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Human Development

HIV Epidemics in the European Region

Vulnerability and Response

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1 2 3 4 18 17 16 15

ISBN (paper): 978-1-4648-0388-8
eISBN (electronic): 978-1-4648-0389-5
DOI: 10.1596/978-1-4648-0388-8

Cover design: Debra Naylor, Naylor Design

Library of Congress Cataloging-in-Publication Data has been requested.

Contents

Boxes

Case Studies

Figures

Maps

Tables

Acknowledgments

This review and secondary analysis of data on HIV in key populations at high risk in the World Health Organization (WHO) European Region were carried out by the Department of Social and Environmental Health Research (SEHR) of the London School of Hygiene and Tropical Medicine (LSHTM) in London, United Kingdom. The work draws extensively from data collected by the European Centre for Disease Prevention and Control (ECDC), the Eurasian Harm Reduction Network (EHRN), the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), WHO Europe, the International Harm Reduction Association (now Harm Reduction International), the European Network for HIV/STI Prevention and Health Promotion among Migrant Sex Workers (TAMPEP), and the European Men Who Have Sex with Men Internet Survey (EMIS). Substantial contributions were made by in-country experts from the following organizations: Central Asia Regional HIV/AIDS Programme, United Nations Development Programme (UNDP), United Nations Office on Drugs and Crime (UNODC), Republican AIDS Centre in Tajikistan, the Support Project in Kazakhstan, ICAP/Columbia University, Mailman School of Public Health, U.S. Centers for Disease Control and Prevention (CDC), Robert Koch Institute and Institute of Public Health in Germany, National Institute for Public Health and the Environment and the Schorer Foundation in the Netherlands, the National Institute for STI and AIDS Control in the Netherlands (SOA AIDS), and the University of Porto in Portugal.

The report benefited from peer review from individuals at ECDC (Teymur Noori, Marita Van De Laar), WHO/Europe (Martin Donoghoe, Brenda Van den Bergh, and Smiljka de Lussigny), and the World Bank (Marcelo Bortman, Daniel Dulitsky, Nicole Fraser, Marelize Görgens, Nedim Jaganjac, George Schmit, and David Wilson).

Product design was provided by Theo Hawkins (World Bank consultant) and the World Bank EXT team. Coordination of final editing was conducted by Zukhra Shaabdullaeva (World Bank consultant).

The review was funded by the World Bank, grant number 7153690. The findings, interpretations, and conclusions expressed in this Review are entirely those of the authors and do not necessarily represent the view of the World Bank, WHO/Europe, their Executive Directors, or the countries they represent.

Executive Summary

European Region Countries

This report covers the following 54 countries of the World Health Organization (WHO) European Region and Liechtenstein:

Western Europe: Andorra, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Liechtenstein, Luxembourg, Malta, Monaco, the Netherlands, Norway, Portugal, San Marino, Spain, Sweden, Switzerland, the United Kingdom

Central Europe: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, the Czech Republic, Hungary, Kosovo, the former Yugoslav Republic of Macedonia, Montenegro, Poland, Romania, Serbia, the Slovak Republic, Slovenia, Turkey

Eastern Europe and Central Asia: Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, the Kyrgyz Republic, Latvia, Lithuania, Moldova, the Russian Federation, Tajikistan, Turkmenistan, Ukraine, Uzbekistan

HIV in Europe

Despite decreases in the rate of the spread of human immunodeficiency virus (HIV) in the last decade, the number of new diagnoses in Europe continues to increase, and by 2011, reached over 1.2 million individuals, with over a half million diagnoses reported in the last five years. Between 2006 and 2010, there have been an average of 127 new diagnoses each year per million people in Europe. Our review of national case reports indicates that the continuing increase in new HIV cases in Europe is fueled by epidemics in the East, which numbered 273 new diagnoses per million people during this time period. Western and Central Europe, on the other hand, have reported relatively stable increases, with an average of 74 and 11 new diagnoses, respectively. In this time period, new diagnoses have increased (by around 30%) in the East, with the highest rates of new diagnoses in Estonia, Russia, and Ukraine. The proportion of cases among women is declining in the West and Central Europe, but remains consistent in the East (at 41%).

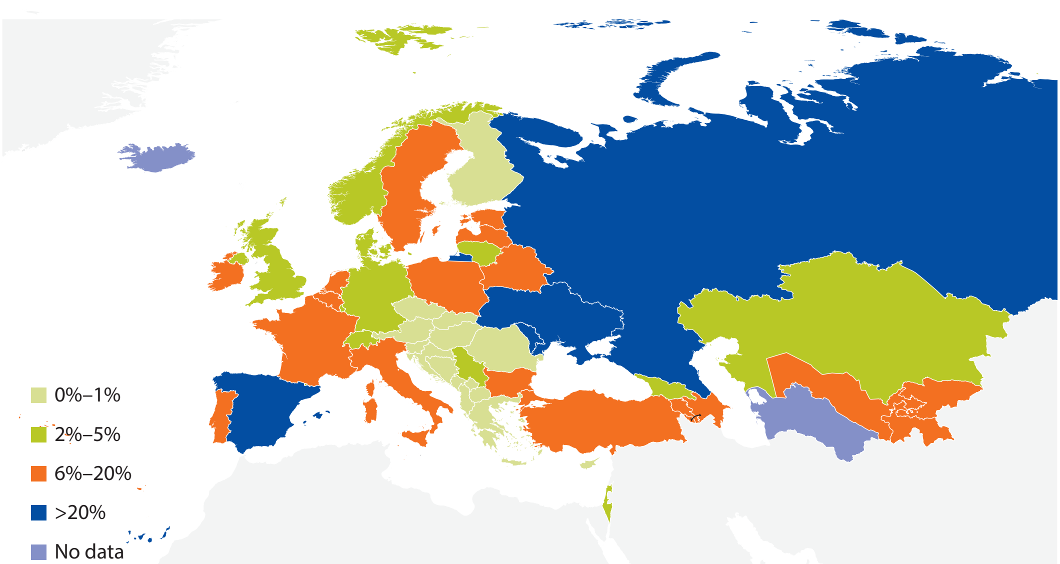
HIV Diagnoses and Prevalence among Key Populations

Between 2006 and 2010, 25% of case reports in Europe were associated with injecting drug use, with higher proportions in the East (33%) than in the West (5%) and Central Europe (7%). During this period there was an annual average of 89 reported HIV diagnoses associated with injecting drug use per million people in the East, 3.6 per million in the West, and 0.8 per million in Central Europe. The countries with the highest levels of reported diagnosed cases among people who inject drugs (PWID) in Europe were Ukraine (153 per million people), Russia (98 per million people), and Kazakhstan (78 per million people).

Findings from HIV-prevalence studies show that prevalence among PWID is highest in Estonia (55.3%), Spain (34.5%), Russia (28.9%), Moldova (28.6%), and Ukraine (22.9%) (see map ES.1). Our review of multivariate risk factors linked to HIV among PWID shows that a history of injecting with previously used injecting equipment, injecting with greater frequency, and a longer history of injecting were linked to HIV. When aggregated across multivariate studies, being female emerges as a risk factor.

Heterosexual exposure was the reported risk factor for 29% of HIV diagnoses in the region. There has been a slight decline in the proportion of cases attributed to heterosexual exposure as well as the number of HIV cases in the West; both have remained stable in Central Europe and increased in the East. During this period the annual average of cases per million people was 74 in the West, 11 in Central Europe, and 273 in the East. The countries with the highest levels of

Map ES.1 Average HIV Case Prevalence across Europe among PWID (2006–10)



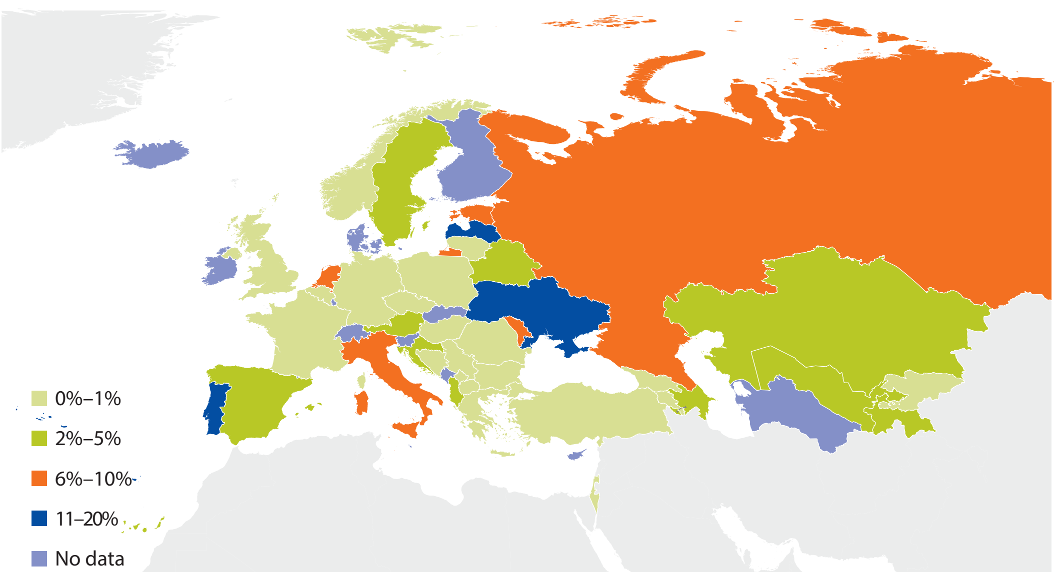
Source: Table B.6.
Note: PWID = people who inject drugs.

reported cases in Europe were Ukraine (161 per million people), Moldova (145 per million people), and Portugal (91 per million people). The highest proportion of cases with heterosexual exposure among women was reported in the East (60%), followed by the West (50%), and lowest in Central Europe (43%). The proportion of reports among people 30 years old or less at diagnosis declined in all three subregions.

With few exceptions, European countries do not collate risk-factor information concerning sex work as part of case reporting. Our review of HIV-prevalence studies shows that HIV remains low among female sex workers (FSWs) who do not inject drugs, at less than 1% in the West [1–12]. HIV prevalence among FSWs in the East is generally higher than in the West and Central Europe, ranging from around 2% to 8% (map ES.2). Our review shows a clear relationship between higher HIV prevalence and higher prevalence of injecting drug use among sex workers (SWs). In the West, HIV prevalence is higher among male and transgender SWs than FSWs, irrespective of injecting drug use, reflecting the higher prevalence of HIV among men who have sex with men (MSM), the main client group of male sex workers (MSWs).

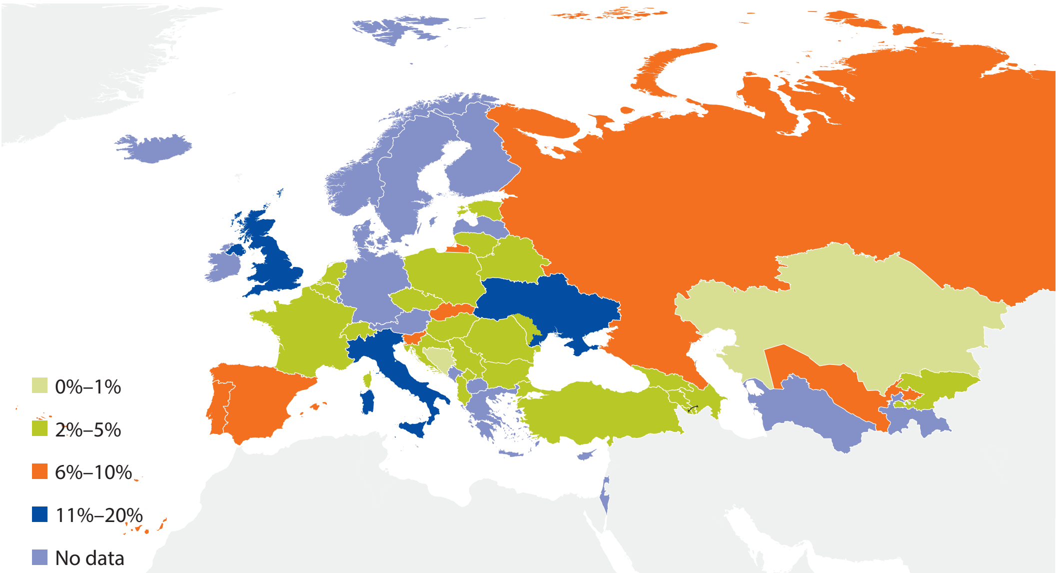
Case-reporting data show that MSM was reported for 10% of all HIV diagnoses in Europe, and higher in the West (36%) than in Central Europe (22%) or the East (0.5%). Between 2006 and 2010, the annual average number of diagnoses linked to MSM per million people was 27 in the West compared with 2.5 in Central Europe and 1.4 in the East, and highest in the United Kingdom (43.4), the Netherlands (43), and Spain (37.3) (map ES.3). But Central Europe and the

Map ES.2 Prevalence of HIV among FSWs in Europe (2006–10)



Source: Table B.6.
Note: FSWs = female sex workers; HIV = human immunodeficiency virus.

Map ES.3 HIV Prevalence across Europe among MSM (2006–10)



Source: Table B.6.
Note: MSM = men who have sex with men.

East have witnessed marked increases in the number of reported diagnoses associated with MSM in the last five years. Despite these increases our findings suggest that case reports remain underreported in this region among MSM. An indication of the extent of underreporting can be seen in the high numbers of case reports with no known exposure group (including in Estonia, Poland and Russia), which may reflect MSM-associated cases hidden due to social and legislative issues related to homosexuality.

Our review also shows that estimates of HIV prevalence among samples of MSM are highest in the West, but vary from as low as 1.6% in Switzerland to nearly 20% in Spain. We also noted a relative lack of targeted HIV prevalence and risk-behavior surveys among MSM throughout the region. Our review of multivariate analyses investigating HIV risk factors among MSM linked HIV to inconsistent condom use, unprotected anal intercourse (UAI), and a history of sexually transmitted infections (STIs). Findings from our systematic review also suggest that the epidemics among MSM in the West may be perpetuated by a core group of MSM and HIV-positive MSM engaging in high-risk behaviors with a high number of sex partners [13, 14].

The evidence shows that HIV epidemics of Europe are greatest in their burden and momentum in the East, where transmission remains primarily linked to injecting drug use. While the epidemics in the West remain primarily linked to MSM, we see recent increases in such case reports in the East and Central Europe. It is important to note that such case report data are only as robust as the HIV surveillance systems producing them. Underreporting risk status, especially among MSM, is likely in settings where social stigma is greatest, arguably in the East of the region. Our synthesis of case report and HIV-prevalence data suggests that the allocation of HIV-prevention resources should concentrate on bolstering and expanding prevention responses targeting PWID and their sexual partners in Eastern Europe, introducing prevention responses among MSM there and in Central Europe, and reinvigorating prevention responses among MSM in the West.

There is also emerging evidence in Europe of the potential for sexual transmission of HIV among PWID involved in sex work [15]. In Estonia, HIV was not associated with injecting drug use among SWs and they had a correspondingly lower prevalence of hepatitis C virus (HCV) suggesting less risky injecting behaviors [16]. A similar pattern has been observed in Russia: a study showed reduced odds of HCV among women who inject drugs associated with sex work, but increased odds of syphilis pointing to the potential for sexual transmission [17, 18]. The high prevalence of syphilis reported along with HIV was observed in the Central Asian republics, Moldova, Russia, and Ukraine, suggesting that conditions may exist for increased sexual transmission of HIV among SWs in the East.

We have not reviewed surveillance activities focused on groups that reflect the general population—such as pregnant women or prisoners. Surveillance activities among such groups—particularly pregnant women—should be regularly reviewed as they can provide insights into whether an epidemic might be generalizing. Monitoring pregnant women may also provide insights into migrants, as they often have higher fertility rates. In countries where there is evidence that indicates generalization of the epidemic, or the potential for the epidemic to generalize, then surveillance among such groups should be incorporated as a response to the epidemic.

Our review shows that SWs involved in injecting drug use have higher HIV prevalence than SWs who do not inject drugs, and that HIV prevalence among SWs is highest in the East where HIV prevalence is highest among PWID. There is considerable overlap between sex work and drug injecting in the East, with some studies of SWs suggesting that the majority are also PWID [19], and studies of PWID suggesting that between one quarter and one half have exchanged sex for money or drugs [20, 21]. Our review finds that SWs who inject drugs are more vulnerable not only to HIV, but also prone to violence, increased problems with mental health, reduced condom use, and unwanted pregnancies [22–24]. Further, a high proportion of male and transgender SWs report injecting drugs [25–29]. HIV-prevention interventions need to give priority to targeting the intersection of sex work and injecting drug use.

Taken together, HIV-surveillance systems need to increase the accuracy of risk-factor data among heterosexual exposures as well as target surveillance among the sexual partners of PWID. It is fundamental that HIV-prevention responses should integrate sexual health and drug-related health. Among SWs, sexual risk-reduction interventions need to better address sexual transmission risk in nonpaying and regular relationships. While our review shows consistent condom use with clients is generally the norm among SWs, it is much less common with nonpaying partners. Among PWID, sexual health concerns have been eclipsed by an almost exclusive focus on preventing viral transmission linked to the shared use of injecting equipment, and this may be particularly the case in the East, where currently the potential for the progression of sexual transmission appears to be the greatest [30]. The majority of PWID in surveys across the region report inconsistent condom use with their regular partners, the majority of whom are noninjectors for male PWID.

HIV and Migration

European HIV case reports indicate the potential significance of migration. Among MSM in the West, 5.8% of diagnoses in 2010 were among men who originated from elsewhere in the West, and 2.8% were among men from Central Europe or the East. Among diagnoses in the West associated with injecting drug use, 4.3% originated elsewhere in the West and 20% in Central Europe or the East. Among cases associated with heterosexual exposure in the West, over one-third were among people who originated from a country with a generalized HIV epidemic. Evidence internationally indicates that local and international migration can have important effects on the dynamics of HIV transmission, both among vulnerable groups and in relation to heterosexual exposure [31–33].

There is a pattern among MSM to migrate into the cities, and from cities in the East toward the large cities of Western Europe. An effect of homophobia in the region is generating mobility among MSM who tend to move or travel to urban centers, which are often considered more gay-friendly and less stigmatizing [25, 34, 35]. The surveys we reviewed suggested that a significant minority of MSM are migrants—as much as 15% in many locations [25, 36–38]. Studies of MSM in some cities show a higher prevalence of HIV among migrant MSM [39].

In the last twenty years, there are increasing numbers of migrant women working in the European sex industries. In the West, the majority of SWs are migrant women, most of whom are East European and African. In some studies of SWs, being a migrant emerges as a risk factor for HIV, but in other studies there is no such association, most likely reflecting the HIV prevalence within country of origin [2, 33, 40, 41]. A systematic review examining the effect of migration on the risk of HIV among migrant SWs found that there was a higher prevalence of HIV among some FSWs originating from high-prevalence countries, likely due to infection at home. However, there were no consistent differences in risk, highlighting the importance of the local context such as the availability of services to migrants, immigration policies, and the local organization of the sex industry in mediating risk among migrant FSWs [42].

Taken together, there is a need to better monitor migrant status in HIV surveillance as well as to increase the accessibility of HIV-prevention responses to migrant PWID, SWs, and MSM. These methods include the translation of existing prevention-related materials, messaging via the Internet, and contact with travel companies, including those servicing the gay tourist market [12, 41, 43].

Monitoring and Surveillance of HIV among PWID, SW, and MSM

During the period from 2000 to 2010, HIV-surveillance studies were found to be better established among PWID than among SWs and MSM, with very little data available among migrants and male SWs.

Among the 21 countries where HIV prevalence was higher than 5% among PWID, the majority had conducted repeated studies monitoring HIV prevalence (18) and risk behavior (16) among PWID. HIV prevalence and behavioral studies need to be conducted in Ireland and Turkey where no recent surveys have been conducted, and in Iceland or Turkmenistan where no surveys at all were identified for PWID. In the context of economic decline across the region and the recent outbreaks of HIV in Greece and Romania, in part attributed to recession and reduction in services, we recommend vigilance in monitoring HIV-case reports as well as one-time behavioral/prevalence surveys to anticipate changes in risk behaviors across the region. This is particularly important in countries where prevalence is higher than 5% among PWID. It is also important among countries hardest hit economically, such as Iceland, Italy, and Spain, and in countries where routine surveillance is not implemented, such as Iceland and Turkmenistan.

Ten countries were identified with high HIV prevalence (>5%) among SWs, and among these, six have conducted repeated HIV-prevalence studies, and seven have conducted studies to monitor risk behaviors. Studies to monitor HIV or behavior among FSWs need to be implemented in Portugal and Turkey and improved in Estonia and the Netherlands. This is particularly important given the lack of routine HIV/STI epidemiological data in relation to sex work in Europe [44]. Studies of MSWs were only found in six countries across the region, all these studies found high prevalence of HIV (>5%). Three of these studies were conducted in countries with the highest annual average number of HIV-case reports per million people (the Netherlands, Spain, and the United Kingdom). Denmark, France Greece, Ireland, Luxembourg, Portugal, and Switzerland also report high numbers of HIV cases among MSM and should consider implementing targeted prevalence studies among male SWs.

Only 2 countries in the West had undertaken either repeated surveys or studies at different points in time that could be used to monitor prevalence among MSM, compared to 7 countries in Central Europe and 10 in the East. Italy, Poland, Luxembourg, and the Slovak Republic, countries of high HIV prevalence (>5%), need to implement repeated targeted studies that could be used to monitor prevalence or risk behaviors.

Our review noted the need for a systematic assessment of the robustness of methods used to monitor HIV prevalence and risk in key populations over time. We also noted the need to expand or introduce repeated studies to measure these methods, as well as indicators of HIV incidence, in some countries. Establishing mechanisms for repeated measures of HIV prevalence and risk is especially important, as is the development of a centralized portal for the synthesis of such data to enable cross-regional comparisons. Moreover, HIV-surveillance systems provide unrealized opportunities to collate data on indicators of HIV-prevention intervention coverage, as outlined in third generation surveillance guidelines [45]. Data on the coverage of combination interventions is especially important. Where feasible, surveillance systems should also be geared toward monitoring indicators of how the social and structural context mediate HIV, for instance, by estimating the prevalence of violence among SWs and MSM and of police contact among PWID.

A key challenge in collecting data to inform interventions is the political context in which sex work, drug use, and MSM take place. In contexts where, for example, sex work is heavily regulated or MSM is stigmatized, conducting HIV-related surveillance studies among people with few rights or representation may create ethical or safety challenges. Proposals for HIV-related surveillance studies need to be conducted with full consultation with affected populations and with appropriate rights protections in place [44]. There are some useful lessons in good surveillance practice in Europe, including for instance, the European Men Who Have Sex with Men Internet Survey (EMIS) among MSM, the sentinel surveillance of HIV and risk among PWID in Italy, Spain, and the United Kingdom, and the sentinel surveillance among SWs in Central Asia [40, 46–49]. All countries within the region should regularly assess and estimate the sizes of the three main key populations at high risk—MSM, PWID, and SW. The plausibility of the estimates generated should be assessed robustly by a range of stakeholders including civil society groups from within the populations of interest. The estimation process should be undertaken at least every 10 years.

Our review of surveillance data shows higher rates of HIV testing in the East, especially in Russia. This may result from mandatory testing of migrants and the practice of "opt-out" rather than "opt in" testing policies at various clinic and health service settings; it may also result from occupational requirements [50, 51]. Evidence reviewed tends to show the protective effect of HIV testing in reducing HIV risk among PWID and SWs and UAI among MSM; however, the cost of this widespread testing of general population groups in the East should be evaluated [52]. Any increase in HIV testing needs to occur simultaneously with increasing access to treatment, reducing the stigma associated with HIV positivity, and removing structural barriers to employment and discrimination for those diagnosed.

Environmental Risk Factors Shaping HIV Risk

Our review points to regional differences, suggesting that levels of risk behavior among key populations tend to be highest in the East. While the frequency of reported needle or syringe sharing is highly variable across Europe, there are instances of especially high levels of sharing in the East and Central Asia. Among SWs, the systematic review showed that condom use with clients was consistently higher in the West than in the East or Central Europe. Among MSM, the highest rates of condom use during anal sex emanate from studies in the West, with rates around 15% higher than those reported in the East. Reports of UAI are also higher in the East than West or Central Europe. Most PWID across the region report inconsistent condom use with their regular partners, with a substantial minority reporting inconsistent condom use with their casual partners.

While the epidemiological studies we reviewed rarely explicitly embraced exploration of social determinants, our synthesis of data on HIV-risk factors nonetheless points to the potential role of environmental-level factors in HIV transmission (chapter 3). Our discussion of HIV-prevention responses (chapter 4) also highlights that the development and impact of interventions can be shaped by social and structural contexts.

Our review identified a number of crosscutting environmental factors as key domains of future social epidemiological research investigating HIV vulnerability in the region: (a) criminalization of key populations at high risk for both drug use and sexual practices; (b) the experience of social stigma and discrimination; (c) migration; (d) gender inequalities; and (e) material inequalities. In our ecological analysis, the strongest and most consistent association we found was a linear relationship between an increased number of people imprisoned per 100,000 population and increased HIV prevalence among PWID and FSWs ("HIV-Prevention Responses among People Who Inject Drugs" and "HIV-Prevention Responses among SWs" sections in chapter 4). Imprisonment—an effect of the criminalization of drug use and sex work—can make prisons riskier environments for the acquisition of HIV. This is not an exhaustive list and does not discount the potential importance of multiple other structural factors. Future epidemiological and intervention studies of HIV among key populations need to better systematically delineate how micro- and macroenvironmental factors combine to increase or reduce HIV risk.

Among PWID, our review of multivariate studies pointed to unemployment, gender, and aspects of the legal environment as potentially important factors in the acquisition of HIV. Regarding gender, women who inject drugs tend to be younger than their male counterparts, engage in higher rates of needle and syringe sharing, are more likely to share their sex partners' injecting equipment, and engage in riskier sexual practices [53–60]. Regarding the legal environment, ever having been arrested and ever having spent time in prison emerged as risk factors for HIV. Rates of arrest were high among PWID surveyed, especially in the East. Qualitative studies in the region link arrest, as well as the fear or experience of police violence, with reduced capacity for risk reduction [61–63]. There is a need to systematically document the prevalence and contexts of policing practices, including extrajudicial practices, which may violate the human rights of PWID as well as potentially impact their HIV-risk reduction capacity. The data also suggest that there is an urgent need to maximize the coverage and intensity of HIV-prevention interventions in prison settings. These findings are corroborated by international studies [61, 62, 64–68].

Among SWs, violence emerges as an important contextual determinant of HIV risk, linking to HIV both directly and indirectly. Reported levels of sexual and physical violence among SWs were high in the East and appeared most commonly among minority groups (transvestites, Roma) [12, 43, 69–71]. Evidence also points to aggressive policing practices, especially in the East, which exacerbated a woman's potential for HIV risk, forcing them to work longer hours to make up lost income after arrest. They are also more likely to have unprotected sex in order to make more money, and they are reluctant to carry condoms as they may be used as evidence of sex work [64, 72, 73]. Explicitly linked to policing is legislation regulating sex work, which is a key structural determinant of violence and HIV risk. The practice of criminalizing activities related to sex work can reduce opportunities for communication between SWs and often results in the concentration of sex work into tolerance zones [74, 75]. The evidence suggests that where sex work is unregulated and accompanied by police corruption, as it is in the East, the environments are most risky [73, 76]. Legislation may also influence community attitudes towards SWs with criminalization of sex work, reinforcing negative attitudes and violence towards SWs and thereby reinforcing the implementation of targeted services for SWs, as reflected in fewer numbers of targeted services for SWs in Russia [77, 78]. Repressive policies will reduce SWs' access to HIV services particularly, as often reported in the East, when HIV testing is enforced following detention by police. The punitive approach to HIV testing following arrest or detention must be stopped in the East in favor of facilitating voluntary counseling and testing (VCT).

Among MSM, the reviewed evidence suggests that social stigma in relation to male homosexuality emerges as a key factor influencing men's capacity for risk-reduction efforts. The stigma felt by these men also constrains the potential impacts of HIV-surveillance and prevention efforts, discouraging MSM from seeking help for HIV prevention as well as encouraging the underreporting of same sex activity as risk factors in HIV-surveillance efforts. Institutionalized social stigma experienced by MSM can be viewed as a form of "structural violence" mediating HIV risk indirectly as well as directly.

Strengthening HIV Prevention among PWID

Findings from our modeling analysis show that high but achievable coverage levels of needle and syringe exchange programs (NSP) can result in large decreases (>30%) in HIV incidence and prevalence in settings with high HIV prevalence among PWID. Required coverage levels are much lower when interventions are combined or in lower prevalence settings. The analysis also highlights the importance of combination interventions for reducing HIV incidence and prevalence to low levels in high-prevalence settings, with no single intervention (or only at high coverage in the lower prevalence setting of Dushanbe, Tajikistan) being able to reduce HIV incidence to less than 1% or prevalence to less than 10% in 20 years. Modeling shows that when core interventions are delivered in combination, coverage targets become more feasible, although still remain considerable, with about 60% coverage of all three core interventions being required in Tallinn, Estonia, and St. Petersburg, Russia, over 20 years and about 30% coverage in Dushanbe, to reduce HIV prevalence to less than 10%. The effectiveness of HIV-prevention policies depends on the combined effects of multiple integrated interventions, including HIV testing to identify those in need of antiretroviral therapy (ART), and bringing these to scale [79].

Intervention availability and coverage is shaped by policy and social the environment, and we have noted, for instance, how law enforcement, policing practices, and national commitments to HIV prevention can limit HIV-prevention coverage potential. We have noted how in Russia—a setting of a major HIV epidemic—the legal and social environment has constrained, even prohibited, the development of proven-to-be-effective HIV-prevention interventions, such as opioid substitution therapy (OST). Structural interventions that bring about policy, legal, or social change are required to enable the scale-up of sufficient HIV prevention, and this is arguably most urgent in the East. The package of combination HIV-prevention interventions promoted by the World Health Organization (WHO) and other international agencies as core to national HIV-prevention programming (which includes NSP, OST, and ART) underemphasizes the potential role of social and structural intervention approaches.

Moreover, combination HIV-prevention approaches should consider including interventions fostering policy reform as well as legal change. While lacking in rigorous evaluation, interventions targeting changes in the criminal justice environment include: (a) the establishment of police HIV-prevention training and partnerships; (b) the development of alternatives to prison programs, including coerced or mandated entry to drug treatment via community penalties and court orders; (c) the provision of sterile injecting equipment in prisons which has been linked by meta-analyses to positive rather than adverse risk-reduction effects; (d) the provision of OST in prisons, which has been linked to improved drug treatment outcomes including post release; and (e) the initiation of interventions enabling legal aid and legal rights literacy to protect against rights violations, though the HIV-prevention impact of these interventions remains unknown.

Interventions that bring about change in the legal environment seek to minimize the iatrogenic health effects of the criminalization of drug users and of the prohibition of HIV-prevention interventions. Legal restrictions to the provision of sterile needles and syringes need to be relaxed in order to increase availability and accessibility. HIV risks are, in part associated with the criminalization of drug use per se, as increasingly evidenced internationally [80–83]; therefore the decriminalization of drug use as a strategy to reduce such harm needs to be considered [82, 84].

Strengthening HIV Prevention among SWs

The importance of SW-specific services cannot be overstated—they are important not only in the provision of services and reducing HIV and STIs but also in facilitating access to SWs for monitoring of harms and risks associated with sex work. To date the majority of interventions focus on reducing prevalence of STIs and HIV, outcomes that may have an onward effect on non-sex working communities. The ecological analysis suggests a decrease in HIV prevalence among FSWs with increasing numbers of sex work services that address not only STIs and HIV but broader harms associated with sex work. More interventions are needed that do not focus solely on sexual risk behaviors, STIs, and HIV, but rather on broader health outcomes including reducing violence and unwanted pregnancies, and improving mental and emotional health. These need to be properly evaluated.

Indicators of coverage by SW services across the region was limited. Data on HIV testing suggested that over one third of SWs across the region had been tested for HIV, but this may reflect testing following arrest or detainment or as a result of mandatory testing through regulation, as in Greece, rather than voluntary testing. We recommend the routine collation of reported HIV or STI testing at SW services, in order to facilitate an estimate of the effective coverage of services in relation to HIV prevention, taking into account the need for consultation with SWs and protection of privacy. Routinely monitoring condom use with clients and nonpaying partners would also give an insight into sexual risk behaviors, as the high prevalence of gonorrhea underscores the persistent sexual vulnerability of SWs.

New approaches to health service provision are needed across the region to adapt to the changing sex-work scene and the increasing number of off-street and migrant SWs. Projects in the United Kingdom have attempted to target off-street populations by conducting outreach online and contacting women via their websites and circulating frequent emails about services, checkup appointments, and other information. Catering for the needs of migrant SWs requires the incorporation of translation and interpreters into services particularly in Western Europe. In the East, the focus of services has been via existing harm-reduction projects and on addressing specific problems relating to drug use and HIV/STI testing rather than broader issues relating to sex work and sexual health. It is fundamental that HIV-prevention interventions specifically target SWs, including those not involved in drug use and who may not define themselves as connected to the sex industry. It is also important that drug and sexual health services are sufficiently integrated to maximize their coverage potential.

Research from Europe and around the world has shown that criminalization and enforcement-based approaches toward sex work can increase risks of both physical and sexual violence against women [75, 85, 86], as well as risk of STIs [17, 87]. Policies and legislation connected to sex work should focus on facilitating safer working environments rather than enforcement approaches that can further marginalize women. Legislation of sex work in Europe is largely characterized by a prohibitive model that may not criminalize the act of selling sex, but criminalizes activities around it such as working in groups or running brothels, which can limit SWs' ability to organize their work safely. In countries where sex work is regulated, the benefits of this are denied to migrant SWs without legal residency rights, as they are not accorded the same rights as nonmigrants.

There is evidence that decriminalization of sex work can reduce incidences of violence and improve mental health of SWs. A long-term strategy needs to decriminalize sex work across the region. Managed street sex-work zones have been effective in reducing incidences of violence and providing a safer place to work and should be introduced as a short-term strategy.

Reports show that SWs experience violence not only in relation to sex work but also by boyfriends, husbands, and family. Broader structural interventions to reduce violence among women as a whole are needed as well as targeted interventions for SWs. Policies are needed that address the social welfare of SWs and social determinants of health such as disparities in employment opportunities, wage, access to welfare, and domestic violence [87–89]. The inclusion of these kinds of structural interventions often have an indirect benefit of reducing harms among peripheral members of key population groups who may not identify themselves as SWs. This is of paramount importance in populations as diverse and fluid as SWs.

Strengthening HIV Prevention among MSM

Effective measures to estimate coverage of services among MSM are urgently needed in order to monitor uptake of services. Standardized indicators are currently lacking across the region. An important finding of the review is that access to mainstream sexual health provision for MSM can be impeded by staff hostility borne out of the dual stigma of homosexuality and HIV, and patient fears concerning breaches of confidentiality [90–92]. Such concerns appear more acute in the East. For instance, social stigma appears to act as a deterrent to timely HIV testing and levels of HIV testing are lower in Central Europe and the East. There is a need to more systematically document how stigma and violence is experienced by MSM, how this affects HIV risk reduction capacity, and how a greater emphasis on stigma reduction initiatives can be a core element of HIV-prevention programming. Stigma-reduction interventions should be promoted throughout all sectors of society and within criminal justice agencies in particular. Protective laws (those against discrimination based on sexual orientation) may assist in prevention efforts through their impact on the perceived acceptability of stigmas against MSM and should be supported throughout the region.

Our review notes a varied environment in relation to the criminalization and social regulation of homosexuality throughout Europe. Legal changes to decriminalize homosexuality in the parts of the region where such laws remain (Turkmenistan, Uzbekistan) need to be made. Shifts in Western Europe toward recognizing the social inclusion of MSM—for instance, through the legalization of civil partnerships between men—are important social interventions in that they contribute to an enabling context for health and citizenship, including potentially for HIV prevention. Community-level interventions may facilitate some of the social changes required to enable the wider social acceptance of homosexuality, including regarding the day-to-day practices of health, welfare, and regulatory institutions, and especially the practices of police and health care professionals.

Aside from HIV-prevention capacity, our review notes that HIV surveillance systems are much more likely to correctly attribute transmission of HIV between MSM, and thus better allocate treatments, in settings less socially stigmatized.

Evidence suggests that HIV testing can increase condom use for anal intercourse [93, 94], but for HIV-negative men it is a more effective HIV-prevention strategy when accompanied by effective counseling on risk reduction [95]. Dedicated MSM-only test facilities are needed in countries where most physicians are inclined to be hostile toward MSM. For full impact, it is essential that links are made with other prevention services appropriate to the needs of MSM, particularly in the East where many MSM appear poorly informed of the HIV risks linked to certain practices [96]. Paying for tests and other medical care are major barriers to prevention and should be discontinued. Condoms should be made freely available in all gay venues and known meeting places and required as a condition of local authority licensing to reduce UAI. Additionally, strategies other than a reliance on 100% condom use are needed such as encouraging slower rates of partner change, fewer partners, and especially the avoidance of multiple concurrent partnerships. Concurrency is a key risk factor in the spread of HIV because people are more inclined to use condoms in casual relationships [14, 97], but the establishment and maintenance of trust in a relationship encourages unprotected intimacy and then sets up barriers to honesty about any infidelity [98, 99]. Other strategies should involve encouraging the practices of sex acts other than anal sex [100].

In the West, social stigma appears less prominent as a factor shaping access to help and risk reduction; HIV testing is more common, knowledge of the risks posed by UAI is higher, and condoms are widely available [101, 102]. However, many MSM continue to have unprotected sex frequently with casual partners. In a context of the widespread availability of highly active antiretroviral therapy (HAART), there may also be a misplaced reliance on negative HIV results when selecting sex partners [103, 104]. Interventions need to question how strategies of “serosorting” are applied in practice, for they may promote a false sense of security, and counseling alongside HIV testing is necessary to address any misconceptions regarding the safety of relying on recent HIV-negative test results as a rationale for unprotected sex.

Complacency about infection and treatment availability complicates prevention messages in the West. There is some evidence that good adherence to HAART can reduce viral load to undetectable levels, resulting in some protection against HIV [105, 106]. However, patients with undetectable viral loads may have detectable levels of the virus in their semen and may therefore be infectious [107, 109]. Many of the studies providing the evidence of effectiveness of treatment as prevention are based on mathematical modeling rather than observed data, which are highly sensitive to the parameters and underlying assumptions of the model, while the remainder are ecological studies that give mixed results overall, and are unable to demonstrate causality [105, 106, 110, 111]. An assumption that treatment is protective is particularly problematic in the case of MSM, given that the per-act probability of transmission is so much higher for anal sex [112] than for vaginal sex [113], and that partner numbers are typically higher. Therefore, the promotion of HIV treatment as a strategy for HIV prevention in Europe needs to be approached with some caution.

One difficulty with the targeting of HIV prevention in parts of the European region is that it tends to be based on "Western" models of experience, and these historically tend to be based on interventions targeting men identified as homosexuals. Such approaches may overrepresent men who mainly or only perform the receptive role, since those who tend to take the insertive role may be more likely to identify themselves as heterosexual [114]. It is fundamentally important to recognize the heterogeneous nature of populations of MSM and to tailor interventions accordingly in different parts and local settings of Europe. MSM HIV-prevention programs need to go beyond gay-scene settings (bars, clubs, saunas, shops) to reach a significant and diverse proportion of the population. Websites for MSM are an essential part of HIV-prevention programs since they are used both by men who are active in the gay-scene and those who are not. Finally, educational mass media messaging targeting all sexually active men can also be designed to benefit MSM through sensitive use of language and imagery [91].

References

1. European Centre for Disease Prevention and Control, Implementing the Dublin Declaration on Partnership to Fight HIV/AIDS in Europe and Central Asia: 2010 progress report. 2010, ECDC: Stockholm.
2. Belza, M. J. Prevalence of HIV, HTLV-I and HTLV-II among female sex workers in Spain, 2000–2001. *European Journal of Epidemiology*, 2004. 19(3): p. 279–82.
3. Cwikel, J. G., et al. Sexually transmissible infections among illegal female sex workers in Israel. *Sexual Health*, 2006. 3(4): p. 301–03.
4. Folch, C., et al. Prevalence of human immunodeficiency virus, Chlamydia trachomatis, and Neisseria gonorrhea and risk factors for sexually transmitted infections among immigrant female sex workers in Catalonia, Spain. *Sexually Transmitted Diseases*, 2008. 35(2): p. 178–83.
5. Gutierrez, M., et al. Prevalence of HIV-1 non-B subtypes, syphilis, HTLV, and hepatitis B and C viruses among immigrant sex workers in Madrid, Spain. *Journal of Medical Virology*, 2004. 74(4): p. 521–27.
6. Linhart, Y., et al. Sexually transmitted infections among brothel-based sex workers in Tel-Aviv area, Israel: high prevalence of pharyngeal gonorrhea. *International Journal of STD & AIDS*, 2008. 19(10): p. 656–69.
7. Nigro, L., et al. Prevalence of HIV and other sexually transmitted diseases among Colombian and Dominican female sex workers living in Catania, eastern Sicily. *Journal of Immigrant and Minority Health*, 2006. 8(4): p. 319–23.
8. Papadogeorgaki, H., et al. Prevalence of sexually transmitted infections in female sex workers in Athens, Greece–2005. *European Journal of Dermatology*, 2006. 16(6): p. 662–65.
9. Platt, L., et al. Risk of sexually transmitted infections and violence among indoor-working female sex workers in London: the effect of migration from Eastern Europe. *Sexually Transmitted Infections*, 2011. 87(5): p. 377–84.

10. Vall-Mayans, M., et al. Sexually transmitted Chlamydia trachomatis, Neisseria gonorrhea, and HIV-1 infections in two at-risk populations in Barcelona: female street prostitutes and STI clinic attendees. *International Journal of Infectious Diseases*, 2007. 11(2): p. 115–22.
11. EuroHIV. HIV/AIDS Surveillance in Europe. Mid-year report 2006, in HIV/AIDS Surveillance in Europe, EuroHIV, Editor. 2007, French Institute for Public Health Surveillance: Saint-Maurice.
12. Nielsen, S., et al. STI rates and risk factors among female sex workers attending STI testing sites in Germany, in International Society for Sexually Transmitted Disease Research. 2011: Quebec.
13. Leobon, A., et al. A relative profile of HIV-negative users of French websites for men seeking men and predictors of their regular risk taking: a comparison with HIV-positive users. *AIDS Care*, 2011. 23(1): p. 25–34.
14. Balthasar, H., et al. Intentional risk reduction practices of men in Switzerland who have anal intercourse with casual male partners. *AIDS Journal of Acquired Immune Deficiency Syndromes*, 2010. 54(5): p. 542–47. 10.1097/QAI.0b013e3181e19a6b.
15. International HIV/AIDS Alliance. Behavioral monitoring and HIV infection prevalence among female sex workers as a component of second generation surveillance. 2009, International HIV/AIDS Alliance: Kiev.
16. Uuskula, A., et al. A study on HIV and hepatitis C virus among commercial sex workers in Tallinn. *Sexually Transmitted Infections*, 2008. 84(3): p. 189–91.
17. Platt, L., et al. Effects of sex work on the prevalence of syphilis among injection drug users in 3 Russian cities. *American Journal of Public Health*, 2007. 97(3): p. 478–85.
18. Rhodes, T., et al. Prevalence of HIV, hepatitis C and syphilis among injecting drug users in Russia: Multi-city study. *Addiction*, 2006. 101(2): p. 252–66.
19. Dershem, L., et al. Characteristics, high-risk behaviors and knowledge of STI/HIV/AIDS, and STI/HIV prevalence of facility-based female sex workers in Batumi, Georgia: 2004–06. Report on two behavioral surveillance surveys with a biomarker component for the SHIP Project. USAID Cooperative Agreement No. 114–A-00–02–00095–00. 2007: Tbilisi, Georgia, Save the Children, 2007 Sep.
20. Stvilia, K., et al. Prevalence of Hepatitis C, HIV, and risk behaviors for blood-borne infections: a population-based survey of the adult population of T'bilisi, Republic of Georgia. *Journal of Urban Health*, 2006. 83(2): p. 289–98.
21. Busza, J. R., et al. Street-based adolescents at high risk of HIV in Ukraine. *Journal of Epidemiology and Community Health*, 2010.
22. Cusick, L., A. Martin, and T. May. Vulnerability and involvement in drug use and sex work. 2003, London.
23. Kral, A. H., et al. Sexual transmission of HIV-1 among injection drug users in San Francisco, USA: risk-factor analysis. *The Lancet*, 2001. 357: p. 1397–401.
24. Wood, E., et al. Elevated rates of antiretroviral treatment discontinuation among HIV-infected injection drug users: implications for drug policy and public health. *International Journal of Drug Policy*, 2004. 15: p. 133–38.
25. Baral, S., et al. Male sex workers in Moscow, Russia: a pilot study of demographics, substance use patterns, and prevalence of HIV-1 and sexually transmitted infections. *AIDS Care*, 2010. 22(1): p. 112–18.

