV+ would you want to keep this a secret?	90%	3994	92%	4265

In the same study the respondents were asked about their potential reaction in case they are tested positive for HIV. The majority said that they would tell their regular sexual partner and the family with only one third willing to share this information with a casual sexual partner and just over 10% with a colleague from work (Table 68).

Table 68. RLMS: potential reaction to positive test

	2001 (ROUND 10)		2003 (ROUND 12)	
	% yes	n	% yes	n
If you tested HIV+ would you tell anyone?	70%	3069	68%	3116
If you tested HIV+ would you tell the following				
normal sexual partner	92%	2063	92%	2158
casual sexual partner	39%	360	34%	351
friend	30%	528	29%	555
family	90%	2241	90%	2377
medical worker	80%	1654	84%	1854
co-worker	13%	208	11%	197

Although almost all stakeholders supported the involvement of PLWHA in making HIV/AIDS policies, laws and decisions, there was almost no evidence that this was taking place in either of the two regions. The vast majority of respondents did not even know whether there were any NGOs representing the interests of PLWHA in their regions. A few interviewees had

reservations concerning participation of PLWHA in policy-making arguing that due to the disease they may not be fit to work and adequately contribute to the decision process.

6.4.4.3. Attitudes towards other prevention strategies

The stakeholder study in Altai and Volgograd sought respondents' views on a number of other HIV preventions strategies. There was a general agreement and support for funding programs of psychosocial care for PLWHA and their families and PLWHA. Fewer (but still a majority) of respondents supported provision of programmes for HIV prevention among military and for providing free condoms to individuals involved in sex business. Rather more respondents were against condom distribution in prisons than in favour.

The majority of stakeholders both expressed that they still supported routine mandatory HIV testing and thought number of population groups who should be subject to mandatory testing should increase. Also, the majority of respondents said that they would support financing of HIV testing even if the financial resources for HIV/AIDS were substantially decreased and the government could fund only a few interventions. The health system study in Volgograd found that in addition to the Regional AIDS Centre and the dermatovenereology dispensaries (who provide HIV testing for free), many other regional health care facilities offer voluntary testing for HIV for a fee. The proportion of HIV tests regarded as 'voluntary walk-in tests' represents a very small proportion of all HIV tests (0.9% in 2004).

The RLMS examined peoples' experience of HIV testing and found that about half of respondents had ever been tested for HIV and about one quarter had been tested in the last 12 months (Table 69). There was little evidence of any change between 2001 and 2003. The respondents were also quite keen to be tested for HIV in future though it is not clear what benefit they expect to get from this.

Table 69. RLMS: HIV testing history

	2001 (ROUND 10)		2003 (ROUND 12)	
	% yes	n	%t yes	n
Ever been tested for HIV	45%	2370	48%	4682
Of whom tested in last 12 months	51%	1175	46%	1209
Of whom were told the results	91%	1062	95%	1141
Of whom told anyone result	72%	748	68%	759
Of whom told normal sexual partner		366		390
Of whom told casual sexual partner		25		13
Of whom told friend		194		161
Of whom told family		301		318
Of whom told medical worker		193		188
Of whom told co-worker		133		134

6.4.5. Information, communication and co-ordination in HIV/AIDS

In this section we examined the process of making decisions and implementing actions on HIV/AIDS. Here we focused on who makes and implements HIV policies and programmes, how they are implemented; which factors underpin and influence the decision-making; which information stakeholders use and how they co-ordinate their joint efforts.

6.4.5.1. Influential stakeholders in HIV/AIDS

There was been no unanimous opinion among respondents in the institutional stakeholder study as to who influences the perception of HIV/AIDS as a public problem and the attitudes towards various interventions. The views on the importance of different levels of power (federal, regional, municipal) in HIV decision-making also varied. For example, when the respondents from the Volgograd oblast were asked who among HIV stakeholders could facilitate the development of Harm reduction programmes over a quarter of them said that this

could only happen if the federal government, federal legislators and the President came out in the support of scaling up. At the same time one third suggested that the regional authorities played a primary role in determining health policies and therefore their support was more important.