26. Belza, M. J. Risk of HIV infection among male sex workers in Spain. *Sexually Transmitted Infections*, 2005. 81(1): p. 85–88.
27. Bruckova, M., et al. HIV infection among commercial sex workers and injecting drug users in the Czech Republic. *American Journal of Tropical Medicine and Hygiene*, 2006. 75(5): p. 1017–20.
28. Leuridan, E., et al. Male sex workers in Antwerp, Belgium: a descriptive study. *International Journal of STD and AIDS*, 2005. 16(11): p. 744–48.
29. Sethi, G., et al. HIV, sexually transmitted infections, and risk behaviors in male sex workers in London over a 10 year period. *Sexually Transmitted Infections*, 2006. 82(5): p. 359–63.
30. Strathdee, S. A., and S. G. Sherman. The role of sexual transmission of HIV infection among injection and non-injection drug users. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 2003. 80 (Supplement 3)]: p. S7–S14.
31. Ryan, K. A., et al. Characteristics associated with prevalent HIV infection among a cohort of sex workers in Cameroon. *Sexually Transmitted Infections*, 1998. 74(2): p. 131–35.
32. van den Hoek, A., et al. High prevalence of syphilis and other sexually transmitted diseases among sex workers in China: potential for fast spread of HIV. *AIDS*, 2001. 15(6): p. 753–59.
33. van Veen, M. G., et al. HIV and sexual risk behavior among commercial sex workers in the Netherlands. *Archives of Sexual Behavior*, 2010. 39(3): p. 714–23.
34. Aral, S. O., et al. Commercial sex work, drug use, and sexually transmitted infections in St. Petersburg, Russia. *Social Science & Medicine*, 2005. 60(10): p. 2181–90.
35. Sokolowski, S., et al. Knowledge, attitudes and sexual behaviour with regards to HIV/STIs among MSM in 4 EU countries. 2007, Bordernet. EU.
36. Adam, P. C. G., I. Teva, and J. B. F. de Wit. Balancing risk and pleasure: sexual self-control as a moderator of the influence of sexual desires on sexual risk-taking in men who have sex with men. *Sexually Transmitted Infections*, 2008. 84(6): p. 463–67.
37. Hurtado Navarro, I., et al. Differences between women and men in serial HIV prevalence and incidence trends. *European Journal of Epidemiology*, 2008. 23(6): p. 435–40.
38. Schwappach, D. L. B., and P. Bruggmann. An integrated model of care to counter high incidence of HIV and sexually transmitted diseases in men who have sex with men—initial analysis of service utilizers in Zurich. *BMJ*, *Public Health*, 2008. 8.
39. Prasad, L. R., et al. Changing epidemiology of HIV anonymous testing in Switzerland for 1996–2006. *Swiss Medical Weekly*, 2009. 139(17–18): p. 256–63.
40. Folch, C., et al. Working group REDAN, prevalence of HIV, HCV and other sexually transmitted infections and associated risk behaviors among Spanish and immigrant IDU in Catalonia, Spain, in International Harm Reduction Conference. April 25–29, 2010: Liverpool.
41. Platt, L., et al. Risk of sexually transmitted infections and violence among indoor-working female sex workers in London: the effect of migration from Eastern Europe. *Sexually Transmitted Infections*, 2011.
42. Platt, L., et al. Systematic Review examining differences in HIV, sexually transmitted infections and health-related risk behaviors between migrant and indigenous sex workers. Draft.

43. TAMPEP, and L. Brussa. Sex Work In Europe: A mapping of the prostitution scene in 25 countries, in Sex Work, Migration and Health, T. International, Editor. 2009, TAMPEP International: Amsterdam.
44. European Centre for Disease Prevention and Control (ECDC). Mapping of HIV/STI behavioral surveillance in Europe, in ECDC Technical Report. 2009: Stockholm.
45. Camara, B., et al. Guidelines for Upgrading of HIV/AIDS/STI surveillance in the Caribbean, in The Third Generation Surveillance of HIV/AIDS/STI Linking HIV, AIDS and STI Case-Reporting Behavioral and Care Surveillance, CAREC, WHO, and PANO, Editors. 2002.
46. Public Health England. Shooting up: infections among injecting drug users in the United Kingdom 2010. An update, November 2011, in Shooting Up: Infections among Injecting Drug Users in the United Kingdom. 2011.
47. Camoni, L., et al. Continued high prevalence of HIV, HBV and HCV among injecting and noninjecting drug users in Italy. *Annali Dell'Istituto Superiore di Sanita*, 2010. 46(1): p. 59–65.
48. Ongoeva, D. HIV-infection epidemiological analysis among sex workers in Central Asia. 2010: Oblast AIDS Centre, Kyrgyz Republic.
49. Schmidt, A. J., et al. EMIS Community Report 1. 2010.
50. Mounier-Jack, S., S. Nielsen, and R. J. Coker. HIV testing strategies across European countries. *HIV Medicine*, 2008. 9: p. 13–19.
51. Samet, J. H. Russia and human immunodeficiency virus—beyond crime and punishment. *Addiction*, 2011. 106(11): p. 1883–85.
52. Platt, L., et al. Impact of gender and sex work on sexual and injecting risk behaviors and their association with HIV positivity among injecting drug users in an HIV epidemic in Togliatti City, the Russian Federation. *Sexually Transmitted Diseases*, 2005. 32(10): p. 605–12.
53. Miller, C. L., et al. Females experiencing sexual and drug vulnerabilities are at elevated risk for HIV risk infection among youth who use injection drugs. *Journal of Acquired Immune Deficiency Syndromes*, 2002. 30: p. 335–41.
54. Montgomery, S. B., et al. Gender differences in HIV risk behaviors among young injectors and their social network members. *American Journal of Drug and Alcohol Abuse*, 2002. 28(3): p. 453–75.
55. Muga, R., et al. Syphilis in injecting drug users: clues for high-risk sexual behavior in female IDUs. *International Journal of STD & AIDS*, 1997. 8: p. 225–28.
56. Spittal, P. M. and M.T. Schechter. Injection drug use and despair through the lens of gender. *Canadian Medical Association Journal*, 2001. 164: p. 295–305.
57. Tortu, S., et al. Women's drug injection practices in East Harlem: an event analysis in a high-risk community. *AIDS and Behavior*, 2003. 7: p. 317–28.
58. Tyndall, M. W., et al. Risky sexual behaviors among injection drugs users with high HIV prevalence: implications for STD control. *Sexually Transmitted Infections*, 2002. 78 (Supplement 1): S170–75.
59. Vioque, J., et al. Prospective cohort study of female sex workers and the risk of HIV infection in Alicante, Spain (1986–96). *Sexually Transmitted Infections*, 1998. 74: p. 284–88.
60. Weber, A. E., et al. HIV risk profile and prostitution among female street youths. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 2002. 79(4): p. 525–33.

61. Booth, R., et al. Police brutality is independently associated with sharing injection equipment among injection drug users in Odessa, Ukraine, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
62. Sarang, A., et al. Policing drug users in Russia: risk, fear, and structural violence. *Substance Use & Misuse*, 2010. 45(6): p. 813–64.
63. Strathdee, S. A., et al. HIV and risk environment for injecting drug users: the past, present, and future. *The Lancet*, 2010. 376(9737): p. 268–84.
64. Rhodes, T., A. Sarang, M. Simic. Police violence and "fear-based policy" as barriers to HIV prevention: qualitative case studies in Russia and Serbia, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
65. Rhodes, T., et al. Trust, disruption and responsibility in accounts of injecting equipment sharing and hepatitis C risk. *Health, Risk & Society*, 2008. 10(3): p. 221–40.
66. Rhodes, T., et al. Situational factors influencing drug injecting, risk reduction and syringe exchange in Togliatti City, the Russian Federation: a qualitative study of micro risk environment. *Social Science & Medicine*, 2003. 57(1): p. 39–54.
67. Dolan, K., et al. HIV in prison in low-income and middle-income countries. *The Lancet*, *Infectious Diseases*, 2007. 7(1): p. 32–41.
68. Jürgens, R., A. Ball, and A. Verster. Interventions to reduce HIV transmission related to injecting drug use in prison. *The Lancet*, *Infectious Diseases*, 2009. 9(1): p. 57–66.
69. Matteelli, A., et al. Chlamydia trachomatis genital infection in migrant female sex workers in Italy. *International Journal of STD & AIDS*, 2003. 14(9): p. 591–95.
70. Strathdee, S. Health risks and power among female sex workers in Moscow, S. Report, Editor. 2005.
71. Ilić, D., S. Šipetić, and V. Bjegović. Risk of HIV infection among indoor and street sex workers and their use of health services in Belgrade, Serbia. Srpski arhiv za celokupno lekarstvo, 2010(3–4): p. 219–24.
72. Simic, M. and T. Rhodes. Violence, dignity and HIV vulnerability: street sex work in Serbia. *Sociology of Health & Illness,* 2009. 31(1): p. 1–16.
73. Crago, A. L. Arrest the violence. Human Rights abuses against sex workers in Central and Eastern Europe and Central Asia. 2009, Sex Workers' Rights Advocacy Network in Central and Eastern Europe and Central Asia.
74. Shannon, K., et al. Mapping violence and policing as an environmental-structural barrier to health service and syringe availability among substance-using women in street-level sex work. *International Journal of Drug Policy*, 2008. 19(2): p. 140–47.
75. Boynton, P. and L. Cusick. Sex workers to pay the price. *BMJ*, 2006. 332(7535): p. 190–91.
76. International Harm Reduction Development Program. Women, harm reduction, and HIV, in Assessment in Action. 2009, Open Society Institute.
77. Campbell, R. and M. Storr. Challenging the Kerb Crawler Rehabilitation Programme. *Feminist Review*, 2001. 67: p. 94–108.
78. Kinnell, H. Violence and Sex Work in Britain. 2008, Cullompton: Willan Publishing. p. 290.
79. Degenhardt, L., et al. Prevention of HIV infection for people who inject drugs: why individual, structural, and combination approaches are needed. *The Lancet*, 2010. 376: p. 285–301.

80. Reuter, P. Ten years after the United Nations General Assembly Special Session (UNGASS): assessing drug problems, policies and reform proposals. *Addiction*, 2009. 104(4): p. 510–17.
81. Degenhardt, L., et al. Toward a global view of alcohol, tobacco, cannabis, and cocaine use: findings from the WHO World Mental Health Surveys. *PLoS Med*, 2008. 5(7): p. e141.
82. Wood, E., et al. Vienna Declaration: a call for evidence-based drug policies. *The Lancet*, 2010. 376(9738): p. 310–12.
83. Wood, E., et al. The war on drugs: a devastating public-policy disaster. *The Lancet*, 2009. 373(9668): p. 989–90.
84. Room, R. The ambiguity of harm reduction—goal or means, and what constitutes harm?, in Harm Reduction: Evidence, Impacts And Challenges, T. Rhodes, Hedrich, D., Editor. 2010, Publications Office of the European Union: Luxembourg. p. 108.
85. Cusick, L., et al. Wild guesses and conflated meanings? Estimating the size of the sex worker population in Britain. *Critical Social Policy*, 2009. 29: p. 703–19.
86. Shannon, K., et al. Prevalence and structural correlates of gender based violence among a prospective cohort of female sex workers. *BMJ*, 2009. 339: p. b2939.
87. Rekart, M. L. Sex-work harm reduction. *The Lancet*, 2005. 366: p. 2123–34.
88. Goodyear, M. D. and L. Cusick. Protection of sex workers. *BMJ*, 2007. 334(7584): p. 52–53.
89. Cusick, L. Widening the harm reduction agenda: From drug use to sex work. *International Journal of Drug Policy*, 2006. 17(1): p. 3–11.
90. Costenbader, E., et al. Secrecy and risk among MSM in Tbilisi, Georgia. *AIDS Care*, 2009. 21: p. 591–97.
91. Peryshkina, A., et al. Men who have sex with men (MSM), physicians, and non-government organizations (NGOs): finding agreement on the HIV risk environment and service provision for MSM in Russia, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
92. Rainbow Project. Through our eyes—experiences of Lesbian, Gay and Bisexual people in the Workplace. 2011.
93. Csepe, P., et al. HIV risk behavior among gay and bisexual men in Budapest, Hungary. *International Journal of STD & AIDS*, 2002. 13(3): p. 192–200.
94. Štulhofer, A., et al. HIV-related sexual risk taking among HIV-negative men who have sex with men in Zagreb, Croatia. *AIDS and Behavior*, 2008. 12(3): p. 505–12.
95. Kasianczuk, M. G., et al. Risk factors associated with condom use among men who have sex with men in Ukraine. *Journal of LGBT Health Research*, 2009. 5(1–2): p. 51–62.
96. Reynolds, L., et al. HIV among men who have sex with men in Central and Eastern Europe: a review of 30 countries, WHO, Editor. 2011, WHO.
97. Folch, et al. Factors associated with unprotected sexual intercourse with steady male, casual male, and female partners among men who have sex with men in Barcelona, Spain. Vol. 18. 2006, New York, NY, ETATS-UNIS: Guilford. p. 16.
98. Choi, K. H., E. S. Hudes, and W. T. Steward. Social discrimination, concurrent sexual partnerships, and HIV risk among men who have sex with men in Shanghai, China. *AIDS Behavior*, 2008. 12(Supplement 4): p. S71–77.

99. Morris, M. and M. Kretzschmar. Concurrent partnerships and the spread of HIV. *AIDS*, 1997. 11(5): p. 641–48.
100. Kippax, S., et al. Sexual negotiation in the AIDS era: negotiated safety revisited. *AIDS*, 1997. 11(2): p. 191–97.
101. European Men Who Have Sex With Men Internet Survey (EMIS). www.emis-project.eu.
102. UNAIDS. An introduction to indicators: UNAIDS monitoring and evaluation fundamentals. 2010.
103. Mirandola, M., et al. HIV biobehavioral survey among men who have sex with men in Barcelona, Bratislava, Bucharest, Ljubljana, Prague and Verona, 2008–09. (Special Issue: HIV/AIDS and other sexually transmitted infections [STI] in men who have sex with men [MSM]—trends and behavioral surveillance.) *Eurosurveillance*, 2009. 14(48): p. 19427.
104. Williamson, L. M., et al. HIV testing trends among gay men in Scotland, United Kingdom (1996–2005): implications for HIV testing policies and prevention. *Sexually Transmitted Infections*, 2009. 85(7): p. 550–54.
105. Granich, R. M., et al. Universal voluntary HIV testing with immediate antiretroviral therapy as a strategy for elimination of HIV transmission: a mathematical model. *The Lancet*, 2009. 373(9657): p. 48–57.
106. Montaner, J. S. G., et al. Association of highly active antiretroviral therapy coverage, population viral load, and yearly new HIV diagnoses in British Columbia, Canada: a population-based study. *The Lancet*, 2010. 376(9740): p. 532–39.
107. Cohen, M. The HIV 'test and treat' movement: the details really matter, and now, in BHIVA Autumn Conference, October 7–8, 2010: London.
108. Cohen, M. S. HIV Treatment as Prevention: To be or not to be? *Journal of Acquired Immune Deficiency Syndromes*, 2010. 55(2): p. 137–38 10.1097/QAI.0b013e3181f0cbf3.
109. Cohen, M. S. HIV Treatment as Prevention: In the real world the details matter. *Journal of Acquired Immune Deficiency Syndromes*, 2011. 56(3): p. e101–e102 10.1097/QAI.0b013e3182041968.
110. Montaner, J. S. G., et al. The case for expanding access to highly active antiretroviral therapy to curb the growth of the HIV epidemic. *The Lancet*, 2006. 368(9534): p. 531–36.
111. Vanable, P. A., et al. Impact of combination therapies on HIV risk perceptions and sexual risk among HIV-positive and HIV-negative gay and bisexual men. *Health Psychology*, 2000. 19(2): p. 134–45.
112. Jin, F., et al. UAI, risk reduction behaviors, and subsequent HIV infection in a cohort of homosexual men. *AIDS*, 2009. 23(2): p. 243–52. 10.1097/QAD.0b013e32831fb51a.
113. Boily, M. -C., et al. Heterosexual risk of HIV-1 infection per sexual act: systematic review and meta-analysis of observational studies. *The Lancet, Infectious Diseases*, 2009. 9(2): p. 118–29.
114. Goodreau, S. M., et al. Role versatility among men who have sex with men in urban Peru. *Journal of Sex Research*, 2007. 44(3): p. 233–39.

Abbreviations

AI	anal intercourse
AIDS	acquired immune deficiency syndrome
AOR	adjusted odds ratio
ART	antiretroviral therapy
CAR	Central Asian Republics
CCM	country coordination mechanism
CI	confidence interval
DCRs	drug consumption rooms
ECDC	European Centre for Disease Prevention and Control
EE	Eastern Europe
EFTS	European Free Trade Association
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
EMIS	European Men Who Have Sex with Men Internet Survey
EU	European Union
FSU	former Soviet Union
FSW	female sex worker
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
GNI	gross national income
GUM	genitourinary medicine clinic
HAART	highly active antiretroviral therapy
HBV	hepatitis B virus
HCV	hepatitis C virus
HIV	human immunodeficiency virus
HPV	human papilloma virus
HSV-2	herpes simplex virus 2
ICRSW	International Committee on the Rights of Sex Workers
IDU	injecting drug user
IHRA	International Harm Reduction Association
LGBT	lesbian, gay, bisexual, transgender

MSM	men who have sex with men
MSW	male sex worker
NGO	nongovernmental organization
NSP	needle and syringe exchange program
OR	odds ratio
OST	opioid substitution therapy
PDU	problem drug use
PLHIV	people living with HIV
PrEP	pre-exposure prophylaxis
PWID	people who inject drugs
RDS	respondent-driven sampling
RITA	Recent Infection Testing Algorithm
STARHS	Serological Testing Algorithm for Recent HIV Sero-conversion
STI	sexually transmitted infection
SW	sex worker
SWAN	Sex Workers' Rights Advocacy Network
TAMPEP	European Network for HIV/STI Prevention and Health Promotion among Migrant Sex Workers
TB	tuberculosis
TESSy	The European Surveillance System
TLS	time location sampling
UAI	unprotected anal intercourse
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNGASS	United Nations General Assembly Special Session
UVI	unprotected vaginal intercourse
VCT	voluntary counseling and testing
WHO	World Health Organization

CHAPTER 1

Introduction

Background

This report aims to describe the dynamics of human immunodeficiency virus (HIV) epidemics among vulnerable and key populations at high risk in the European region, focusing specifically on people who inject drugs (PWID), sex workers (SWs), and men who have sex with men (MSM). It does so to inform future HIV prevention, treatment, and care responses as well as to guide future HIV-prevention surveillance and research.

A Focus on Key Populations in Concentrated HIV Epidemics

This report focuses specifically on reviewing European epidemiological evidence in relation to HIV among populations of PWID, SWs, and MSM. These populations are most at risk in concentrated rather than generalized HIV epidemics (see box 1.1). As shown in map 1.1, the HIV epidemics of Europe are largely concentrated HIV epidemics.

A Focus on Exploring Evidence in Relation to the HIV Risk Environment

A growing body of research substantiates relationships between environmental factors and HIV vulnerability [2–3]. The heuristic of the HIV risk environment, for example, has emerged as one way to envisage HIV risk as the product of reciprocal relationships between micro- and macro-level influences in the physical, social, economic, and policy environments, which contextualize individual and community actions in relation to risk [2–8]. Recent reviews have called for a shift toward social epidemiological approaches capable of capturing how elements of the risk environment affect HIV in vulnerable and key populations [2, 9]. This approach requires investigating how the distribution of HIV in such populations is in part shaped by "social factors"—that is, forces that extend beyond "proximal" individual-level factors and their biological mediators. Conscious that HIV epidemiological research may often lack sufficient focus on the study of social determinants, this report explores the extent to which recently published European evidence on HIV among key populations of PWID, SWs, and MSM captures indicators of the HIV risk environment.

Box 1.1 Definitions of HIV Epidemic

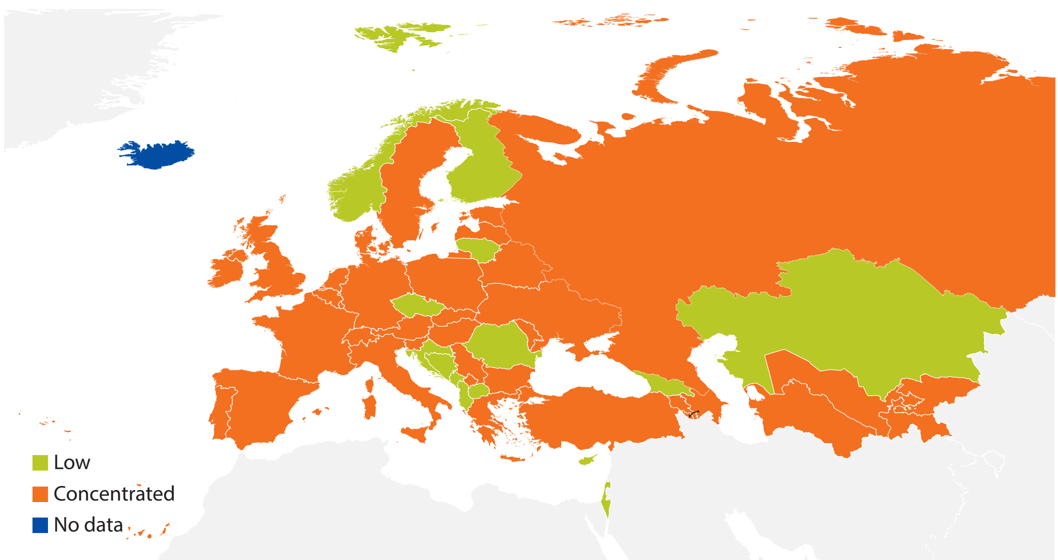
In generalized epidemics, where HIV is over 1% in the general population, surveillance systems concentrate on monitoring HIV infection and risk behavior in the general population. This usually includes HIV sentinel surveillance among pregnant women in antenatal care.

In concentrated epidemics, where HIV is over 5% in any subpopulation at higher risk of infection (such as, PWID, SW, and MSM), but under 1% in the general population, surveillance systems should monitor infection in those groups and their behavioral links with the general population. Surveillance systems may also monitor the general population for high-risk sexual behaviors that might lead to rapid spread of the virus if it were introduced and trends in sexually transmitted infections (STIs).

In low-level epidemics, where relatively little HIV is measured in any group, surveillance systems should focus on key populations at high risk and their associated behaviors, looking for changes in behavior that may increase the transmission of HIV infection.

Source: UNAIDS/WHO [1]. Guidelines for Second Generation HIV Surveillance: The Next Decade.

Map 1.1 The State of HIV Epidemics in Europe



Source: See chapter 3 of this report (for MSM, self–reported as well as those from biologically verified prevalence estimates have been used).
Note: HIV = human immunodeficiency virus; MSM = men who have sex with men.

A Focus on Exploring Evidence to Generate HIV Enabling Environments

Recognizing HIV epidemics as features of their social and structural contexts emphasizes the potentially pivotal role of social and structural interventions in creating environments which are enabling, rather than constraining, of evidence-based HIV-prevention [10–12]. Key dimensions of "enabling" policy environments conducive to effective HIV prevention among vulnerable and key populations at high risk include: the meaningful engagement of the main stakeholders and affected populations in policy formation and programming; a coordinated multisectoral HIV-prevention strategy emphasizing an evidence-based public health and rights-oriented approach; the generation of research and surveillance on HIV epidemic spread and response; and the development and scale-up of a package of evidence-based interventions, including the removal of structural obstacles limiting their implementation, such as the criminalization of affected populations [11, 13–15]. This report considers the implications of the epidemiological evidence it reviews for the development of HIV-prevention responses, including those incorporating social and structural intervention approaches.

Outline of the Report

In addition to a description of methods (below), the report comprises three main sections. Chapter 2 synthesizes evidence drawn from European HIV surveillance data (chapter 2.1) and targeted HIV prevalence studies (chapter 2.2). Chapter 3 synthesizes evidence drawn from systematic reviews of epidemiological studies among PWID, SWs, and MSM. Chapter 4 draws on the evidence reviewed in chapter 3 as well as the international literature more broadly to consider implications for strengthening responses, including in relation to HIV surveillance and HIV prevention for PWID, SWs, and MSM. In chapter 5, we draw our conclusions.

Methods

This report draws on four main methods of data collection and analysis: (a) a review of HIV surveillance in Europe; (b) a systematic review of published and unpublished epidemiological literature; (c) an ecological analysis exploring the relationship between structural indicators and HIV prevalence; and (d) focusing on PWID specifically, mathematical modeling of the impact of needle and syringe exchange programs (NSP), opioid substitution therapy (OST) and antiretroviral therapy (ART) on HIV incidence and prevalence.

For the purposes of this report, we adopt the World Health Organization's (WHO) definition of Europe. This definition includes 55 countries in total: 24 from Western Europe (Andorra, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Liechtenstein,[1] Luxembourg, Malta, Monaco, the Netherlands, Norway, Portugal, San Marino, Spain, Sweden, Switzerland, and the United Kingdom); 16 from Central Europe (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, the Czech Republic, Hungary, Kosovo,[2] the former Yugoslav Republic of Macedonia, Montenegro, Poland, Romania, Serbia, the Slovak Republic, Slovenia, and Turkey); and 15 from Eastern Europe and Central Asia (Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, the Kyrgyz Republic, Latvia, Lithuania, Moldova, the Russian Federation, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan).

Throughout the report, we provide selective illustrative case studies. The following countries are included in the case studies: Estonia, Portugal, Russia, Ukraine, and the United Kingdom, as well as the Central Asian republics. A case study approach enables us to draw on unpublished and review material not available to the systematic review and to explore the dynamics of the HIV epidemic and vulnerability across key populations.

Review of HIV Surveillance Data

HIV Case Reports

We examine public health surveillance data related to HIV in Europe using published information as well as gray literature with the aim to exploring the burden of HIV case reports attributed to injecting drug use, MSM, and heterosexual exposure, with particular focus on trends in the years 2006–11. These analyses are synthesized in chapter 2 of this report.

The reporting of HIV diagnosis has been examined using the following data sources:

- Human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) surveillance data from the European Centre for Disease Prevention and Control (ECDC)/WHO Regional Office for Europe (data up to 2010) [16]
- HIV diagnoses reports to the Federal AIDS Centre for Russia (data up to 2010) [17]
- EuroHIV 2006 survey on HIV and AIDS surveillance in the WHO European region [18]

Biological and Behavioral Studies

Alongside HIV case reports, we examine the extent and methods of directly assessed HIV prevalence and related risk behaviors from targeted studies among PWID, SW, and MSM. This analysis enables us to assess the extent of second-generation surveillance activities in place [1].

Sources used to identify biological and behavioral HIV surveillance activities include:

- Results of systematic searches of the published literature (both scientific journal and gray literature) undertaken for each of the three main population groups: MSM, PWID, and SW
- The ECDC report on behavioral surveillance in the European Union (EU) and European Free Trade Association (EFTA): for data on PWID, MSM, and SW [19]
- EuroHIV reports on HIV prevalence studies: for data on HIV serosurveillance, 2000–06 inclusive [20–22]
- European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) Drug Related Disease Key Indicator: for data on HIV prevalence studies among PWID in the EU, Norway, and EU accession countries [23]

Excluded from our analysis were studies using self-reported HIV results to measure prevalence, surveys with sample sizes less than 50, or studies where the sampled population was unclear or was likely to be unrepresentative of the population concerned. Our analyses are limited in that they only draw on published sources in English, Spanish, French, and Russian identified through searches for documents (scientific journal articles and gray literature) published since 2000. The analyses here may underestimate the extent to which surveys have been undertaken to directly measure HIV prevalence or risk behaviors as they exclude publications in other languages, studies that could not be identified through the searches undertaken, and very recent and other unpublished surveys. Our analyses reported in chapter 3 focuses on 50 countries in the region, excluding the four smallest countries, which all have populations less than 100,000 people (Andorra, Liechtenstein, Monaco, and San Marino). Such small population numbers are likely to make undertaking targeted surveys impractical among PWID, SWs, and MSM.

Assessing the Extent and Quality of HIV Surveillance

We examine the extent of biological and behavioral studies among PWID, SWs, and MSM by documenting the activity in each country and the extent of repeated surveys that provide a system of ongoing monitoring. The quality of the studies that was considered during the process of selecting the best HIV prevalence estimates is discussed below. We used the data extracted during this process and selected case studies to explore the range and robustness of the methodologies used.

Best Estimates of HIV Prevalence

In order to better compare prevalence estimates across the region as well as explore the quality of estimates used by each country, we selected what we defined as the best national-level prevalence estimates. An appendix of all such scored studies is available on request. Our criteria for selection included wide geographic coverage, most recent study, population sampled, and recruitment setting. We allocated up to three points for most recent studies, up to three points for the population sampled, up to three points for country coverage, and up to three points for the range of settings sampled. We deducted one point for treatment-only samples due to the potential bias associated with recruiting from such settings.

We used these indicators in order to gain some insights into the quality of second-generation surveillance in the country and to determine what further work may be needed (summarized in chapter 2) as well as to select a "best estimate" of HIV prevalence among key populations (summarized in chapter 3).

Taking HIV case reporting systems and biological and behavioral surveillance studies together, we categorize surveillance systems according to whether they are

- Comprehensive (case reports plus prevalence and behavioral surveillance in two or more geographical sites, clear definition of population group, two or more recruitment methods used, multiple years, as well as estimates of population size)

- Extensive (case reports plus prevalence and/or behavioral surveillance in at least one area, clear definition of population group, clear recruitment methods, not repeated)
- Focused (case reports plus prevalence and/or behavioral surveillance in one site, not repeated)
- Basic (only case reports) or
- None

By drawing on the quality assessment of the range of prevalence estimates identified, national epidemics among each population were classified to allow for easier comparison. Using the best quality estimate(s) available to us, the HIV prevalence in PWID, SWs, and MSM were classed as (a) low (<1%); (b) medium (1% to <5%); (c) high (5% to <20%); or (d) very high (20% or more). This definition of the magnitudes of national epidemics was compared alongside HIV case reports and our assessment of the quality of the national surveillance systems in order to assess the appropriateness of the system in place to effectively monitor HIV in that population. This analysis of quality assessment and improvement is presented in chapter 4.

Estimates of PWID and SW Population Sizes

Data on PWID between the ages of 15–64 in a country were obtained from national estimates as reported by the EMCDDA, Reference Group to the United Nations on HIV and injecting drug use [24] or by country coordination mechanisms (CCMs) in their most recent grant proposals to the United Nations Global Fund to Fight AIDS, Tuberculosis and Malaria (GFAMT) [24]. The prevalence of PWID in a country was obtained by dividing the PWID population by the total population (ages 15–64) and expressed as a rate per 1,000 individuals.

Missing values were imputed based on other available data or by using estimates from neighboring countries with similar epidemiological profiles. When a range of values as available, the midpoint value was taken or more complex estimations were sought to arrive at acceptable estimates. For example, the estimated size of the PWID population in Latvia was unavailable, although the population of problem drug use (PDU, which includes PWID and long-term use of opioids, cocaine, or amphetamines according to the EMCDDA) was estimated at 7,191, or 4.6 per 1,000 adults. In neighboring Lithuania, whose PWID epidemic has similar features, the PWID population is estimated at 2.2 per 1,000 adults. Extrapolating this figure to the Latvian adult population, we assumed that the size of the PWID population in Latvia would be about 3,429, a figure around half the size of the PDU population, which seemed a plausible estimate. When data on the main drug injected were unavailable, data from the EMCDDA on treatment demand, which indicate the proportion of patients entering treatment, stratified by primary drug and proportion injecting, were used to obtain a country-level estimate. This estimate assumes that treatment demand is relatively equal across groups of drug users throughout the country.

Data on the number of female sex workers (FSWs) in a country were obtained from estimates of the proportion of FSWs in the adult population provided by Vandepitte et al. [25]. Actual numbers were calculated using these estimates, multiplied by the female adult population (ages 15–64) then divided by 1,000 to give a rate per 1,000 people. Other estimates were derived from project reports collated by the European Network for HIV/STI Prevention and Health Promotion among Migrant Sex Workers (TAMPEP) and projects funded by the Global Fund. When estimates varied widely across the three sources, a midpoint was taken and low- and high-range estimates were presented. Data on the profile of FSWs were taken from the systematically reviewed literature (see 1.1.2 below). Missing data on levels of injecting or violence among FSW populations were imputed using the same methods applied to missing PWID indicators.

Systematic Review of Epidemiological Literature

We conducted a systematic review to assess published and unpublished epidemiological and behavioral research data (both quantitative and qualitative studies) addressing vulnerable and key populations at high risk; to examine the prevalence and incidence of HIV and risk behaviors among PWID, SWs, and MSM; and to establish what factors (from behavioral to structural) are driving the HIV epidemic among key populations in Europe.

The specific research questions to be answered through the review exercise are

- What is the prevalence and incidence of HIV among key populations (PWID, SWs, MSMs, prisoners, and migrants) in Europe?
- What are the individual, social, and environmental risk factors associated with HIV and HIV risk factors among these populations?
- How does risk differ within subpopulations of each population?

Searches and Inclusion Criteria

The databases searched are as follows: MEDLINE (1950–2008), EMBASE, Social Science Citation Index, Popline, CINAHL, Global Health, and an online search combining terms for injecting drug users, sex work, MSM, HIV, and risk factors for acquiring HIV. We drew on thesaurus and non-thesaurus terms as appropriate (a summary of our full search terms is attached in appendix A). Reference lists of found articles were also searched and experts in the field consulted to identify other relevant studies. We conducted a systematic search of websites of research institutes, service providers, and donor organizations working with the risk groups across the region. In addition, we searched conference abstracts from the International Conference on the Reduction of Drug Related Harm (2005–10) and the International AIDS Conference (2006, 2008, and 2010). A list of the websites searched is attached in appendix A.

Quantitative Studies

We included reports written in English, Spanish, French, and Russian published from 2005 to 2011 based on studies undertaken in WHO-defined Europe that reported rates among PWID, SWs (male, female, or transgendered selling sex to men or women), and MSM on any of the following: HIV prevalence or incidence, sharing needles/syringes; unprotected anal intercourse, and unprotected vaginal intercourse. PWID were defined as individuals who have ever injected drugs for nonmedical purposes. A SW was defined as someone who has ever exchanged sex for money, drugs, or goods. MSM are defined as chromosomal males who have ever had penetrative sex with other chromosomal males (i.e., it includes male-to-female transgendered people and heterosexually identified men). Studies were included if they reported crude or adjusted associations.

For SWs, we broadened search terms to include composite measures of HIV and sexually transmitted infections (STIs) and risk associated with acute STIs [26, 27]. We examined composite measures of HIV and STIs in order to assess vulnerability associated with infection rather than as biologically plausible risk factors. We also included studies published up to 2000, after which there were no recent estimates available.

Qualitative Studies

We drew selectively (rather than systematically) on qualitative studies that explored how PWID, SW, and MSM experienced risk and the harms associated with increased risk of HIV.

Exclusion Criteria

Manuscripts that were commentaries or editorials were excluded as were review papers containing no primary data, although these were collected in order to gather references for primary studies not identified by the search. Papers not fitting the inclusion criteria were coded according to whether they contained information on HIV interventions or coverage. These papers were set aside to aid in the interpretation of the systematic review findings.

Results of Search and Data Extraction

From the included quantitative studies, we extracted data from the following categories: setting (specifying city/region and country); date (of publication and/or fieldwork); study aim, design, sampling strategy, sample size, data-collection methods, and analytic strategy; population and definition used; measures of HIV prevalence and incidence; receipt of HIV testing; and author-reported study limitations. Demographic characteristics, risk behaviors, and experience of other harms extracted varied according to individual risk groups. Information on the numbers of papers identified and the process of the systematic review are included in figures A.1–A.3. For the qualitative studies we extracted data on the main themes, concepts, and findings on the social contextual factors linked to risk practices and HIV vulnerability.

A total of 5,644 studies were identified in the systematic review of PWID. Among these, 128 were used to generate estimates of HIV/STI prevalence and demographic and risk profile of PWID. We extracted data on the duration of injecting career, main drug injected, regular income, the proportion HIV tested, needle/syringe sharing, inconsistent condom use, sex work, arrests, prison and history of drug treatment, and sample characteristics (gender, age, sampling methodology, drug user inclusion criteria).

A total of 1,993 studies were identified in the systematic review of SWs. Among these, 73 papers were used to generate estimates of HIV/STI prevalence and demographic and risk profile of SWs. We extracted data on unprotected vaginal intercourse, unprotected anal intercourse (UAI) with clients and nonpaying partners, experience of violence from clients or police, injecting drug use, time in sex work, location of sex work, and sample characteristics (age, nationality, and education). In addition we extracted data from qualitative papers to interpret findings from the systematic review, particularly in relation to experience of violence and mental health that were not well documented in the epidemiological data.

A total of 3,200 papers were identified in the systematic review of MSM. Among these, 73 papers were used to generate estimates of HIV prevalence and demographic and risk profile of MSMs. We extracted data on UAI, female partners, unprotected vaginal intercourse, experience of violence, alcohol and drug use including injecting drug use, selling, buying and trading sex, and sample characteristics (age, nationality, education, socioeconomic position).

Ecological Analysis

We collected selected indicators of structural interventions and social-structural factors across the region. The primary method used for collating up-to-date indicators was to synthesize routine coverage estimates produced by international agencies, governmental and nongovernmental organizations (NGOs), and umbrella organizations working in Europe. Indicators were collated from the World Health Organization Regional Office for Europe; the ECDC/EMCDDA; Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM); International HIV/AIDS Alliance; the International Harm Reduction Association (IHRA); the United Nations Reference Group on HIV Prevention Among Injecting Drug Users; International Gay and Lesbian Association; the Joint United Nations Programme on HIV/AIDS (UNAIDS) Stigma index; national censes; the Global Network of People Living with HIV; and TAMPEP.

Coverage and Policy Indicators

Data on intervention coverage including numbers of services and PWID accessing those services for NSP and OST were obtained from the EMCDDA and the UN Reference Group [28]. Data on PWID accessing ART was obtained from WHO-Europe. The majority of variables are not complete for all countries. The presence and quantity of NSP, OST, and ART sites in a country as well as the estimated number of people accessing them were obtained from the EMCDDA and the UN Reference Group [28] for the most recent year available.

Data on different legislative models regulating sex work and services working with SWs in the region were collated from our systematic review as well as the Global Fund Project Monitoring Reports; a directory of health and social support services for SWs in Europe (services4sexworkers.org); surveys produced by the International HIV/AIDS Alliance; and TAMPEP [29–32].

Data on the extent of HIV testing among MSM were extracted from the systematic review and the European Men's Internet Survey [33]. We extracted data on the coverage achieved of MSM by HIV programs through United Nations General Assembly Special Session (UNGASS) indicators collected through the Dublin Declaration [34].

Outcome

The primary outcomes of HIV prevalence among PWID, FSWs, and MSMs were drawn from our systematic review of recent published and gray literature. Best estimates of HIV prevalence and injecting drug use (for FSWs only) were selected according to the criteria described to assess the quality and extent of biological and behavioral surveillance. In the case of multiple studies with equal scores, a weighted average of HIV and injecting drug use was taken. For FSWs this applies to Georgia, Russia, Spain, Ukraine, and the former Yugoslav Republic of Macedonia. The relationship between HIV prevalence and selected structural indicators are described using linear regression models. Findings from this analysis are used to illustrate key points in chapter 4.

Policy Environment Index for PWID

We generated a simple index of "enabling" policy environment. Our interpretation of an enabling policy environment drew on guidelines generated by WHO [35], UNAIDS [36], international NGOs [37], and peer-reviewed papers in this field [9, 12, 14, 38]. As outlined in box A.1, the core items of the index included country-level indicators of (a) coordinated national strategy for HIV prevention and drug use (indicated by evidence of explicit inclusion of "harm reduction" in national-level strategy and monitoring and evaluating HIV epidemics); (b) meaningful engagement of stakeholders in HIV prevention policy formation and programming (indicated by evidence of a national organization of drug users); and (c) evidence-based HIV prevention intervention approaches (indicated by presence of OST and NSP, presence of OST and NSP in prison settings, and evidence of de-emphasizing criminalization through the use of administrative penalties for drug use possession for personal use).

Indicator data were obtained from a combination of sources, including global reports of harm reduction policy and coverage [39]; country profiles collated and updated by the EMCDDA [40]; our systematic review of research studies; and the International Network of People who Use Drugs [41]. The index was constructed by allocating equal weight to each of the six items and aggregating a score for each country, with higher scores indicating a more enabling environment conducive to evidence-based public health approaches.

Key indicators of supportive policy environment for MSM were selected as follows:

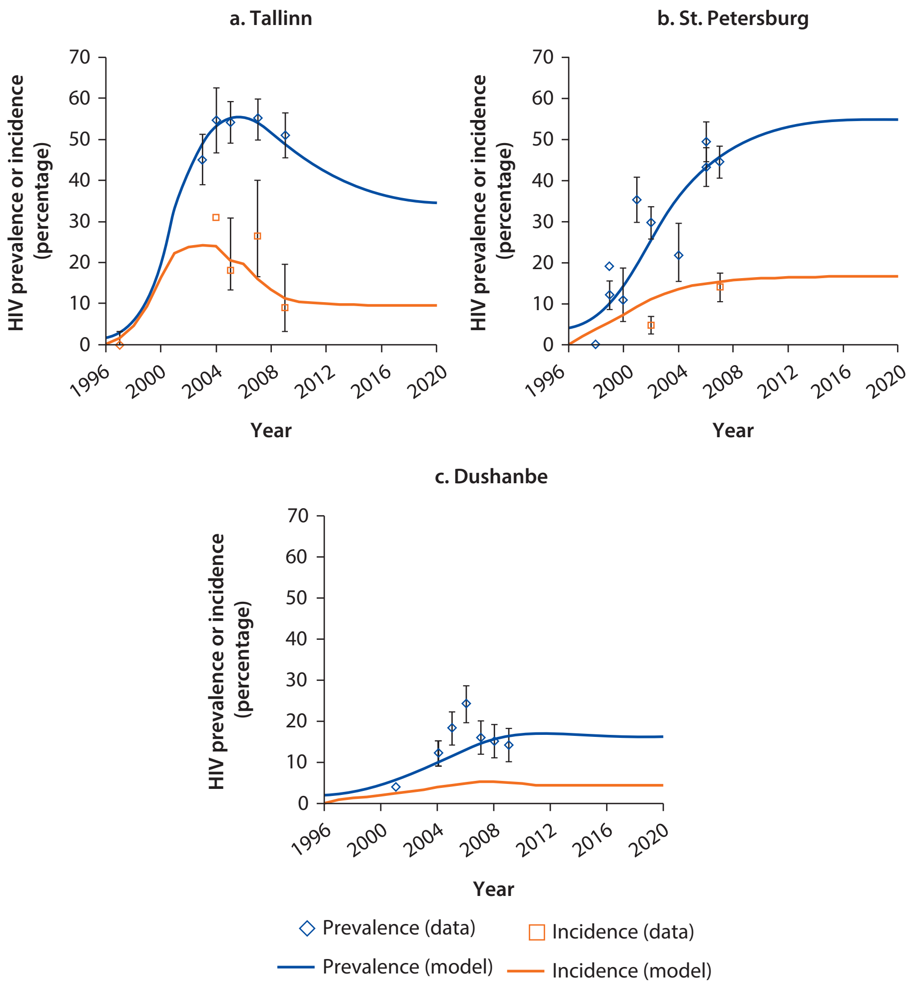
- Legislation against male-male sex
- Legislation that predates 1981
- Legislation against discrimination on the grounds of sexual orientation
- The presence of an annual Gay Pride activity
- The recognition of civil partnership or marriage between people of the same gender

The index was constructed by allocating equal weight to each of the items and aggregating a score for each country, with higher scores indicating a more liberal legislative and social environment. The findings of the policy index are presented in chapter 4.

Modeling Analysis

We conducted a simple modeling analysis to consider the potential impact of OST, NSP, and ART on HIV incidence and prevalence in three illustrative epidemic scenarios: Estonia (Tallinn); Russia (St. Petersburg); and Tajikistan (Dushanbe). At baseline, the model is calibrated to detailed HIV prevalence and incidence data from each setting, adjusting for the possible decrease in HIV incidence resulting from heightened coverage of NSP in Tallinn [42] or moderate coverage of NSP in Dushanbe. The model also adjusts for possible longer duration of injecting drugs in Tallinn and St. Petersburg than Dushanbe [43–45]. In accordance with NSP data from Tallinn [42], the effect of NSP in Tallinn was assumed to scale up from 2003 to 2009 with the final efficacy estimated on the basis of fitting the model to observed prevalence and incidence trends in Tallinn. It was also assumed that the efficacy in intermediate years was proportionate to the relative number of syringes distributed in that year compared to 2009. The same assumptions for the effect of NSP on HIV transmission were made for Dushanbe, but the syringe distribution scaled up more slowly, from 0 in 1999 to about 7 syringes per PWID per year in 2006. By 2010 and 2011, the distribution rapidly scaled up to about 32 syringes per PWID per year. The model was fit to HIV prevalence and incidence data by adjusting (a) the HIV seeding prevalence in 1996 (to shift when the epidemic started), (b) the infection rate per month in the latent phase of HIV, and (c) the duration of injecting (both used to change the rate at which the epidemic progresses and the prevalence at which it stabilizes). The effect of NSP expansion in Tallinn was used to fit the model to the downturn in HIV incidence (and possibly prevalence) in Tallinn. The adjusted parameter values used for the model fits are shown in table A.1, while all other parameters were kept constant and are shown in table A.2. A comparison of the model (baseline projections) with prevalence and incidence data from each setting is shown in figure 1.1 below. It is important to note that the model runs should only be seen as illustrative for the type of epidemic occurring in these different

Figure 1.1 Comparison of HIV Prevalence and Incidence Projections in Three Sites in Eastern Europe (1996–2020)



Note: HIV = human immunodeficiency virus.

settings, that is, the Tallinn epidemic represents a high-prevalence epidemic with high-coverage NSP, whereas the St. Petersburg and Dushanbe epidemics represent high and moderate HIV prevalence epidemics, respectively, with no or moderate NSP.

Assumptions underlying the modeling of the impact of scaling up OST, NSP, and ART are summarized as follows:

- Receipt of OST reduces by 50% the chances of PWID becoming infected, based on a recent unpublished meta-analysis of cohort studies that estimates the reduction in HIV incidence among people currently on OST [46]. Any scale-up of OST and NSP is assumed to occur over a 7 year period from

2012 to 2019 to mimic the scale-up of NSP in Tallinn [42]; the impact of different final coverage levels are also considered

- High-coverage NSP (assumed to correspond to 70 syringes distributed per PWID per year as achieved in Tallinn in 2008/09) is assumed to reduce by 40% the chances of a PWID becoming infected, based on the possible effect of widespread NSP on HIV incidence in Tallinn [42] as calibrated through fitting the model to observed trends in HIV incidence in that setting. This effect is assumed to occur at the highest NSP coverage achieved in Tallinn in 2008–09 (~70 syringes distributed per PWID per year), whereas for lower coverage levels a linear relationship is assumed between syringe distribution per PWID per year and the relative decrease in transmission risk. This is likely to be a simple approximation of the likely real relationship between level of syringe distribution and resulting decrease in HIV incidence, but unfortunately no suitable data exist to parameterize the model more precisely. Therefore, any coverage of NSP is assumed to be relative to the maximum coverage of NSP achieved in Tallinn, with 100% coverage assumed to have the same efficacy as that achieved in Tallinn in 2008–09 (40% reduction in infection risk to all PWID) and 50% coverage assumed to have half this efficacy, that is, a 20% reduction in HIV infection risk among all PWID. In other words, 50% of PWID have a 40% reduction in risk. Receipt of ART reduces the infectivity of HIV-positive PWID by 80%. This number is based on results of recent trials [47, 48] adjusted downward for the lower adherence levels characteristic of PWID [49–51], which has been shown to increase viral load [52–55]. For simplicity, it is assumed that all HIV-positive PWID (except those in the initial acute phase) can be recruited for ART at a fixed rate. ART coverage is only measured among HIV-positive PWID.

It is worth noting that estimates of the NSP- and OST-HIV effect roughly coincide with the published effect of OST or high-coverage NSP in decreasing HCV incidence among PWID in the United Kingdom [56]. For each intervention, we consider the coverage needed separately or in combination with (a) achieve a 30% or 50% relative reduction in HIV incidence or prevalence over 10 years; and (b) reduce HIV incidence to below 1% or HIV prevalence below 10% after 20 years.

Model Equations

The model stratifies the PWID population into those that are susceptible to HIV infection (stage x) and those that are HIV infected. The HIV-infected individuals can either be in the (a) initial high-viremia phase of infection (stage h with average duration $1/\nu$); (b) longer latent stage of low viremia (stage y with average duration $1/\gamma$); (c) a short late phase of high-viremia pre-AIDS (stage a with average duration $1/\eta$); or (d) on ART (stage τ with average duration $1/\Delta$). PWID enter the population at a rate $\Omega(t)$ that is set to balance all PWID leaving the population due to non-HIV causes (at a rate μ—includes cessation and overdose) and HIV mortality/morbidity (at a rate η) if there was no ART. PWID can be recruited for ART (at a rate r) once they enter the long latent phase of HIV, at which stage they have reduced infectivity (cofactor ω). Those in the initial and late phases of high viremia have heightened transmission (cofactors δ and θ, respectively) compared to the infection rate of those in the latent phase of HIV (β). OST and NSP are assumed to have specific coverage levels (n[t] and o[t]—independent of each other but varying over time) and reduce HIV transmission by cofactors ψo and ψn, respectively, when not in combination, and by ψon if in combination. OST and NSP are not modeled explicitly because PWID move between these groups with quite fast turnover, so incorporating them as average coverage levels is a reasonable approximation. The model equations are shown below:

$$\begin{bmatrix} \dfrac{dx}{dt} = \Phi(t) - \dfrac{\beta x}{N}\Phi(t)(h\delta + y + \theta a + \omega r) - \mu x \\ \dfrac{dh}{dt} = \dfrac{\beta x}{N}\Phi(t)(h\delta + y + \theta a + \omega\tau) - h(\nu + \mu) \\ \dfrac{dy}{dt} = \nu h - y(\mu + \gamma + r) \\ \dfrac{da}{dt} = \gamma y - a(\mu + \eta + r) \\ \dfrac{dx}{dt} = r(a + y) - \tau(\mu + \Delta) \end{bmatrix}$$

Where N is the total PWID population size (n = x + h + y + a + τ), and Φ(t) is the overall cofactor effect of NSP and OST and has the following form (where the coverage of OST and NSP, o and n, vary over time):

$$\left[\Phi(t) = (1 - o - n + on) + o(1 - n)\psi_o + n(1 - o)\psi_n + on\psi_{on}\right]$$

The inflow into the PWID population (Ω[t]) is defined below as a', is the number of people who would have AIDS if no ART were present:

$$\Phi(t) = \mu N + \eta a^1$$

Limitations

The modeling described here is relatively simple, so the projections should be seen as indicative of the impact that could be expected from scaling up interventions in settings with different HIV prevalences. First, the model only incorporates heterogeneity with respect to stages of HIV and ART status, so the effect of risk heterogeneity in relation to injecting is not accounted for. It is likely that risk heterogeneity would reduce the projected impact of these interventions but may be a lesser concern if PWID transition between different categories of risk [57]. Second, only single-model fits were obtained for each setting—allowing for multiple model fits would quantify the degree of uncertainty that is present in our impact projections [58]. However, because the model is fit to multiple estimates for the HIV prevalence and incidence for each setting, the level of uncertainty due to not obtaining multiple model fits should be reduced. Third, minimal risk behavior data from each setting were used in the model fitting. This was because normal measures of syringe and equipment sharing are generally biased and are unreliable for parameterizing models. Instead, the HIV prevalence and incidence data from each setting were used to calibrate the modeled HIV epidemic by adjusting the average monthly risk of HIV transmission between any susceptible and infected PWID, the time at which the epidemic started, and the estimated leaving rate for HIV-uninfected PWID.

The current duration of injecting reported in each setting was used to evaluate the likely difference in the leaving rate of each setting. Fitting the model to the HIV prevalence and incidence data suggests that the model can portray the type of epidemic that occurred in each setting. Lastly, we do not consider uncertainty in the efficacy estimates for the different interventions. This is of most concern for ART and NSP because there is little evidence assessing the impact of ART on parenteral HIV transmission, and it is hard to assess the efficacy of specific levels of syringe distribution on an individual's risk of acquiring HIV. Despite this issue, the efficacy estimate for NSP seems reasonable because it coincides with the possible HIV-impact of widespread NSP in Tallinn [42] and the impact of high-coverage NSP on other blood-borne infections [56]. It also seems reasonable that ART will have a large impact on parenteral HIV transmission, as evidence shows a huge decrease in plasma viral load when individuals start treatment, and ecological studies have shown associations between PWID-community viral load and HIV incidence at the population level in Vancouver, British Columbia, and Baltimore, Maryland [59]. Due to the uncertainty in the exact effect of ART on HIV transmission in PWID, and because of the low adherence observed among PWID [49], we used a conservative estimate of 80% for the efficacy of ART in reducing HIV transmission risk among PWID.

Notes

1. Liechtenstein data are reported via Switzerland; there are therefore 53 country reports, with Switzerland reporting for two countries.
2. Kosovo became a member of the World Bank Group in 2009. As far as WHO is concerned, references to "Kosovo" shall be understood to be in the context of UN Security Council resolution 1244 (1999).

References

1. UNAIDS/WHO. Guidelines for Second Generation HIV Surveillance: The Next Decade. Geneva, Switzerland 2000:48.
2. Poundstone, K. E., et al. The social epidemiology of Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome. *Epidemiologic Reviews* 2004, 26: 25–35.
3. Sumartojo, E. Structural factors in HIV prevention: concepts, examples, and implications for research. *AIDS* 2000, 14(Suppl. 1): S3–10.

4. Cusick, L. Widening the harm reduction agenda: From drug use to sex work. *International Journal of Drug Policy* 2006, 17: 3–11.
5. Rhodes, T. The 'risk environment': a framework for understanding and reducing drug-related harm. *International Journal of Drug Policy* 2002, 13: 85–94.
6. Rhodes, T., et al. The social structural production of HIV risk among injecting drug users. *Social Science and Medicine* 2005, 61: 1026–44.
7. Latkin, C. A., et al. The relationship between social network characteristics and exchanging sex for drugs or money among drug users in Baltimore, MD. *International Journal of STD and AIDS* 2003, 14: 770–75.
8. Latkin, C., et al. Personal network characteristics as antecedents to needle-sharing and shooting gallery attendance. *Social Networks* 1995, 17: 219–28.
9. Strathdee, S. A., et al. HIV and risk environment for injecting drug users: the past, present, and future. *The Lancet* 2010, 376: 268–84.
10. Gupta, G. R., et al. Structural approaches to HIV prevention. *The Lancet* 2008, 372: 764–75.
11. Blankenship, K, et al. Structural interventions: concepts, challenges and opportunities for research. *Journal of Urban Health* 2006, 83: 59–72.
12. Rhodes, T., et al. Transition and the HIV risk environment. *BMJ* 2005, 331: 220–23.
13. World Health Organization (WHO). *Policy and programming guide for HIV/AIDS prevention and care among injecting drug users*. In. 2005.
14. Degenhardt, L., et al., Prevention of HIV infection for people who inject drugs: why individual, structural, and combination approaches are needed. *The Lancet* 2010, 376: 285–301.
15. Beyrer, C., et al. *The global HIV epidemics among men who have sex with men*. Washington, DC: World Bank; 2011.
16. European Centre for Disease Prevention and Control/WHO Regional Office for Europe. *HIV/AIDS surveillance in Europe 2010*. Stockholm: European Centre for Disease Prevention and Control; 2011.
17. Department of Health and Social Development of the Russian Federation, et al. *HIV INFECTION Newsletter 35*. Moscow; 2011.
18. EuroHIV. *Report on the EuroHIV 2006 survey on HIV and AIDS surveillance in the WHO European Region*. In. Saint-Maurice, Switzerland: Institut de Veille Sanitaire; 2007.
19. European Centre for Disease Prevention and Control (ECDC). *Mapping of HIV/STI behavioral surveillance in Europe*. Technical report. Stockholm: ECDC; 2009.
20. EuroHIV. *HIV/AIDS Surveillance in Europe*. Mid-year report, 2005. Saint-Maurice: Institut de Veille Sanitaire; 2006.
21. EuroHIV. *HIV/AIDS Surveillance in Europe*. Mid-year report 2006. Saint-Maurice: Institut de Veille Sanitaire; 2007.
22. EuroHIV. *HIV/AIDS Surveillance in Europe*. Mid-year report 2007. Saint-Maurice: Institut de Veille Sanitaire; 2007.
23. European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). www.emcdda.europa.eu/themes/key-indicators/drid.
24. Mathers, B. M., et al. Global epidemiology of injecting drug use and HIV among people who inject drugs: a systematic review. *The Lancet* 2008, 372: 1733–45.

25. Vandepitte, J., et al. Estimates of the number of female sex workers in different regions of the world. *Sexually Transmitted Infections* 2006, 82: III18–III25.
26. Folch, C., et al. Prevalence of human immunodeficiency virus, Chlamydia trachomatis, and Neisseria gonorrhea and risk factors for sexually transmitted infections among immigrant female sex workers in Catalonia, Spain. *Sexually Transmitted Diseases* 2008, 35: 178–83.
27. Linhart, Y., et al. Sexually transmitted infections among brothel-based sex workers in Tel-Aviv area, Israel: high prevalence of pharyngeal gonorrhea. *International Journal of STD and AIDS* 2008, 19: 656–59.
28. Mathers, B. M., et al. HIV prevention, treatment, and care services for people who inject drugs: a systematic review of global, regional, and national coverage. *The Lancet* 2010, 375: 1014–28.
29. Central and Eastern European Harm Reduction Network. *Sex work, HIV/AIDS, and human rights in Central and Eastern Europe and Central Asia*. A report from the Central and Eastern European Harm Reduction Network: Vilnius, Lithuania, CEEHRN, July, 2005.
30. Crago, A. L. *Arrest the violence. Human rights abuses against sex workers in Central and Eastern Europe and Central Asia*. Sex Workers' Rights Advocacy Network in Central and Eastern Europe and Central Asia; 2009.
31. Cwikel, J. G., et al. Sexually transmissible infections among illegal female sex workers in Israel. *Sexual Health* 2006, 3: 301–03.
32. Gjenero-Margan, I., and B. Kolari. Epidemiology of HIV infection and AIDS in Croatia–an overview. *Collegium Antropologicum* 2006: 11–16.
33. Schmidt, A. J., et al. European Men Who Have Sex with Men Internet Survey (EMIS) Community Report 1; 2010.
34. European Centre for Disease Prevention and Control. *Implementing the Dublin declaration on partnership to fight HIV/AIDS in Europe and Central Asia*. 2010 progress report. Stockholm: ECDC; 2010.
35. World Health Organization (WHO). *Adelaide Recommendations on Healthy Public Policy*. Geneva: World Health Organization; 1988.
36. Reference Group to the United Nations on HIV and Injecting Drug Use. Consensus Statement of the Reference Group to the United Nations on HIV and Injecting Drug Use; 2010.
37. International HIV/AIDS Alliance (Secretariat). Enabling Legal Environments for Effective HIV Responses. In http://www.aidsalliance.org/publicationsdetails.aspx?id=496 2010.
38. Tawil, O., et al. Enabling approaches for HIV/AIDS prevention: can we modify the environment and minimize the risk? *AIDS* 1995, 9: 1299–306.
39. International Harm Reduction Association. The Global State of Harm Reduction 2010: Key Issues for Broadening the Response. In http://www.ihra.net/contents/145. Edited by Cook C. 2010.
40. European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). Country overviews. In http://www.emcdda.europa.eu/online/annual-report/2011/responding/1; 2011.
41. Albert, E. R. International Network of People who Use Drugs (INPUD). Personal communication with Emma Jolley. 2011.

42. Uuskula, A., et al. Expanded syringe exchange programs and reduced HIV infection among new injection drug users in Tallinn, Estonia. *BMC Public Health* 2011, 11: 517.
43. Beyrer, C., et al. Characterization of the emerging HIV type 1 and HCV epidemics among injecting drug users in Dushanbe, Tajikistan. *AIDS Research and Human Retroviruses* 2009, 25: 853–60.
44. Niccolai, L. M., et al. High HIV prevalence, suboptimal HIV testing, and low knowledge of HIV-positive serostatus among injection drug users in St. Petersburg, Russia. *AIDS and Behavior* 2010, 14: 932–41.
45. Platt, L., et al. High HIV prevalence among injecting drug users in Estonia: implications for understanding the risk environment. *AIDS* 2006, 20: 2120–23.
46. MacArthur, G. J., et al. Opiate substitution treatment and HIV transmission in people who inject drugs: systematic review and meta-analysis. *BMJ* 2012, 345: e5945.
47. Cohen, M. S., et al. Prevention of HIV-1 infection with early antiretroviral therapy. *New England Journal of Medicine* 2011, 365: 493–505.
48. Donnell, D., et al. Heterosexual HIV-1 transmission after initiation of antiretroviral therapy: a prospective cohort analysis. *The Lancet* 2010, 375: 2092–98.
49. Malta, M., et al. Adherence to antiretroviral therapy among HIV-infected drug users: a meta-analysis. *AIDS Behavior* 2010, 14: 731–47.
50. Wood, E., et al. Adherence and plasma HIV RNA responses to highly active antiretroviral therapy among HIV-1 infected injection drug users. *Canadian Medical Association Journal* 2003, 169: 656–61.
51. Nolan, S., et al. Adherence and plasma HIV RNA response to antiretroviral therapy among HIV-seropositive injection drug users in a Canadian setting. *AIDS Care* 2011, 23: 980–87.
52. Bangsberg, D. R., et al. Adherence to protease inhibitors, HIV-1 viral load, and development of drug resistance in an indigent population. *AIDS* 2000, 14: 357–66.
53. Petersen, M. L., et al. Pillbox organizers are associated with improved adherence to HIV antiretroviral therapy and viral suppression: a marginal structural model analysis. *Clinical Infectious Diseases* 2007, 45: 908–15.
54. Gross, R., et al. Effect of adherence to newly initiated antiretroviral therapy on plasma viral load. *AIDS* 2001, 15: 2109–17.
55. Braithwaite, R. S., et al. Adherence, virological and immunological outcomes for HIV-infected veterans starting combination antiretroviral therapies. *AIDS* 2007, 21: 1579–89.
56. Turner, K., et al. The impact of needle and syringe provision and opiate substitution therapy on the incidence of Hepatitis C virus in injecting drug users: pooling of United Kingdom evidence. *Addiction* 2011, 106 (11): 1978–88.
57. Vickerman, P., et al. Can needle and syringe programmes and opiate substitution therapy achieve substantial reductions in HCV prevalence? Model projections for different epidemic settings. *Addiction* 2012, 107 (11): 1984–95.
58. Degenhardt, L., et al. Prevention of HIV infection for people who inject drugs: why individual, structural, and combination approaches are needed. *The Lancet* 2010, 376: 285–301.
59. Wood, E., et al. Longitudinal community plasma HIV-1 RNA concentrations and incidence of HIV-1 among injecting drug users: prospective cohort study. *BMJ* 2009, 338: b1649.

CHAPTER 2

HIV Surveillance

HIV Diagnoses and AIDS Case Reporting

This chapter summarizes the human immunodeficiency virus (HIV) surveillance systems across European countries, before examining recent surveillance data for what these systems indicate regarding the burden and pattern of HIV diagnoses in key populations, especially in the five-year period from 2006 to 2010.

AIDS Case Reporting Systems

All European countries developed systems to monitor the number of acquired immune deficiency syndrome (AIDS) diagnoses soon after the first cases were recognized in the early 1980s. However, while AIDS case report data remain useful, their utility has declined over the past 15 years due to better monitoring of HIV diagnoses and the introduction of highly active antiretroviral therapy (HAART) in 1996. The increasing use of HAART since then has resulted in fewer people developing AIDS and an increase in the recovery of people diagnosed with an AIDS-defining illness. Countries continue to collect AIDS case data [1] because such data provide insight into the extent of late diagnosis and the impact of HIV treatment, particularly if data on CD4 cell counts or viral load are not routinely monitored (in 2010, 25 countries in the region collected data on CD4 cell counts at HIV diagnosis). However, in most European countries the primary focus of surveillance is new HIV diagnoses rather than AIDS cases. In Sweden, for instance, the reporting of AIDS cases ceased to be mandatory in 2000 [1].

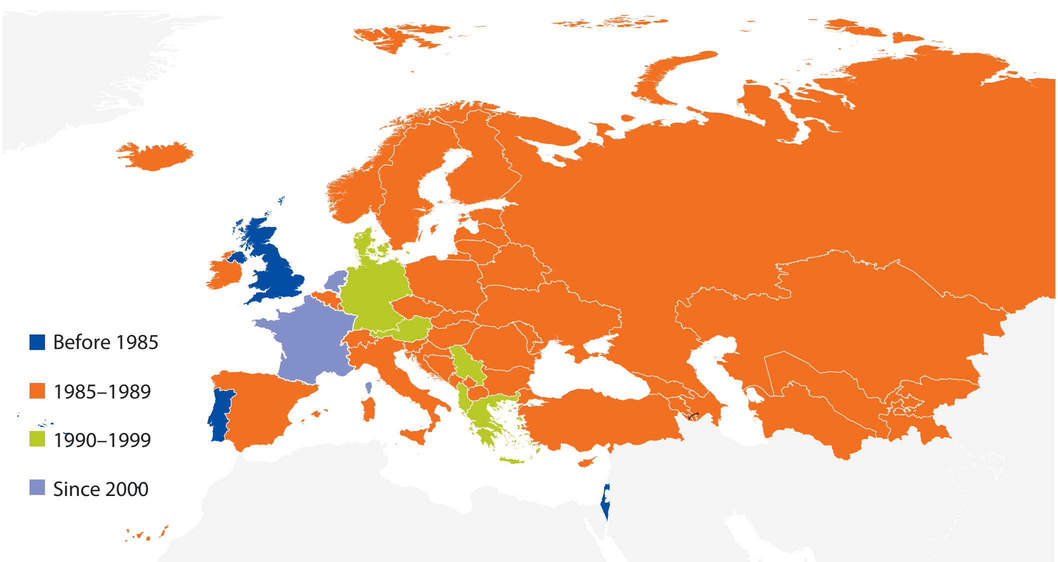
HIV Diagnoses Reporting Systems

Robust HIV diagnoses reporting data assist countries producing estimates of the numbers of people living with HIV (and thus the prevalence of diagnosed infection), as well as providing numbers for overall HIV prevalence (i.e., including both diagnosed and undiagnosed cases). If such reports include CD4 count data, they also provide insight into the extent of late diagnosis. HIV case reporting is a fundamental feature of public health intelligence on the HIV epidemics of Europe. At the same time, it is important to appreciate that country HIV diagnoses reports need not reflect current patterns of HIV transmission, since they include new as well as past infections.

All countries in the World Health Organization (WHO) European region, except Monaco and Liechtenstein, have established systems for monitoring the number of new HIV diagnoses. A few countries established HIV diagnoses reporting systems soon after the first tests for HIV infection became available in the early 1980s (Israel, Portugal, and San Marino in 1983; the United Kingdom in 1984). Most countries established systems in the late 1980s and early 1990s. By 1990, 41 (79%) of the 52 countries that now have HIV diagnoses reporting systems had a system operating in at least part of the country. In 11 countries (see map 2.1), HIV diagnoses reporting started after 1990, and a few of these countries have only established HIV case reporting systems more recently (Andorra and Malta in 2004, France in 2003, and the Netherlands in 2002). In some countries, systems have undergone significant revision in the way that they operate; as a result, data from different time periods are not always comparable [1]. Spain and Italy have regionally based surveillance with no national coverage as data are not available for all regions. However, the number of regions covered in both of these countries has increased over time [1], and Italy is reported to be establishing a national HIV notification system that will provide countrywide data in the future [2].

Countries use different methods to collate their HIV diagnoses data. In particular, risk-group information may not always be available or recorded. Due to variations in these systems, their data need to be compared cautiously for the following four reasons: (a) there will be differences in the timeliness of the

Map 2.1 Introduction of HIV Case Reporting System in Europe by Year



Sources: EuroHIV [3]; table B.1.
Note: HIV = human immunodeficiency virus.

reporting; (b) there will be differences in the extent of overreporting and the effectiveness of approaches for eliminating duplication (which may be especially difficult to avoid when anonymous testing for HIV is common); (c) there may be underreporting of cases, for example due, because of administrative errors; and, (d) national variations in the accessibility of HIV testing will affect the proportion of cases recognized. That is, countries with the largest number of diagnosed cases could be more successful at case finding than countries that do not have the worst epidemics (see also chapter 4).

The ECDC and the WHO European office systematically collate HIV diagnoses report data across the region, and we draw on these data here [1]. Most countries in the region provide data for inclusion in this European data set, with the exception of the Russian Federation (which only provided the total number of diagnoses for 2010), Austria (data not available due to legal issues), and Liechtenstein (where because of the small population, public health data are reported to Switzerland) [1]. We have added data for Russia, obtained from the Russian Federal AIDS Centre [4]. When possible, we have combined these data with the aggregate data from the ECDC/WHO data set in order to present the available data for all countries in the region except Austria, Liechtenstein, and Monaco (though the data do not cover all regions of Italy and Spain). HIV diagnoses report that data for the period 2006–10 are thus available for the vast majority of countries in the region, with data available for countries and areas covering 95% (841,383,300–889,201,000 people) of the population of the WHO European region.

AIDS Cases

By the end of 2010, almost 366,000 people had been reported as diagnosed with AIDS in the region (excluding Russia) [1]. Of these, almost 197,000 were known to have died by the end of 2010 [1]. It is thought that around 165,000 people were living with an AIDS diagnosis at the end of 2009 [1]. The number of AIDS cases reported has declined in recent years, dropping from 14,147 in 2006 to 7,714 in 2010 [1]. This decline almost certainly reflects the ongoing impact of the improved HIV treatment options on disease progression [5]. It may also reflect in part improved case finding, resulting in earlier diagnoses and help in seeking treatment.

The decline in AIDS cases overall was also seen in all three subregions of Europe between 2006 and 2010, from 7,598 to 4,249 in Western Europe; from 652 to 584 in Central Europe; and from 5,897 to 2,881 in Eastern Europe (excluding Russia). Declines in the number of AIDS cases over this five-year period are seen among both men and women overall and in each of the three subregions [1]; these declines have occurred even though access to HAART varies greatly across the region [6]. The annual number of AIDS cases associated with injecting drug use or acquired heterosexually has declined markedly in all three of the subregions [1]. While the annual number of AIDS cases associated with men who have sex with men (MSM) has fallen markedly in the West (from 1,838 to 1,222), it has been fairly stable in the East (23 in 2006 to 31 in 2010, excluding Russia), and has increased slightly in Central Europe (from 79 in 2006 to 134 in 2010) [1]. Although this is a relatively small number of cases, the reason for this increase in Central Europe needs to be examined.

Analysis of AIDS cases reported in the countries of the European Union (EU) indicates that migrants from Sub-Saharan Africa account for a considerable proportion of the HIV cases associated with heterosexual exposure and mother-to-child transmission. The analysis also indicates that, while MSM cases are largely from within Europe, there are also many men of Latin-America origin [7].

Number of HIV Tests Undertaken

HIV testing practices can vary widely between countries [8–10]. Many European countries collect data on the number of diagnostic HIV tests undertaken annually, while other countries estimate this number [11]. In 46 countries, recent data exist on the actual or estimated number of HIV tests performed in a year, suggesting an average of 57 HIV tests per 1,000 people annually (table 2.1). The number of tests undertaken varied across the subregions, ranging from 18 per 1,000 people in Central Europe (all countries had data) to 33 per 1,000 in the West (only 16 countries had data) to 119 per 1,000 in the East (all countries had data). However, the annual number of tests performed varied greatly between countries ranging from less than 0.2 (Greece) to 178 (Russia) per 1,000 people. Of all the reported tests undertaken, 53% were reported from Russia, which accounted for only 19% of the population of countries with data on the number of tests.

This variation in rates of diagnostic testing reflects a number of factors including differences in the accessibility of HIV testing, HIV testing practices including occupational requirements, and the stigma associated with HIV and HIV testing [8–10, 12]. While these findings should be interpreted cautiously as the numbers of tests conducted relate to different years and are derived from a variety of methods, they show that HIV testing is much less common in Central Europe.

Cumulative Number of Reported HIV Diagnoses

By the end of 2010, over 1,280,000 diagnosed HIV infections had been reported in Europe since the start of reporting in the early 1980s. Among these, 30% (379,353) of all diagnoses have been recorded in the West, 3% (33,308) in Central Europe, and 69% (867,457) in the East. This figure is

Table 2.1 Annual Number of Diagnostic Tests for HIV in Europe by Subregion

Subregion	*Number of countries with data on number of tests*	*Number of HIV tests*	*Proportion of total (%)*	*Tests per 1,000 people (average)*	*Tests per 1,000 people (country range)*
West	16	10.616,260	22	33	0.19–164
Central Europe	15	3.382,477	7.1	17	0.99–49
East	15	33.624,312	71	119	5.9–178
Total	46	47.623,049	100.1	57	

Sources: ECDC/WHO European Office HIV Report 2011, and Russian AIDS Centre Report 2011; Data on number of tests relates to different years; see table B.1.
Note: HIV = human immunodeficiency virus.

an underestimate since country data sets will not include information on all diagnosed infections.[1]

Russia has reported the largest number of HIV diagnoses (630,222), constituting around half (49%) of diagnoses ever reported in the region. Russia also has the highest population in the region—at over 140 million—accounting for 16% of the total. The cumulative total of reported HIV diagnoses in Russia equals 4,457 diagnoses per million population. Ukraine, with 5% of the region's population (46 million), has the second largest cumulative number of reported HIV diagnoses (153,108), at 3,329 per million people. There are three other countries where the cumulative reported diagnoses exceed 2,500 per million people: Estonia (5,736 diagnoses reported per million people), Switzerland (4,272 diagnoses reported per million people), and Portugal (2,607 diagnoses reported per million people). Only 3% of the cumulative reported HIV diagnoses are from Central Europe, where 23% of the region's population reside. Central Europe has lower levels of reported HIV than elsewhere in Europe, but as noted above, it also has the lowest level of HIV testing (table B.2).

Overall, one-third (410,869) of all the HIV diagnoses reported since the start of the epidemic have been associated with injecting drug use. Heterosexual transmission is the next most common exposure category, accounting for one-quarter of all diagnoses (306,966). Sex between men is associated with just over one-in-ten (138,286) of diagnosed infections reported. Mother-to-child transmission, receipt of contaminated transfusions and blood products, and nosocomial infections accounted for around 1% of reported diagnoses. However, nearly 32% of diagnoses reported lacked risk factor information.

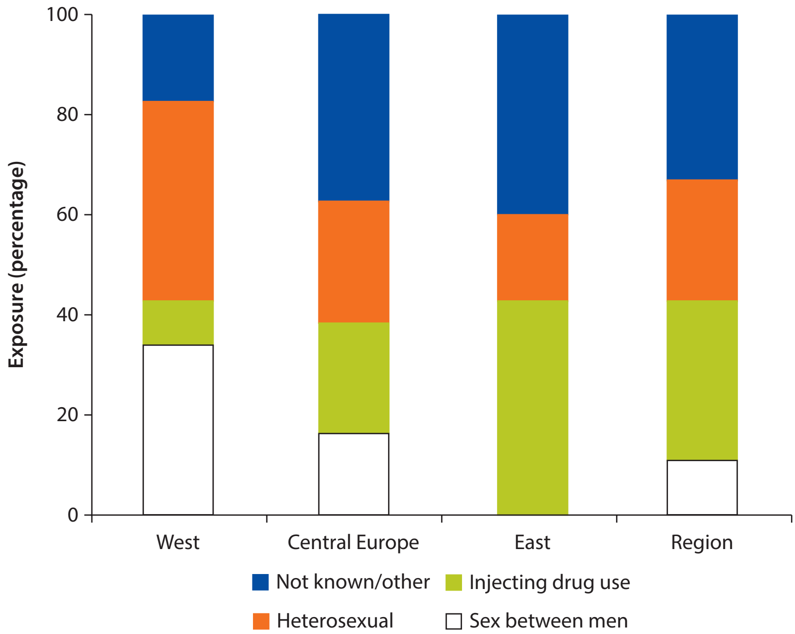
Regional Variation

The proportion of diagnoses associated with the different exposure categories varies across the region. In the West, heterosexual transmission and then MSM have been the most reported exposure categories. In Central Europe, the most reported categories are heterosexual transmission and then injecting drug use, with few reports attributed to MSM. In the East, 43% of all reported diagnoses were associated with injecting drug use, 17% with heterosexual transmission, and almost 39% not attributed to any exposure category (figure 2.1). The vast majority of the reported diagnoses associated with injecting drug use (90%) were from the East, with only 2% from the Central region. Of the diagnoses associated with heterosexual transmission, 49% were from both the West and East subregion, whereas for the diagnoses associated with MSM, almost all (93%) were reported from the West (data not shown).

Age and Gender

Most HIV diagnoses in Europe to date have been among men, with one-third among women (33%, or 424,775 of all reported diagnoses with information on gender). The proportion of women among the cumulative total of diagnoses varies slightly by subregion: 27% in Central Europe; 35% in the East, and 30% in the West. Approximately half of all of those who have received HIV diagnoses in the

Figure 2.1 Cumulative Total of Major Exposure Categories among All HIV Cases in Europe by Subregion since the Early 1980s



Sources: ECDC/WHO European Office HIV Report 2011, and Russian AIDS Centre Report 2011. Data for the most recent years may be revised because of delays in case reporting (table B.3).
Note: HIV = human immunodeficiency virus.

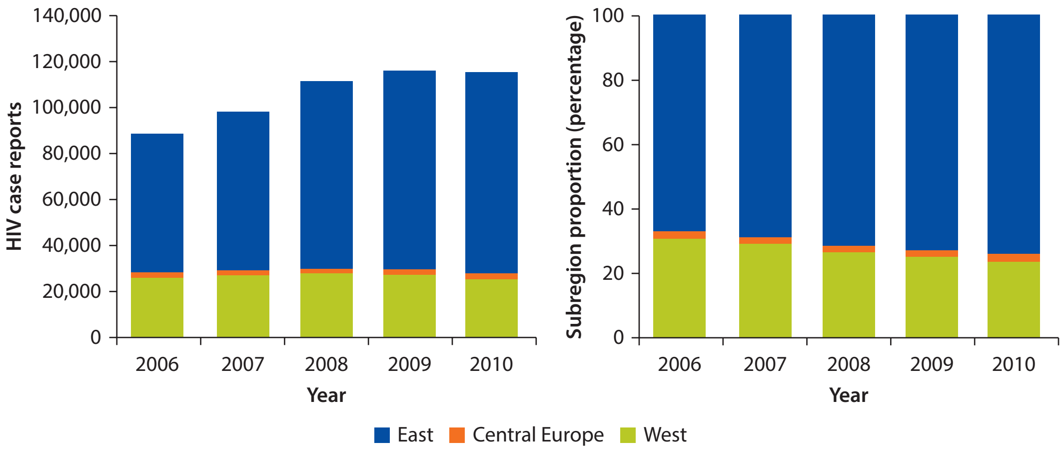
region were aged less than 30 years at the time of their diagnosis (51%, or 586,299 of all the reported diagnoses with information on age at diagnosis).

Trends in Reported HIV Diagnoses, 2006–10

Between the five-year period from 2006 to 2010, the annual total of reported HIV diagnoses increased from 89,185 in 2006 to 115,701 in 2010 (figure 2.2), with over one-half million (533,181) diagnoses reported during the five-year period. There was an annual average of approximately 107,000 diagnoses, equating to an average of 127 new diagnoses each year for every one million people living in the region. It should also be noted that the potential for reporting delays means that the number of diagnoses in the most recent years, particularly 2010, may yet be revised upward.

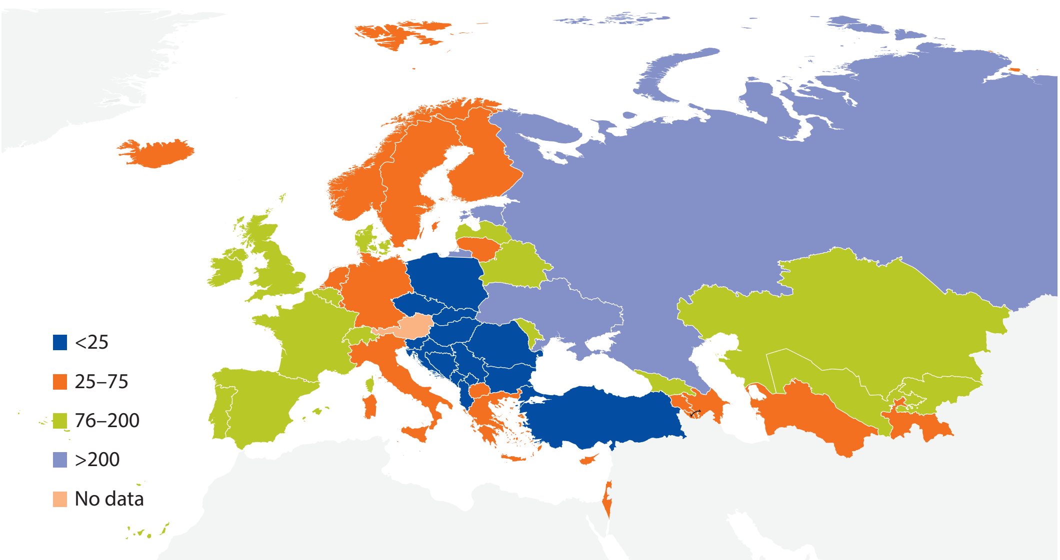
Eastern Europe has carried the greatest burden of newly diagnosed HIV infections during recent years with an annual average of 77,371 new diagnoses (273 per million people), compared to 27,046 in Western Europe (74 per million people) and 2,220 in Central Europe (11 per million people). Overall, the countries with the highest annual average number of reported new HIV diagnoses during this period were Estonia (392 per million people), Russia (372 per million people), and Ukraine (328 per million people) (map 2.2, table B.3). While the annual number of diagnoses reported has been relatively stable in the West and

Figure 2.2 HIV Case Reports in Europe and Proportions by Subregion (2006–10)



Source: Table B.4.
Note: HIV = human immunodeficiency virus.

Map 2.2 Annual Average Case Reports in Europe per Million (2006–10)



Source: Table B.6.

Central Europe, it has increased in the East, from 60,941 in 2006 to 87,564 in 2010. In 2010, 76% of diagnoses were reported from the East (map 2.2).

Gender and Age

Between 2006 and 2010, the proportion of women among reported HIV diagnoses has decreased in the West and Central Europe, from 33% to 27% and from 27% to 19%, respectively. In the East, the proportion of women diagnosed during this period remained the same, at 41% (figure 2.3). However, between 2006 and 2010, the East reported 79% of all diagnoses among women—more than any other region in Europe.

The proportion of reported HIV diagnoses in people under 30 years of age gradually declined between 2006 and 2010, suggesting that the average age at diagnosis is increasing over time. This decline was seen in Central Europe (from 43% to 38%) and in the East (from 51% to 43%), but in the West the number dropped to 27% (figure 2.3). Thus, those diagnosed in the West during the five-year period have generally been older than 30 years (32% of the reported cases compared to 25% of all reported diagnoses elsewhere in the region).

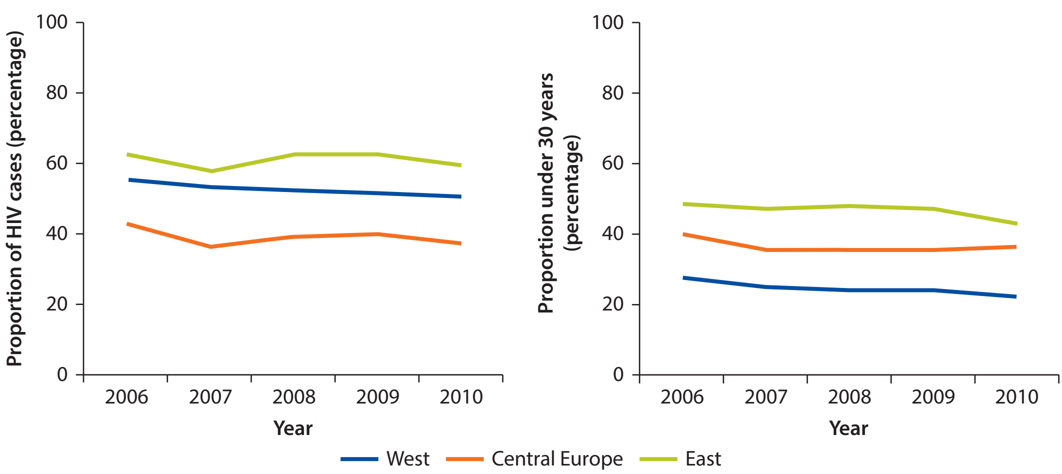
Distribution of HIV Diagnoses by Exposure Category, 2006–10

HIV Diagnoses Associated with Injecting Drug Use

Between 2006 and 2010, 25% (133,900) of reported HIV diagnoses were associated with injecting drug use. This proportion varies by region, with 5% of diagnoses in the West associated with injecting drug use, 7% in Central Europe, and 33% in the East. Overall, more than 90% of the reports where the exposure was injecting drug use were from the East, and this proportion has increased over time. In 2010, 96% (28,238) of the diagnoses reported were associated with injecting drug use; of these, 27,211 were reported from the East, 921 from the West, and only 106 from Central Europe. The number of reports associated with injecting drug use has increased in recent years in the East, while it has been falling in the West and Central Europe (figure 2.4).

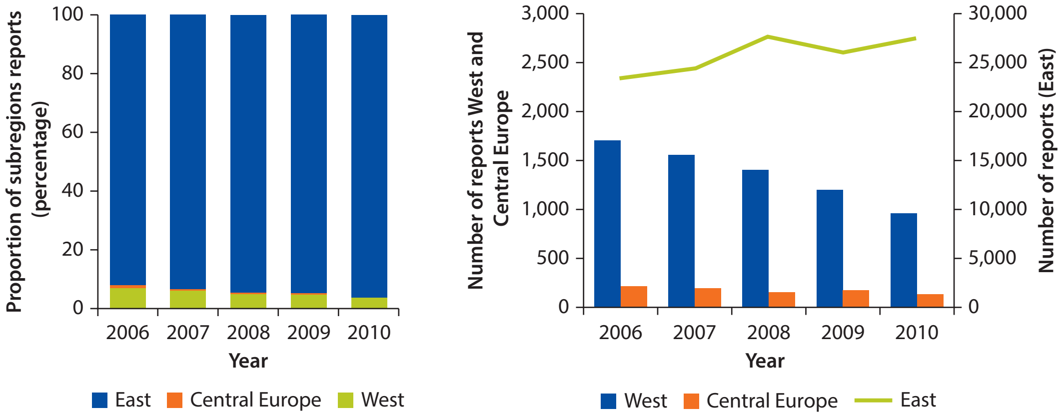
Looking at the period between 2006 and 2010, there was an annual average of 89 reported HIV diagnoses associated with injecting drug use per million

Figure 2.3 Proportion of HIV Case Reports among Women, by Age and by European Subregion (2006–10)



Sources: ECDC/WHO European Office HIV Report 2011 and Russian AIDS Centre Report 2011. Data for the most recent years may be revised because of delays in case reporting (appendixes A.2.4 and A.2.5).
Note: HIV = human immunodeficiency virus.

Figure 2.4 HIV Case Reports and Proportion Associated with Injecting Drug Use (2006–10)



Sources: ECDC/WHO European Office HIV Report 2011 and Russian AIDS Centre Report 2011. Data for most recent years may be revised because of delays in case reporting (appendix A.2.6).
Note: HIV = human immunodeficiency virus.