Only a few informants were definitive in their views on who exerts the most important influence on attitudes towards HIV interventions in Russia (20). Most respondents spoke about the authorities responsible for decisions in general terms and stated that all key government sectors are important. However, most frequently they named health authorities; federal and local legislators; drug control services; police; education authorities and mass media. The authorities for sports and culture as well as private sector stakeholders were mentioned occasionally. Interestingly while the authorities for economic development and finance were named as very important stakeholders in determining the overall regional priorities. Their role in making decisions on HIV/AIDS however, was identified as marginal. The finance authorities were named as influential only in determining the levels of funding for the HIV programmes. They did not play an important role in choosing HIV strategies and interventions or monitoring the effectiveness of HIV control. While health institutions such as the AIDS centres and the Narcology service were perceived as the best informed HIV stakeholders (because they "held statistics and knew the epidemiological situation"), they were not seen as particularly influential in determining policy or in being able to promote the implementation of more effective HIV policies and actions or increase the level of funding. The role of academic institutions in decision-making was also mentioned only a few times.

When we asked who in the Russian society holds responsibility for HIV/AIDS the overwhelming majority named the Ministry of Health and the regional health authorities.

> "A complicated issue. Of course, one can say the government, but the government is responsible for everything. Still I believe that the Ministry of Health and Social Development carries responsibility for that".

The participants of the population survey in Altai were also asked who they considered to be the most important institutions in dealing with the problem of HIV & AIDS. The findings are shown in Table 70. Here the priority was also given to healthcare institutions. A large proportion of the respondents believed that the responsibility lies with the population itself. But interestingly very few thought that the business sector had any role to play.

Table 70. Altai Krai: Important institutions / groups in addressing HIV/AIDS

	Very Important	Important	Not Important	Don't Know
Federal Government	54%	22%	9%	15%
Ministry of Internal Affairs	29%	34%	18%	20%
Regional authorities	31%	34%	14%	21%
City authorities	41%	28%	12%	20%
Medical establishment	73%	12%	4%	12%
Business/private sector	13%	30%	35%	23%
Community Based Organisations	35%	29%	16%	20%
International Organisations	40%	27%	14%	20%
Population	59%	15%	11%	16%

6.4.5.2. Co-ordination between sectors, agencies and services

At the level of the health system the study in Volgograd identified seven vertical subsystems, which provide services to HIV-positive individuals but are organisationally and financially separate from the general health services and from each other, and all have different reporting systems. These include the AIDS centre; 'narcology' services, that deal with individuals who have substance abuse problems; dermatovenereology departments, which deal with STIs; women's services, which provide services to prevent mother-to-child vertical

transmission; tuberculosis (TB) services, which deal with HIV-associated-TB and TB-associated-HIV; infection disease departments, and; mental health services.

Although Federal regulations articulate the need for close collaboration between subsystems[32], separate organisational structures, financing streams and reporting requirements lead to operational gaps in the care process, as identified by senior officers from the AIDS and Narcology Centres:

> "The antenatal clinics and narcology clinic are cooperating with us well …but we have some problems with the tuberculosis service"

Although there are visible efforts to mount a multisectoral response, involving both the state organisations and the civil society, there is a risk of establishing services which duplicate each other. For instance, given the potential of the HIV epidemic, the narcology and the TB services reported on planning to expand their activities and establish specialised units to manage their patients who were HIV-positive. The regional AIDS Centre has plans to establish a new centre to treat HIV-positive patients with concomitant illness.

Some interviewees argued that the establishment of co-ordination bodies had played a positive role in improving and maintaining the co-ordination process and preventing duplication:

> "… [in the last three years] there was much duplication and overlap of roles and responsibilities as regards IDUs. Since the Department of Illegal Drugs Control (a federal agency) was replaced by the Interagency Commission for Drug Abuse the coordination has improved."