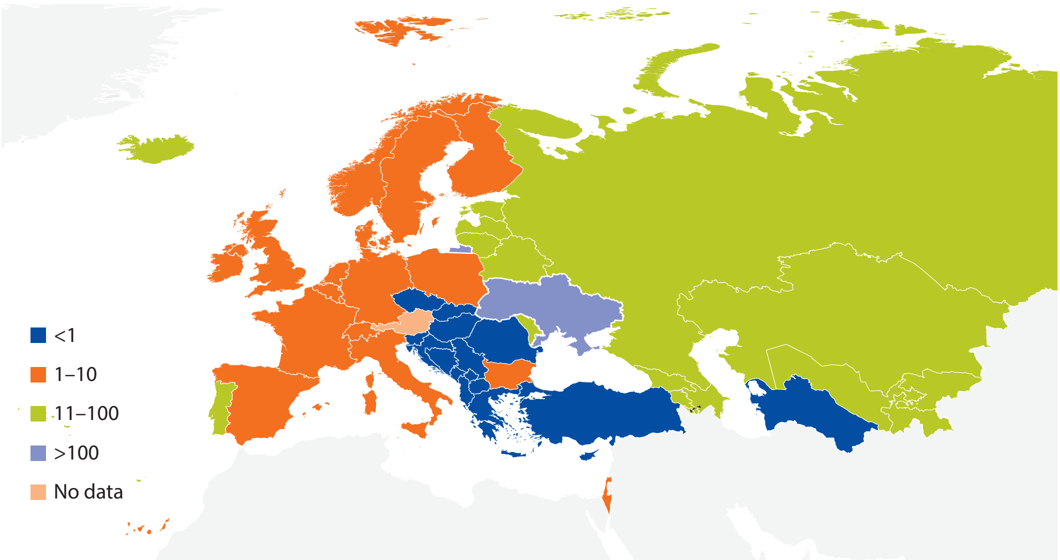
people in the East, compared to 3.6 per million in the West and 0.8 per million in Central Europe. The countries with the highest levels of reported diagnosed cases associated with injecting drug users (IDUs) during this period were Ukraine (153 per million people), Russia (98 per million people), and Kazakhstan (78 per million people). The focus of HIV among people who inject drugs (PWID) is in the East (map 2.3), where almost all countries report large numbers of such cases. However, a number of countries in Central Europe and the West have reported outbreaks of HIV among PWID in recent years [11]. In Greece, for example, there was been a marked increase in the number of diagnoses associated with injecting drug use reported during 2011, while Romania has also documented recent outbreaks of HIV among PWID [11].

The reported HIV diagnoses associated with injecting drug use in 2010 were predominantly among the male population; among women the proportions ranged from 19% in the East, 22% in the West, and 14% in Central Europe (data not shown). In 2006–10, the proportion of IDUs under the age of 30 varied by subregion, with the majority of cumulative cases reported in Central Europe (57%), compared with 27% in the East and 19% in the West (figure 2.5). This distribution did not change significantly across the period. In the West, data on the country of origin of cases are often available, and in 2010, 62% were diagnosed in their country of origin, while 4.3% originated from elsewhere in the West and 20% (181) from Central Europe or the East.

HIV Diagnoses Associated with Heterosexual Transmission

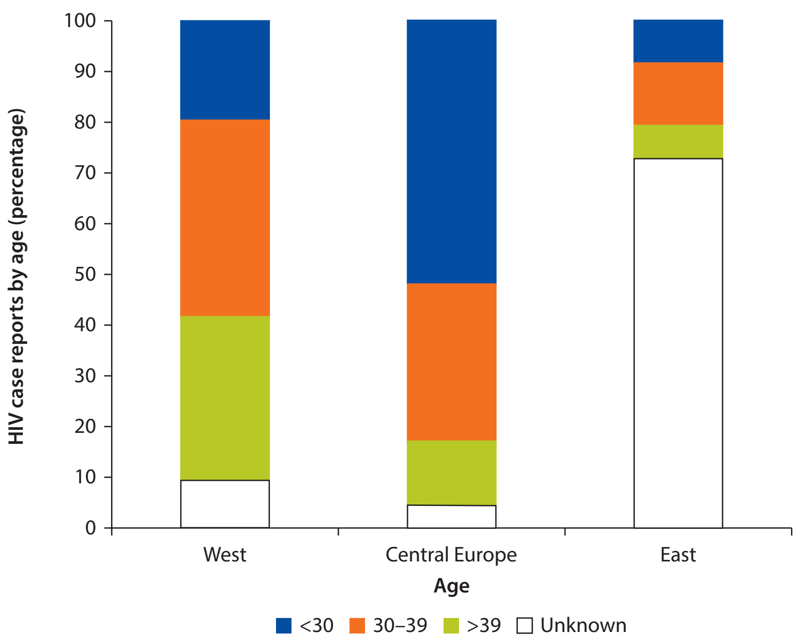
During the five-year period from 2006 to 2010, heterosexual exposure was reported for 29% (155,639) of HIV diagnoses in the region. In the West, the proportion and number of reported diagnoses associated with heterosexual exposure has shown a slight decline during this period, with 10,214 reports in

Map 2.3 Average HIV Case Reports in Europe Attributed to Injecting Drug Use per Million (2006–10)



Source: ECDC/WHO European Office HIV Report 2011 and Russian AIDS Centre Report 2011, see appendix A.2.6.
Note: HIV = human immunodeficiency virus.

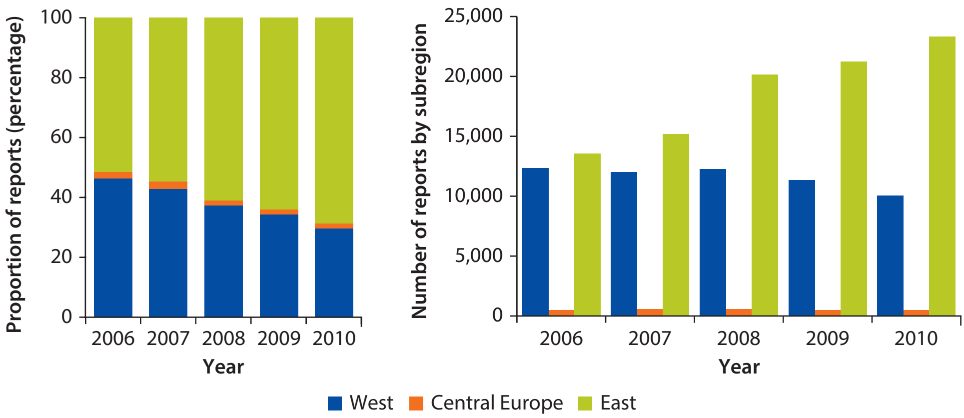
Figure 2.5 Cumulative HIV Case Reports in Europe Attributed to Injecting Drug Use, by Age and Subregion (2006–10)



Sources: ECDC/WHO European Office HIV Report 2011. Data exclude Austria, Liechtenstein, Monaco, Russia, and Turkmenistan (appendix A.2.6).
Note: HIV = human immunodeficiency virus.

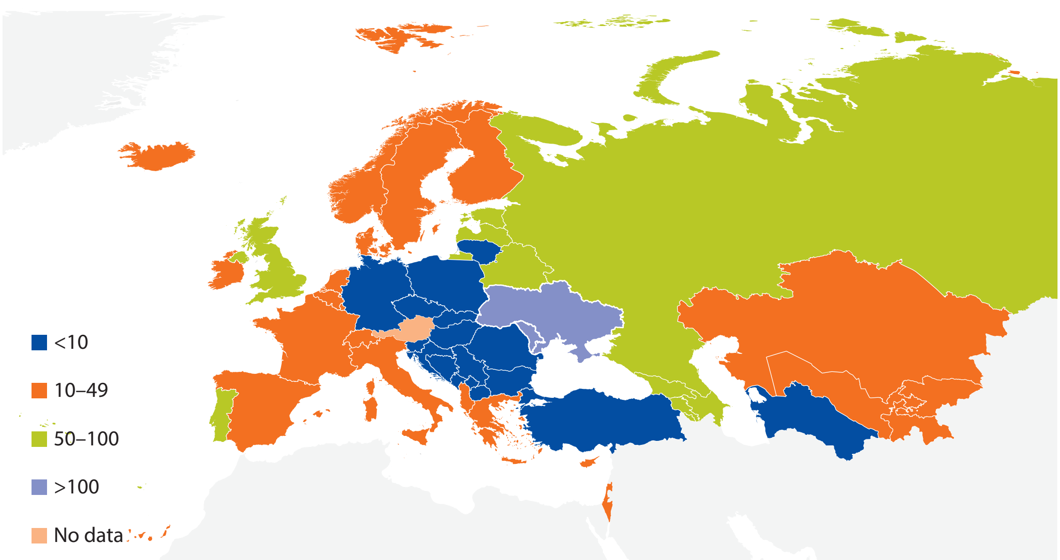
2010 compared to 12,281 in 2006 (figure 2.6). In Central Europe, the number of reported diagnoses associated with heterosexual exposure has been relatively stable, with 605 reports in 2010. The East has seen an increase in the proportion and number of diagnoses attributed to heterosexual exposure, with reports increasing from 13,610 in 2006 to 23,499 in 2010 (map 2.4). There was an annual average of 66 reported HIV diagnoses associated with heterosexual

Figure 2.6 HIV Case Reports and Proportion Attributed to Heterosexual Exposure (2006–10)



Sources: ECDC/WHO European Office HIV Report 2011, and Russian AIDS Centre Report 2011. Data for the most recent years may be revised because of delays in case reporting.
Note: HIV = human immunodeficiency virus.

Map 2.4 Average HIV Case Reports in Europe Attributed to Heterosexual Sex per Million (2006–10)

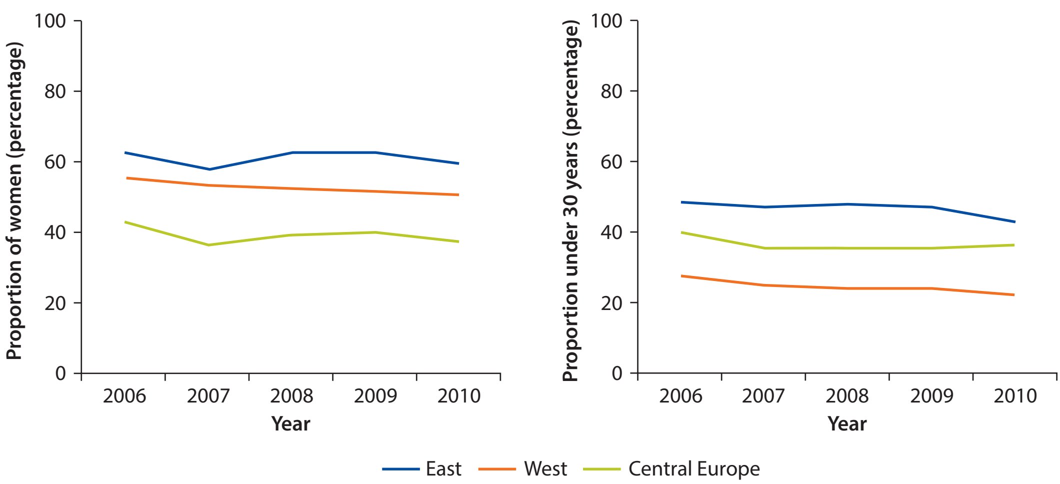


Sources: ECDC/WHO European Office HIV Report 2011, and Russian AIDS Centre Report 2011. Data for the most recent years may be revised because of delays in case reporting (appendix A.2.6).
Note: HIV = human immunodeficiency virus.

exposure per million people in the East, compared to 32 per million in the West and 3 per million in Central Europe. The countries with the highest annual average number of reported new HIV diagnoses associated with heterosexual exposure during the period from 2006 to 2010 were Ukraine (161 per million people), Moldova (145 per million people), and Portugal (91 per million people), (map 2.4, based on data in table B.6).

In many systems, particularly in the West, reported HIV diagnoses attributed to heterosexual transmission are further categorized into exposure subcategories such as (a) people from countries with generalized HIV epidemics; (b) people with partners from countries with generalized HIV epidemics; (c) people with high-risk partners (e.g., PWID or MSM); and (d) other or undetermined. This data should be interpreted with caution as they are not collected by all countries, are often incomplete, and are not collected at all in some subregions (such as the East). In the West over one-third of the reported HIV diagnoses associated with heterosexual transmission have information indicating that they are among people who originate from a country with a generalized HIV epidemic. These cases account for over one-quarter of the diagnoses reported from Belgium, Finland, Germany, Greece, Ireland, Israel, Luxembourg, Malta, the Netherlands, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. More than 10% are among people whose partner originates from a country with a generalized HIV epidemic (with these accounting for over one-quarter of cases in Denmark and France). These individuals could have been infected either abroad, likely in the country with the generalized epidemic, or in Europe with a partner from abroad.

Figure 2.7 HIV Case Reports in Europe Attributed to Heterosexual Sex among Women and by Age (2006–10)



Sources: ECDC/WHO European Office HIV Report 2001. Data excludes Austria, Liechtenstein, Monaco, Russia, and Turkmenistan. Data for the most recent years may be revised because of delays in case reporting.
Note: HIV = human immunodeficiency virus.

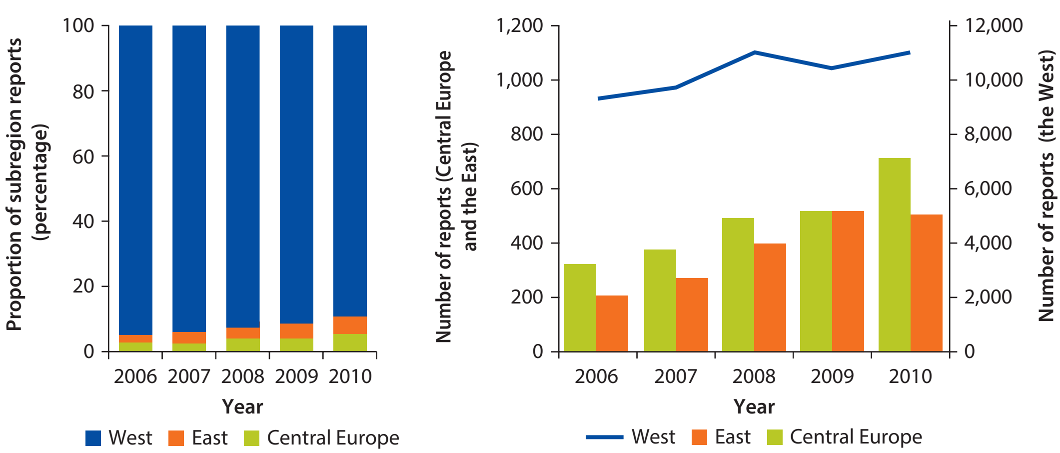
The proportion of the reports associated with heterosexual exposure among women varies by subregion (figure 2.7). The highest proportion is in the East and was constant over the period, with 63% of diagnoses among women in 2006 and 61% in 2010. The West had the second highest proportion among women, with 56% of diagnoses in 2006 and 52% in 2010. Central Europe reported 46% of diagnoses among women in 2006 and 40% in 2010. The proportion of reports associated with heterosexual exposure among people aged 30 years or less at diagnosis declined in all three subregions during this period. In 2010 this proportion was highest in the East (43%), followed by Central Europe (36%) and the West (22%).

HIV Diagnoses Associated with MSM

Between 2006 and 2010, 10% of HIV diagnoses were attributed to MSM as follows, 36% in the West, 22% in Central Europe, and 0.5% in the East. During this time there were 53,244 reports associated with MSM, of which 91% (48,841) were from the West, though this proportion has declined from 94% in 2006 to 89% in 2010 (figure 2.8). The reported HIV diagnoses associated with MSM are concentrated in the West, where between 2006 and 2010 the annual average was 27 diagnoses per million people, compared with only 2.5 diagnoses in Central Europe and 1.4 in the East. However, these last two subregions have seen marked increases in such reported diagnoses over this period, with reports in Central Europe increasing from 330 in 2006 to 722 in 2010, and in the East from 215 to 529.

The countries with the highest average annual number of new HIV diagnoses associated with MSM were the United Kingdom (43.4 per million people), the Netherlands (43.2 per million people) and Spain (37.3 per million

Figure 2.8 HIV Case Reports in Europe and Proportion Attributed to MSM (2006–10)



Sources: ECDC/WHO European Office HIV Report 2011, and Russian AIDS Centre Report 2011. Data for the most recent years may be revised because of delays in case reporting (appendix A.2.6).
Note: HIV = human immunodeficiency virus; MSM = men who have sex with men.

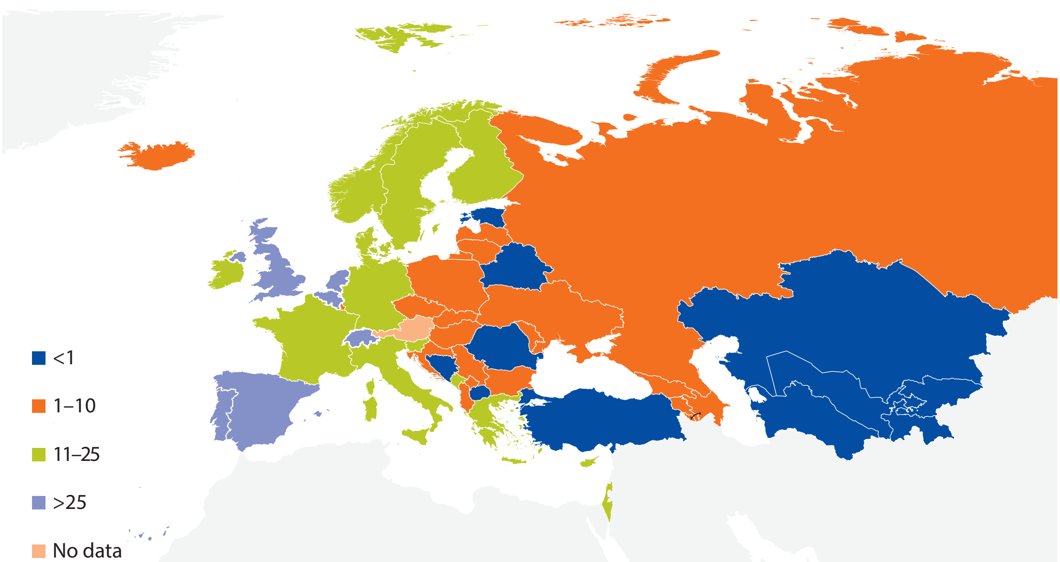
people), (map 2.5). In the West, data on country of origin are often available, and in 2010, 68% of MSM were diagnosed in their country of origin, while 5.8% of the diagnoses originated from elsewhere in the West and 2.8% (281) came from Central Europe or the East. This might reflect the movement for MSM toward seemingly more liberalized social environments in the region (see also chapter 4).

The proportion of HIV diagnoses associated with exposure through MSM in men 30 years old or less varies by subregion. Between 2006 and 2010, the proportion of these MSM was lower in the West than elsewhere and changed little over time, fluctuating between 27% and 29% (figure 2.9). In Central Europe the proportion fluctuated between 36% and 42% and declined in the East, from 50% in 2006 to 39% in 2010. During this time, there was wide variation between countries in the proportion of reports associated with exposure through MSM that were under 30 years old at the time of diagnosis, from 19% in Finland to 62% in Belarus.

Those with Missing Exposure Data

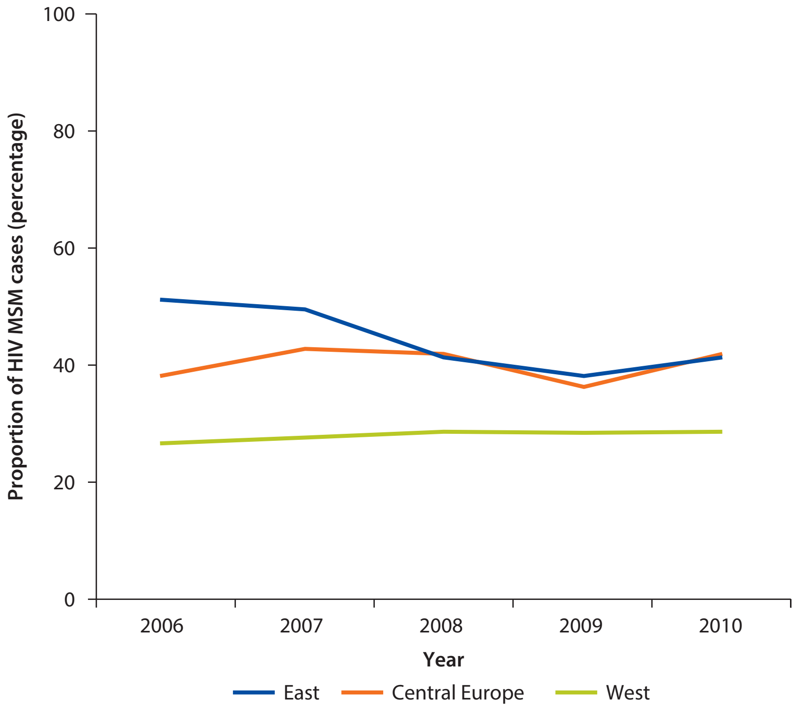
Between 2006 and 2010, around 35% (187,202 of 533,181) of reported HIV diagnoses in Europe were not allocated to a main exposure category (sex between men, injecting drug use, heterosexual, mother-to-child, hemophiliac/transfusion recipient, nosocomial infection). Only a small minority of these might be due to other exposures, with most lacking information on exposure.

Map 2.5 Average HIV Case Reports in Europe Attributed to MSM per Million (2006–10)



Source: ECDC/WHO European Office HIV Report 2011 and Russian AIDS Centre Report 2011. Data for the most recent years may be revised because of delays in case reporting (appendix A.2.6).
Note: HIV = human immunodeficiency virus; MSM = men who have sex with men.

Figure 2.9 Proportion of HIV Diagnoses in Europe Attributed to MSM 30 Years Old or Less (2006–10)



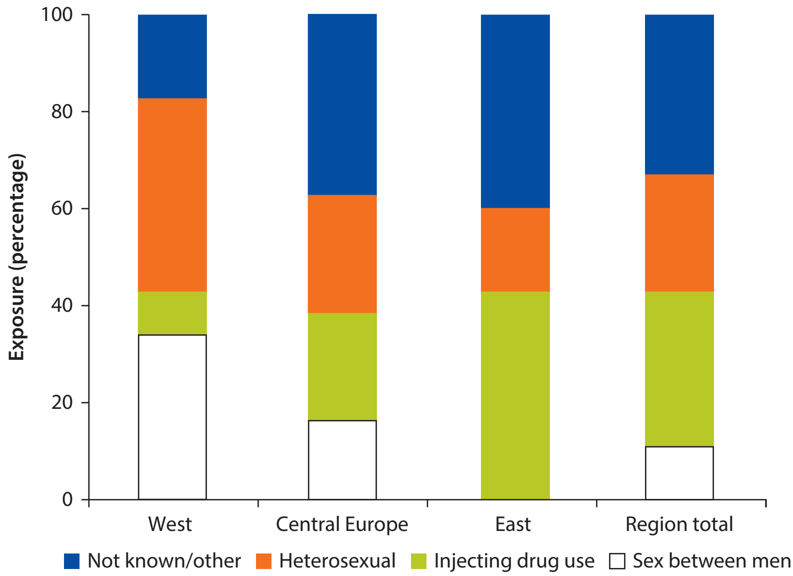
Sources: ECDC/WHO European Office HIV Report 2011 and excludes Austria, Liechtenstein, Monaco, Kazakhstan, Russia, Turkmenistan and Ukraine). Data for the most recent years may be revised because of delays in case reporting.
Note: HIV = human immunodeficiency virus; MSM = men who have sex with men.

In total, proportionally fewer HIV diagnoses reported in the West lacked information on exposure (15%), compared to Central Europe (42%) and the East (42%) (figure 2.10). The proportions lacking this information changed little over the past five years (data not shown). This lack of information limits the capacity to monitor and compare HIV patterns over time. Overall, information on exposure category is available for 90% or more of reports from 22 countries, and in another 16 countries it is available for between 80% and 90% of diagnoses reported. A substantial lack of exposure information is limited to the following countries: France, Georgia (where more than 75% of HIV diagnoses have missing exposure data), Greece, Poland, Romania, Russia (where exposure data are missing for 57% diagnoses), San Marino, Turkey, and Uzbekistan (with exposure data missing in over 30% of diagnoses).

Case Studies: Estonia, Tajikistan, Ukraine, and United Kingdom

We select here four brief case studies reflecting changing patterns in HIV diagnoses among key populations in Estonia, Tajikistan, Ukraine, and the United Kingdom.

Figure 2.10 Major Exposure Category among Cumulative HIV Case Reports in Europe (2006–10)



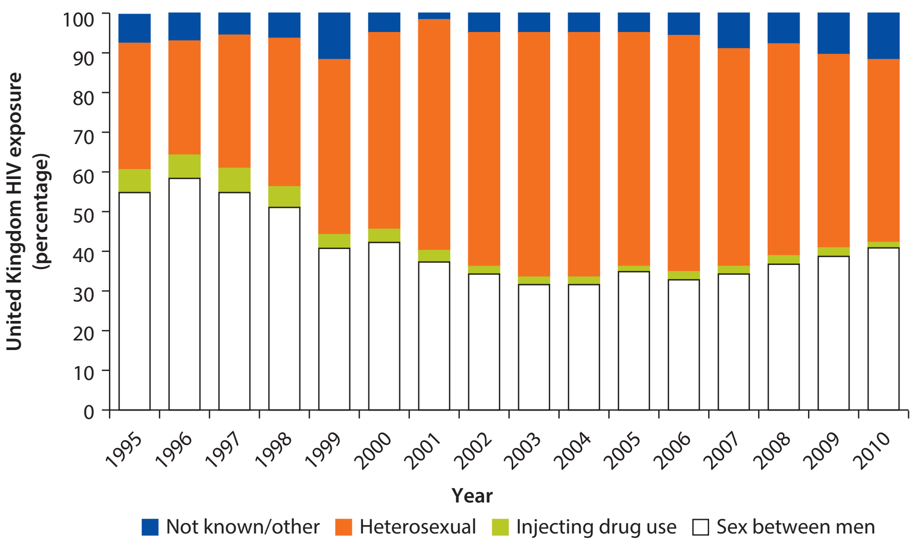
Sources: ECDC/WHO European Office HIV Report 2011 and Russian AIDS Centre Report 2011. Data for the most recent years may be revised because of delays in case reporting (appendix A.2.6).
Note: HIV = human immunodeficiency virus.

To do this, we extracted data from EuroHIV and ECDC reports on the proportion of HIV diagnoses in these countries in the 15-year period from 1995 to 2010.

Case Study: United Kingdom and Ukraine

In the United Kingdom, the number of HIV diagnoses has grown from 2,655 in 1995 to 6,654 in 2010, though in the past 5 years the total number of reports has declined from a high of 7,451 in 2006. The most commonly reported exposure category in the mid-1990s was MSM; however, by the late 1990s this category was overtaken by heterosexual exposure. This change reflected a marked increase in the number of infections diagnosed in individuals who had migrated from or had close links to countries with generalized epidemics [1]. The proportion of diagnoses associated with injecting drug use was low throughout the whole period and the number of these diagnoses has declined in recent years from 198 in 2005 to 141 in 2010. The United Kingdom has a low proportion of diagnoses associated with other or unknown exposure categories. The proportion of new diagnoses associated with MSM has gradually increased since 2004 and is currently almost equal to the proportion associated with heterosexual exposure (figure 2.11). While the absolute number of HIV diagnoses attributed to heterosexual exposure has declined from 4,329 in 2006 to 3,018 in 2010, the absolute numbers of reports attributed to MSM has been more consistent (2,590 in 2006 and 2,702 in 2010). These data thus suggest that the HIV epidemic

Figure 2.11 Exposure Categories among HIV Case Reports in the United Kingdom



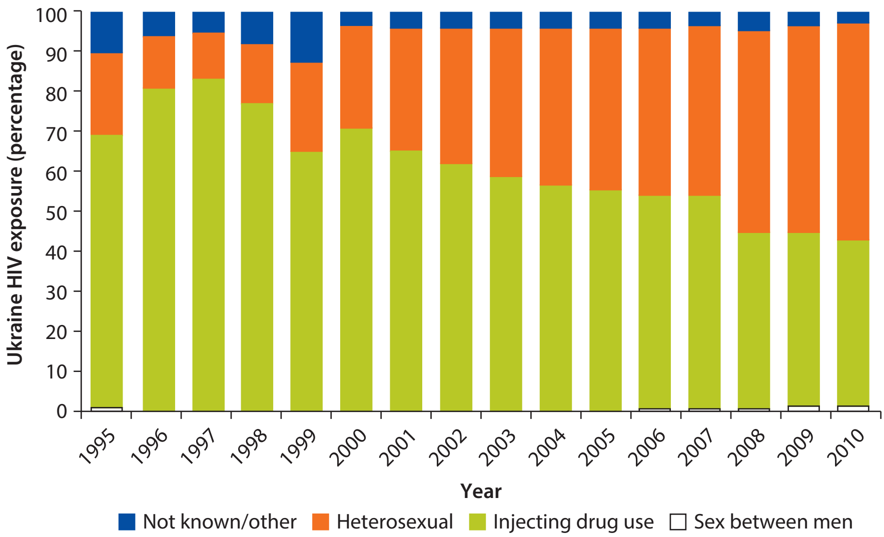
Sources: Data extracted from EuroHIV and ECDC reports on the proportion of HIV diagnoses in the United Kingdom in the15-year period 1995–2010.
Note: 1995–2007 data are by year of report; 2008–10 data are by year of diagnosis. Data for the most recent years may be revised because of delays in case reporting. HIV = human immunodeficiency virus.

in the United Kingdom is in a concentrated phase—mostly affecting MSM and migrants.

In Ukraine, the total number of diagnoses reported during 1995 was 1,490, and there were 16,643 new diagnoses made in 2010, with only a small proportion of these without exposure category information (figure 2.12). In the past 5 years, the absolute number of diagnoses reported has increased from 13,256 in 2006. The vast majority of diagnosed HIV infections in Ukraine have been among PWID, which is the most common exposure throughout 1995–2010. However, the absolute number of HIV case reports attributed to injecting drug use declined between 2006 and 2010 (7,127 to 6,938, respectively), while cases attributed to heterosexual exposure have increased by over 60% (from 5,646 to 9,122). While the majority of cases among PWID remain among men, the majority of heterosexual cases are among women. There have been very few infections reported associated with MSM, though it is possible this might reflect underreporting due to the stigma faced by MSM.

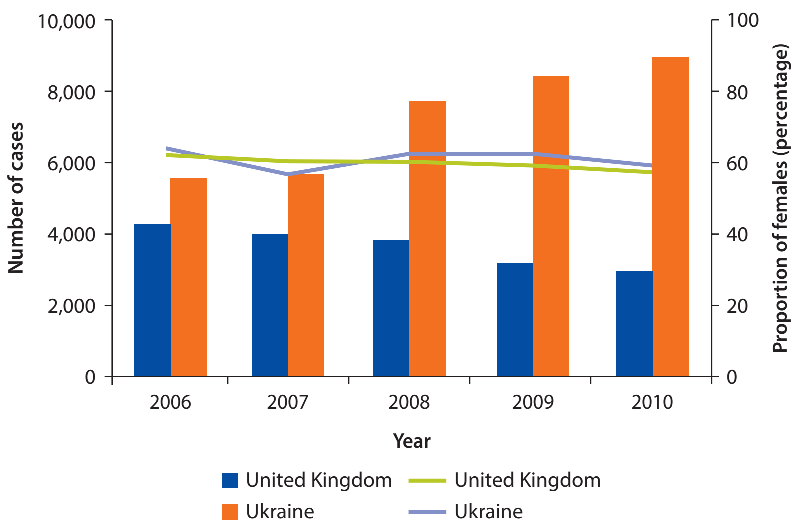
Figure 2.13 shows that the proportion of HIV diagnoses attributed to heterosexual exposure among women is at a similar level in the United Kingdom and Ukraine. However, the absolute number of cases is decreasing in the United Kingdom and increasing in Ukraine. Data from Ukraine suggests that the HIV epidemic is growing and though it has been concentrated—among PWID—it would now appear to be starting to generalize within the population as a whole, with increasing numbers of diagnoses among women who have acquired HIV through heterosexual sex.

Figure 2.12 Exposure Categories among HIV Case Reports in Ukraine (1995–2010)



Source: Data extracted from EuroHIV and ECDC reports on the proportion of HIV diagnoses in Ukraine in the 15-year period from 1995 to 2010.
Note: 1995–2007 data are by year of report; 2008–10 data are by year of diagnosis. Data for the most recent years may be revised because of delays in case reporting. HIV = human immunodeficiency virus.

Figure 2.13 HIV Case Reports and Heterosexual Exposure among Females: United Kingdom and Ukraine (2006–13)



Source: Data extracted from EuroHIV and ECDC reports.
Note: HIV = human immunodeficiency virus.

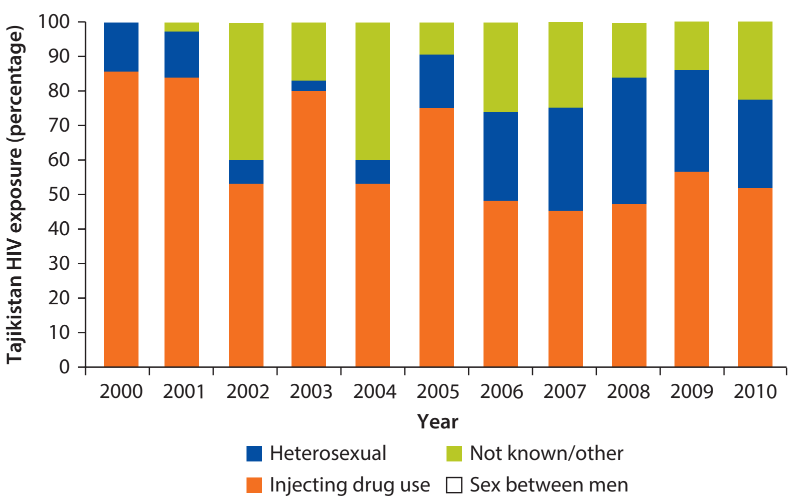
Case Study: Tajikistan

The total number of HIV diagnoses made in Tajikistan ranged from 7 in 2000 to 1,004 in 2010. Based on the population size, this is an increase from just over one diagnosis per million people in 2000 to 147 diagnoses per million people in 2010. To date, no cases have been attributed to sex between men (figure 2.14), and injecting drug use has been the most commonly attributed route of transmission. Since 2006, heterosexual transmission is becoming a more important route with 52 cases reported in 2006 and 249 in 2010. The proportion of cases with other or unknown transmission routes remains reasonably high (>10%).

Case Study: Estonia

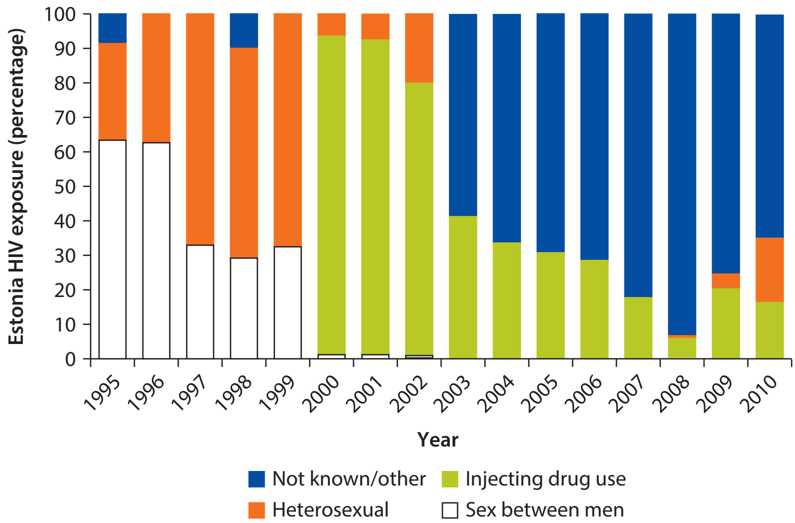
The total number of HIV diagnoses made in Estonia increased from 12 or less during 1995–99 to 372 in 2010, peaking in 2001 with a total of 1,474 diagnoses. Based on the population size, this is an increase from 8 diagnoses per million people in 1995 to 1,099 diagnoses per million people in 2001, decreasing to 277 diagnoses per million people in 2010. Injecting drug use was the major route of transmission from 2000 for several years, although since 2003, the proportion of new diagnoses not attributed to any route grew from nearly 60% to over 90% in 2008 and about 65% in 2010 (figure 2.15). This lack of data severely undermines an understanding of the HIV epidemic in Estonia as well as efforts to respond to the epidemic. In 2007, for example, there were no cases attributed to heterosexual exposure: however, cases grew to 3 in 2008, 17 in 2009, and 69 in 2010. Prior to this, cases associated with heterosexual exposure were not reported consistently.

Figure 2.14 Exposure Categories among HIV Case Reports in Tajikistan (2000–10)



Source: Data extracted from EuroHIV and ECDC reports.
Note: 1995–2007 data are by year of report; 2008–10 data are by year of diagnosis. Data for the most recent years may be revised because of delays in case reporting. Data on risk factors are only reported from 2000. HIV = human immunodeficiency virus.

Figure 2.15 Exposure Categories among HIV Case Reports in Estonia (1995–2010)



Source: Data extracted from EuroHIV and ECDC reports.
Note: 1995–2007 data are by year of report; 2008–10 data are by year of diagnosis. Data for the most recent years may be revised because of delays in case reporting. HIV = human immunodeficiency virus.

Assessing HIV Prevalence and Risk Behavior

In order to understand the dynamics of HIV epidemics in key populations, including undiagnosed infections, it is important to directly assess HIV prevalence and the extent of risk practices. According to WHO guidelines on second-generation HIV surveillance, surveys to directly measure HIV prevalence and risk should be undertaken periodically in all countries and regularly in countries with concentrated epidemics [13]. In this section we examine whether countries have undertaken targeted studies to directly assess HIV prevalence and/or risk behaviors in key populations of PWID, sex workers (SWs), and MSM. We also explore whether countries have monitored their HIV epidemics over time by generating estimates of HIV prevalence and risk behavior through repeated studies or through comparable studies undertaken at different points in time. We also comment on the quality of the studies directly measuring HIV prevalence by selecting the best available estimates (see chapter 1 for further description). The characteristics of the studies included in our analysis here are summarized in tables B.7–B.10.

According to the studies we identified through the systematic literature review (see chapter 1 for a description of methods), and during the period 2000–10, more studies directly assessing HIV prevalence and risk behavior were undertaken among PWID (149 studies) than SWs (101 studies) or MSM (67 studies). There was little difference in number of studies conducted by region.

More studies have been conducted among PWID (16 studies) and SWs (17 studies) in Russia than in any other country, with the United Kingdom conducting a notably higher number of studies across all vulnerable and key populations.

People Who Inject Drugs

Between 2000 and 2010, 48 countries in Europe (96%), with the exception of Iceland and Turkmenistan, had undertaken a study to directly assess HIV prevalence and/or risk behavior among PWID. Of the 48 (96%) countries in Europe having undertaken a study to assess HIV prevalence, 19 were in the West (95% of countries in that subregion), 15 were in Central Europe (all countries of that subregion), and 14 were in the East (93% of countries in that subregion). Recent (that is, within the last 3–5 years) estimates of HIV prevalence were found among PWID in the majority of countries (44), while estimates dated back to 2003 in Ireland, Israel, Latvia, and Lithuania.

Of the 149, HIV prevalence studies among PWID, 48 were selected as constituting "best estimates." The characteristics of these studies show that more than half (29) had national coverage. The majority of studies in the West (13) had national coverage comprising large samples [14, 15]. This in part reflects the better established sentinel surveillance systems in place at drug treatment centers or HIV testing clinics. Just over half the studies had national coverage in Central European countries [14, 16–18], with large samples from 3 treatment centers (>1,000), for instance, in the Czech Republic (1,363) and Poland (1,713). Just under half (7) of the studies in the East had national coverage, with large samples recruited from drug treatment centers in Latvia and Lithuania (>1000) [14, 19–22]. For practical reasons it is easy to recruit PWID from treatment centers but large community samples were also reported, including in Belarus (1,770), Bosnia and Herzegovina (780), Bulgaria (1,421), Georgia (1,289), Kazakhstan (4,860), Serbia (960), and Ukraine (6,459) [17, 20, 22–26]. Large community samples reported from the West were not included as best estimates. Small sample sizes were documented in Cyprus, Ireland, and the Slovak Republic, possibly reflecting small populations [14]. While national coverage will provide a more representative estimate of national HIV prevalence, it is not necessarily an appropriate indicator of quality of the surveillance system; if a population is known to be concentrated, sampling a single city may be sufficient. Estimates of the size and location of the population at risk are thus needed in order to assess the most appropriate study site. In some cases where the geographic coverage was reported to be national, the sample size was also small, thus limiting the confidence with which inferences can be made to the wider population (for example, studies in Cyprus and Turkey).

In the absence of a representative sampling frame, a key consideration when estimating HIV prevalence among PWID is the recruitment and sampling strategy. Sampling strategies that recruit from multiple sites and networks will minimize geographic and network bias, and surveys recruiting from a broad range of locations may be able to claim wider applicability of their results than those recruiting from only one or two settings [27, 28]. In particular, studies that only recruit from clinical settings may find their samples biased toward higher risk individuals or those who feel they need to access testing or treatment services. Evidence suggests that drug users in treatment systematically differ from those not currently in treatment [29–33]. Sampling PWID from opioid substitution therapy (OST) clinics may, for example, bias the sample away from stimulant injectors who may form an important group, albeit with different characteristics and risks than those faced by opiate users [33]. A wide range of recruitment approaches were used in the 48 studies selected as best estimates from recruitment via clinical settings to low threshold services and community-based recruitment. Recruitment took place via treatment-drug or low-threshold needle and syringe exchange programs (NSP) in all the studies in the West, except for France, where recruitment took place in both community and low-threshold services. In some countries, such as Greece, Luxembourg, Lithuania, Sweden, and the United Kingdom, recruitment took place from multiple sites including drug-treatment and HIV-testing centers, NSP, and prisons [14, 34]. In contrast the majority (9 out of 14) of the best estimate studies in the East were recruited from community settings [14, 19–20, 22–23, 34–36]. In case studies 2.1 and 2.2 below, we show how different recruitment strategies, as well as the effect of different sample sizes, can result in variance in HIV estimates.

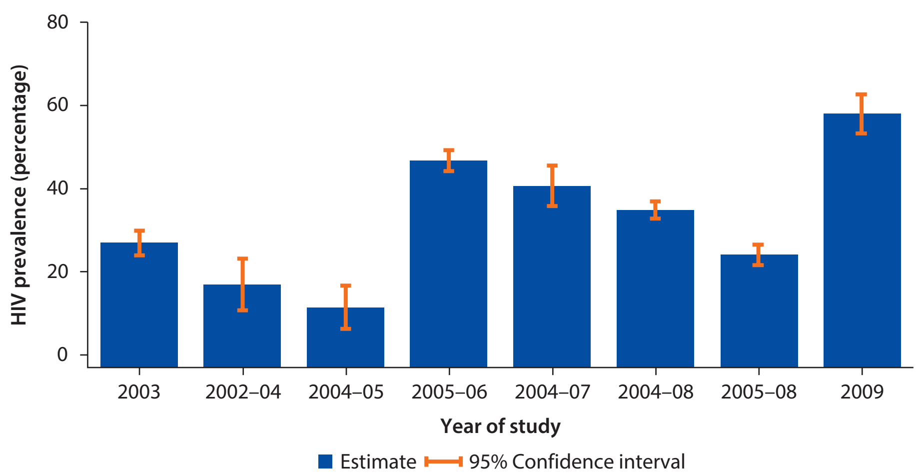
Seven of the studies used in Estonia, the Kyrgyz Republic, Moldova, Montenegro, Romania, Russia, and Tajikistan employed respondent-driven sampling (RDS) to recruit PWID from community settings [20, 37–42]. In RDS, sampling begins with a set of initial subjects who serve as seeds for an expanding chain of referrals recruited through dual incentives, one received for participating in the study and subsequent ones for each person recruited. Respondents from each link in the chain, or wave-referring respondents, form subsequent waves. Information on the relationships between recruiters and recruited and their estimated network size is collected during the interview to allow for the calculation of selection probabilities [43]. This information is used to assess homophily, or the extent to which recruiters are likely to recruit individuals similar to themselves, and to weight the sample to compensate or control for differences in network size, homophily, and recruitment success. RDS has been increasingly used in Europe and internationally to recruit samples of SWs [44, 45], MSM [46] and PWID [47–50], and it has been championed for its ability to provide more representative estimates of risk behavior and HIV prevalence [46, 50–53]. There have been recent ethical concerns that the use of incentives may negatively affect participants' social and economic relationships in populations of PWID. Incentives may also lead to a questioning of the assumption that participants can accurately recall detailed information on the composition of their network, including size and relationship, in order to fulfill the condition of randomly recruiting a participant within their social network [54–56]. In addition some evidence shows that RDS is less effective at recruiting populations with small social networks, such as SWs [57, 58].

In addition to direct measures of HIV prevalence, at least one behavioral survey had been undertaken among PWID in 37 (74%) countries: 50% (10) in

Case Study 2.1 Estimating HIV Prevalence among PWID in St. Petersburg, the Russian Federation

St. Petersburg is the Russian Federation's second largest city, with a population of around 4.2 million. Some studies have estimated a three-fold increase in people who inject drugs (PWID), and a nine-fold increase in teenaged PWID, between 2000 and 2005, and an estimated 70,000 PWID as of 2005 [59]. The first case of HIV was reported in 1996, and since then there have been multiple estimates suggesting high numbers of cases and high HIV prevalence among PWID. Our review identified eight studies [38, 60–66] reporting HIV prevalence among PWID from 2002 to 2009. Even within this one city the estimates vary widely from 30.1% in 2002, down to 14.6% in 2005 and up to 61.1% in 2009. More recent data not collected in the review from St. Petersburg (a 2008–10 cohort) suggest that prevalence is around 35% [37, 67, 68].

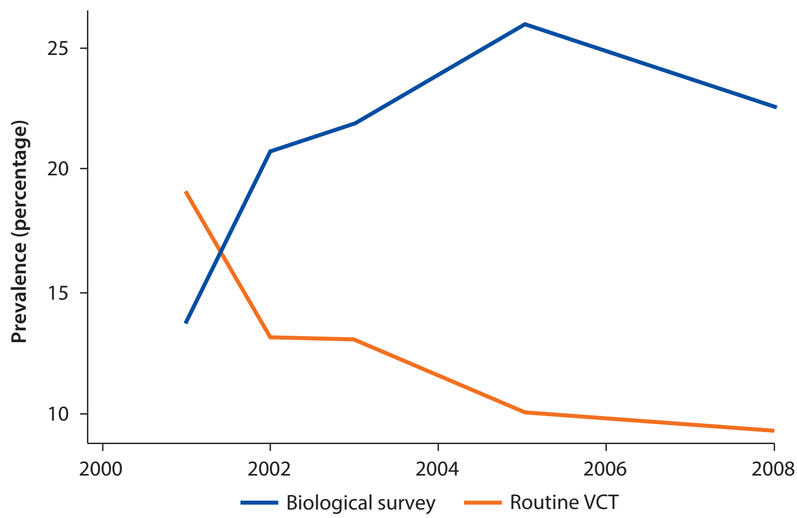
Are these shifts in prevalence a true reflection of trends or is there an alternative explanation? If the samples were truly representative of the population from which they were selected then there is a 95% likelihood that the true population prevalence lies on the orange line representing the confidence interval (see below). The larger the study sample, the smaller the confidence intervals represented by the bar and the more accurate the proportion estimated: thus the 2002 [60] and 2004–08 [64] estimates are likely to be (statistically) the most precise as their confidence intervals are the narrowest and thus the margin for error the smallest. However, this assumes the representativeness of the population and as with any hidden population with no explicit sampling frame, it is impossible to assess the representativeness of the sample. While the studies in 2002 [60, 69], 2004 [61, 70], 2007 [63], and 2009 [71] are limited to those who have injected drugs relatively recently, the 2005 [62] study recruited participants from narcology hospitals, only 40% of whom admitted to ever having injected drugs. Of the remaining four studies, those from 2002 and 2007 recruited participants from the community and social services as well as through snowball sampling. The 2004 study recruited participants from primary health care centers only, and the recruitment procedures used in the 2009 study were not clearly described.



Note: HIV = human immunodeficiency virus.

Case Study 2.2 Estimating HIV Prevalence among PWID in Riga, Latvia

The United Nations General Assembly Special Session (UNGASS) 2010 Country Report for Latvia [72] reported two sets of prevalence figures provided by the Infectology Centre of Latvia (ICL) among PWID in Riga for the period 2001–08. Both estimates appear to have stabilized by the end of the decade, but the biological survey data show significantly higher prevalence than the routine voluntary counseling and testing (VCT). Despite a larger sample size from the routine VCT (mean sample size of 644 versus 265), the studies both present feasible estimates of the HIV prevalence in the population. One possible explanation for the differences is that the studies may have recruited participants from different settings that may influence or be influenced by HIV status. Participants recruited through routine VCT may not be current injectors, and evidence shows that PWID not in touch with services tend to engage in higher risk injecting behaviors reflected in the higher prevalence of the survey sample. The figure below highlights the heterogeneity in prevalence estimates obtained with different recruitment strategies, emphasizing the importance of drawing estimates from multiple different methods, even in relatively small locations, before defining or delineating an estimate of prevalence.



Note: VCT = voluntary counseling and testing.

the West, 97% (13) in Central Europe, and 93% (14) in the East. Thus, in the West and Central Europe, HIV prevalence among PWID had been more widely measured than risk behavior. Obtaining repeated measures of HIV prevalence is critical in concentrated epidemic situations, and such measures were observed in 42 (84%) countries. Two-thirds of the countries (33) also had repeated surveys of risk behavior. As shown in table 2.2, 44 (88%) countries had studies that allowed monitoring of HIV prevalence, risk behaviors, or both among PWID, SWs, and MSM (80% in the West; 93% in both Central Europe

Table 2.2 Number of Countries with Studies Measuring and Monitoring HIV and Behaviors among PWID, SWs, and MSM in Europe

	Number of countries with a direct measure of prevalence (monitoring[a])			*Number of countries that measured behaviors (monitoring[a])*			*Number of countries that have measured either behaviors or prevalence (monitoring[a])*		
Sub-region	*PWID*	*SW*	*MSM*	*PWID*	*SW*	*MSM*	*PWID*	*SW*	*MSM*
West (n = 20)	19 (15)	13 (1)	8 (2[b])	10 (10)	8 (7)	15 (12)	19 (16)	13 (7)	16 (12)
Central Europe (n = 15)	15 (14)	11 (4)	13 (7)	13 (9)	9 (2)	13 (5)	15 (14)	11 (4)	13 (7)
East (n = 15)	14 (13)	14 (13)	12 (10)	14 (14)	13 (11)	14 (11)	14 (14)	14 (14)	14 (12)
Total	48 (42)	38 (18)	33 (19)	37 (35)	30 (20)	42 (28)	48 (44)	38 (25)	43 (31)

Source: Tables B.7–B.10.
Note: HIV = human immunodeficiency virus; MSM = men who have sex with men; n = sample size; PWID = people who inject drugs; SWs = sex workers.
a. They have either undertaken a study that has been repeated at regular intervals, or they have undertaken a number of separate studies at different time points that have used comparable methodologies.
b. Unclear.

and the East). Table 2.2 also shows that evidence of monitoring over time was common across all three subregions as follows: 75% of the countries in the West, 93% in Central Europe and 87% in the East monitored HIV prevalence; 50% of the countries in the West, 62% in Central Europe and 93% in the East monitored risk behaviors. An example of a successful biological-behavioral system among PWID used annually in the United Kingdom is summarized in case study 2.3.

Sex Workers

Three-quarters of the countries conducted studies to estimate HIV prevalence or risk behavior among SWs in the period from 2000 to 2010, equaling 76% of the 50 countries across Europe. An HIV prevalence study was found in just over one-half of the countries (13) in the West, two-thirds (11) of those in Central Europe, almost all (14 out of 15) of those in the East. The majority of countries in the East conducted 13 either repeated surveys or studies at multiple points in time, but only four in Central Europe and one in the West had done so. Three countries with populations of less than 1 million (Cyprus, Iceland, and Malta) did not publish studies, likely because it is impractical to conduct surveys in countries with small populations. The other eight countries without such studies were Albania, Denmark, Finland, France, Ireland, the Slovak Republic, Sweden, Slovenia, and Turkmenistan. We identified few studies (15) conducted in the last 3–5 years among SWs. Of these, most had been conducted in the East, with estimates from Austria, the Netherlands, Portugal, Spain, the Czech Republic, and Poland dating back to 2000–01.

Of the HIV prevalence studies among SWs identified (101), 38 were selected as best estimates. The characteristics of these studies show that only 8 out of 38 had national coverage [17–18, 32, 76–81]. As with PWID, these samples were mostly recruited via sexually transmitted infection (STI) clinics, such as studies

Case Study 2.3 Two Decades of Serobehavioral Monitoring of Infections among PWID in the United Kingdom

National serobehavioral surveillance among PWID in England and Wales was started in 1990 [73]. Around 3,000 PWID have been recruited annually through over 50 needle and syringe exchange programs and prescribing services. Consenting PWID provide a biological sample and self-complete a behavioral questionnaire.

This survey found that HIV prevalence among PWID fell from 1.8% in 1991 to 0.61% in 1996; it then remained at or below 1% until 2002, before rising to 1.6% in 2005. Prevalence has remained at around that level since then. Trends in hepatitis C virus (HCV) prevalence showed a similar pattern, falling from 61% in 1992 to 38% in 1999, before rising to 47% in 2009. Reported needle and syringe sharing fell from 24% in 1991 to 17% in 1997, before rising to 34% in 2002 and then declining to 19% in 2009. Uptake of HIV testing was found to have increased in recent years after being relatively stable through 2003 with around half of PWID ever tested; it then rose to 75% in 2009.

These surveillance data have influenced policy and responses, and have reflected their impacts. For example, reducing the sharing of needles and syringes was a policy target from 1992 to 1997, but in 1998 the policy focus shifted to criminal justice issues. This policy shift coincided with the rise in sharing levels and subsequent rise in prevalence of HIV. In response to increased levels of infections among PWID, in 2003 the publication of an annual surveillance report on infections among PWID was started [74]. The resultant increase in the profile of injection related harm among PWID contributed to the development of Action Plans on HCV and drug-related harms. In response, harm reduction services were improved, and access to drug treatment was made easier. Needle/syringe sharing has recently declined and the prevalence of both HIV and HCV are now stable [75]. Serobehavioral surveillance has thus been important in both monitoring and informing the development of interventions and policy.

in Austria (1,184), Germany (3,880), Kazakhstan (1,960), Russia (4209), and Spain (4,485), and a large community-recruited sample in Ukraine (2,278) [3, 32, 77, 78, 82, 83]. Studies in the former Yugoslav Republic of Macedonia and Armenia, described as national samples, were limited by small sample sizes [3, 18]. Recruitment sites for SWs focused on STI clinics, work settings, and outreach projects for male sex workers (MSWs). Community surveys employed a range of methods, including recruiting from sex work venues, for example, street sites were used in Portugal or Romania [84]; gay clubs and bars were used in studies in France, Italy, or the United Kingdom [10, 85, 86], and respondent-driven sampling RDS) was used in Moldova and Albania [44, 45]. As with PWID (see above), recruiting SWs at their places of work and in the community overcomes potential bias linked to recruiting those in contact with STI clinics and helping services. Especially vulnerable SWs, such as migrant SWs, for instance, are less likely to be in contact with clinics [87–89].

An HIV-related behavioral survey of SWs was identified in three-fifths (30) of the countries: two-fifths (8) in the Western subregion, three-fifths (9) in the

Central subregion, and the majority (13 out of 15) in the Eastern subregion. More countries had undertaken either repeated surveys or studies at different points in time that could be used to monitor behaviors in the West (7) and the East (11) than in Central Europe (2). So while overall HIV prevalence among SWs had been more widely measured than risk behaviors in all three subregions, more countries in the West monitored behaviors more than HIV prevalence. One example of behavioral monitoring conducted in the region is TAMPEP, the European Network for HIV/STI Prevention and Health Promotion among Migrant Sex Workers. TAMPEP conducts quantitative and qualitative research via SW-oriented services in 25 EU member countries every two years. Data are collated on the size of populations as well as the profile of male, female, and transgender SWs across the region, documenting increases in violence, problems with the police, changes in the profiles of SWs, and the organization of SWs [90]. Another example of a successful surveillance system used to measure HIV and related risk behaviors among SWs in Kazakhstan is given below in case study 2.4.

Only six studies were identified among MSWs, five of which were in the West and one in Russia. The studies in Russia and the Netherlands were limited by

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Case Study 2.4 Serobehavioral Monitoring of Infections among FSWs in Kazakhstan

In 2009, Kazakhstan had an estimated population size of 16,250 female sex workers (FSWs) in the country. Between 2005 and 2009, annual biobehavioral surveillance surveys were implemented among FSWs involving large sample sizes; in 2009, 2,249 FSWs were recruited, but sample sizes for previous years were not specified [91]. Eligibility criteria included women with a self-reported history of provision of sex work at least once in the past 6 months and women who were recruited across multiple sites nationally [91, 92]. This biobehavioral surveillance survey collected information to monitor the impact of the responses to HIV (with similar surveys among men who have sex with men (MSM) and people who inject drugs (PWID). Similar studies were conducted in the Kyrgyz Republic and Tajikistan.

The findings for the period from 2006 to 2009 indicate that among FSWs the prevalence of HIV decreased from 2.5% to 1.3%, the prevalence of HCV from 17% to 11%, and the prevalence of syphilis from 26% to 18%. During this period, the self-reported coverage of FSWs with HIV-prevention activities consistently increased from 51% in 2006 to 88% in 2009, with 90% of the participants reporting that they received free condoms in 2009. Over three-quarters (76%) of the participants reported having had a voluntary HIV test in the past 12 months in 2009.

These changes probably reflect the ongoing investment in prevention services, including provision of condoms, information and advice, and syndromic (or clinical) STI management [92]. For example, in 2009, 5,090,026 condoms were distributed among SWs in Kazakhstan, or 313 condoms per SW. Continued surveillance will allow the ongoing assessment of the situation and monitoring of intervention impact. Both the surveillance system and programs are supported through funding via the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM). Since funding for this has been cut in 2011, the future of these projects is uncertain.

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small sample sizes. All studies were conducted prior to 2007 and all were at single sites with the exception of Spain where a large national sample was taken from an HIV clinic. All studies collected linked behavioral data.

Men Who Have Sex with Men

Between 2000 and 2010, the majority (43, or 86%) of the 50 countries in the European region had publications reporting on studies conducted that were related to HIV or behaviors among MSM. The countries without published studies of either directly measured HIV prevalence or behaviors among MSM were Austria, Cyprus, Iceland, Luxembourg, Malta, Montenegro, and Turkmenistan.

Of the identified HIV prevalence studies among MSM (67), 33 were selected as best estimates. Proportionally fewer countries in the West (8 out of 20) had assessed HIV prevalence among MSM, compared to Central Europe (13 out of 15) and Eastern subregions (12 out of 15). Very few countries in the West (2) had undertaken either repeated surveys or studies at different points in time that could be used to monitor prevalence, while 7 countries had done so in Central Europe and 10 in the East. The majority of studies (27) were conducted within the last 3 years with the exception of the following countries: Croatia, the Netherlands, Poland, Portugal, Spain, and Switzerland, where studies were conducted between 2000 and 2006.

The characteristics of these studies showed that only 9 out of 33 countries had national health coverage [3, 16–18, 22, 25, 93, 94], and only three had a sample size greater than 1,000 (the Netherlands, Spain, and Switzerland) [3]. A large sample had been recruited from five cities in the United Kingdom as well as Russia [79, 95, 96]. Clinic-based recruitment centered around STI clinics and HIV testing centers [3, 17, 97] and one community health service [35]. Unlike, PWID and SWs, the majority of samples were recruited from community settings [16, 18, 21–22, 24, 36, 79, 95, 96, 98–105].

Recruitment from community settings used time location sampling (TLS) in the Czech Republic, Italy, the Slovak Republic, and Slovenia, and RDS in Albania, Croatia, Georgia, and the Kyrgyz Republic [16, 96, 99, 102–104, 106]. TLS works by conducting extensive mapping of venues where the research population congregates, recruiting from randomly selected venues, and then systematically recruiting participants from those venues [27]. Evidence from this review shows that TLS was possible in cities with well-developed gay scenes such as Barcelona, London, and Verona, and with cities with fewer gay venues and less liberal attitudes to MSM in Bratislava, Bucharest, and Ljublijana [96, 102].

Across the whole region behavioral surveys had been more extensively undertaken than prevalence studies, with published studies originating from 42 (84%) countries of the region. This is particularly so in the West where three-quarters (15) of the countries in the subregion had assessed behaviors among MSM, as had the majority of countries in Central Europe (13 out of 15) and the East (14 out of 15). Approximately two-thirds of the countries had evidence to indicate that they could monitor HIV-related behaviors among MSM through either repeated surveys or studies undertaken at different points in time.

One example of a successful behavioral survey of MSM in the West is the European Men Who Have Sex with Men Internet Survey (EMIS) [107]. The survey collected data from MSM in 38 countries and was advertised on a range of "gay-orientated" Internet sites, mainly sites where MSM meet sexual partners, and through community organizations. Data from Internet surveys need to be interpreted with caution as the sample is self-selecting; as a result, the representativeness of such samples is unclear and the data are also likely to differ between countries and possibly over time (e.g., due to varying and evolving patterns in Internet access and use). However, the EMIS survey has the potential to provide broadly comparable data on behaviors among MSM across much of the region. Repeating EMIS on an annual basis would provide a European-wide behavioral surveillance system for MSM that complements the existing national systems.

Limitations of This Assessment

Public health surveillance studies typically use pragmatic approaches to ensure efficient use of the available resources, to allow data to be collected and made available relatively quickly, and to ensure their sustainability over time. Thus, these studies have to balance robustness (i.e., representativeness and geographic coverage) against efficient use of resources, timeliness, and sustainability as well as consider the population context. This need for a pragmatic approach often leads to studies that use sentinel sites and accessible subgroups of the population to produce data that can produce nationally useful insights when combined with other available data (e.g., HIV case reports, data on HIV testing, service usage data [NSP, OST, STI testing, etc.], estimates of population size). However, there are problems with making national estimates of HIV prevalence in countries with highly diverse HIV epidemics between cities; this point is illustrated in case study 2.5. Our review focused on synthesizing data from published studies and so we identify estimates from both public health surveillance activities and from studies using more sophisticated epidemiological research designs. As a consequence, data on prevalence and behaviors are not always comparable either between or within countries. This analysis is further limited since information on the methodologies used in the studies was often not provided in full, making it difficult to systematically assess quality.

Measurement of HIV Incidence among High-Risk Groups

Incidence, the rate at which new infections occur in a population, can be directly measured using two approaches. The most established approach is to follow-up on a group of people at risk over time. However, such studies are costly to undertake, and with marginalized populations it can be particularly difficult to get a representative sample and keep track of it over time. Retrospective cohorts can also be constructed through use of case-note reviews and record linkage, but they are affected by similar biases. More recently it has been possible to measure HIV incidence using a laboratory test that assesses whether an HIV infection is recent (STARHS [Serological Testing Algorithm for Recent HIV Sero-conversion] or RITA [Recent Infection Testing Algorithm]). It is also possible to indirectly

Case Study 2.5 Estimating HIV Prevalence in the Kyrgyz Republic and Tajikistan

This case study illustrates the diversity of HIV prevalence estimates generated within a country or region, especially in a context of rapidly evolving localized epidemics, accentuating the limits of relying on composite national estimates of HIV prevalence when assessing programmatic needs and responses.

Kyrgyz Republic: Annual sentinel surveillance of HIV prevalence among PWID is carried out in the Kyrgyz Republic. HIV prevalence among PWID was estimated to be 7.7% in 2007, declining to 6.8% in 2008 and increasing to 14.3% in 2009. However, by examining the surveillance methods more closely we can see that the apparent decline in 2008 was an artifact of the methodology and the inclusion or exclusion of certain sites. Initially only the cities of Bishkek and Osh were included in the survey, but in 2007 the sample increased to include Batken, Chui, and Jalal-Abad. In 2008, however, Osh was not included. The HIV prevalence among PWID in Osh is high, reported as 12% as early as 2004, increasing to 14% in 2005 and 2006, and decreasing back down to 12.9% in 2007. By excluding Osh in the 2008 survey, the results for that year are artificially lowered.

Tajikistan: Sentinel surveillance of HIV among PWID has been in place in Tajikistan since 2005, although studies in the capital, Dushanbe, from 2004 indicate that prevalence there was 12.1%. National reported prevalence among PWID was 15.8% in 2005, increasing to 23.5% in 2006 and then decreasing to 19.4% in 2007, 17.6% in 2008, and 17.3% in 2009. Similar to the Kyrgyz Republic, the number of sites included in the surveillance has changed several times over the time period, starting in 2007 with the inclusion of four high to very high prevalence cities in the survey, causing the national prevalence to increase. In 2009 an additional two cities, this time with medium-level HIV prevalence, were included, leading to the appearance of a reduced national prevalence among PWID.

The diversity of HIV epidemics between cities, even in relatively small countries such as the Kyrgyz Republic and Tajikistan, highlights the unsuitability of using a composite national prevalence in describing the HIV epidemic among PWID in many settings.

estimate incidence from HIV prevalence data using a number of approaches including force of infection modeling [108, 109] and measuring prevalence among people who have recently started injecting, assuming that that they would not have been infected via another route [57, 110]. An example where this approach has been used is described in case study 2.6. Incidence can also be estimated through back-calculation approaches using data on HIV diagnoses, clinical status at diagnosis, and AIDS [111]. Here the literature review was used to explore whether countries had reported incidence among PWID, MSM, and SWs since 2000, from either a cohort study or the application of the RITA test.

There were only a few countries where studies had been undertaken to directly measure HIV incidence since 2000. The literature review indicated that among PWID, incidence had been directly measured in five countries: Ireland (retrospective cohort, case note) [112], the Netherlands (prospective cohort)

Case Study 2.6 Using Biobehavioral Surveys to Measure HIV Incidence among PWID in Estonia

Serial cross-sectional studies of PWID were conducted in Tallinn, Estonia, in 2005 (n = 350), 2007 (n = 35), and 2009 (n = 327) [39, 110]. Eligibility criteria were defined as injecting in the last 4 weeks (2005) and last 2 months (2007 and 2009). Recruitment took place in community settings using RDS. Biological data were collected using dried blood spots (2005) and whole serum samples in the other 2 years. Comparable measures of injecting risk behaviors and access to services were collected in all 3 years although a different questionnaire was used in 2005. Results of the surveys suggest that HIV prevalence among the samples was consistently high at 54% in 2005, 55% in 2007, and 50% in 2009. HIV incidence was calculated among recent initiates into injected (defined as those injecting for 3 years or less) and estimated, assuming new injectors were HIV negative when they began injecting and that seroconversion took place at the midpoint between first injection and recruitment into the study [110]. HIV incidence per 100 person years was 20.9 (95% CI 13.5020.8) in 2005, 26.5 (95% CI 16.6–40.1) in 2007, and 9 (95% CI 3.3–19.6) in 2009.

Behavioral data suggested that demographic characteristics of new injectors remained the same over time, with the exception of age. For example, there were proportionally more new injectors in 2009 who were older than 20 years than there were in 2005. The use of HIV-prevention services changed and proportionally more new injectors reported ever using a needle and syringe exchange program (NSP) (70% in 2005 and 97% in 2009) and that the NSP was their main source of new needles/syringes (44% in 2005 and 76% in 2009). There was no difference in the proportion reporting receptive sharing of daily injecting over the years. These observed changes in incidence coincided with an increase in the number of needles/syringes distributed in Tallinn over time: for example, the number distributed in 2009 was 3 times greater than in 2005 and 43 times greater than in 2003. Increases in condom distribution have also been observed, as well as the introduction of opiate substitution therapy. This example shows how the use of serial cross-sectional surveys can be useful for informing the evaluation of HIV-prevention services as well as for giving a measure of HIV incidence.

[113], Russia (prospective cohort) [37], Spain (retrospective cohort, record linkage) [114], and the United Kingdom (prospective cohort) [115]. There were three countries with published incidences among MSM; Italy (retrospective cohort, case note), the Netherlands (prospective cohort) [117], and the United Kingdom (STARHS/RITA) [118]. There were also [116] two counties with papers reporting direct incidence measures among MSWs: Russia (prospective cohort) [119] and the United Kingdom (retrospective cohort, case note) [120].

Measuring Population Sizes for MSM, PWID, and SWs

Knowing the size of the population at risk is important for planning HIV prevention and care services as well as for measuring the harms associated with the population or risk behavior [121, 122]. Without a denominator it is difficult to know whether HIV prevalence at a general population level is increasing and/or whether the size of the population group is increasing. While almost all countries have robust data on the size of their overall population, measurement of the size of high-risk groups is not a routine demographic activity in part because of the associated challenges.

Due to the illicit and marginalized nature of injecting drug use and sex work, and common discrimination against MSM, the sizes of these groups are difficult to estimate. In the case of SWs, estimation problems are further complicated by the mobile nature of the group. Estimates of the population sizes of these groups typically use indirect estimation approaches such as capture-recapture and multiplier methods. A number of countries have looked at measuring the extent of same-sex behaviors through household surveys; however, the robustness of this measure is unclear [122]. We identified most recent published estimates for the three main risk groups, presenting the year the estimates were given. Estimates of PWID and SWs typically relate to individuals who are either currently or have recently injected drugs or sold sex (e.g., injected in last month, or sold sex in last year). Estimates of MSM may relate to sexual behavior, (e.g., had sex with another man in last five years), or identity (e.g., identify as gay or bisexual). As many of the estimates identified were derived from secondary sources or lacked methodological details the findings should be interpreted with caution. We focus on documenting whether a recent estimate was available rather than commenting on the plausibility of the estimate or the robustness of the method used to obtain it—there is, however, likely to be considerable variability in the quality and comparability of the estimates.

Overall 43 (86%) countries had published estimates of the size of their PWID populations, with 37 of these estimates relating to 2000 or later (table 2.3). Since 2000, 55% of countries in the West (85% if pre-2000 estimates are included) had estimated the sizes of their PWID populations, as had 87% of the countries in both Central Europe and the East. Overall 5 (10%) countries had published estimates of the size of their MSM populations (none of the countries in the West, 7% in Central Europe and 27% in the East), while 43 (86%) countries had done so for SW (75% of countries in the West, 87% in Central Europe and all the countries in the East).

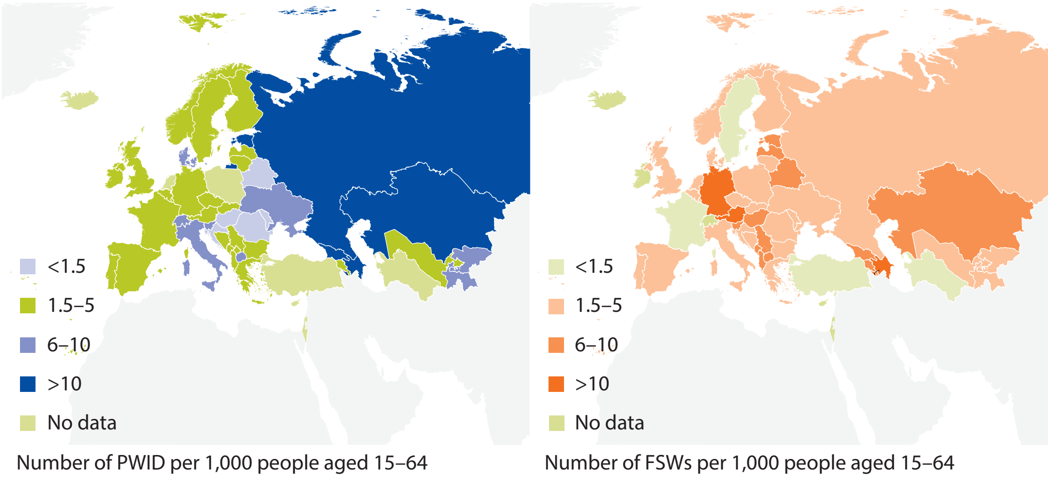
Estimates of the size of the PWID population suggest that the largest populations are in the East, particularly in Russia, Baltic states, and Central Asian

Table 2.3 Number of Countries with Estimates of Population Sizes of PWID, FSWs, and MSM

Subregion	*Number of countries with PWID estimates*	*Number of countries with MSM estimates*	*Number of countries with FSW estimates*
West (n = 20)	11 (plus 6 pre-2000)	0	15
Central Europe (n = 15)	13 (4 years unclear)	1	13
East (n = 15)	13	4	15

Source: Literature Review. See table B.11.
Note: FSWs = female sex workers; MSM = men who have sex with men; n = sample size; PWID = people who inject drugs.

Map 2.6 Number of PWID and FSWs per 1,000 People, Aged 15–44 Years



Sources: EMCDDA Statistical Bulletin 2011; Mathers et al., [146]; Albania Global Fund Round 5 proposal; Bosnia/Herzegovina UNICEF 2009; Macedonia IIEP 2008; IPH of Serbia 2008; The Government of Kazakhstan 2010; APMG [158]; Vandepitte et al., [147]; TAMPEP; Bosnia/Herzegovina, Azerbaijan and Belarus Global Fund proposals.
Note: FSWs = female sex workers; PWID = people who inject drugs.

republics, corresponding to high HIV prevalence in those regions. The pattern is slightly different for FSWs, as larger populations of FSWs have been recorded in Central Europe, particularly in Austria, Germany, and Luxembourg (>10 per 1,000 people [map 2.6]).

Note

1. In a few countries, HIV diagnoses reporting systems are not implemented nationally (e.g., Italy, Spain) and administrative errors may have resulted in reports being missed. In addition, in 11 countries HIV diagnoses reporting started after 1990, more than five years after HIV testing first became available (see figure 2.1). Data are not currently available for all countries (such as Austria, Liechtenstein, and Monaco).

References

Note: References below are also cited in Appendix B.

1. European Centre for Disease Prevention and Control/WHO Regional Office for Europe, HIV/AIDS surveillance in Europe 2009, 2010, European Centre for Disease Prevention and Control: Stockholm.
2. European Centre for Disease Prevention and Control (ECDC), Mapping of HIV/STI behavioral surveillance in Europe, in *ECDC Technical Report* 2009: Stockholm.
3. EuroHIV. *HIV/AIDS Surveillance in Europe*. End of year report 2005, 2006, *Institut de Veille Sanitaire: Saint-Maurice*.

4. Department of Health and Social Development of the Russian Federation, et al. *HIV Infection* Newsletter № 34, 2010: Moscow.
5. Mocroft, A., et al. Decline in the AIDS and death rates in the EuroSIDA study: an observational study. *The Lancet*, 2003. 362(9377): p. 22–29.
6. Stengaard, A. R., et al. Access to highly active antiretroviral therapy (HAART) for women and children in the WHO European Region 2002–2006. *AIDS Care*, 2009. 21(7): p. 893–902.
7. Del Amo, J., et al. The epidemiology of HIV and AIDS reports in migrants in the 27 European Union countries, Norway and Iceland: 1999–2006. *European Journal of Public Health*, 2011. 21(5): p. 620–6.
8. Deblonde, J., et al. Barriers to HIV testing in Europe: a systematic review. *European Journal of Public Health*, 2010. 20(4): p. 422–32.
9. Khotenashvili, L., S. Matic, and J.V. Lazarus. HIV testing and counselling policies and practices in Europe: lessons learned, ways forward. *HIV Medicine*, 2008. 9: p. 30–33.
10. European Centre for Disease Prevention and Control. *Implementing the Dublin declaration on partnership to fight HIV/AIDS in Europe and Central Asia: 2010 progress report*. 2010, ECDC: Stockholm.
11. European Centre for Disease Prevention and Control/WHO Regional Office for Europe. *HIV/AIDS surveillance in Europe 2010*. 2011, European Centre for Disease Prevention and Control: Stockholm.
12. Deblonde, J., et al. HIV testing in Europe: mapping policies. *Health Policy*, 2011. 103(2–3): p. 101–10.
13. UNAIDS/WHO. *Guidelines for second generation HIV Surveillance: The Next Decade*. 2000, Geneva, Switzerland. p. 48.
14. European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). *Statistical bulletin*, 2011; Available from: http://www.emcdda.europa.eu/stats11.
15. Loebstein, R., et al. *Hepatitis C, B, and human immunodeficiency virus infections in illicit drug users in Israel: prevalence and risk factors* 2008. 10: 4. Israel Medical Association: Ramat Gan, ISRAEL.
16. ICON Institute for Public Health. Operational research on key STIs and HIV in Turkey. 2007, Ankara.
17. UNGASS. *Country progress report on monitoring the declaration of commitment on HIV/AIDS: Republic of Bulgaria*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
18. UNGASS. *Country progress report: Republic of Macedonia*. United Nations General Assembly Special Session on HIV/AIDS. Editor 2010.
19. Inogamov, Z. I. State of the HIV epidemic in the Republic of Uzbekistan the results of sentinel surveillance of HIV infection among injecting drug users in 14 sentinel sites of the Republic of Uzbekistan. 2007, 2008, Tashkent.
20. Soliev, A. Analysis on epidemiological situation and responses based on second generation sentinel surveillance system among injecting drug users, Tajikistan, Kazakhstan, Kyrgyzstan, 2006–2009. 2010.
21. UNGASS. *Country Progress Report: Belarus*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
22. UNGASS. *National Report on Monitoring Progress towards the UNGASS Declaration of Commitment on HIV/AIDS*. Ukraine, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010, Kyiv.

23. UNGASS. *Country Progress Report*. Georgia, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
24. UNGASS. *Country Progress Report*. Republic of Serbia, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
25. UNGASS. *National Report on the Implementation of the Declaration of Commitment on HIV/AIDS*. Republic of Belarus, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010, Minsk.
26. UNICEF. *Biological and Behavioral Survey among Injection Drug Users, Bosnia and Herzegovina*. 2007, UNICEF Bosnia and Herzegovina.
27. Semaan, S., J. Lauby, and J. Liebman. Street and network sampling in evaluation studies of HIV risk-reduction interventions. *AIDS Reviews*, 2002. 4: p. 231–23.
28. Des Jarlais, D. C., K. Dehne, and J. Casbona. HIV Surveillance among injecting drug users. *AIDS*, 2001. 14(Suppl. 3): p. S13–22.
29. Diaz, T., et al. Factors associated with prevalent hepatitis C: differences among young adult injection drug users in lower and upper Manhattan. New York City. *American Journal of Public Health*, 2001. 91(1): p. 23–30.
30. Griffiths, P., et al. Researching hidden populations of drug users by privileged access interviewers: methodological and practical issues. *Addiction* 1993. 88: p. 1617–26.
31. Kuebler, D., D. Hausser, and J.-P. Gervasoni. The characteristics of 'new users' of cocaine and heroin unknown to treatment agencies: results from the Swiss Hidden Population Study. *Addiction*, 2000. 95(10): p. 1561–71.
32. Rhodes, T., et al. Prevalence of HIV, hepatitis C and syphilis among injecting drug users in Russia: a multi-city study. *Addiction*, 2006. 101(2): p. 252–66.
33. Watters, J. K. and P. Biernacki. Targeted sampling: options for the study of hidden populations. *Social Problems* 1989. 46: p. 416–30.
34. UNGASS. *Country progress report: Sweden*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
35. UNGASS. *Country progress report: Estonia*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
36. UNGASS. *Country progress report: Azerbaijan*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
37. Kozlov, A. P., et al. HIV incidence and factors associated with HIV acquisition among injection drug users in St. Petersburg, Russia. *AIDS*, 2006. 20(6): p. 901–6. 10.1097/01.aids.0000218555.36661.9c.
38. Niccolai, L. M., et al. High HIV prevalence, suboptimal HIV testing, and low knowledge of HIV-positive serostatus among injection drug users in St. Petersburg, Russia. *AIDS and Behavior*, 2010. 14(4): p. 932–41.
39. Platt, L., et al. High HIV prevalence among injecting drug users in Estonia: implications for understanding the risk environment. *AIDS*, 2006. 20(16): p. 2120–23. 10.1097/01.aids.0000247586.23696.20.
40. UNGASS. *Country progress report: Montenegro*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
41. UNGASS. *Country progress report: Tajikistan*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
42. United Nations Office on Drugs and Crime (UNODC). *HIV, HBV and HCV behavioral surveillance survey among injecting drug users in Bucharest, Romania*. 2010: Bucharest.

43. Heckathorn, D. D., et al. Extensions of respondent driven sampling: a new approach to the study of injection drug users aged 18–25. *AIDS and Behavior,* 2002. 6(1): p. 55–67.
44. Qyra, S. T., et al. Behavioral risk factors and prevalence of HIV and other STIs among female sex workers in Tirana, Albania. *New Microbiologica*, 2011. 34(1): p. 105–8.
45. UNGASS. *Country progress report: Republic of Moldova*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010: Chisinau.
46. Johnston, L.G., et al. The effectiveness of respondent driven sampling for recruiting males who have sex with males in Dhaka, Bangladesh. *AIDS and Behavior,* 2008. 12(2): p. 294–304.
47. Wang, J., et al. Respondent-driven sampling to recruit MDMA users: a methodological assessment. *Drug and Alcohol Dependence,* 2005. 78: p. 147–57.
48. Judd, A., et al. Improving survey methods in sero-epidemiological studies of injecting drug users: a case example of two cross sectional surveys in Serbia and Montenegro. *BMC Infectious Diseases,* 2009. 9: p. 14.
49. McKnight, C., et al. Respondent-driven sampling in a study of drug users in New York City: notes from the field. *Journal of Urban Health*, 2006. 83(Suppl. 6): p. i54–9.
50. Abdul-Quader, A. S., et al. Effectiveness of respondent-driven sampling for recruiting drug users in New York City: findings from a pilot study. *Journal of Urban Health*, 2006. 83(3): p. 459–76.
51. Goel, S. and M. J. Salganik. Assessing respondent-driven sampling. *Proceedings of the National Academy Sciences USA*, 2010. 107(15): p. 6743–47.
52. Ramirez-Valles, J., et al. From networks to populations: the development and application of respondent-driven sampling among IDUs and Latino gay men. *AIDS and Behavior,* 2005. 9(4): p. 387–402.
53. Salganik, M. J. and D. D. Heckathorn. Sampling and estimation in hidden populations using respondent-driven sampling. *Sociological Methodology,* 2004: p. 1–28.
54. Heimer, R. Critical issues and further questions about respondent-driven sampling: comment on Ramirez-Valles, et al. (2005). *AIDS and Behavior,* 2005. 9(4): p. 403–8; discussion p. 409–13.
55. Platt, L., et al. Methodologies to recruit hard-to-reach groups in Russia and Estonia: Comparisons of two chain referral sampling methods across nine studies. *Journal of Urban Health: Bulletin of the New York Academy of Medicine,* 2006. 83(7): p. i39–53.
56. Scott, G. "They got their program, and I got mine": a cautionary tale concerning the ethical implications of using respondent-driven sampling to study injection drug users. *International Journal of Drug Policy,* 2008. 19(1): p. 42–51.
57. Platt, L., et al. Changes in HIV prevalence and risk among new injecting drug users in a Russian city of high HIV prevalence. *Journal of Acquired Immune Deficiency Syndrome*, 2008. 47(5): p. 623–31.
58. Simic, M., et al. Exploring barriers to "respondent-driven sampling" in sex worker and drug-injecting sex worker populations in Eastern Europe. *Journal of Urban Health: Bulletin of the New York Academy of Medicine,* 2006. 83(Suppl. 1): p. 6–15.
59. Ostrovski, D. V. WHO drug injecting study in St. Petersburg, phase two, in XIV World AIDS Conference, July 7–12, 2002: Barcelona, Spain.
60. Shaboltas, A. V., et al. HIV prevalence, sociodemographic, and behavioral correlates and recruitment methods among injection drug users in St. Petersburg, Russia.

Journal of Acquired Immune Deficiency Syndrome, 2006. 41(5): p. 657–63. 10.1097/01.qai.0000220166.56866.22.

61. Abdala, N., et al. Sexually transmitted infections, sexual risk behaviors and the risk of heterosexual spread of HIV among and beyond IDUs in St. Petersburg, Russia. *European Addiction Research*, 2008. 14(1): p. 19–25.
62. Raj, A., et al. Correlates of any condom use among Russian narcology patients reporting recent unprotected sex. *AIDS and Behavior*, 2008. 13(2): p. 310–17.
63. Gyarmathy, V. A., et al. Correlates of unsafe equipment sharing among injecting drug users in St. Petersburg, Russia. *European Addiction Research*, 2009. 15(3): p. 163–70.
64. Gyarmathy, V. A., et al. Unprotected sex in heterosexual partnerships of injecting drug users in St. Petersburg, Russia. *AIDS and Behavior*, 2011. 15(1): p. 58–64.
65. Abdala N., et al. Comparing sexual risks and patterns of alcohol and drug use between injection drug users (IDUs) and non-IDUs who report sexual partnerships with IDUs in St. Petersburg, Russia. *BMC Public Health*, 2010. 10: p. 676.
66. Federal Service for Surveillance of Consumer Rights Protection and Human Well-Being Ministry of Health and Social Development of the Russian Federation. C*ountry Progress Report of the Russian Federation on the Implementation of the Declaration of Commitment on HIV/AIDS*. 2010: Moscow.
67. Verevochkin, S., et al. Different approaches confirm high level of prevalence and incidence rate of HIV infection among IDUs in St. Petersburg, Russia, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
68. Degenhardt, L., W. Hall, and M. Warner-Smith. Using cohort studies to estimate mortality among injecting drug users that is not attributable to AIDS. *Sexually Transmitted Infections*, 2006. 82(Suppl. 3): p. iii56–iii63.
69. Shapatava, E. N. K., T. Tsertsvadze, and C. del Rio. Risk behaviors and HIV, hepatitis B, and hepatitis C seroprevalence among injection drug users in Georgia. *Drug and Alcohol Dependence*, 2006. 82: p. S35–S38.
70. Stvilia, K., et al. Prevalence of Hepatitis C, HIV, and Risk behaviors for blood-borne infections: a population-based survey of the adult population of T'bilisi, Republic of Georgia. *Journal of Urban Health*, 2006. 83(2): p. 289–98.
71. Russian Federation Federal Service for Surveillance of Consumer Rights Protection and Human Well-Being. C*ountry Report of the Russian Federation on the Implementation of the Declaration of* C*ommitment on HIV/AIDS*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010, Moscow.
72. UNGASS. C*ountry Progress Report*. Latvia, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
73. Public Health England. Unlinked anonymous survey of injecting drug users (IDUs). London. C*ommunicable Disease Report Rev.* 1993, 3 (1): R1–R11.
74. Public Health England, H.P.S. National Public Health Service for Wales, CDSC Northern Ireland, and the CRDHB, Shooting up: infections among injecting drug users in the United Kingdom 2007, 2008. *Public Health England*: London.
75. Shooting up: infections among injecting drug users in the United Kingdom 2010. An update, November 2011, in Shooting up: infections among injecting drug users in the United Kingdom 2007, 2008. *Public Health England*: London.
76. EuroHIV. *HIV/AIDS Surveillance in Europe*. Mid-year report 2006. HIV/AIDS Surveillance in Europe, EuroHIV, Editor 2007, *Institut de Veille Sanitaire:* Saint-Maurice.

77. Nielsen, S., et al. STI rates and risk factors among female sex workers attending STI testing sites in Germany. In *International Society for Sexually Transmitted Disease Research*, 2011: Quebec, QC.
78. Smolskaya, T. T., et al. HIV sentinel surveillance in high-risk groups in Azerbaijan, the Republic of Moldova and in the Russian Federation, 2004, World Health Organization (WHO), Europe.
79. UNGASS. *Country Progress Report*. The Russian Federation, United Nations General Assembly Special Session on HIV/AIDS, Editor 2008.
80. van Veen, M. G., et al. HIV and sexual risk behavior among commercial sex workers in the Netherlands. *Archives of Sexual Behavior,* 2010. 39(3): p. 714–23.
81. Family Health International (FHI), I. Stellit. Behavioral Monitoring Survey Russia 2005, 2007.
82. Belza, M. J. Prevalence of HIV, HTLV-I and HTLV-II among female sex workers in Spain, 2000–2001. *European Journal of Epidemiology*, 2004. 19(3): p. 279–82.
83. Gutierrez, M., et al. Prevalence of HIV-1 non-B subtypes, syphilis, HTLV, and hepatitis B and C viruses among immigrant sex workers in Madrid, Spain. *Journal of Medical Virology,* 2004. 74(4): p. 521–27.
84. Day, S. and H. Ward. Approaching health through the prism of stigma: research in seven European countries, in *Sex Work, Mobility and Health in Europe*, H.W.S. Day, Editor 2004, Kegan Paul: London.
85. Platt, L., et al. Risk of sexually transmitted infections and violence among indoor-working female sex workers in London: the effect of migration from Eastern Europe. *Sexually Transmitted Infections,* 2011. 87(5): p. 377–84.
86. Spizzichino, L., et al. HIV infection among immigrant sex workers in Rome: comparing men, women and transgenders, in XVII International AIDS Conference, August 3–8, 2008: Mexico City, Mexico.
87. Gushulak, B. D. and D.W. Macpherson. The basic principles of migration health: population mobility and gaps in disease prevalence. *Emerging Themes in Epidemiology*, 2006. 3: p. 3.
88. Soskolne, V., and R. A. Shtarkshall. Migration and HIV prevention programmes: linking structural factors, culture, and individual behavior—an Israeli experience. *Social Science & Medicine,* 2002. 55(8): p. 1297–307.
89. Day, S. and H. Ward. Approaching health through the prism of stigma: research in seven European countries, in *Sex Work, Mobility and Health in Europe*, H.W.S. Day, Editor 2006, Kegan Paul: London.
90. TAMPEP and L. Brussa. Sex work in Europe: a mapping of the prostitution scene in 25 countries, in *Sex Work, Migration and Health*, TAMPEP International, Editor 2009, TAMPEP International: Amsterdam.
91. Ongoeva, D. HIV-infection epidemiological analysis among sex workers in Central Asia, 2010: Oblast AIDS Centre, the Kyrgyz Republic.
92. Country Coordination Committee, R.o.K. *UNGASS Country Progress Report*. Republic of Kazakhstan, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010: Almaty, Kazakhstan.
93. Ibisevic, S. Presentation of results from biobehavioral survey among injecting drug users in Sarajevo, Bosnia and Herzegovina, in International Harm Reduction Conference, April 20–23, 2009: Bangkok.