However, overall, the study found that referral and counter-referral between different services were poorly managed and there was often a reluctance to care for patients who are HIV-positive:

> "What referral system?"

> "Each service tries to prove that it is not responsible for the HIV patient."

One of the key problems in service delivery identified was the low level of incentives for healthcare professionals providing HIV services. As an informant from a maternity hospital said:

> "The biggest problem is that we have high demand but few surgeons. The staffs receive additional payment of 20 Roubles for delivering HIV-positive women: hardly an inducement. The problem is increasing as we have more women with HIV."

The institutional stakeholder study also identified a number of problems in co-ordination between various institutions within a broader framework of HIV response. Most respondents reported on difficulties in cooperation between government organisations and between government organisations and NGOs. The key challenges mentioned were the lack of information on who is doing what; differences in perception of the role of various actors involved in the HIV work; and discrepancies in laws and regulations guiding the activities of different stakeholders.

Some senior healthcare managers were of the opinion that the laws related to HIV prevention, treatment, care and mitigation had significant gaps which created barriers to successful programme implementation.

In addition to the general co-ordination challenges outlined above, we found some problems specific to certain sectors and organisations. For example, some regional respondents said that although there was a large number of NGOs working in the area of HIV/AIDS, there was no mechanism or structure for co-ordination of their activities with the government. We found that the regional NGOs were hardly represented in the AIDS Intersectoral Committees nor involved in decisions on the content of the HIV targeted programme and the level of funding for HIV/AIDS. The regional government organisations interviewed had limited knowledge about NGO activities, whereas the NGOs argued that the government provided little

information and financial resources to support their work. The health systems study in Volgograd found that there were different types of NGOs working in the field. Some were quite independent of the government in terms of operations, management and funding. Another group was the quasi-NGOs created under the regional AIDS centres and were closely associated with government organisations. Some policy-makers argued this type of organisation had a number of benefits including stability, financial sustainability in the absence of external grants, and provision of incentives to health professionals who work in public organisations to undertake additional work and augment their income. In contrast, they argued that the stand alone-NGOs depend excessively on grant funding, which is unpredictable, focus on achieving the objectives of the funding agency rather than the region and do not adequately coordinate their activities with the mainstream HIV control.

There was no unanimous opinion on the division of responsibilities between different stakeholders. Most respondents perceived the government to be responsible for policies, laws, financing and overall ideology of response. Some respondents thought that the government should also provide prevention, diagnostic and treatment services while others saw NGOs should be the leading players in these areas. Many stakeholders believed that education and information activities and services for vulnerable populations should be left to NGOs.

Private sector stakeholders were seen largely as providers of extra budgetary funding for HIV work. Sponsorship was the key role given to these actors by the government interviewees. In Altai a few respondents suggested that the private sector could provide jobs for PLWHA and should conduct preventive activities among their employees. However there was no evidence of any government strategy for engaging with the business or private healthcare providers in prevention activities or provision of ARTs in either region. As for the representatives of the private sector themselves some of them said that they would like to initiate HIV prevention activities at their enterprises. Others said that this was not necessary (21).

Perceptions the benefits of involvement of international agencies among respondents to the institutional stakeholder study were mixed. On the positive side were the additional financial resources, technical assistance, sharing of experiences and broadening understanding of HIV/AIDS which international agency involvement enabled.

> "They helped to change our perceptions of HIV from a medical to a social problem".

However, the perceptions shared by several key respondents were that the international agencies had independent agendas, failed to coordinate their work with local agencies and to accommodate local needs and priorities when planning and implementing their programmes.

> "They need to agree with the Federal level before coming into an area... This is not a lawless country. They need to respect the Russian Laws rather than push their agendas."

In addition to contextual and health system factors, which hinder HIV programme implementation, respondents in the health system study in Volgograd pointed out to lack of financing, need to secure agreement of the federal level for any major changes in control efforts, professional inertia, low salaries for staff and excessive administrative burden (collecting data and reporting).