94. UNGASS. *Country Progress Report*. Uzbekistan, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
95. Country Report of the Russian Federation on the Implementation of the Declaration of Commitment on HIV/AIDS, United Nations General Assembly Special Session on HIV/AIDS, Editor 2008.
96. Williamson, L. M., et al. Sexual risk behavior and knowledge of HIV status among community samples of gay men in the United Kingdom. *AIDS*, 2008. 22(9): p. 1063–70.
97. UNGASS. *Country Report*. Kazakhstan, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
98. Berghe, W. V., et al. A venue-based HIV prevalence and behavioral study among men who have sex with men in Antwerp and Ghent, Flanders, Belgium, October 2009 to March 2010. *Eurosurveillance*, 2011. 16(28): p. 19914.
99. Bozicevic, I., et al. Prevalence of sexually transmitted infections among men who have sex with men in Zagreb, Croatia. *AIDS and Behavior*, 2009. 13(2): p. 303–9.
100. Ismailova, A. Epidemiological surveillance of HIV infection in the Kyrgyz Republic. *BMJ*, 2009.
101. Izdebski, Z. Research on men who have sex with men. 2004, TNS OBOP for National AIDS Centre: Warsaw.
102. Mirandola, M., et al. HIV biobehavioral survey among men who have sex with men in Barcelona, Bratislava, Bucharest, Ljubljana, Prague and Verona, 2008–2009. (Special Issue: HIV/AIDS and other sexually transmitted infections [STI] in men who have sex with men [MSM]—trends and behavioral surveillance.) *Eurosurveillance*, 2009. 14(48): p. 19427.
103. Sharra, E. and R. Bani. An analysis of HIV-related risk behaviors of men having sex with men (MSM), using respondent driven sampling (RDS), in Albania. Archives: *The International Journal of Medicine*, 2009. 2(2): p. 231–34.
104. USAID. USAID IDUs Tbilisi, Georgia 2007, In pdf.usaid.gov/pdf_docs/PNADK404.pdf. 2008.
105. Velter, A., et al. HIV prevalence and HIV testing behavior among men who attend commercial gay venues in Paris (France), PREVAGAY 2009 Survey. (Numero thematique—L'infection a VIH-side en France 2009: depistage, nouveaus diagnostics et incidence.) [French]. *Bulletin Epidemiologique Hebdomadaire*, 2010. 45(46): p. 464–67.
106. Ismailova, A. HIV-Infection situation analysis among MSM in Central Asia. 2010: Almaty.
107. European Men Who Have Sex With Men Internet Survey (EMIS). Available from: http://www.emis-project.eu.
108. Platt, L., et al. Measuring risk of HIV and HCV among injecting drug users in the Russian Federation. *The European Journal of Public Health*, 2009. 19(4): p. 428–33.
109. Sutton, A. J., et al. A comparison between the force of infection estimates for blood-borne viruses in injecting drug user populations across the European Union: a modelling study. *Journal of Viral Hepatitis*, 2008. 15(11): p. 809–16.
110. Uuskula, A., et al. Expanded syringe exchange programs and reduced HIV infection among new injection drug users in Tallinn, Estonia. *BMJ Public Health*, 2011. 11: p. 517.

111. Downs, A. M., et al. Back-calculation by birth cohort, incorporating age-specific disease progression, pre-AIDS mortality and change in European AIDS case definition. European Union Concerted Action on Multinational AIDS Scenarios. *AIDS*, 2000. 14(14): p. 2179–89.

112. Grogan, L., et al. Bloodborne virus infections among drug users in Ireland: a retrospective cross-sectional survey of screening, prevalence, incidence and hepatitis B immunisation uptake. *Irish Journal of Medical Science*, 2005. 174(2): p. 14–20.

113. Van Den Berg, C., et al. Full participation in harm reduction programmes is associated with decreased risk for human immunodeficiency virus and hepatitis C virus: evidence from the Amsterdam Cohort Studies among drug users. *Addiction*, 2007. 102(9): p. 1454–62.

114. Hurtado Navarro, I., et al. Differences between women and men in serial HIV prevalence and incidence trends. *European Journal of Epidemiology*, 2008. 23(6): p. 435–40.

115. Judd, A., et al. Incidence of hepatitis C virus and HIV among new injecting drug users in London: prospective cohort study. *BMJ*, 2005. 330: p. 24–25.

116. Giuliani, M., et al. Increased HIV incidence among men who have sex with men in Rome. *AIDS*, 2005. 19(13): p. 1429–31.

117. Dukers, N. H., et al. HIV incidence and HIV testing behavior in men who have sex with men: using three incidence sources, the Netherlands, 1984–2005. *AIDS*, 2007. 21(4): p. 491–99.

118. Brown, A. E., et al. Implications for HIV testing policy derived from combining data on voluntary confidential testing with viral sequences and serological analyses. *Sexually Transmitted Infections*, 2009. 85(1): p. 4–9.

119. Baral, S., et al. Male sex workers in Moscow, Russia: a pilot study of demographics, substance use patterns, and prevalence of HIV-1 and sexually transmitted infections. *AIDS Care*, 2010. 22(1): p. 112–18.

120. Sethi, G., et al. HIV, sexually transmitted infections, and risk behaviors in male sex workers in London over a 10 year period. *Sexually Transmitted Infections*, 2006. 82(5): p. 359–63.

121. EMCDDA. *Methodological guidelines to estimate the prevalence of problem drug use at local level, CT.97.EP.05*, Editor 2000, European Monitoring Centre for Drugs and Drug Addiction: Lisbon.

122. UNAIDS and WHO. *Guidelines on estimating the size of populations most at risk, in UNAIDS Working Group on Global HIV/AIDS and STI Surveillance, UNAIDS/WHO*. Editor 2010.

123. Prasad, L. R., et al. Changing epidemiology of HIV anonymous testing in Switzerland for 1996–2006. *Swiss Medical Weekly*, 2009. 139(17–18): p. 256–63.

124. UNGASS. *National AIDS program: country progress report: Albania*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.

125. UNGASS. *Country progress report: Bosnia and Herzegovina*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.

126. UNGASS. *Country progress report: Romania*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.

127. UNGASS. *Country progress report: Republic of Armenia*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.

128. EuroHIV. *HIV/AIDS Surveillance in Europe*. Mid-year report 2005, 2006, Institut de veille sanitaire: Saint-Maurice, Switzerland.
129. Papadogeorgaki, H., et al. Prevalence of sexually transmitted infections in female sex workers in Athens, Greece–2005. *European Journal of Dermatology*, 2006. 16(6): p. 662–65.
130. Linhart, Y., et al. Sexually transmitted infections among brothel-based sex workers in Tel-Aviv area, Israel: high prevalence of pharyngeal gonorrhea. *International Journal of STD & AIDS*, 2008. 19(10): p. 656–59.
131. Gjenero-Margan, I., and B. Kolaric. Epidemiology of HIV infection and AIDS in Croatia—an overview. *Collegium Antropologicum*, 2006.30(Suppl. 2): p. 11–16.
132. Bruckova, M., et al. HIV infection among commercial sex workers and injecting drug users in the Czech Republic. *American Journal of Tropical Medicine and Hygiene*, 2006. 75(5): p. 1017–20.
133. Ministry of Health. Research among populations at higher risk to HIV and among people living with HIV/AIDS. Basic results of surveillance research 2009–10. Ministry of Health, Republic of Serbia: Belgrade, 2010.
134. Suleymanova, J., H. Gadirova, and S. Khasiyev. Seroepidemiological research of HIV, hepatitis B, C, syphilis and behavioral risk factors among most-at-risk groups in Azerbaijan, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
135. UNGASS. *Republic of Belarus: National Report on the Implementation of the Declaration of Commitment on HIV/AIDS*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2008: Minsk.
136. Uuskula, A., et al. A study on HIV and hepatitis C virus among commercial sex workers in Tallinn. *Sexually Transmitted Infections*, 2008. 84(3): p. 189–91.
137. Tsereteli, N., and G. Lomidze. Low HIV prevalence among female sex workers in two cities of Georgia—contributing factors, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
138. Platt, L., et al. Impact of gender and sex work on sexual and injecting risk behaviors and their association with HIV positivity among injecting drug users in an HIV epidemic in Togliatti City, the Russian Federation. *Sexually Transmitted Diseases*, 2005. 32(10): p. 605–12.
139. International HIV/AIDS Alliance. Behavioral monitoring and HIV infection prevalence among female sex workers as a component of second generation surveillance. 2009, *International HIV/AIDS Alliance*: Kiev.
140. Kolemasova, S. Review of HIV prevention and risk factors associated with HIV infection among sex workers in Uzbekistan, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
141. Leuridan, E., et al. Male sex workers in Antwerp, Belgium: a descriptive study. *International Journal of STD and AIDS*, 2005. 16(11): p. 744–48.
142. van Veen, M. G., H. M. Gotz, et al. HIV and sexual risk behavior among commercial sex workers in the Netherlands. *Archives of Sexual Behavior*, 2010. 39(3): p. 714–23.
143. Diez, M., et al. HIV prevalence among men and transgender sex workers in Spain, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
144. UNGASS. *Country progress report: Hungary*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.

145. UNGASS. *Country progress report: Lithuania*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
146. Mathers, B. M., et al. Global epidemiology of injecting drug use and HIV among people who inject drugs: a systematic review. *The Lancet*, 2008. 372(9651): p. 1733–45.
147. Vandepitte, J., et al. Estimates of the number of female sex workers in different regions of the world. *Sexually Transmitted Infections*, 2006. 82: p. III18–III25.
148. Hayes, J., et al. Prevalence of same-sex behavior and orientation in England: results from a National Survey. *Archives of Sexual Behavior*, 2011: p. 1–9.
149. The Global Fund to Fight *AIDS*, T.a.M.G. *The Global Fund to Fight AIDS, Tuberculosis and Malaria. 2011* [cited 2011 3/1/2012]; Available from: http://www.theglobalfund.org/en/.
150. Baćak, V., et al. *Report on behavioral and biological surveillance among injection drug users in Bosnia and Herzegovina, 2009*. A respondent driven sampling survey, 2009.
151. Ministry of Health of Republic of Macedonia, R.I.f.H.P. Biobehavioral study conducted among young people and most at risk populations for HIV infection in Republic of Macedonia in 2007, 2008: Skopje.
152. Meskovic, D. Behavioral surveillance survey of HIV/AIDS knowledge, attitudes and practices among MSM (unpublished). 2006, NGO Safe Pulse of Youth: Belgrade.
153. UNDP. Reversing the Epidemic: Facts and Policy Options, in *HIV/AIDS in Eastern Europe and the Commonwealth of Independent States*, T. Barnett, et al. Editors. 2004, United Nations Development Programme: Bratislava.
154. Papoyan, A., et al. Rapid assessment and response of HIV/AIDS among especially vulnerable young people in the Republic of Armenia. 2006, UNICEF: Yerevan.
155. National AIDS Centre, K. Programme on counteraction of AIDS epidemics in the Republic of Kazakhstan for 2006–2010. Almaty, Kazakhstan, 2006.
156. Oostvogels, R. HIV and men who have sex with men in the Kyrgyz Republic, assessment and review. 2005, *The Global Fund to Fight AIDS, Tuberculosis and Malaria:* Bishkek.
157. Gheorgita, S., and O. Scutelniciuc. Data provision and data use: Republic of Moldova. In Consultation Meeting on HIV Prevention Activities in MSM in ECA, 2010. Kyiv, Ukraine.
158. AIDS Project Management Group (APMG). Report on the project: Support to national AIDS response to scale up HIV prevention and care services in Tajikistan: 2009, UNDP Tajikistan.

CHAPTER 3

Epidemiology of HIV in Key Populations at High Risk

People Who Inject Drugs

Injecting drug use is a major global health concern, with between 11 and 21 million people injecting drugs worldwide [1]. Overall, there are approximately 4.8 million people who inject drugs (PWID) in the European region, with over 1.8 million of these living in the Russian Federation [1]. In Europe the estimated prevalence of injecting drug use among the adult population varies widely from almost 0 in some Central European countries (for instance Hungary) to more than 1 in 20 adults in others (for instance Azerbaijan) [1].

Blood-borne viruses, including HIV, contribute significantly to the excess morbidity and mortality experienced by PWID [2, 3]. HIV has the potential to spread rapidly via the sharing of needles or syringes between PWID as well as via unprotected sex between PWID and their injecting and noninjecting partners. Sexual contact between PWID and noninjecting populations may in part explain the rise in HIV cases among heterosexual noninjectors in areas where injecting drug use was previously thought to be the principal route of transmission of HIV [4]. The risk of HIV infection after injecting with a contaminated needle is high, estimated to be around 1 in 125 injections [5], compared with unprotected sex between heterosexuals, which carries a risk of transmission of about 1 in 2,000–5,000 sex acts [6]. This goes some way to explain the disproportionate burden of HIV among PWID in the region.

Demographic Characteristics

Age and Sex

Studies suggest that three times as many men as women inject drugs in Europe. Males make up a higher proportion of PWID in southeastern Europe, Central Asia, and the Caucasus. Data from Georgia and Azerbaijan suggested over 95% of respondents were male [7–13]. Most research among PWID tends to recruit through services or in the community via drug-user networks, so those who are poorer or lack access to services or who have weak ties to such networks may be less likely to be included in a study. Female PWID are generally harder to reach than males and use services less and may thus be underrepresented in studies. In Georgia, for example, it is estimated that there are about 8,000 female PWID, which is roughly 20% of problem drug users, yet women only constitute around 8% of participants reached by harm reduction programs and 1% of participants reached by methadone programs [14].

PWID tend to be older in the West where the median age was over 30 years, but younger in Central Europe (mid-20s) and in the East (late 20s). Sentinel surveillance from Kazakhstan, the Kyrgyz Republic, and Tajikistan in 2006 suggested that the median age of PWID ranged between 29 and 34 years. In 2009 the median age ranged from 31 to 37 years, suggesting that either the PWID population was aging with fewer new initiates, or that sampling methods excluded younger people [15]. Many studies restrict recruitment to PWID 18 years or over, so populations of younger injectors may be inadequately represented. A study of street-based adolescents (10–19 years old) in four cities in Ukraine reported that 15.5% had ever injected drugs and over half of those had done so in the previous month. The average age of first injection was between 14 and 16 years [16]. If this pattern is common throughout the region it is likely that a significant part of the PWID population has been underrepresented in studies to date.

The evidence suggests that the average age of male PWID is older than females: studies from Belarus [18], England and Wales [19], France [17], Russia [18], and Ukraine [18] all showed male respondents to be more than one year older than females on average. Evidence also suggests that age differs by type of drug used, with amphetamine users tending to be younger than opiate users. A study of cocaine and heroin users (not all PWID) from Barcelona, Madrid, and Seville in Spain showed that cocaine only users were generally younger than those who also used some heroin in addition to cocaine [20]. A study from Tallinn in Estonia reported amphetamine (psychostimulants) users as younger on average than fentanyl (synthetic opiate) users [21]. Studies that recruited exclusively from drug treatment centers tended to report respondents with higher average ages than those recruiting from the street and low-threshold services. All demographic characteristics of PWID in European studies captured are presented in tables C.4–C.6.

Income and Employment

The proportion of PWID who report having a regular income was generally low, although it is important to note the likelihood for underreporting of illegal earnings as well as the effect of low levels of employment within the wider community. In the West, the proportion of PWID reporting regular income ranged between 2% and 30%. Exceptions to this included Italy where higher levels of employment were reported at 79% (Northern Italy) and 56% (Southern Italy) [22, 23]. In Marseille, France, 65% reported receiving benefits in addition to the 18% who were employed [24]. In Central Europe the proportions of employed PWID was generally between 20% and 35%. Similarly, in the East, regular income and employment was generally less than 50%, although studies in Ukraine reported that 6–7 respondents out of 10 were employed full or part time [25, 26]. A study in St. Petersburg, Russia, reported that 44% of PWID were employed, although 76% reported having a legal income [27].

A study comparing PWID from Volgograd and Barnaul with a random sample of respondents from a Russian national household survey [28] provides more detail on the economic activities of PWID. PWID were likely to have a similar level of income as noninjectors of the same age, and although they were less likely to have a regular job, those out of work were more likely to be actively seeking one. PWID without regular work had a greater variety of additional sources of income than noninjectors who relied heavily on state support in the form of pensions and child benefits. PWID relied more on illegal activities such as selling sex or drugs and on money from parents or friends. These studies emphasize caution in generalizing that PWID are without income or employment and without the potential to contribute to the economy. Recent research from Vancouver, British Columbia, suggests that PWID involved in the labor market experience lower levels of HIV risk and prevalence than those not involved in the labor market, and that there is a relationship between increasing frequency of employment and decreasing HIV risk [29].

Risk Profile

Contact with Criminal Justice Systems

Previous reviews suggest that prisons and other closed settings may act as structural determinants in the production of HIV risk, especially linked to drug injecting [30–32]. While drug use, and injecting, may continue in prison, access to harm-reduction resources are reduced, with levels of risk consequently higher. A number of international studies link incarceration with an increased risk of HIV transmission among PWID [32–34]. Additionally, a strong emphasis on law enforcement—including intense street policing of PWID resulting in caution, arrest, fine, or detention—has been linked (directly and indirectly) with HIV vulnerability. Evidence, for example, links intensity of police contact and arrest with increased odds of syringe sharing among PWID [35–39].

The data reviewed from Eastern Europe and the former Soviet Union suggest that between half and three-quarters of PWID have been arrested (see tables 3.1 and C.7–C.9). For instance, in Dushanbe, Tajikistan, 45% of PWID had ever been arrested [41], while in Tallinn, Estonia, 50% of amphetamine users reported

Table 3.1 Contact with the Criminal Justice Systems in Case Study Countries

	PWID ever arrested (%)	*PWID ever in prison (%)*	*Harm reduction services available in prisons [40]*
Estonia	49–66	58–66	OST
Russian Federation	27–76	6–37	Not available
Tajikistan	44.5	Not available	Not available

Source: PWID publications as per tables C.7–C.9.
Note: OST = opioid substitution therapy; PWID = people who inject drugs.

being arrested in the last year, compared with 66% of fentanyl users [21]. A study in Odessa, Ukraine, (n = 600) found that police beatings were common, with nearly 50% of respondents reporting at least one beating; police beatings were linked to elevated levels of syringe sharing [30, 39]. Studies in other regions also suggest relatively high rates of police arrest. In Serbia and Montenegro (historically), for example, 64% of PWID in Belgrade and 58% in Podgorica had been arrested by police in the past 12 months [42]. Qualitative studies in Russia, as elsewhere, link police arrest and police violence to reduced capacity for risk reduction as well as increased risk behavior [43–45].

No reports on the prevalence of arrests among PWID in the West were identified although between 11% and 70% of PWID reported having spent time in prison. Elevated risk of injecting-related harm while in prison is well documented; between 1% and 56% of prisoners report ever injecting while in prison [46]. In Estonia, between 58% and 66% of PWID have been in prison at least once. Even among new injectors with less than three years of injecting between 32% and 40% have been incarcerated [47]. Reports of arrest or imprisonment, although varied, were consistently high across the region: in Georgia between 6% and 21% of PWID were arrested and in Russia the number was between 6% and 37%. The number of PWID imprisoned in 2007 ranged from 50% in Belgrade to over 70% in Lithuania, 43% in Podgorica, and 18% in Sofia [42, 48, 49].

Some studies showed increased vulnerability associated with prison: in Finland 84% of HIV-positive PWID and 67% of HIV-negative PWID had been in prison [50]; in Spain, experience of prison was associated with increased risk of recent injection of heroin (past 12 months) compared to only using cocaine among a sample of injectors and noninjectors [20]. In Russia in 2003 a study suggested male PWID were almost three times more likely to report ever having been in prison than female PWID [44].

HCV Infection

While the main focus of the review is HIV vulnerability, PWID in Europe are also vulnerable to hepatitis C virus (HCV) [51]. Reviewed studies show HCV prevalence estimates between 52% and 94% among PWID in the West, 37% and 74% in Central Europe, and between 54% and 96% in the East. There is generally a high prevalence of HCV co-infection among HIV-positive PWID [52, 53].

Injecting Drug Use Practices

Duration of Injecting

The duration of injecting careers varies across the region, and also at country level, but evidence suggests that PWID in the West have been injecting on average for over 10 years and in the East for between 2 and 8 years. In Central Europe, the duration of injecting varied from 5 to 10 years [42, 54, 55]. A review of hospital records in Israel reported a mean duration of injecting of less than a year among Israeli PWID [56]. Generally studies suggest that on average female PWID had been injecting for a shorter time than their male counterparts, although one study from St. Petersburg reported both males and females having mean injecting careers of five years [18]. A study from Estonia highlighted differences in injecting careers between stimulant and opiate users, with 16% of amphetamine users injecting for less than two years and 33% injecting for more than five years, compared with only 3% of fentanyl users injecting for less than two years and 68% injecting for more than five years [21]. A study in the United Kingdom found that PWID who reported getting most of their injecting equipment through secondary distribution had shorter injecting careers (median 6.4 years) than PWID who got most of their equipment from pharmacies (median 9.2 years) or low-threshold services (median 9.0 years) [57].

Drugs Injected

Historically, heroin has been the main drug injected in the West and South of Europe, with amphetamines being more common in northern countries, and home-produced opiates and/or misuse of medicines in Central Europe and the East. Since the late 1990s, there has been an increase in heroin or opiate use in Central Europe and the East, as well as increases in cocaine use as the predominant stimulant in South and Western Europe, compared to amphetamines in the North, Central Europe and the East [58]. Case study 3.1 considers how stimulant use and effects may link with HIV risk and transmission.

Heroin is noted as the drug of choice among injectors in Europe, although there are subregional differences, and the use of more than one drug (poly-drug) is common (table 3.2). Poly-drug use can be associated with increased harm to health through interactions between drugs, psychoactive substances increasing risk behaviors, and reduced cognition that can lead to injury [59]. Cocaine use is also associated with cardiovascular problems [60]. In the West, poly-drug use was reported by 83.5% of PWID in Italy in 2005 [61] and 55% in Sweden in 2002–03 [62]. Speedball (a mix of cocaine and heroin) emerged as a key trend and is reported for instance among 52% of PWID in the Netherlands [63], 43%–68% in Spain [20, 64], and 84.2% in Luxembourg [65]. There is an emerging culture of crack-based speedball injection that appears almost unique to the United Kingdom [66], though a minority of PWID in France also report crack use [17]. Recent evidence in Finland suggests that there is increased buprenorphine use and injection among those with a history of buprenorphine treatment; one report estimates that PWID attending syringe exchanges used buprenorphine most frequently (73%), amphetamines (24%) and other opioids (2%) [67]. Another study in Finland shows differences in drug use linked to HIV prevalence, with HIV-positive PWID reporting amphetamines as their main drug (52%), buprenorphine (11%) and heroin (3%). Among the HIV-negative PWID, they reported buprenorphine as their main drug (44%), followed by amphetamines (36%), and heroin (16%) [50].

In Belarus, Moldova [68], and Russia, the injection of home-produced opioids such as "hanka" or "shirka" (a liquid poppy extract) is reported alongside heroin injection, and in Ukraine, this is reported as the primary pattern of injection by PWID (between 79% and 94%) [25, 69]. In Estonia, and initially following a heroin shortage, the use of the synthetic opiate, fentanyl (China White), has

Case Study 3.1 Stimulant Injection and HIV Risk in Europe

The term "stimulants" includes both amphetamines and cocaine (including crack). While there is little evidence of physical dependence on amphetamines, unlike opiates there is no pharmacological substitute that can be used for treatment purposes; once a tolerance is developed withdrawal may be uncomfortable and linked to depression [82]. Cocaine injection is associated with more frequent and uncontrolled injection due to the shorter half-life of the drug, which can lead to more injection and dosage-related harms [83]. Although there is limited data on harms associated with injecting amphetamine-group substances, there is some evidence of high dependency, increased frequency of injecting, and among men who have sex with men (MSM) in particular, increased sexual risk behaviors [77].

The type of drug injected may be associated with HIV as well as distinct behavioral risks [84]. Among drug users followed for a year in St. Petersburg, frequent stimulant use was the primary factor linked to HIV seroconversion [85]. The majority of stimulant users were also users of heroin and opiates, but those using stimulants three or more times a week were eight times more likely HIV seroconvert (HR 8.1, CI 2.4–27.3). Having three or more sexual partners was also linked to HIV seroconversion (HR 2.6, CI 0.9–7.8).

Studies in Ukraine also associate rising levels of HIV prevalence with the injection of amphetamine-group substances [74, 77]. A comparison of stimulant injectors with opiate injectors found that stimulant users had shorter injection careers, were younger, and engaged in higher levels of drug and sexual risk behavior [86]. PWID in Ukraine link the cheaper price and availability of stimulants as factors shaping the growing popularity of stimulants relative to opioids [74, 87].

Studies outside Europe have also reported stimulant use as a correlate for HIV risk and seroconversion [85, 88, 89], though there are exceptions, and in Estonia, amphetamine users were less likely to have ever shared a needle than fentanyl users (24% as opposed to 34%) [21].

Table 3.2 Injecting Practices in Case Study Countries

	Mean career duration	*Main drugs injected*	*Percentage reporting daily injecting (%)*
Estonia	7.9 years	Fentanyl, mak, heroin, amphetamines	61
Russian Federation	5.5–7.2 years	Heroin	15–92
Tajikistan	4.6–11.6 years	Heroin	39

Source: PWID publications as per tables C.4–C.6.

become common (among 61% to 74% of respondents in Tallinn and Kohtla-Jarvë), along with amphetamine injection [70, 71]. Anecdotal reports in Russia also suggest recent shifts away from heroin injection toward the injection of liquid opioid solutions derived from pharmaceutical medicines [72]. Sentinel surveillance in Central Asia shows that heroin is injected by over 90% of PWID in Kazakhstan, the Kyrgyz Republic, and Tajikistan [15].

There are few reports of cocaine use in the East, but injection of methamphetamine is more common. The injection of home-produced liquid forms of methamphetamine (vint) or methcathinone (jeff or boltushka) derived from ephedrine or pseudoephedrine, are also reported in parts of Ukraine and Russia [73]. Some studies in Ukraine link home-produced cathinone-based injection (naturally occurring amphetamine contained in Khat, a flowering plant) with legal restrictions on the sale of ephedrine-based medications [74]. In Central Europe, heroin is reported as the main drug injected by PWID (between 48% and 97%), followed by amphetamines (between 30% and 50%) [55, 75, 76]. In the Czech Republic, for instance, the injection of crystal methamphetamine (pervitin or piko) is common [58]. The Czech Republic also has the highest prevalence of methamphetamine use in Europe [73, 77, 78]. Around 30% of PWID in Central Europe report poly-drug use [79].

Home-produced drugs have been linked with increased health harms including the inclusion of variable quantities of unregulated ingredients; the use of human blood in the preparation in some areas; and the communal aspect of preparing and using the drugs, such as injecting from a common container or with common needles [74, 80, 81].

Frequency of Injection

The frequency of injection varies widely throughout and within countries. Frequency of injecting will depend on multiple factors including availability and quality of drugs, what drugs are injected, and stage of injecting career. Data from the review suggested that daily injecting was more common among female PWID involved in sex work compared to those who were not sex workers (SWs) and male PWID [90]. Studies in Hungary and Estonia report more frequent daily injecting among heroin or opioid users than amphetamine users [21, 79].

Risk Practices

Data on risk practices concerning needle sharing, unprotected sex, and sex work are summarized in table 3.3 for three case-study countries.

Needle/Syringe Sharing

In the West between 5% and 32% of PWID report sharing needles/syringes in the past four weeks (tables C.4–C.6). Frequency of needle sharing in the East is more varied, ranging between 2% and 79% [48, 85] and in Russia alone between 8% and 79% [85, 91]. The estimate of 2% from Vilnius, Lithuania, refers to receptive sharing in the past four weeks [48], and most estimates range between 20% and 30%, with one study estimating sharing (receptive or distributive) in the past 30 days at 98% [92]. Among the Russian studies, frequency of sharing increased with age: the lowest reported frequency was from a study restricted to recent initiates (injecting for less than 3 years) [91], who were over 5 years younger on average than those reporting the highest frequency of needle sharing [85] (19.6 years versus 24.3 years). Excluding these extreme results, the majority of studies from Russia reported rates ranging from 12% [93] and over 50% [18].

Table 3.3 Risk Practices in Case Study Countries

Percent

	Sharing needles in past four weeks	*Reporting unprotected sex with casual partner*	*Sex work*
Estonia	18–32	26–58 (new injectors ≤3 years; 28 days)	2–17
Russian Federation	8–79	34 (6 months)	Females: 24–32; males: <1–5
Tajikistan	37 last injection	55–100	Females 31; males 13

Source: Tables C.4–C.9.

In Tajikistan, 65% of PWID reported injecting with a previously used needle/syringe in the past six months [41]. Data from Uzbekistan and Tajikistan suggest that while only 10% of young PWID shared a needle/syringe at their last injection, sharing paraphernalia is considered a social norm [94]. In Central Europe, between 15% and 67% of PWID reported sharing a needle or syringe when they injected in the previous four weeks (tables C.4–C.6).

Unprotected Sex

Reported rates of risky sexual practices (generally measured by reported unprotected vaginal or anal sex) were generally much higher among PWID in the region than unsafe injecting practices. However, PWID throughout Europe were consistently more likely to use a condom with their casual partners than with regular ones. In the West rates of inconsistent condom use were between 72% and 83% with regular partners, and between 28% and 44% with casual partners (tables C.7–C.9). In the East, rates varied, with between 28% and 94% reporting inconsistent condom use with regular partners and 2% and 87% with casual partners. In Central Europe, a study from Sofia, Bulgaria, showed that males reported less inconsistent condom use than females: 72% compared with 90% with regular partners and 44% compared with 61% with casual partners [49]. Conversely in Tashkent, Uzbekistan, 90% of males and 82% of females reported inconsistent condom use with their regular partners, and 80% of males and 60% of females reported it with their casual partner(s) [94, 95].

Sex Work

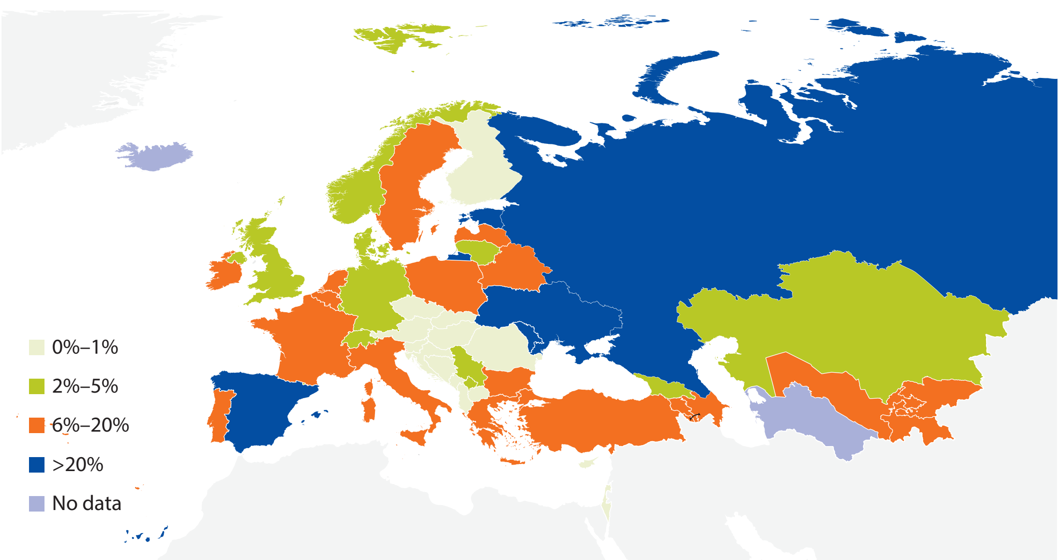
In the West between 15% and 20% of PWID had exchanged sex either for money or drugs, although no studies differentiated between males and females (tables C.7–C.9). Studies in the East suggest that proportionally more female PWID exchange sex than their male counterparts. In Tallinn, 6% of men reported receiving money for sex compared with 72% of women [96]. Additionally, this study reported that 34% of the males had paid for sex themselves. Studies from Russia show that between 25% and 32% of female PWID in St. Petersburg and between 1% and 5% of men reported selling sex in the last 6 months [18, 12, 90]. In Togliatti, 50% had ever exchanged sex for money, drugs, or goods and 43% had done so in the last month [85]. Elsewhere in the region, reported rates of sex work were generally much lower; for instance, in Uzbekistan only 3% of respondents reported having exchanged sex for drugs, and in Ukraine, 5% reported having paid for sex and 3% reported having sold sex in the past three months [26, 95]. In Central Europe rates varied from as low as 0.2% in the Czech Republic in 1999–2000 [97] to 10% in Belgrade in 2005 [42].

HIV Prevalence

A total of 91 sources identified by our systematic review (see chapter 1) reported unique, primary HIV-prevalence estimates among PWID in Europe; 24 from Western Europe [17, 20, 22–24, 56, 61, 63, 64, 98–113], 44 from Eastern Europe and Central Asia [7–12, 15, 25–27, 41, 48, 69, 70, 85, 91, 93, 96, 114–140], 21 from Central Europe [42, 49, 76, 79, 97, 141–156], one that included data from Central and Eastern Europe [92], and the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), Statistical Bulletin 2011, which provided estimates for many countries across the region [46].

The review generated many and diverse prevalence estimates, with large variations seen across the subregions, countries, and even cities. However, a discernible trend emerged with low to medium prevalence in the Central region, high to very high prevalence in the East, and prevalence evenly spread between low, medium, and high in the West (tables C.1–C.3). It is important to note that, based on the available estimates, some countries fall within multiple categories (in the case of Spain, all four), and this may be due to city or area variations or to differing study methodologies. In order to better compare prevalence estimates across the region, we selected the best national level prevalence estimates. Map 3.1, figures 3.1–3.3 and table 3.4 show the best estimates of HIV prevalence among PWID in Europe.

Map 3.1 Best Estimates of HIV Prevalence among PWID across Europe



Source: Data from reports, as shown in tables C.1–C.3.
Note: HIV = human immunodeficiency virus; PWID = people who inject drugs.

Eastern Europe

HIV prevalence among PWID is highest in the East, only Georgia, Kazakhstan, and Lithuania can claim to have medium-level epidemics, according to the studies examined here (figure 3.1). The remaining 11 countries with data are categorized as high-level epidemics (no data exists for Turkmenistan); of these, 4 have prevalence estimates of over 20% and Estonia has a prevalence of over 50%.

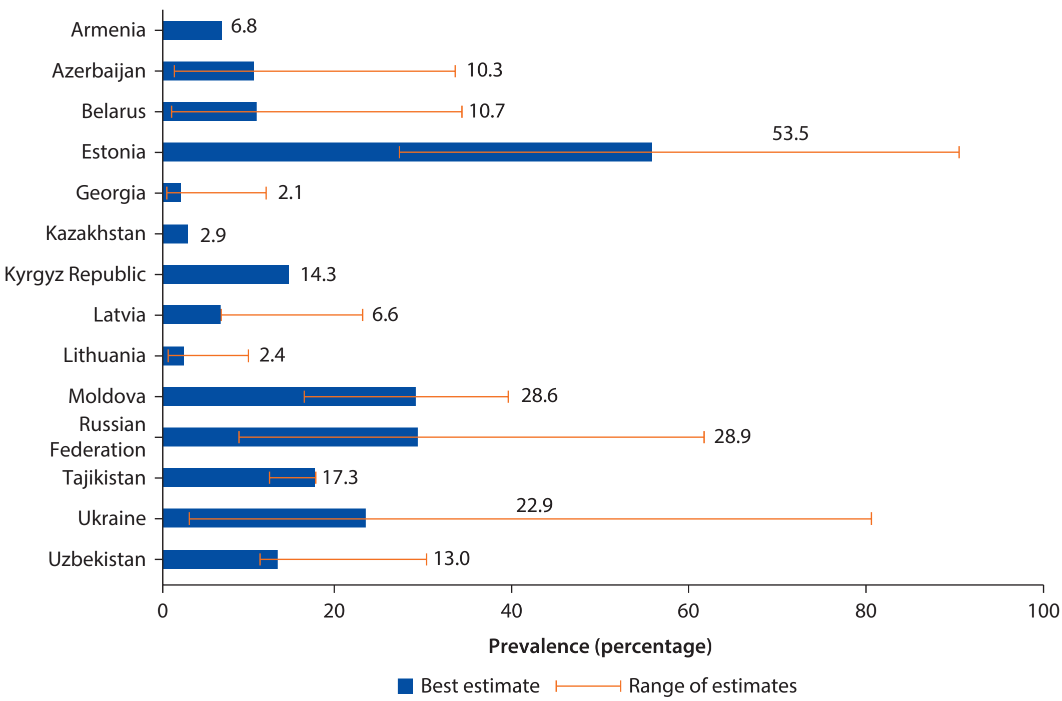
Central Europe

Central Europe appears to have the lowest level of epidemics among PWID within the region. Only Poland and Bulgaria appear to have high-level epidemics, and neither of these exceeds 10% prevalence (figure 3.2). Several countries (Albania, Croatia, Cyprus, Hungary, the former Yugoslav Republic of Macedonia, and Slovenia) report 0% HIV prevalence among PWID. However, this is the region with the fewest studies, and in general smaller sample sizes, so the estimates generated are less reliable than the best estimates generated in the East or the West.

Western Europe

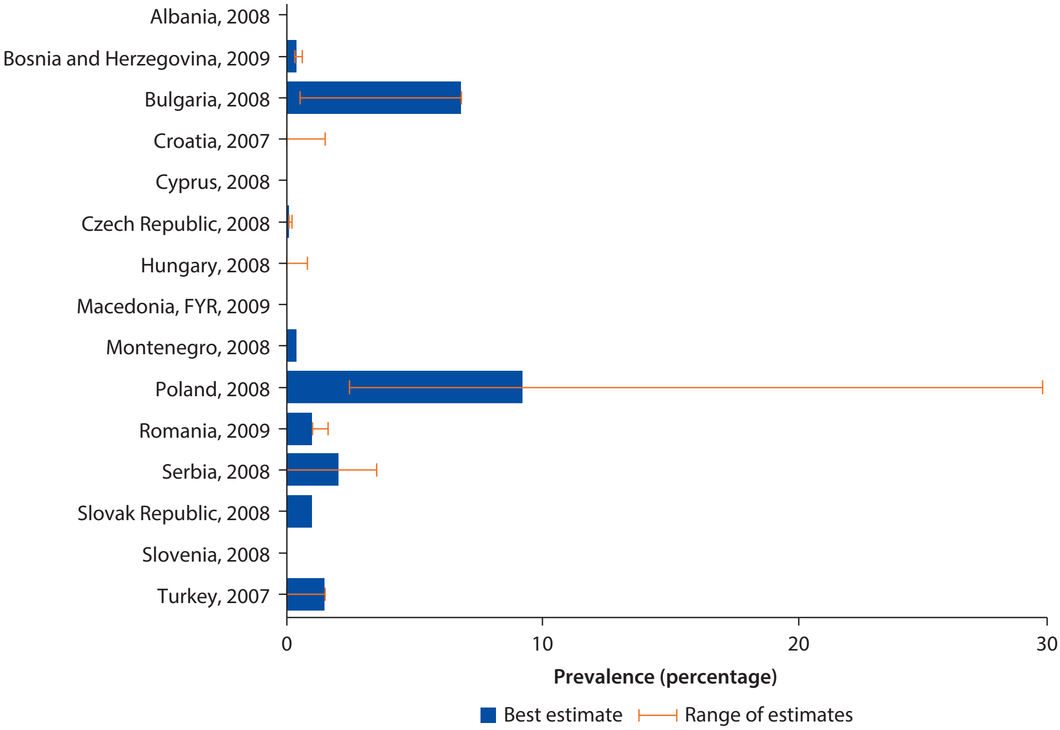
There is greater diversity in HIV prevalence in the West than in the East or Central Europe. Only Spain is identified here (by the study with the widest coverage) as having a very high epidemic among PWID, although other city-specific

Figure 3.1 Best Estimates of HIV Prevalence among PWID in Eastern Europe



Source: Table C.3.
Note: HIV = human immunodeficiency virus; PWID = people who inject drugs.

Figure 3.2 Best Estimates of HIV Prevalence among PWID in Central Europe



Source: Table C.2.
Note: HIV = human immunodeficiency virus; PWID = people who inject drugs.

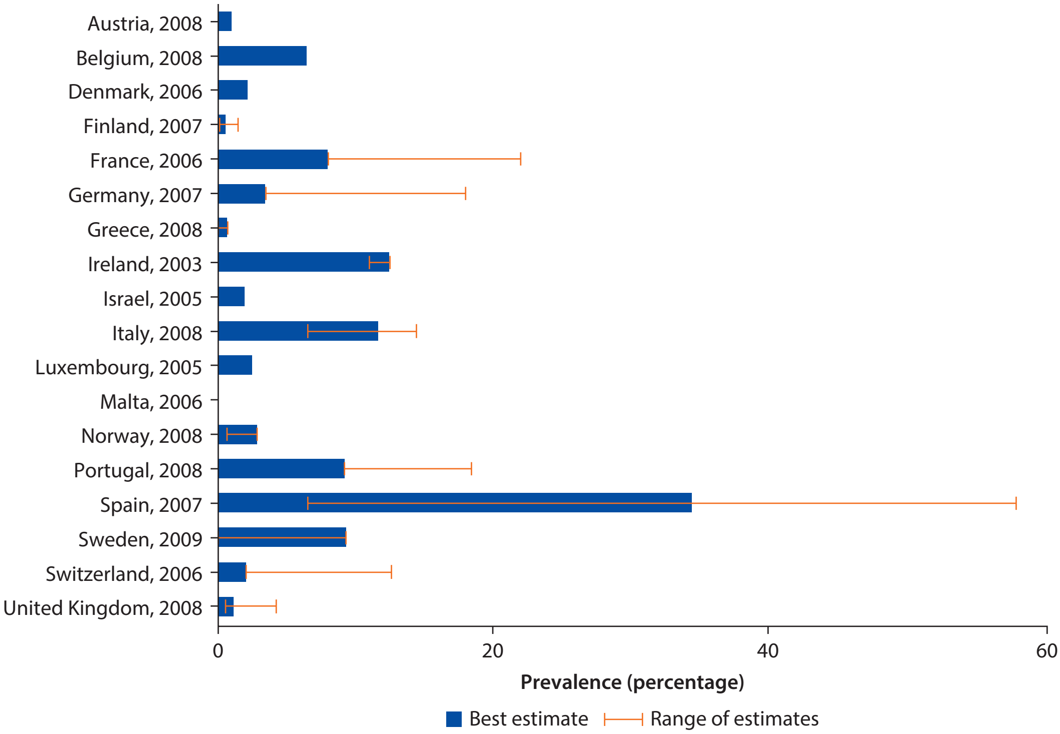
studies yield a range that includes far lower estimates (figure 3.3). City-level estimates from Spain range from as low as 7% among female PWID in Valencia [105] to 58% among male and female PWID in Barcelona [104]. The majority of the remaining countries have either low- or medium-level epidemics among PWID, although Ireland and Italy still appear to have prevalence levels of over 10%. Although there is no estimate of HIV among PWID in the Netherlands recent enough to be included in this review, data from 2003 indicate that prevalence in Rotterdam was 9.5% among PWID recruited from the street and drug treatment centers [157].

Factors Linked to HIV

Because of low prevalence estimates, no studies examined risk factors linked to HIV in Central Europe, and so we summarize the findings of the 22 multivariate HIV-risk factor analyses identified by our review in the West and the East (see also tables C.10 and C.11).