6.4.5.3. Information for decision-making and advocacy

From the institutional stakeholder study we found that that the decision-making process in both regions was largely based on personal experiences and perceptions of the situation by decision-makers. There was no evidence of any cost-utility or cost-benefit analyses used by stakeholders in choosing their regional priorities or selecting strategies for the HIV response. One of the most common answers to the question "Why did you decide that this is a priority?" was "Because my life experience tells me that this is the best way".

Similarly the health system study in Volgograd found that the budgeting for HIV services was not informed by needs assessment or scenario planning based on epidemiological projections, outputs or outcomes.

> "The only guidelines are the number of patients we have and the number of new patients we expect next year".

There is, currently, no accurate way of estimating future increases in HIV incidence but officials in the region believe that strengthening management capacity, implementing second generation surveillance systems, behavioural surveys and use of modeling will enable forecasting of HIV incidence and service needs.

The stakeholder study examined how much and which types of information the regional and federal stakeholders had and used in decision-making. We found that a large proportion of respondents in both regions did not have much information on HIV/AIDS. Slightly more information was available to the informants in Altai. The difference was particularly noticeable in the NGO group (Table 71).

Table 71. Amount of information on HIV/AIDS available to regional stakeholders

Amount of information	**Percentage of answers**	
	Volgograd	Altai
Very much	1.5%	3%
Quite enough	17%	38%
Not very much	51%	30%
Very little	29%	26%
Hard to answer	1.5%	3%

As far as the types of information available are concerned, the majority of the respondents identified data on the number of HIV and AIDS cases and characteristics of HIV positive population group. However even this information was, in the main, only available to members of the Intersectoral Committees on AIDS and NGOs in Altai. About 2/3rd of respondents in Altai and around a half in Volgograd had data on the real and estimated numbers of vulnerable groups (IDUs, CSWs) and behavioural risks. Fewer informants particularly among NGOs and private sector stakeholders had the data from modeling projections and economic analyses (Table 72)[lxxii].

Table 72. Types of information available to stakeholders

Type of information avaliable	Percentage "yes"						
	Volgograd			Altai			
	Round 1	Round 2	Round 3&4	Round 1	Round 2	Round 3	Round 4
Number of registered cases on HIV and AIDS in a region	95	52	28	85	33	75	20
Gender and age characteristics of HIV-affected population	90	32	52	77	30	75	30
Social and economical characteristics of HIV-affected population	70	16	42	69	15	58	10
Estimations of the real number of HIV-infected in a region	45	40	28	61	18	50	0
Official number of drug users in a region	60	32	24	77	29	67	10
Official number of those involved in sex-business in a region	40	16	9	23	11	17	0
Estimation of actual number of drug users and those involved in sex-business in a region	20	28	14	77	81	58	0
Data on behaviours and risk factors among different risk groups	55	16	28	77	18	50	40
Data of models that predict epidemics development in a region in future	35	12	14	69	11	17	0
Data on economical consequences of HIV/AIDS in a region	25	8	9	38	7	0	10
Data on effectiveness of different prevention interventions	55	12	14	38	15	25	10
Comparative data on cost of different prevention interventions	40	8	9	23	4	17	10

The key sources of information reported by government stakeholders were Goskomstat (State statistical committee), the AIDS centre and the Ministry of Health. NGOs and private sector organisations reported receiving information largely through mass media. Interestingly, many respondents found media to be an unreliable source. The health systems study in Volgograd found that although the media was generally supportive to raising awareness on HIV/AIDS there were several journalists who had a negative attitude towards HIV programmes and provided misleading information:

> "We get support from the media but have to be careful. Some journalists change information before it is published. There is much misinformation on HIV and this scares people."

We found that the amount of information transferred from one stakeholder group to another varied. The members of the Intersectoral Committee had the largest amount of HIV data. Some of this was transferred to other government organisations but very little to NGOs and private sector stakeholders.

The main vehicles for receiving HIV information were reports; scientific journals; government decrees and letters; minutes and resolutions of the meetings; lectures and training materials.

The RLMS showed that the receipt of information about HIV/AIDS by the general population decreased between 2001 and 2003. In 2003, despite the larger sample, fewer people had received any type of information other than that presented in posters. The ranking of sources

is the same in both years; however the numbers who received information from a friend fell quite sharply between the two years (Table 73).

Table 73. RLMS Information sources for HIV

	2001 (ROUND 10)		2003 (ROUND 12)	
Question: Information	**Percent yes**	**n**	**Percent yes**	**n**
Has heard of HIV/AIDS	98.2%	5605	97.3%	5857
Received info about HIV/AIDS in last 4 weeks	52.2%	2801	40.6%	2316
from TV		2000		1719
from Radio		607		456
from periodicals		1793		1310
from poster		583		655
from sex partner		78		61
from friend		203		131
from family		110		70
from medical worker		293		252
from co-worker		208		158

Most respondents found it difficult to give a precise definition of the term 'advocacy'. Although a number of informants had a clear vision of what HIV advocacy should be, it was obvious that the word is not yet commonly used, particularly amongst those who do not deal with HIV/AIDS on a day to day basis. The vast majority of respondents thought that HIV advocacy was largely related to protection of human rights of PLWHA and protection of the non-infected population. A few respondents saw it as means for raising public awareness and dissemination of information on HIV/AIDS.

6.5. Summary

6.5.1. Perception of HIV/AIDS as a public problem:

Both policy-makers and the population are well aware about the growing problem of HIV/AIDS in Russia. They recognize that the uncontrolled epidemic may have a significant negative impact on the country in the future. However at present the problem is of small scale compared to many other public issues and its consequences appear to be distant and uncertain. As a result policy choices and allocation of financial resources is made in favour of other public priorities.

The current system of decision-making and the overall public service management does not have effective mechanisms or capacities to choose between various policy priorities and strategies for intervention. The choices made by policy-makers are multiple and often arbitrary based on personal opinion and knowledge. There is neither an agreed set of strategic public priorities nor clear guidelines on how these priorities to choose. As in many countries HIV/AIDS in Russia is 'swallowed up' by dozens of other competing policy issues.

The threats of the uncontrolled epidemic are seen by regional decision-makers largely through the impact on demography, mortality and public finance. There are doubts about the impact on the economy, poverty and political situation.

The attention of the government to HIV/AIDS has increased in recent years. However it seems to be more of symbolic and declarative nature and can possibly be linked to the international pressure and significant financial resources allocated through internationally funded programmes.

The evidence of the changes in the attitudes of the population towards HIV/AIDS is contradictory. On the one hand the population got used to the problem and started talking

less about it. On the other hand almost a half of 15-49 year olds report having changed their behaviour as a result of the epidemic.

The level of stigma towards HIV/AIDS and HIV+ people is still high. Although AIDS is not seen as a disease of high risk groups alone, it is still common to think that "normal" people can be infected "only by chance". The "real" risk is possessed by certain population groups who are marginal to the society and who are not those who live and work next to us.

6.5.2. Attitudes towards interventions:

Harm reduction and sex education in schools are still perceived as controversial and difficult to scale up. However the overall societal resistance to these strategies seems to be more of a widely spread stereotype rather than a fact. Harm reduction is supported and opposed by approximately the same proportion of decisions-makers and the population with about a third taking nether side. As for sex education, it is supported by the overwhelming majority. There is no doubt that there are a number of institutions who appear to be highly influential in the contemporary Russia and who, for various reasons, take a negative position towards Harm reduction and/or sex education in schools. However one of the key obstacles to scaling up of both strategies seems to be this faulty conventional belief that the "public opinion" is against it.

Among other key obstacles to the development of Harm reduction in Russia there is little information on operation and effectiveness of the existing projects in Russia; financial dependence on grants and the lack of government resources to support the projects; mistakes in advocating the projects with a strong focus on needle-exchange and IDU rights rather than prevention of HIV; discrepancies and gaps in the legislation; stigma and marginalisation of high risk groups.