The review identified 15 papers presenting multivariate analyses of factors associated with HIV in the East [25, 26, 41, 70, 85, 90, 93, 121, 134, 137, 138, 161–164], although two [41, 162] present new analyses of data already published in other papers and also presented here [90, 163]. The review identified seven

Figure 3.3 Best Estimates of HIV Prevalence among PWID in Western Europe



Source: Table C.1.
Note: HIV = human immunodeficiency virus; PWID = people who inject drugs.

Table 3.4 HIV Epidemics in Case Study Countries

	Total population, 2006 (thousands) [158]	*PWID adult prevalence (%) [89]*	*Best estimate of PWID HIV prevalence (%)*	*PWID HIV-prevalence estimates range (%) (see table C.3)*	*HIV case reports (2010) attributed to PWID per million people [159, 160]*
Estonia	1,341	1.5	53.5	27–90	46
Russian Federation	141,394	1.8	28.9	9–61	109
Tajikistan	6,836	0.6	17.3	12.1–17.3	77

Source: Table C.3.
Note: HIV = human immunodeficiency virus; PWID = people who inject drugs.

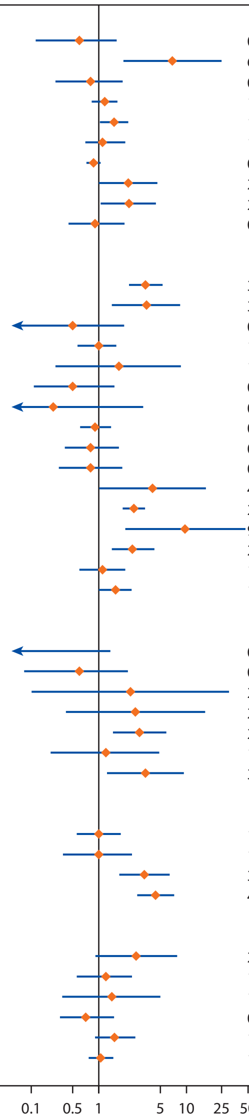
papers presenting multivariate analyses of factors associated with HIV prevalence [22, 61, 99, 102, 103, 105] in the West, although two described different analyses of the same data set [102, 103], and one paper presented multivariate analyses of HIV incidence [63].

Synthesizing the Associations

The forest plots summarized in figures 3.4 and 3.5 summarize the effects of individual and structural risk factors on HIV identified through the multivariate studies. Although studies measure similar risk factors, it is important to note that each may have carried out analyses differently and may have adjusted for different confounding variables. Full details of the studies and factors presented can be found in tables C.10 and C.11.

Figure 3.4 summarizes individual-level risk factors. Many studies investigated the link between HIV and injecting with a used needle, or sharing a needle,

Figure 3.4 Adjusted Effect Estimates of Individual-Level Risk Factors among PWID

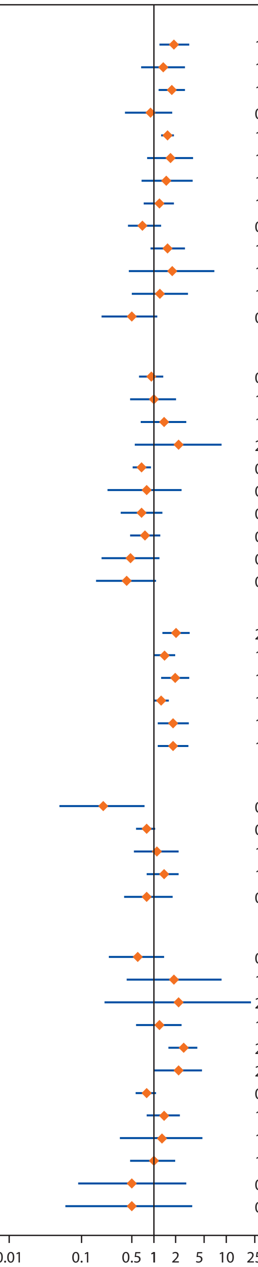


Risk factor	ES (95% CI)	City	Country	Reference
Injecting frequency				
Daily	0.60 (0.19, 1.60)	Moscow	Russian Federation	93
Daily	6.90 (1.91, 25.08)	Volgograd	Russian Federation	93
Daily	0.80 (0.32, 1.86)	Barnaul	Russian Federation	93
Daily	1.16 (0.83, 1.62)	Tashkent	Uzbekistan	138
Daily	1.49 (1.03, 2.17)	3 cities	Ukraine	134
Daily	1.10 (0.70, 2.00)	Tallinn	Estonia	161
Daily	0.87 (0.72, 1.05)	16 cities	Ukraine	26
Daily (ethnic Tajik)	2.16 (1.00, 4.66)	Dushanbe	Tajikistan	163
Daily (opiates)	2.20 (1.05, 4.46)	Vinnitsya	Ukraine	25
Daily*	0.90 (0.45, 1.95)	Togliatti	Russian Federation	162
Needle or syringe sharing				
Ever shared	3.40 (2.20, 5.30)	3 cities	Spain	102
Ever shared	3.50 (1.40, 8.40)	Moscow	Russian Federation	93
Ever shared	0.50 (0.10, 1.94)	Volgograd	Russian Federation	93
Ever shared	1.00 (0.57, 1.57)	Barnaul	Russian Federation	93
Injected with used needle in past 4 weeks‡	1.70 (0.32, 8.57)	Togliatti	Russian Federation	90
Injected with used needle in past 4 weeks	0.50 (0.18, 1.50)	Moscow	Russian Federation	93
Injected with used needle in past 4 weeks	0.30 (0.02, 3.21)	Volgograd	Russian Federation	93
Injected with used needle in past 4 weeks	0.90 (0.61, 1.37)	Barnaul	Russian Federation	93
Injected with used needle in past 4 weeks**	0.80 (0.41, 1.69)	Togliatti	Russian Federation	90
Injected with used needle in past 4 weeks**	0.80 (0.35, 1.85)	Togliatti	Russian Federation	162
Injected with used needle in past 4 weeks†	4.10 (1.01, 16.60)	Togliatti	Russian Federation	90
Injected with used needle in past 6 months	2.51 (1.86, 3.37)	Tallinn	Estonia	121
Injected with used needle of a sex partner in past 4 weeks	9.60 (2.00, 47.00)	Volgograd	Russian Federation	93
Injected with used needle of a sex partner in past 4 weeks	2.40 (1.40, 4.30)	Tallinn	Estonia	161
Shared in past 4 weeks	1.10 (0.60, 2.00)	Tallinn	Estonia	161
Shared in past 4 weeks	1.54 (1.00, 2.36)	St. Petersburg	Russian Federation	164
Needle or syringe sharing with known risk				
Injected with used needle from known HIV+ person‡	0.10 (0.01, 1.35)	Togliatti	Russian Federation	90
Injected with used needle from known HIV+ person**	0.60 (0.14, 2.13)	Togliatti	Russian Federation	90
Injected with used needle from known HIV+ person†	2.30 (0.17, 30.60)	Togliatti	Russian Federation	90
Injected with used needle with known HCV+ person‡	2.60 (0.42, 16.30)	Togliatti	Russian Federation	90
Injected with used needle with known HCV+ person**	2.90 (1.45, 5.85)	Togliatti	Russian Federation	90
Injected with used needle with known HCV+ person†	1.20 (0.28, 4.85)	Togliatti	Russian Federation	90
Shared with HIV+ person in past year	3.40 (1.24, 9.30)	Vinnitsya	Ukraine	25
Primary drug injected in past 4 weeks				
Heroin (ref. Mak/Vint)	1.00 (0.56, 1.78)	Barnaul	Russian Federation	93
Heroin (ref. Mak/Vint)	1.00 (0.39, 2.38)	Moscow	Russian Federation	93
Opioid (ref. amphetamine)	3.30 (1.70, 6.40)	Tallinn	Estonia	161
Opioid (ref. amphetamine)	4.43 (2.74, 7.18)	Tallinn	Estonia	121
Number of sex partners				
Higher number of sex partners in past 6 months	2.66 (0.91, 7.79)	St. Petersburg	Russian Federation	85
Higher number of sex partners in past year	1.20 (0.56, 2.39)	Moscow	Russian Federation	93
Higher number of sex partners in past year	1.40 (0.38, 5.03)	Volgograd	Russian Federation	93
Higher number of sex partners in past year	0.71 (0.36, 1.49)	Barnaul	Russian Federation	93
Higher number of sex partners in past year	1.50 (0.90, 2.60)	Tallinn	Estonia	161
Higher number of sexual partners in past month	1.05 (0.76, 1.46)	Tashkent	Uzbekistan	138

Source: Tables C.10 and C.11.
Note: Mak is the liquid derivative of opium poppy straw, and Vint is a liquid methamphetamine. See original papers for full details of models.
CI = confidence interval; ES = estimate; HCV = hepatitis C virus; HCV+ = HCV-positive; HIV = human immunodeficiency virus; HIV+ = HIV-positive; PWID = people who inject drugs; ref. = reference.
* = new people who inject drugs (PWID) (≤3 years); ** = male people who inject drugs (PWID); †=female (non-sex workers [non-SWs]) PWID;
‡ = female sex workers (FSWs) PWID.

Figure 3.5 Adjusted Effect Estimates of Social-Structural Risk Factors among PWID

Risk factors	ES (95% CI)	Country	City	Reference
Gender				
Female	1.90 (1.20, 3.10)	Spain	3 cities	102
Female	1.35 (0.67, 2.70)	Uzbekistan	Tashkent	138
Female	1.77 (1.16, 2.69)	Ukraine	3 cities	134
Female	0.90 (0.40, 1.80)	Estonia	Tallinn	161
Female	1.55 (1.27, 1.89)	Ukraine	16 cities	26
Female*	1.70 (0.81, 3.48)	Russian Federation	Togliatti	162
Female†	1.50 (0.68, 3.47)	Russian Federation	Moscow	93
Female†	1.20 (0.73, 1.90)	Russian Federation	Volgograd	93
Female†	0.70 (0.44, 1.27)	Russian Federation	Barnaul	93
Female††	1.56 (0.90, 2.70)	Italy	Nationwide	22
Female‡	1.80 (0.45, 6.87)	Russian Federation	Moscow	93
Female‡	1.21 (0.50, 2.97)	Russian Federation	Volgograd	93
Female‡	0.50 (0.19, 1.12)	Russian Federation	Barnaul	93
Level of education				
High vs. low	0.93 (0.63, 1.35)	Uzbekistan	Tashkent	138
Higher vs. secondary	1.00 (0.47, 2.03)	Russian Federation	Moscow	93
Higher vs. secondary	1.40 (0.66, 2.83)	Russian Federation	Barnaul	93
Higher vs. secondary	2.20 (0.55, 8.63)	Russian Federation	Volgograd	93
Higher vs. secondary	0.68 (0.51, 0.91)	Ukraine	16 cities	26
Higher vs. secondary*	0.80 (0.23, 2.44)	Russian Federation	Togliatti	162
Middle vs. primary††	0.68 (0.35, 1.31)	Italy	Nationwide	22
More than 8 years education vs. less††	0.76 (0.47, 1.24)	Italy	Nationwide	61
Secondary or higher vs. primary††	0.48 (0.19, 1.20)	Italy	Nationwide	22
Vocational vs. primary††	0.42 (0.16, 1.07)	Italy	Nationwide	22
Employment status				
Main source of income other than work	2.04 (1.32, 3.14)	Estonia	Tallinn	121
Unemployed	1.42 (1.01, 1.99)	Uzbekistan	Tashkent	138
Unemployed	1.97 (1.26, 3.08)	Russian Federation	St. Petersburg	164
Unemployed (vs. full-time employed)	1.27 (1.01, 1.61)	Ukraine	16 cities	26
Unemployed††	1.86 (1.13, 3.05)	Italy	Northern	22
Unemployed††	1.85 (1.14, 3.00)	Italy	Nationwide	61
Income regularity				
Irregular	0.20 (0.05, 0.75)	Russian Federation	Volgograd	93
Irregular	0.80 (0.57, 1.05)	Russian Federation	Barnaul	93
Irregular	1.10 (0.53, 2.22)	Russian Federation	Moscow	93
Irregular	1.40 (0.80, 2.20)	Estonia	Tallinn	161
Irregular*	0.80 (0.39, 1.82)	Russian Federation	Togliatti	162
Contact with law enforcement				
Arrested ever**	0.60 (0.24, 1.39)	Russian Federation	Togliatti	90
Arrested ever†	1.90 (0.42, 8.68)	Russian Federation	Togliatti	90
Arrested ever‡	2.20 (0.21, 22.20)	Russian Federation	Togliatti	90
Arrested in past year*	1.20 (0.57, 2.43)	Russian Federation	Togliatti	162
Ever been in prison	2.60 (1.60, 4.00)	Spain	3 cities	102
Ever been in prison	2.20 (1.00, 4.65)	Russian Federation	Moscow	93
Ever been in prison	0.80 (0.56, 1.08)	Russian Federation	Barnaul	93
Ever been in prison	1.40 (0.80, 2.30)	Estonia	Tallinn	161
Ever been in prison*	1.30 (0.34, 4.70)	Russian Federation	Togliatti	162
Ever been in prison**	1.00 (0.47, 1.98)	Russian Federation	Togliatti	90
Ever been in prison†	0.50 (0.09, 2.80)	Russian Federation	Togliatti	90
Ever been in prison‡	0.50 (0.06, 3.39)	Russian Federation	Togliatti	90



Reduced association with HIV — Increased association with HIV

Note: See original papers for full details of models. CI = confidence interval; ES = estimate; HIV = human immunodeficiency virus; PWID = people who inject drugs; vs. = versus.
* = new people who inject drugs (PWID) (≤3 years); ** = male people who inject drugs (PWID); † = female (non-sex workers [non-SWs]) PWID; ‡ = female sex workers (FSWs) PWID; †† = sample does not include 100% of injectors.

not always specifying whether this was done distributively or receptively. The majority of studies suggest increased HIV risk associated with sharing needle/ syringes, though most results are inconclusive. Injecting with the used needle of a sex partner was found in Volgograd [93] and Tallinn [161] to clearly increase an individual's odds of contracting HIV. More definitively, injecting with a needle previously used by someone known to have HIV or HVC is shown in most studies to be clearly positively correlated with contracting HIV [25, 90], Daily injecting is also found to be linked to increased risk of HIV. For instance, another study in Volgograd [93], found that daily injectors have seven times the odds of contracting HIV than those who inject less frequently (95% CI 1.9–25.1). Many reviewed studies also associate longer injecting careers with greater odds of contracting HIV, a risk that increases with each additional year of injecting (data not shown) [90]. This is usually explained as a function of increased risk-exposure time.

Studies in Estonia found that primary injectors of an opiate (such as fentanyl) had between 3 and 4.5 times greater odds of contracting an HIV infection than individuals who primarily inject amphetamines [161, 165]. A study in Ukraine (Kiev, Makeevka/Donetsk, and Odessa) identified injecting a sedative/opiate mix in the past 30 days (adjusted odds ration [AOR] 1.63, 95% CI 1.13–2.35) as associated with HIV [134]. However, a study in Russia found no difference in an individual's odds of contracting HIV based on the primary drug they inject [93]. An analysis of a St. Petersburg cohort examining multivariate associations with HIV incidence found that frequency of injecting psychostimulants was the only risk factor significantly associated with HIV (reference group: none, one to two times adjusted hazard ratio 1.98, 95% CI 0.7–5.57; three or more times adjusted hazard ratio 8.15, 95% CI 2.43–27.34) following adjustment for number of sex partners and sex work in the past six months [85].

In relation to HIV and sexual risk, most multivariate analyses examined the effect of exchanging sex for drugs or money, the number of sexual partners, and unprotected vaginal or anal sex, as risk factors. Although several strong univariate associations were found, these tended not to hold in the multivariate models once adjustments were made for confounding. This could be because sample sizes were insufficient or because much sexual behavior risk is determined by other factors such as gender, socioeconomic status, or injecting behavior.

Figure 3.5 summarizes the social structural-level risk factors. Although most studies presented adjusted odds ratios identifying female gender as a risk factor for HIV, the results are generally inconclusive with confidence intervals (CIs) that straddle one. This association is likely to have indirect, rather than biological, causative roots through pathways involving multiple linked socioeconomic differences related to gender. Qualitative data from Ukraine report that female PWID are at risk of psychological, physical (including sexual), and economic violence from their partners. It is harder for them to negotiate safer sex or safer injecting practices or to access services, which elevates risk of HIV [166]. A global review on the lives of female PWID supports this research and promotes harm minimization measures and drug treatment for women including psychological services to deal with violence, while programs for men should include services around anger management, domestic abuse counseling, and partner support programs [167].

Multiple studies link HIV to the socioeconomic status of PWID, though economic status is defined through different measures, including level of education, employment (regular or not), and income (regular or not, legal or not). Of these measures only an individual's employment status showed a consistent association with HIV, with unemployed individuals or those having a main source of income other than legitimate work, showing greater odds of HIV than others [22, 26, 61, 121, 138, 164]. The effects of not having a regular source of income on the odds of being HIV-infected are unclear, appearing to have no association, or possibly a negative one. The lack of association with income may be an anomaly or unique to these settings, though it is important to note that the ways in which HIV links to wealth and poverty is shaped by social context, and in some settings—arguably in these cases—drug injecting has been diffused among those populations whose economic status may be more generally comparable to the wider local population [93]. An Estonian multilevel study included neighborhood-level data in its analyses and found that neighborhood-level effects of unemployment (10% increment in unemployment AOR 5.95, 95% CI 2.47–14.31) and habitat change since 1989 (10% change AOR 1.89, 95% CI 1.09–3.26), were both associated with HIV prevalence (results not presented) [121].

Several studies have examined contact with law enforcement agencies as a structural factor linked with the odds of being HIV infected, although the results shown have large CIs and are inconclusive. The strongest individual association between history of incarceration and HIV is seen in a study from Spain [102], with weaker results from Moscow, Russia [93]. Few studies examined the effect of arrest; however, evidence from qualitative research in the region supports relationships between policing practices, including extrajudicial ones such as police violence and increased vulnerability to HIV, and through reduced capacity for risk avoidance as a consequence of safety shortcuts and rushed injections borne out of a fear of detection or arrest [39, 43, 44, 168, 169].

The association between some structural risk factors including ethnicity and HIV were found to be context specific. A study in Tajikistan found that respondents identifying as Tajik (AOR 7.06, $p<0.001$) or other ethnicity (AOR 6.05, $p<0.001$) as opposed to Russian were at higher risk of testing HIV positive, once data were adjusted for other factors including gender [41]. A study in Uzbekistan similarly found respondents of Uzbek ethnicity to have higher odds of HIV than their Russian counterparts (AOR 1.20, 95% CI 0.80–1.80) [138]; however, a study in Estonia found that ethnic Estonians had a reduced odds of HIV compared with those of Russian or other backgrounds (AOR 0.63, 95% CI 0.28–1.25) [71]. An association between HIV among PWID who also belong to an ethnic minority that cannot otherwise be explained by needle/syringe sharing has been noted elsewhere, and linked to material as well as other social inequalities, including access to support services [170, 171]. A subsequent analysis identified ever having experienced drug treatment as a risk factor for HIV among the ethnic Tajik subset of this study (AOR 2.75, 95% CI 1.22–6.22) [163].

This association could be interpreted in a number of ways, including patients sharing contaminated needles for covert injecting while in treatment, or possibly medical staff using contaminated equipment themselves [172]. In parts of Eastern Europe where PWID are often required to register as such to obtain drug treatment or are forced to register through contact with police, this can lead to increased social marginalization as well as reducing their ability to gain employment or even to drive a car [173]. In Moscow and Tallinn ever having registered as a PWID for drug treatment was found to be associated with more than double the odds of HIV (AOR 2.4, 95% CI 1.3–4.7; AOR 2.4, 95% CI 1.5–3.8 [161]) [93]. Conversely, a study in Togliatti in Russia conducted among 96 new (<three years) injectors found that having been in drug treatment in the past was negatively associated with risk of HIV (AOR 0.4, 95% CI 0.1–1.0 [91]).

Risk Associated with HCV

Evidence from Ireland, Russia, and Serbia suggests that the odds of being HCV-positive increase with age or duration of injecting career [42, 101, 174]. Other individual risk factors for HCV positivity include daily or frequent injection [41, 169], and sharing injecting equipment [10, 25, 41, 52, 169]. Structural factors have also found to be associated with risk of HCV. Experience of imprisonment or contact with criminal justice agencies emerges as a risk factor for HCV positivity in some settings. In Georgia, and Serbia, increased risk of HCV was associated with ever having been in prison [8, 42]; in Montenegro, this risk was associated with having been detained by police in the last year [42], and in Tajikistan with ever having been arrested [41]. Risk of HCV was also higher among female PWID [41, 169].

Concluding Comment

The systematic review of epidemiological literature among PWID finds that HIV prevalence varied widely in Europe, with generally low or medium (<5%) prevalence in the West and Central Europe and high (>10%) prevalence in the East, especially in Estonia, Moldova, Russia, and Ukraine. We found evidence for a number of structural factors associated with HIV, including gender, contact with criminal justice systems, and socioeconomic position.

Sex Workers

In many parts of the world, HIV prevalence has been documented to be higher among SWs than non-sex working populations. This pattern also occurs among male and transgender SWs. Women account for an increasingly disproportionate number of HIV infections globally [1]. Of particular concern are dramatic increases in HIV among young women, who now make up over 60%

of 15- to 24-year-olds living with HIV. Globally, young women are 1.6 times more likely to be living with HIV than young men. In Europe the majority of people living with HIV (PLHIV) are men, but this pattern is changing with an increasing number of cases among women, mostly in the East [1]. Factors known to increase SWs' vulnerabilities to HIV infection are a lack of protective policies and legislation, limited information, and lack of access to services, as well as lifestyle factors [2]. With this mind, we examine here the extent and risk of HIV among SWs across Europe within a broader sexual health framework that encompasses vulnerability as it also relates to stigma, mental health, sexual health, violence and drug use.

Demographic Characteristics

The European Network for HIV/STI Prevention and Health Promotion among Migrant Sex Workers (TAMPEP) estimates that 87% of SWs in the European Union (EU) member states are women, 7% are male, and 6% are transgender. The distribution of sex work in this part of the region varies: Austria, Denmark, Estonia, Finland, and Lithuania report almost exclusively female sex workers (FSWs); while countries in the West, such as Belgium, France, Greece, Italy, and Luxembourg, report more transgender sex workers [3].

Across the region women working in the sex industry are predominantly between 20- and 30-years-old. The range of midpoint ages was wider in the West than in Central Europe and the East, suggesting a slightly younger population in those regions. The mean or median age of SWs in studies in Catalonia [8], Israel [9–10], London [4–6], and Milan [7], range between 20 and 30 years. Data from the East suggest that street-based FSWs are younger with a midpoint age ranging between 21 and 27 years [11–15]. The only exception was Armenia where the population was older at 33.7 years. In Central Europe, the average age of SWs ranges between 22 and 28 years [16–18]. There is some evidence to suggest that age varies among subpopulations of SWs. In the Netherlands, nondrug-using FSWs and transgender SWs were younger than their drug-using counterparts (median age = 30 versus 37 years) [19]. In Athens and London migrant women from Eastern Europe and the former Soviet Union were younger than their Greek or United Kingdom-born counterparts [4, 20]. However, migrant street SWs in Barcelona were older than nonmigrants with a median age of 38.5 years [21]. For male sex workers (MSWs), midpoint ages ranged between 22 and 30 years. All demographic and risk behaviors are summarized in tables C.19 and C.20.

Risk Profile

Drug Use

Evidence shows that drug misuse and particularly injecting drug use occurs more frequently among street-working women than off-street SWs across the region, with managers of off-street establishments less tolerant of drug use [6, 22–26] (case study 3.2).

Studies in Western Europe suggested a decline in injecting among street-working women with the increasing number of migrant women in the sex

Case Study 3.2 Sex Work and Drug Use

In the United Kingdom, SWs who misuse drugs are at increased risk of violence, unsafe sexual practices, pregnancy terminations, and problems with the police [38, 39]. In terms of broader sexual health indicators, international evidence shows drug dependence as the key factor influencing street-SWs' decisions to continue selling sex during pregnancy and postnatally [40], as well as adverse health outcomes on pregnancy and the fetus [41].

Data from five cross-sectional studies of SWs and PWID in three Russian cities (Barnaul, Moscow, and Volgograd) collected during 2003 and 2004 (n = 280) indicated that SWs who inject drugs may lead a more "chaotic" or "transitional" lifestyle: they are younger, less likely to have completed secondary education, and more likely to live in temporary accommodations. They engaged in higher levels of sexual risk. They report having fewer clients for vaginal or anal sex per month but are less likely to use condoms consistently with clients. They report significantly more nonpaying casual sex partners in the last year and more nonpaying sex partners who also inject drugs, suggestive of sex being exchanged for drugs or as a means to obtain drugs and not simply for economic gain, arguably pointing to a less professional approach to sex work.

Comparison of Demographic Characteristics and Sexual Risk Behaviors between IDU and Non-IDU SWs in the Russian Federation

	Sex workers				
	Non injecting drug users		*Injecting drug users*		
Characteristic	*n*	*% or mean (SD)*	*n*	*% or mean (SD)*	*p value*
Total	89/280	31.8	191/280	68.2	
Completed secondary education	31/81	38	41/189	22	<0.01
Live in temporary accommodations	6/89	7	57/191	30	<0.001
Inconsistent use of condoms with clients in last month	16/82	20	28/76	38	0.02
Age (years)	—	24.2 (6.3)	—	22.7 (4.6)	0.03
Number of clients per month	—	65.6 (70.2)	—	45.0 (47.8)	0.01
Number of nonpaying sex partners per year	—	4.6 (16.2)	—	7.9 (16.5)	0.12
Number of casual sex partners in last year	—	0.5 (1.1)	—	3.0 (7.8)	<0.01
Number of IDU sex partners in the last year	—	0.2 (0.7)	—	2.1 (5.8)	<0.01

Note: IDU = injecting drug user; n = sample size; % = percentage; *p* = probability value; SD = standard deviation; SW = sex worker; — = not available.

industry [7, 21, 27–29]. Some drug use is reported among migrant SWs: in the Netherlands, 18% of FSWs, including some migrant women, working in a range of street and off-street locations reported using drugs in the last six months and had a history of injecting [19]. In London, some injecting drug use was reported among off-street SWs including migrants (between 4% and 11% had ever injected) but little current injecting was reported (1%) [4, 30]. Limited data were available on drug use among SWs in Central Europe. One study specifically targeting young 15- to 24-year-olds suggested a highly vulnerable population; almost one-quarter of the sample had ever injected [31], and another study in the Czech Republic suggested that 10% of FSWs and 38% of MSWs had a history of injecting drug use [18]. Studies of street FSWs in Eastern Europe suggest a closer link between sex work and injecting drug use, but levels of injecting vary at a city level. A high prevalence is reported in Vinnitsa in Ukraine (71%) [32] and 97% in St. Petersburg [33], while prevalence is lower in Samara and Saratov (between 7% and 14%) [34] and around 6% in Estonia and Georgia [35, 36]. Overall an average of 15% of FSWs had injected in the last 30 days across multiple cities in Ukraine [24]. Studies of PWID, particularly in Russia, show consistently high levels of sex work among female PWID ranging between 24% and 50% [13, 14]. Estimates from Central Asian republics suggest that 62% of female drug users in the Kyrgyz Republic (n = 73) and 89% in Azerbaijan (n = 150) also engage in sex work [37].

Violence

There is a growing body of international evidence demonstrating the association between risk of HIV and experience of violence among SWs [42–46]. Experience of violence has similarities with HIV in that it is concentrated among marginalized, vulnerable populations [45]. The interplay of violence and HIV among SWs has direct pathways, such as forced unprotected sex, as well as indirect pathways, such as reducing self-esteem and the ability to negotiate safer practices for fear of further violence, increasing drug use, or forced relocation of sex work to less familiar or safe areas [46–49].

Data from Europe show that levels of sexual and physical violence among SWs were universally high, particularly among minority groups such as Roma populations and transvestites [47, 50]. Qualitative data from Western Europe suggest that violence among SWs is ubiquitous and compounded by drug use and the stigma associated with sex work [25, 26, 51]. Violence was the most frequently reported risk associated with work by respondents of the TAMPEP study who reported violence from clients, robberies, and verbal abuse from the police. In London, one-third of SWs (n = 268) had experienced some form of physical or sexual violence from clients in the last 12 months [4].

In Central Europe and the East, higher levels of violence are reported than in the West. In Ekaterinburg, Moscow, Samara, and Saratov in Russia between 20% and 76% of street SWs reported an incidence of sexual violence in the last 12 months [11, 15, 52]. In Armenia, 30% of street SWs reported a lifetime experience of forced sex from clients [53], and 54% had experienced violence from clients in Moldova [11]. In Croatia, between 30% and 52% of FSWs reported incidents of physical abuse in the last 12 months [54], and in Kosovo 16% of street and off-street SWs reported being forced to have sex in the last 12 months [17]. Younger SWs may be more vulnerable to violence: in Romania 46% of a sample of FSWs (aged 16- to 24-year-olds) had been forced to have sex in the last 12 months [31]. In Moscow, 28% of MSWs had ever experienced violence from clients [55]. Qualitative data from Central and Eastern Europe and Central Asian republics suggested that physical violence from the police was ubiquitous among male and transgender SWs, and in some countries (Bulgaria, the Kyrgyz Republic, Lithuania, FYR Macedonia, Russia, and Ukraine) police were cited as the main threat to personal safety [56]. Qualitative interviews among female Roma and transvestite SWs from Serbia highlight the practice by police of using violence and threats of violence to discourage women from engaging in sex work and extorting money. This "moral enforcement" forces women to work in unfamiliar locations to avoid police harassment as well as working longer hours [50] and hurrying to negotiate with a client and thus reducing the time available to assess the potential risks [56].

Mental Health and Stigma

Research has shown the link between violence, fear of violence and psychological stress associated with sex work [23, 57]. Some research has focused on how the stigmatized nature of working in the sex industry affects women's mental health. Evidence shows how stigma can cause women to be socially isolated, prevents them talking openly and honestly about their work, and limits the opportunities to talk to peers, particularly for street workers and migrant women [26, 58]. Fear of exposure as a SW to friends and family and concerns about losing children prevents women from talking to authorities and social services, thus limiting opportunities for psychological and emotional support [25, 26]. In Central Europe and the East, police threaten to expose SWs as a method to exert control and extort money [25, 26]. Some studies have found that psychological and emotional risks were of greater significance than safety risks as women feel less able to control the former [59], and while the risk of violence ends after work, the psychological impact continues [60].

Drug-using SWs are doubly stigmatized and any mental health issues may be compounded by neglect of basic health needs such as diet and adequate sleep, as well as lack of permanent accommodations and increased vulnerability to violence [25, 26]. In some countries of the former Soviet Union, registration as a drug user provides sufficient grounds for authorities to remove newborn babies and children from female PWID [37]. Qualitative studies in Ireland showed how drug use helped women manage the stress associated with sex work, but at the same time made them more prone to violence or sexual risk behaviors. These studies highlighted the frequency of mental health issues (depression and suicide attempts) among street-working women [61, 62]. A study in Switzerland suggested that mental health problems (defined as a range of disorders) were associated with the working location and migrant status of SWs [63].

HIV Prevalence

HIV prevalence among SWs in Western Europe is generally low, with prevalence of 1% or less consistently reported across the subregion [4, 9, 20, 21, 27, 28, 64–69]. Prevalence was higher among a sample of SWs in Portugal, Spain and the

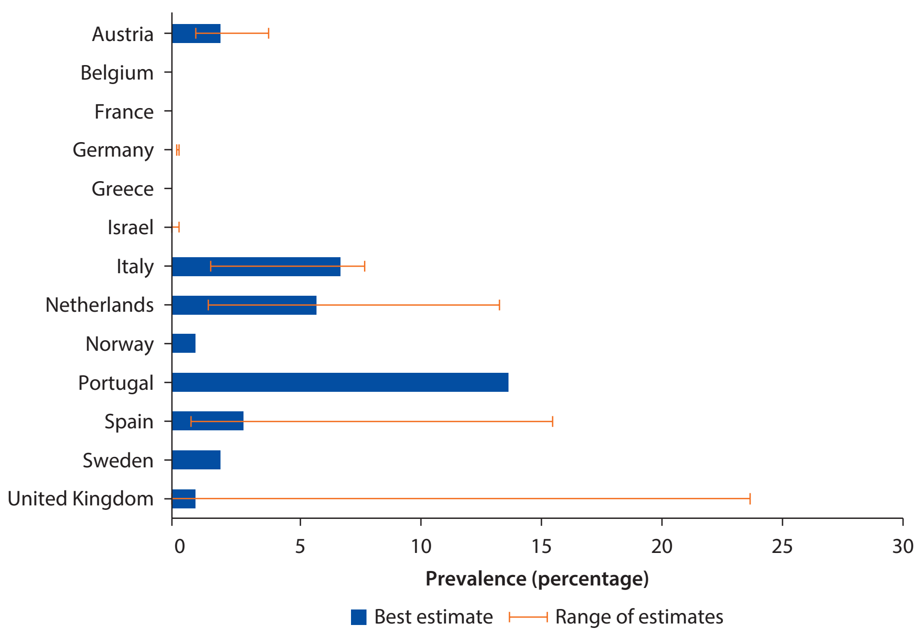
Netherlands (figure 3.6) where higher prevalence of injecting drug use was recorded; in Italy and Spain, this prevalence was found among migrant street and transgender SWs [19, 65, 70–71].

Prevalence of HIV is low in countries in Central Europe at less than 1% in Albania, Bosnia and Herzegovina, Bulgaria, the Czech Republic, Kosovo, Romania, and Serbia (figure 3.7) [17, 18, 64, 68, 72–74]. No cases were reported in a sample in Hungary [64]. Prevalence was 2% in Croatia and Poland, and between 0% and 1.8% in FYR Macedonia, though these studies involved small sample sizes [68, 75, 76].

HIV prevalence among SWs in countries in Eastern Europe is consistently higher than in the Western region (figure 3.8). HIV prevalence ranged between 2.5% and 8% in Azerbaijan (Baku) [33, 77], 7.6% in Estonia (Tallinn) [36], and 4.6% in Moldova (Chisinau) [33]. A lower prevalence of less than 2% was reported in Armenia and Georgia [68, 78], and 0% in Belarus and Lithuania [68, 79]. A higher prevalence of 6.4% was reported in 2009 in Minsk (Belarus), where 15.5% of the sample reported injecting [80]. In both Russia and Ukraine, prevalence varied by city, ranging from 2% to 60% in Russia and between 0% in Chernitz, Kharkov, and Uzhgorod, and 42% in Donetsk, Ukraine, (see figure 3.8 below) suggesting outbreaks remain contained at a city level. In Ukraine, prevalence ranged from 13% to 20% [24, 81, 82].

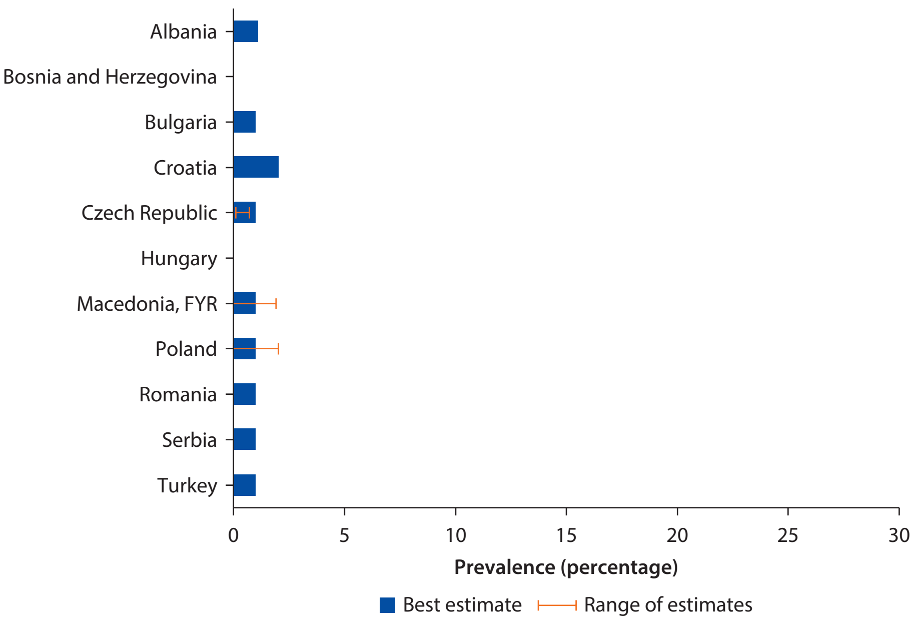
Map 3.2 presents the best estimates of HIV prevalence among FSWs from each country. The HIV epidemic among FSWs is characterized as a low-level

Figure 3.6 Best Estimates of HIV Prevalence among FSWs in Western Europe



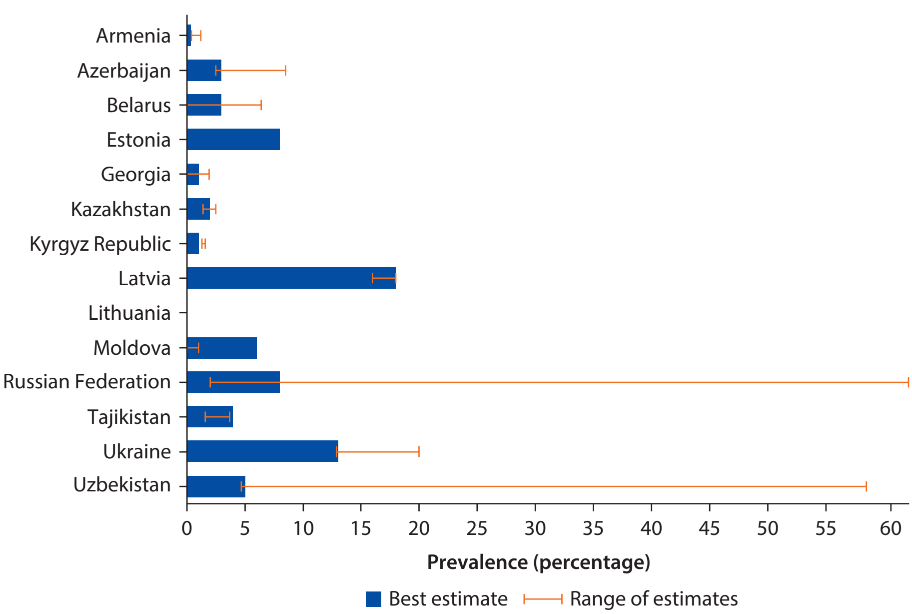
Source: Table C.12.
Note: Some ranges included SWs who inject and transgender people; FSW = female sex worker; HIV = human immunodeficiency virus; SW = sex worker.

Figure 3.7 Estimates of HIV Prevalence among FSWs in Central Europe



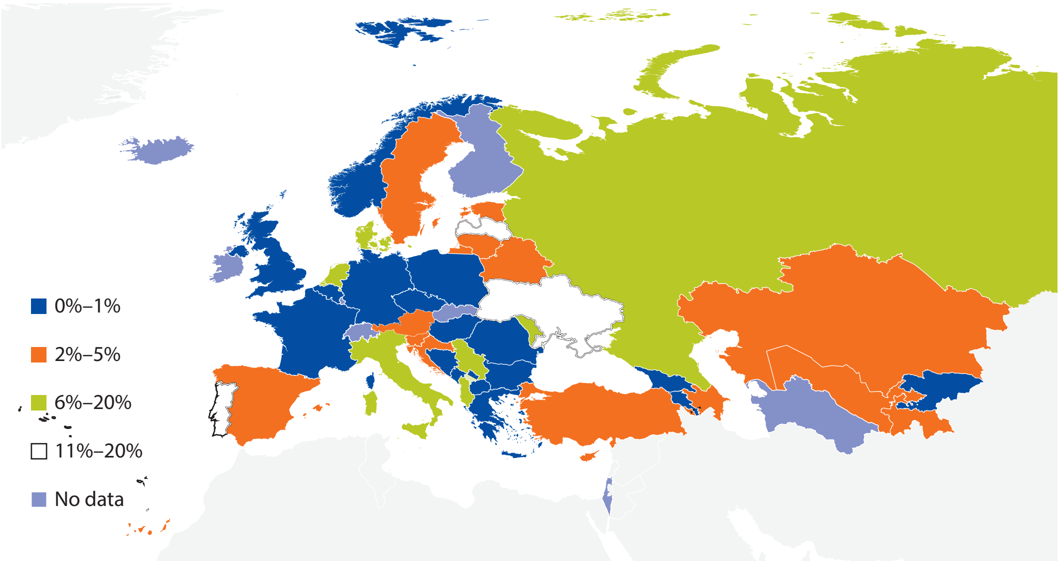
Source: Table C.13.
Note: Some ranges included SWs who inject. FSW = female sex worker; HIV = human immunodeficiency virus; SW = sex worker.

Figure 3.8 Best Estimates of HIV Prevalence among FSWs in Eastern Europe



Source: Table C.14.
Note: Some ranges included SWs who inject. FSW = female sex worker; HIV = human immunodeficiency virus; SW = sex worker.

Map 3.2 Best Estimates of HIV Prevalence among FSWs across Europe



Source: Tables C.12–C.15.
Note: FSW = female sex worker; HIV = human immunodeficiency virus.

epidemic in the majority of countries in the West and Central Europe, with the exception of Spain, which has a medium-level epidemic and Portugal and Italy, which are characterized as high. The majority of countries in the East are characterized by high-level epidemics, with the exception of the Central Asian republics, which have a medium-level epidemic. This study is explored in more detail in case study 3.3.

HIV and Injecting Drug Use

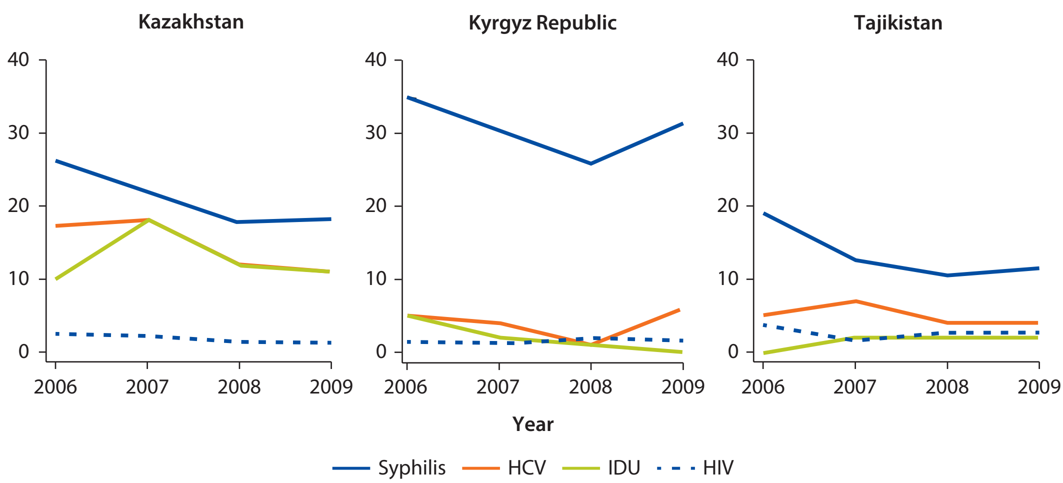
There is a clear relationship between HIV and injecting drug use across the region (figure 3.9). Where prevalence of injecting drug use is higher, so is HIV. In the Netherlands, HIV prevalence was reported to be 5.7% overall and higher among transgender SWs (18.8%) and FSWs with a history of drug use (13.6%) [19]. In Spain and the United Kingdom small samples of SWs suggested a far higher HIV prevalence of 15% [27] in London, HIV prevalence was 4% and 24% among heroin or crack users respectively [83], and in Portugal the prevalence was 13.5% compared to people who did not inject drugs [5]. The same patterns occur in the East, with the exception of Azerbaijan (Baku), Estonia (Tallinn), and Moldova (Chisinau) which have high HIV rates (2.5–8%) despite relatively lower levels of injecting drug use (<10) [33, 36, 77].