The key obstacles to the development of sex education programmes in schools are conservative views of the Russian education system on the issues related to sexuality with a strong focus on abstinence and moral upbringing rather than safe sex; the lack of qualified trainers and adequate education materials; and mistakes in the implementation of the earlier programmes without taking into account contextual and cultural specificity of Russia.
Harm reduction and sex education are also perceived as "Western" interventions which were imposed on Russia. Despite a wide spread of international development programmes in Russia the expression "Western influence" still seems to have more negative rather than positive connotation.

The development of ART programmes is widely supported by decision-makers. However they are realistic about the government financial capacities and do not think that the free universal treatment can be supported by the government in the near future. It seems there are two possible options for the development of ART in Russia: the provision will be either universal, but with the majority of resources provided by international sources, or selective with prioritising children, pregnant women and those who acquired HIV through unsafe medical procedures.

Drug treatment services are not effective and the access to treatment is limited by a number of constraints including compulsory legal requirement to be registered; inability to pay fees and low efficacy. The services are poorly connected with other drug-related facilities and interventions.

6.5.3. Communication, co-ordination and delivery of services

Co-ordination between different HIV stakeholders has improved in recent years. The co-ordination structures are in principle perceived as effective. In the regions however these have almost no representation of NGOs and PLWHA. NGOs are involved in implementation. But there is little exchange of information between the government and NGOs and the involvement of the latter in decision-making is marginal. The involvement of PLWHA in policy-

making is generally supported. However there are currently no mechanisms available at the regional level.

The role of private sector stakeholders in HIV/AIDS is not clearly defined. At the regional level they are viewed largely as providers of extra budgetary funding. At the federal level the understanding of their potential role in prevention of HIV at the workplace is broader. However there is no evidence of any strategy or mechanisms to initiate this. The private sector itself does not yet see how the epidemic may affect them in the future or what they themselves could realistically do to prevent it.

Financial resources allocated to HIV/AIDS by the government are still perceived as insufficient. It remains unclear, however, whether the substantial funding allocated by international donors is taken into account by decision-makers and if so, how it is done and what the actual financial gap is. We also found the evidence that the existing resources are not efficiently spent with a number of services and activities being duplicated.

Healthcare system in Russia is experiencing severe constraints. The access to services and quality seem to have dropped compared even to the Soviet times. Fees and under-the-counter payments are widely spread and a large proportion of the population cannot afford the basic healthcare. It appears that the reforms implemented since the late 1980s stagnated. It is likely that these severe deficiencies of the health system will continue imposing constraints on effective HIV control, particularly in relation to treatment, care and support.

Although the need for high level political leadership and multisectoral response is widely recognised, in practice the responsibility for HIV/AIDS still stays within the remit of the health authorities and health institutions. They appear to be the main actors holding the key information on HIV/AIDS and deciding on the content of the AIDS programmes. At the same time decisions on HIV finance are taken by the financial authorities who are little involved in technical aspects of design, implementation and evaluation of interventions. This decision-making discrepancy leads to potential gaps between making policies and programmes on paper and their implementation in practice.

The involvement of international donors and agencies in HIV control is generally perceived as positive. They however are seriously criticized for pushing their own agendas, for insensitivity toward the local context and for poor co-ordination of their activities with the Russian authorities.

The information on HIV/AIDS available and used by decision-makers is perceived as insufficient. There is more information on epidemiological and behavioural aspects of HIV/AIDS but very little data from modeling and economic analyses.

The NGO sector is still poorly developed with one part of NGOs being significantly dependent on international grants and the agendas of the international donors; and the other part being quasi- NGOs dependent on the government policies and funding. There are significant deficiencies in the legislation regulating co-operation between NGOs and government structures.

6.6. Recommendations

1. There is a need to have more clarity on strategic priorities in general and in health and about the place of HIV/AIDS among other policy issues. Whether the government decides to prioritise HIV/AIDS among other government funded programmes or not, it is essential that the choice is well-informed and based on comparative analyses of costs and benefits of public investments in the medium- and long-term. This requires a closer interaction of the health sector with the broader system of public management and planning;
2. There is a need to design and implement more research on potential impact of AIDS on the Russian economy; levels of poverty; and social system including orphanage and to integrate this knowledge in the process of selecting public policy priorities ;

3. There is a need to formally raise the responsibility for HIV/AIDS to the highest political level and establish operational mechanisms for securing such leadership in practice. This is required largely at the federal level, as the regional responsibility for HIV/AIDS is already relatively high. In addition it is likely that the high level of the federal authority responsibly for HIV/AIDS will ensure the high level of responsibility in the regions. In our view however this change can be effectively achieved if only one federal co-ordination mechanism is present in the country;
4. There is a need to have more clarity on and better co-ordination of all financial resources available to HIV/AIDS including international donors' and NGOs' funding. There is a need to measure whether Russia really has financial gaps and if so, what these financial gaps are; how and by whom they could be filled in;
5. There is a need to implement a comprehensive and systematic review of harm reduction projects and their effectiveness in Russia. This needs to be done together with authorised and trusted Russian authorities and involve both supporters and opponents of the programmes; The report on the review will need to be widely available throughout the country;
6. In addition to the above mentioned review there is a need to open a high level policy debates on appropriate ways to prevent HIV among IDUs. Such debates could provide an effective mechanism to develop an effective and culturally acceptable strategy to prevent HIV among high risk populations. The debates need to involve both supporters and opponents of various interventions and be based on scientific evidence and best practices available in Russia and internationally;
7. There is a need to open similar debates at the level of education authorities in relation to HIV and sex-related education in schools. These debates could provide a forum for expressing different positions and developing consensus on the appropriate strategies. Similarly, the debates would need to be based on scientific evidence and best practices available in Russia and internationally;
8. In order to overcome the opposition and mobilise those stakeholders who have not yet formed their opinion on harm reduction or sex education in schools, there is a need to widely and regularly disseminate the available data on the operation and effectiveness of such programmes in Russia and elsewhere; More specifically, there is a need for data on the impact of harm reduction programmes on behavioural risks and on the incidence of HIV/HCV among IDUs and IDU SWs; the data on links (if any) between the programmes and the number of IDUs in the community; and the data on links between sex education programmes and adolescent sexual behaviour and risks.
9. There a need to reform drug treatment services. These need to move from a highly medicalised short term care to wider range of services including long-term care with provision of psychosocial counseling, relapse prevention and treatment follow up to meet different needs of drug users and to improve treatment outcomes. Services need to further work on the integration with harm reduction programs. There is a need to advocate an increase in resource allocation and for insurance coverage of drug treatment services to improve quality of services and to reduce the burden for those seeking treatment.
10. There is a need to develop a strategy on engaging with business and the private sector in HIV control. It is unrealistic to expect that the private sector would agree to play the role of a provider of sponsorship and extra budgetary funding alone. There is certainly a need to support the development of Russian philanthropy in a systematic way, through charity grant making foundations. However, it would be more effective to involve the private sector into prevention of HIV/AIDS at the workplace. There may be a need to have a project that could systematically collect the experiences already available in Russia; develop necessary policies and guidelines for regulating such activities and to pilot workplace HIV prevention at a number of selected enterprises;
11. The Regional Intersectoral Committees on AIDS need to broaden their membership and involve NGOs, private sector representatives and PLWHA into their work and into the design of policies and programmes. There is also a need to involve financial authorities, legislators and other non-medical institutions into the technical aspects related to HIV programming, and specifically to the implementation of monitoring and evaluation.

12. There is a need to provide more information on HIV/AIDS to regional decision-makers. There is a need to establish mechanisms for regular communication and transfer of the up to date information between the federal level and the regions and between different stakeholders within the regions.

6.7. References

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