Studies conducted in the Netherlands, Ukraine, the United Kingdom, and Uzbekistan,[1] examining risk factors for HIV among SWs, show more evidence of increased risk of HIV associated with injecting drug use [19, 84–86]. Among FSWs currently injecting drugs, risk of HIV is higher among those reporting

Case Study 3.3 Central Asian Republics

Serial cross-sectional studies conducted in Kazakhstan, the Kyrgyz Republic, and Tajikistan between 2006 and 2009 [68, 88] suggest that prevalence of HIV remains consistently low at less than 3% in all three countries, but marginally higher in Tajikistan. The proportion of sex workers (SWs) reporting injecting drug use is higher in Kazakhstan than the other two countries. In Tajikistan the trajectory of hepatitis C virus (HCV) reflects levels of injecting drug use in the population. In all countries, prevalence of syphilis is higher than HIV, with some evidence of a decline in prevalence between 2006 and 2008 and then a sharp increase in 2009; this is particularly marked in the Kyrgyz Republic. Evidence suggests prevalence of HIV is higher in Uzbekistan at 4.7% among samples of SWs recruited across multiple sites between 2005 and 2007 [89]; 6% among female and male SWs in Samarkand [85]; and in Tashkent HIV prevalence was 10% overall among female sex workers but significantly higher among those with experience of injecting (58%) compared to those without (5.2%) [84].

Repeated Prevalence of HIV, Syphilis, HCV, and Injecting Drug Use 2006–09



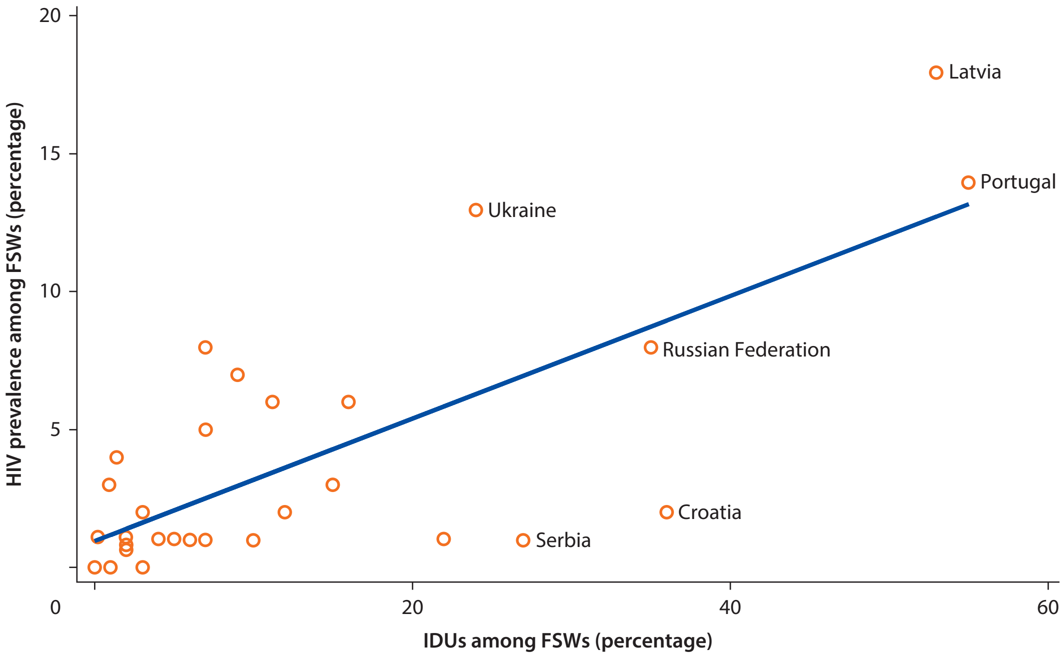
Source: Ongoeva [88], Regional AIDS Centre, the Kyrgyz Republic.
Note: HCV = hepatitis C virus; HIV = human immunodeficiency virus; IDU = injecting drug user.

specifically selling sex for drugs and injecting daily [87], and among those injecting home-made drugs in Russia (figure 3.10) [13]. In Ukraine, having a sex partner who also injects drugs was associated with increased risk of HIV [24].

HIV among Male and Transgender SWs

In Western Europe, prevalence of HIV is higher among male and transgender SWs than FSWs, even where injecting is lower. This reflects the higher prevalence of HIV among men who have sex with men (MSM), the main client group of MSWs [19, 90–91]. HIV prevalence is low in the Czech Republic despite

Figure 3.9 The Relationship between HIV and Injecting Drug Use among FSWs



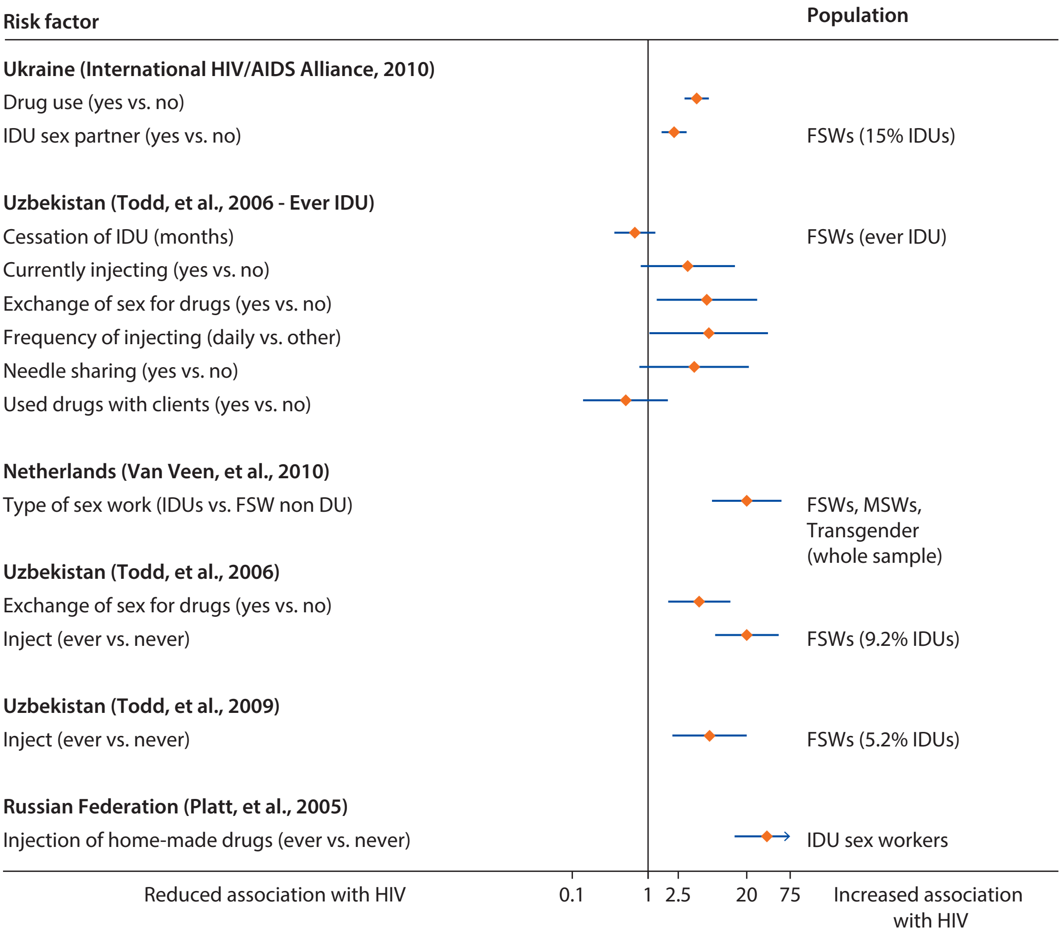
Source: Tables C.12–C.14.
Note: FSW = female sex worker; HIV = human immunodeficiency virus; IDU = injecting drug user.

higher levels of injecting drug use [18, 86]. Figure 3.11 summarizes HIV prevalence estimates among male and transgender SWs along with estimates of injecting drug use. Multivariate analysis of risk factors associated with HIV among a diverse group of SWs (including male, transgender, female drug users, and nondrug users) in the Netherlands suggested that the odds of contracting HIV were significantly higher among female injecting drug user (IDU) and transgender SWs compared to nondrug users. This was adjusted by years in sex work and whether or not anal techniques (defined as insertive or receptive anal sex) were practiced with clients [19]. In Spain an analysis that adjusted for age suggested that the risk of contracting HIV was no higher among transvestite or transgender MSWs than it was among a sample of MSWs [92].

Incidence of HIV and Chlamydia

A study of MSWs in London suggested that there were 49 incident cases of HIV over 1,309 person years or 3.7 cases per 100 person years [86]. The only significant risk factor associated with seroconversion was if the MSW first attended the clinic between 1994 and 1996, compared to men who attended between 1997 and 1999 or between 2000 and 2003. In Belgium, the incidence of chlamydia was 98 episodes in 1,347 person years or an incidence rate of 7.3 cases per 100 person years. Baseline prevalence of chlamydia was higher than general population samples in Belgium, the Netherlands, and the United Kingdom [93].

Figure 3.10 Adjusted Effect Estimates of HIV with Injecting Risk Behaviors among SWs



Note: DU = drug user; FSW = female sex worker; HIV = human immunodeficiency virus; IDU = injecting drug user; MSW = male sex worker; SW = sex worker.

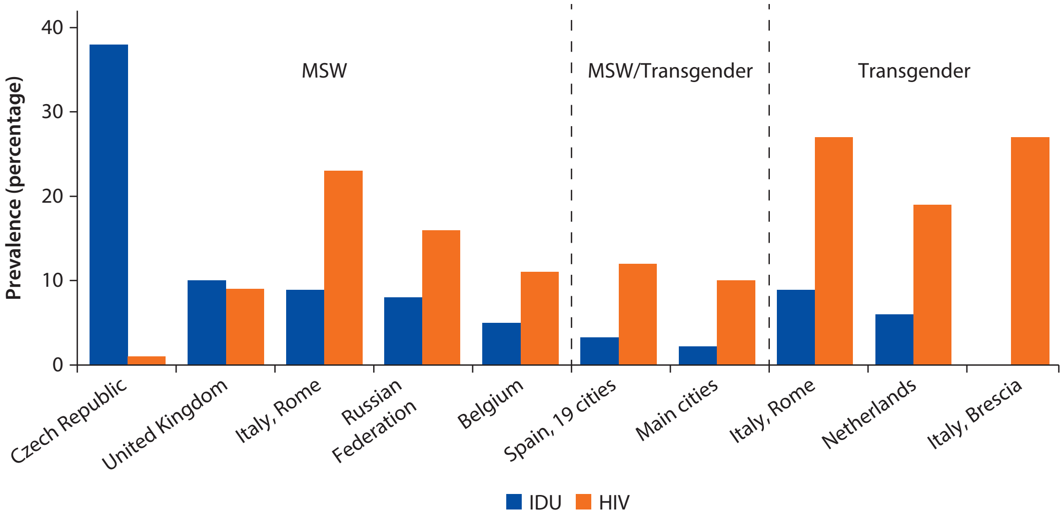
HIV and Syphilis

Studies in Spain and Italy show a high prevalence of HIV and syphilis among transgender SWs from South America; the prevalence of syphilis is also notably higher in Spain than Italy (figure 3.12) [65, 90]. Prevalence of HIV was comparable among MSWs in Belgium and the United Kingdom, and, but syphilis was far higher among MSWs in London, potentially as a result of increased oral sex transmission that had been documented since 2000 [86, 94, 95].

Structural Factors Linked to HIV and STIs

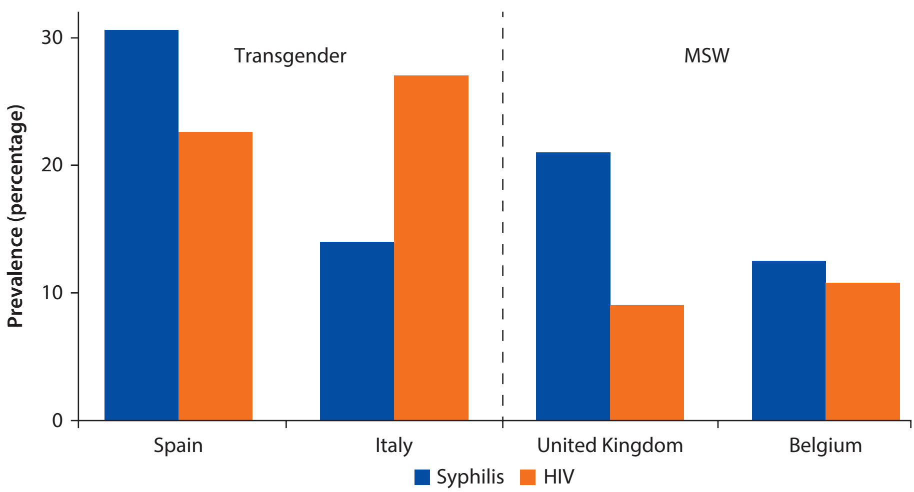
It is clear that while injecting drug use is the main risk factor associated with HIV among FSWs, other structural factors are important in mediating risk of HIV and sexually transmitted infections (STIs) and vulnerability among SWs. We examine studies that used multivariate analyses since these adjust for confounding factors to explore the association between risk factors and HIV.

Figure 3.11 Prevalence of HIV and Drug Use among Male and Transgender SWs



Source: Table C.15.
Note: HIV = human immunodeficiency virus; IDU = injecting drug user; MSW = male sex worker; SW = sex worker.

Figure 3.12 Prevalence of HIV and Syphilis among Male and Transgender SWs

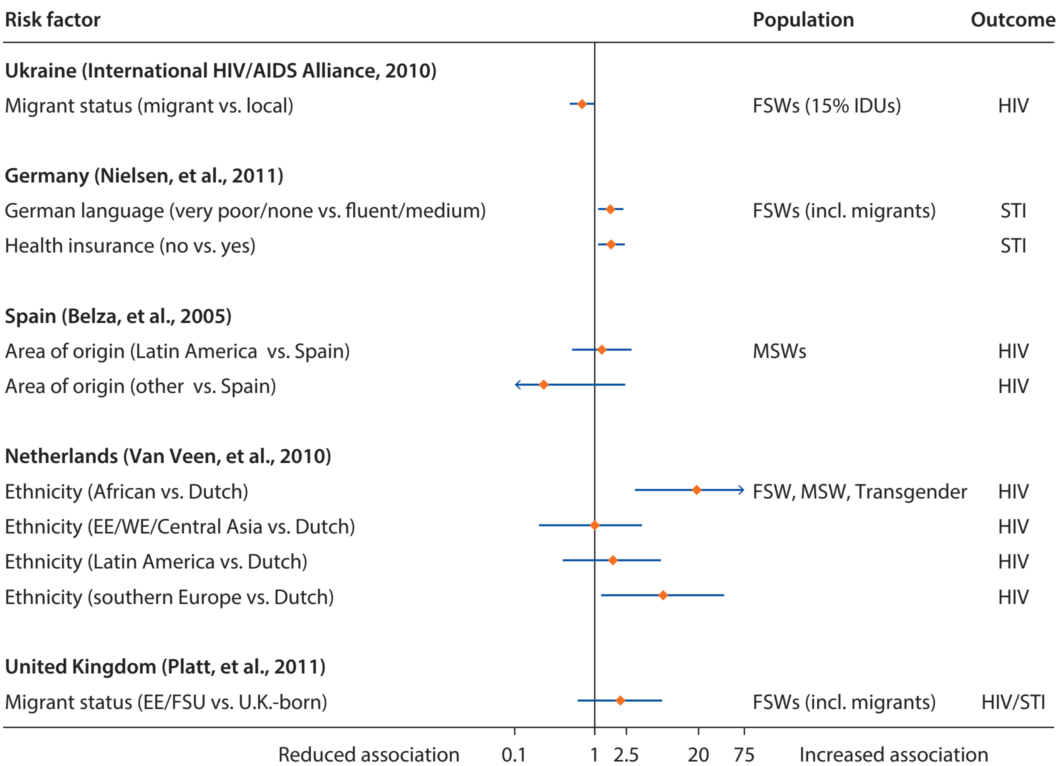


Source: Table C.16.
Note: HIV = human immunodeficiency virus; MSW = male sex worker; SW = sex worker.

Nationality/Migration

Among studies reporting prevalence data only, some evidence showed a higher HIV prevalence among SWs in Spain, which reflected a higher prevalence among migrant SWs from Sub-Saharan African countries and Ecuador [65]. A higher prevalence was found among migrant SWs from a street-based sample in Palermo and Rome [71, 91]. No data on country of origin or injecting drug use

Figure 3.13 Adjusted Effect Estimates of HIV/STI Associated with Migration among SWs



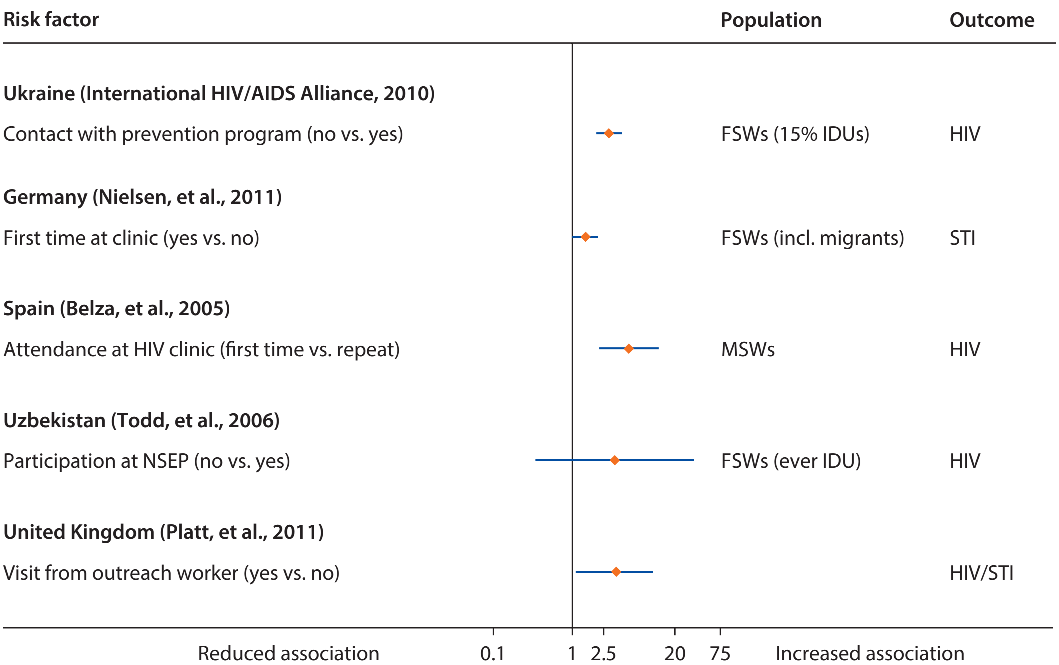
Note: EE = Eastern Europe; FSU = former Soviet Union; FSW = female sex worker; HIV = human immunodeficiency virus; IDU = injecting drug user; incl. = including; MSW = male sex worker; STI = sexually transmitted infection; SW = sex worker; WE = Western Europe.

were reported in the latter two studies. Studies that analyzed associations between migration and HIV adjusting for confounders suggested that risk of HIV among migrants varied depending on background prevalence of HIV/STIs in the country of origin [13, 19, 24, 28, 65, 92] (figure 3.13). Other factors relating to migration were important risk factors for HIV including language skills of migrants and access to health insurance [19, 69].

Health Service Provision

The majority of studies showed that using a health service reduced risk of HIV (figure 3.14). The only exception is in Uzbekistan where the relationship between using needle and syringe exchange programs and HIV risk was unclear [84]. In London, FSWs with no contact with an outreach worker at their place of work had higher odds of being infected with HIV/STIs [4]. This effect was maintained even after adjusting for screening at an STI clinic in the last six months, suggesting that outreach services play an important role in reducing HIV/STIs on top of the advantages provided by fixed-site services.

Figure 3.14 Adjusted Effect Estimates of HIV/STI Associated with Attending Health Services



Note: FSWs = female sex workers; HIV = human immunodeficiency virus; IDU = injecting drug user; MSWs = male sex workers; NSEP = needle syringe exchange program; STI = sexually transmitted infection.

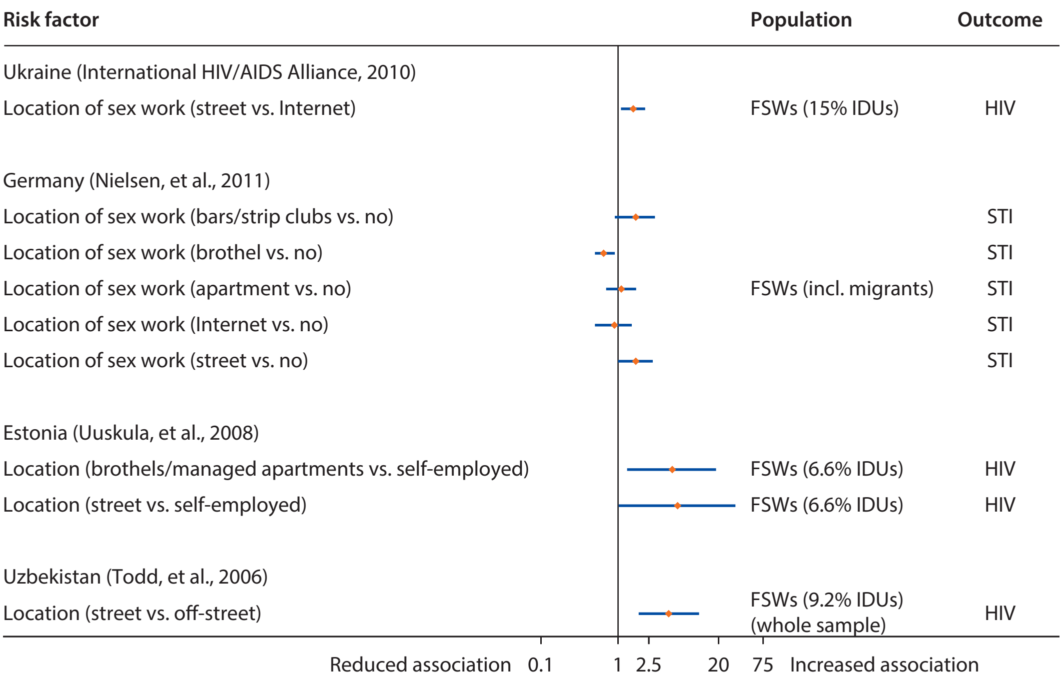
Location of Sex Work

TAMPEP estimates that just under two-thirds of SWs work off-street in the 25 EU member countries in which they operate. They note a shift away from street-work to off-street work since 2003 [3], caused by an increase in the number of migrants as well as policy changes in some countries that criminalize clients and SWs and specifically target street SWs. Changes in technology such as the increased use of the Internet and mobile phones to advertise services have also facilitated off-street work [3, 24]. Street-based sex work is more commonly reported across countries of the FSU as well as the Central Asian republics; it is characterized by involvement of criminal gangs, police, and a close overlap with IDUs [11, 13–14, 52, 88, 96, 97]. Risk-factor analyses suggest that risk of HIV or STIs were higher among SWs working on the street in Estonia (Tallinn), Germany, Ukraine, and Uzbekistan (Tashkent) (figure 3.15) [36, 69, 84].

Sexual Vulnerability

While HIV prevalence remains low among FSWs who do not inject drugs, it is also harder to transmit HIV sexually than other STIs, specifically gonorrhea, chlamydia, and syphilis [98, 99]. Below we examine the prevalence of syphilis, gonorrhea, and chlamydia to examine the extent of sexual vulnerability among SWs.

Figure 3.15 Adjusted Effect Estimates of HIV/STI Associated with Location of Sex Work



Note: FSWs = female sex workers, HIV = human immunodeficiency virus; IDU = injecting drug user; incl. = including; STI = sexually transmitted infection.

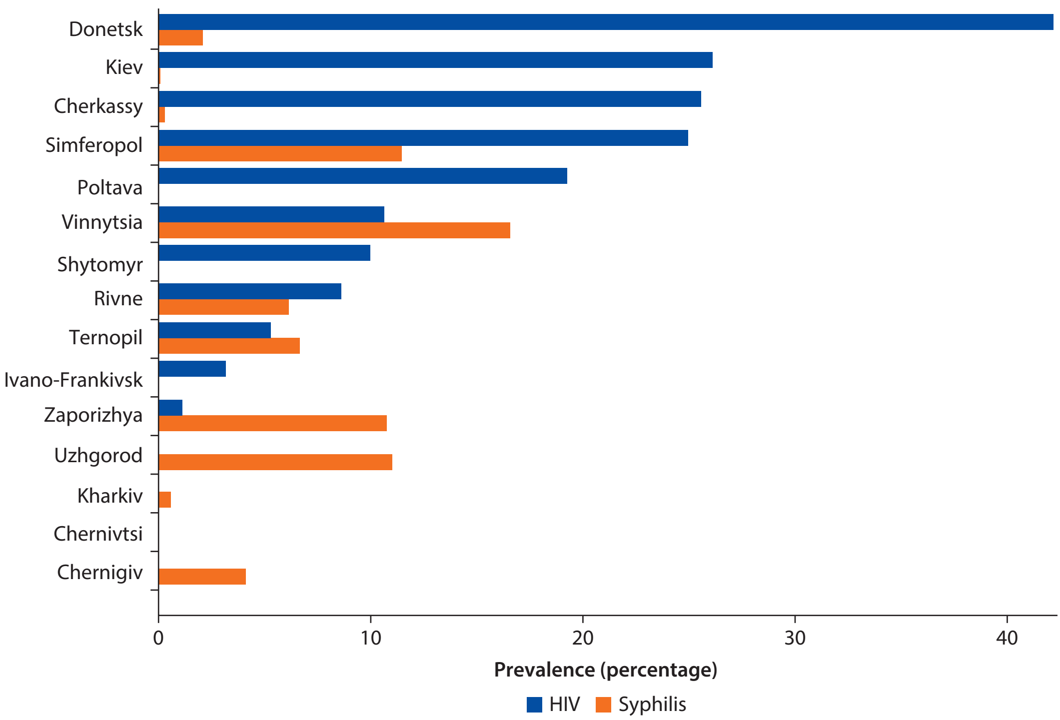
Past and Current Infection with Syphilis

Prevalence of syphilis is highest among samples of FSWs in the East. Across the region, prevalence of syphilis is higher than HIV with the exception of Ukraine, although this varied considerably at a city level (see figure 3.16). In 2001, a high prevalence of syphilis was found among a group of migrant street-SWs in Italy (12%); these cases were among migrants from Eastern European countries (countries not specified), and infection was attributed to infections contracted in their countries of origin [100]. In Greece no cases of HIV were found among off-street SWs in Athens, but a high prevalence of syphilis was observed (18%) [20]. Among this sample, 20% were migrants from Eastern Europe but prevalence did not differ by country of origin. In Russia and Moldova the data suggest a concurrent epidemic of syphilis and HIV occurring among samples of SWs; all the study samples included SWs who inject drugs [11, 14]. Figure 3.17 summarizes selected studies that measured both prevalence of syphilis and HIV among FSWs in Europe. All studies report prevalence of antibodies to Treponema Pallidum and detect current and past infection with syphilis.

Chlamydia and Gonorrhea

Across countries in Western Europe, prevalence of chlamydia remains low at under 7% among FSWs (figure 3.18). Two older studies in Italy suggested a

Figure 3.16 Prevalence of HIV and Syphilis among FSWs in Ukraine



Source: International HIV/AIDS Alliance; behavioral monitoring and HIV infection prevalence among FSWs as a component of second generation surveillance. 2009, International HIV/AIDS Alliance: Kiev.
Note: FSW = female sex worker; HIV = human immunodeficiency virus.

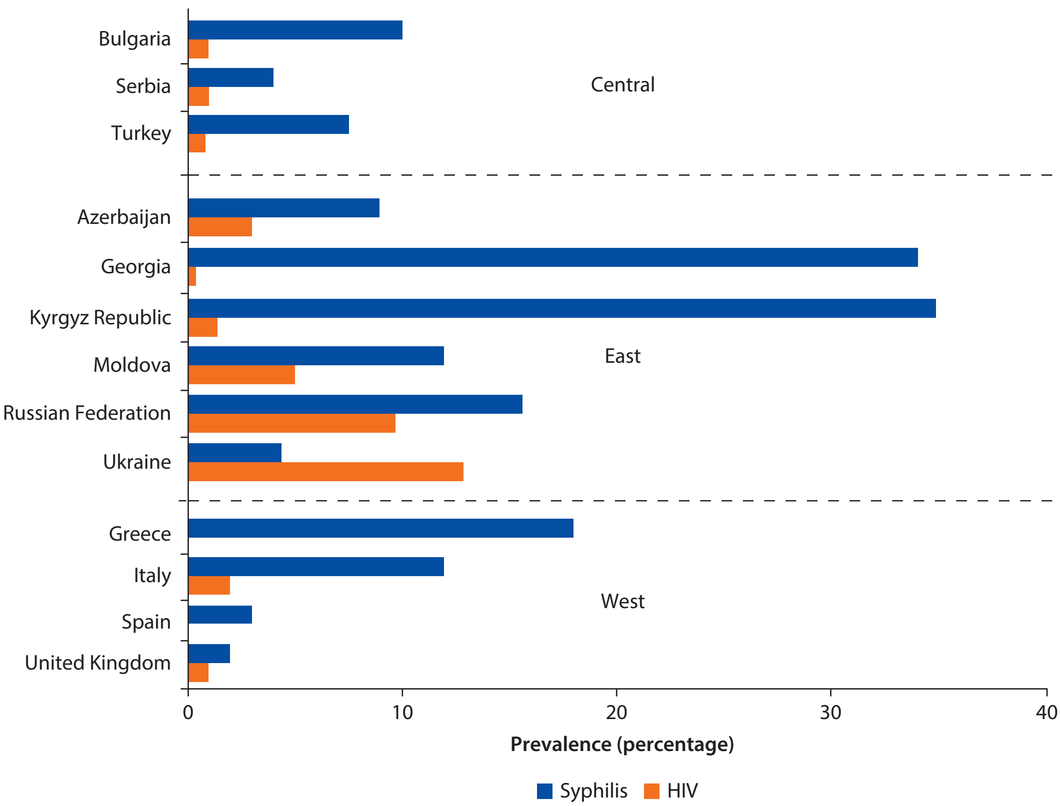
prevalence of 14% of chlamydia among migrant SWs [29, 100] and a high prevalence (45%) among off-street and street-working SWs in three cities in Kosovo, a sample that was recruited from STI clinics [17]. Prevalence of gonorrhea is reported at 5% or less across the region, with the exception of Georgia, where a higher prevalence of 12% and 18% were reported among samples of street and off-street SWs and a prevalence of just over 20% of chlamydia [35, 101]. Prevalence of gonorrhea is between 10 and 100 times higher than in general population samples [102].

The high prevalence of STIs relative to the general population suggests that SWs remain sexually vulnerable.

Sexual Risk Behaviors

A few studies showed increased risk related to sexual risk behaviors during sex work. In Spain, risk of chlamydia and gonorrhea was higher among SWs having unprotected sex with clients [28], and risks of a single or coinfection with gonorrhea, chlamydia, or active syphilis were higher among those reporting more than 30 clients a week and not regularly using a condom for vaginal intercourse [66]. A study in Estonia suggested, counterintuitively, that consistent condom use was

Figure 3.17 Prevalence of HIV and Syphilis among FSWs across Multiple Sites in Europe



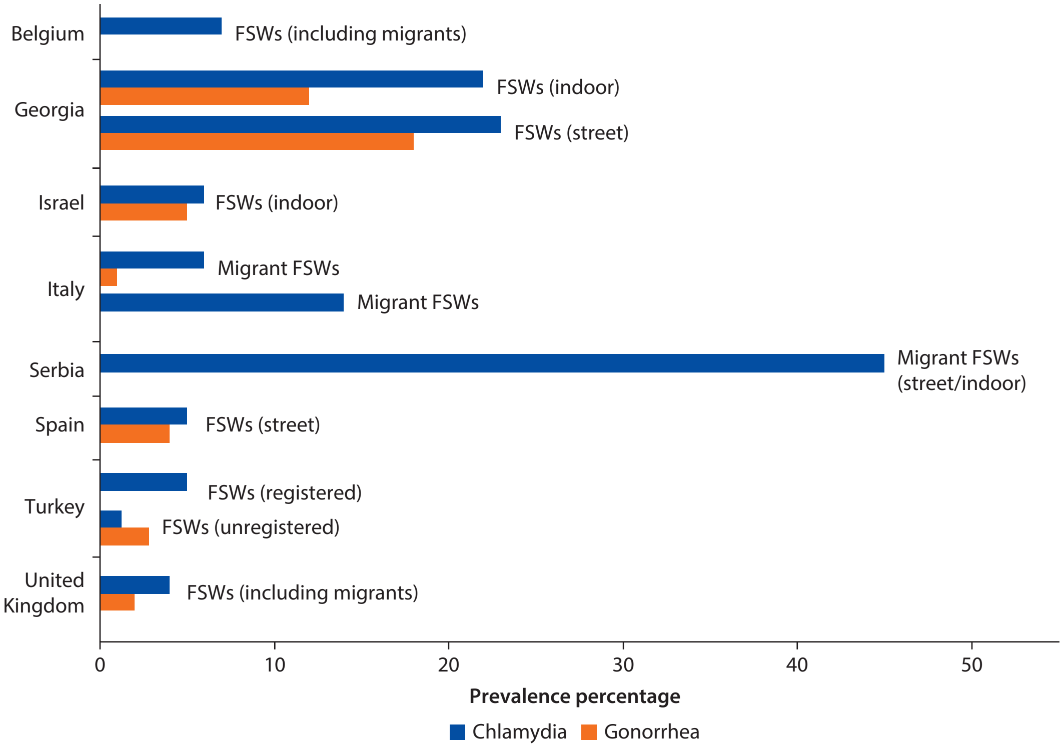
Sources: Tables C.16 and C.17.
Note: FSW = female sex worker; HIV = human immunodeficiency virus.

associated with increased odds of HIV, most likely as a result of misclassification or underreporting or as a result of women made aware of their HIV status, modifying their behavior to use condoms more frequently. Figure 3.19 summarizes data for eight countries, including different types of FSW populations.

Condom Use with Clients

Behavioral data from our systematic review suggested regional differences in condom use with clients: use was consistently higher among samples of SWs in Western Europe (<17% reported inconsistent condom use with clients) compared to those in the East (0%–78% inconsistent use) and the Central European countries (ranging between 5% and 38% inconsistent condom use). Evidence suggests the interplay between drug use and sex work in condom use: SWs who use drugs are less likely to use condoms than noninjecting SWs, and IDUs who sell sex are less likely to use condoms than their non-sex-working counterparts [13, 25]. In the West, lower levels of condom use with clients were reported among samples of SWs who used drugs in London and the Netherlands, as well

Figure 3.18 Prevalence of Chlamydia and Gonorrhea among FSWs in Europe



Source: Table C.18.
Note: FSWs = female sex workers.

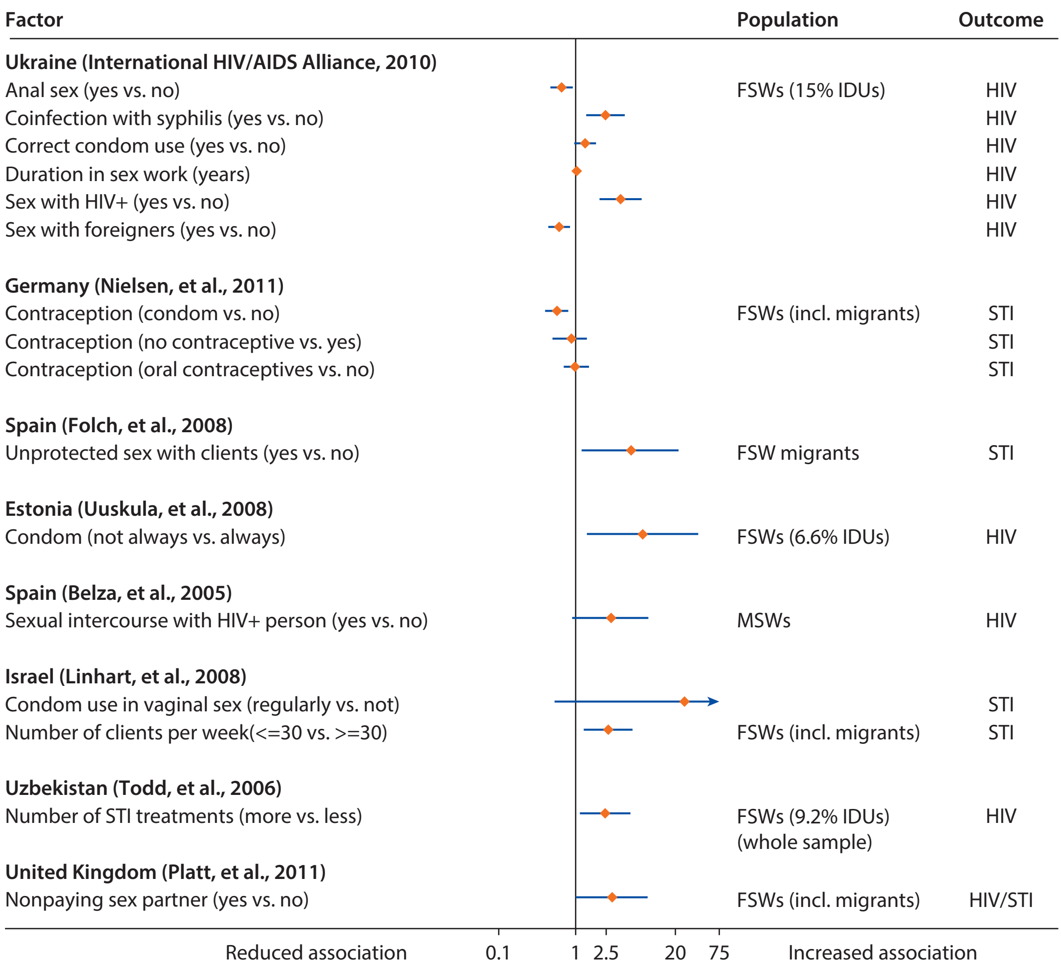
among transgender SWs [6, 19, 25]. Differences in condom use by gender were observed in a study of migrant SWs in Rome: male and transgender SWs were less likely to report condom use with clients than females [91]. However, condom use among MSWs with clients is high, with inconsistent condom use reported by <25% in the Netherlands [19] and Italy [90, 91].

Reasons for not using condoms were generally economically motivated, but pressure from clients was also reported in both Central and Eastern European countries as well as from qualitative data from studies in Ireland and the United Kingdom [61, 103]. Concerns about condom breakages are also a factor as illustrated by a study from the Netherlands [19]. Data suggest that condom breakage can occur in up to 5% of use and is associated with incorrect application [104, 105]. Policing practices such as the confiscation of condoms as evidence of sex work was reported as a disincentive for carrying condoms, therefore limiting opportunities for their use [50, 56].

Condom Use with Nonpaying Sex Partners

Across all the countries, condom use with nonpaying partners was less common than with clients. Qualitative data have shown how condoms are used as barriers

Figure 3.19 Adjusted Effect Estimates of HIV/STI Associated with Sexual Health



Note: FSW = female sex worker; HIV = human immunodeficiency virus; HIV+ = HIV-positive; IDU = injecting drug user; incl. = including; MSWs = male sex workers; STI = sexually transmitted infection.

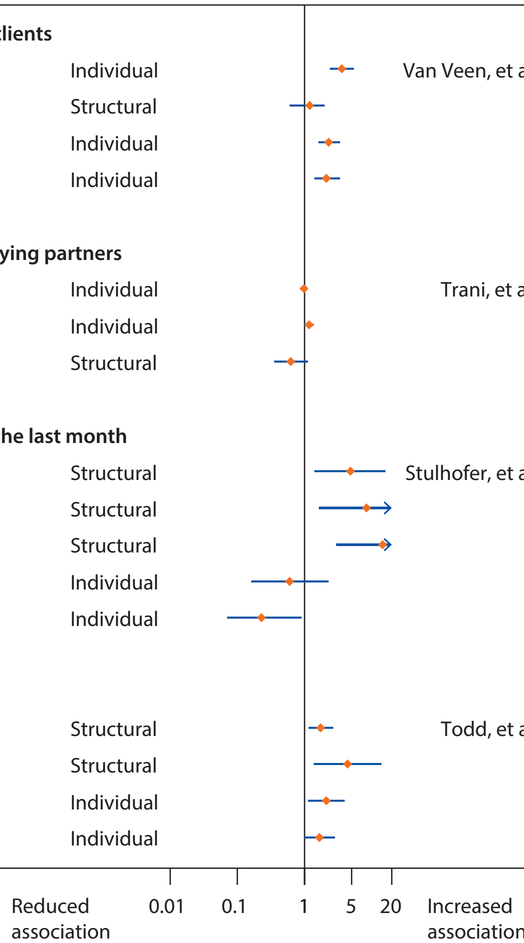
to STIs and also as a barrier to intimacy, with women opting not to use condoms with boyfriends and nonpaying partner in order to clearly demarcate sex for work and sex in their personal lives [59]. Condom use for anal sex was the norm among MSWs in London for commercial sex, but 37% reported not using condoms for anal sex with regular partners (table C.19) [86].

Risk Factors Associated with Unprotected Sexual Intercourse

We identified four studies that examined risk factors associated with unprotected sexual intercourse measured by consistency or inconsistency of condom use (figure 3.20) [7, 19, 54, 106]. Inconsistent condom use was associated with lower education, not being tested for HIV, more clients and nonpaying partners [7, 54]. Drug users were less likely to use condoms in the Netherlands as well as people

Figure 3.20 Adjusted Effect Estimates of Condom Use among SWs in Europe

Risk factor	Risk	Reference
The Netherlands: inconsistent condom use with clients		
Type of sex work (FSW, non-DU vs. DU)	Individual	Van Veen, et al., 2010
Type of sex work (FSW, non-DU vs. transgender	Structural	
Condom failure (never vs. regularly)	Individual	
Anal sex techniques with clients (no vs. yes)	Individual	
Italy: routine condom use with clients and nonpaying partners		
Number of clients and non-paying partners	Individual	Trani, et al., 2005
Age at first intercourse	Individual	
Years of education	Structural	
Croatia: inconsistent condom use with clients in the last month		
Education (secondary/college vs. primary or less)	Structural	Stulhofer, et al., 2009
Tested for HIV (yes vs. no)	Structural	
City (Zagreb vs. Split)	Structural	
HIV risk self assessment (no/low vs. moderate)	Individual	
HIV risk self assessment (no/low vs. high)	Individual	
Uzbekistan: consistent condom use with clients		
Married (yes vs. no)	Structural	Todd, et al., 2007
Origin (South CA vs. other)	Structural	
Know condom prevents HIV (yes vs. no)	Individual	
Sharing drugs with clients (yes vs. no)	Individual	



Note: FSW = female sex worker; HIV = human immunodeficiency virus; SWs = sex workers.

experiencing regular condom failure or practicing anal sex techniques with clients (receptive or insertive sex) [19]. More consistent condom use was associated with being married or a migrant and among those who considered themselves at higher risk of HIV infection [54, 106]. Greater knowledge of HIV transmission routes was associated with more consistent condom use as was not sharing drugs with clients [106].

Concluding Comment

The systematic review demonstrates that HIV remains low among FSWs who do not inject drugs, (<1%) but high among FSWs who inject drugs (>10%) and male and transgender SWs. Structural risk factors associated with HIV among SWs included lack of contact with outreach and HIV/STI services, working on the street, and originating from a country with a high HIV prevalence. SWs remain sexually vulnerable as the high prevalence of gonorrhea demonstrates, and they remain highly vulnerable to physical and sexual violence from clients, nonpaying partners, and police.

Men Who Have Sex with Men

MSM are primarily at risk of HIV infection through unprotected anal intercourse (UAI). The estimated per-contact risk of acquiring HIV through receptive UAI with a known HIV-positive partner is 1-in-70 sexual contacts for a receptive partner (with ejaculation) and 1-in-909 for the insertive partner [1]. The risk of transmission for oral sex is low: one study determined it to be 0 [2], while another calculated it to be 1-in-2,500 [3].

Demographic Characteristics

Below we describe the characteristics of the men sampled by the studies reviewed (see tables C.24–C.26). Because many studies were undertaken in relatively high-prevalence settings including cities with noted “gay communities”, and with recruitment often undertaken in gay venues or health care settings, survey findings may not be generalizable beyond such settings. This may mean that younger men, and those more socially and maybe sexually active, are overrepresented, whereas men who are not as engaged in their communities may be underrepresented.

Age

In the West, the median age of MSM participating in studies was between 28 and 33 years. In Central Europe, the median age is slightly lower, between 25 and 30 years, with mean age ranging between 26 and 29. In Eastern Europe the age range was very similar to Central Europe’s, with medians ranging from 24 (in the Kyrgyz Republic) to 30 (in Estonia), and the mean age around 28 years [a little more than 10 years younger than the mean age of respondents in the West].

Education

In the West, respondents tended to be highly educated; between 38% and 58% had university degrees or higher levels of education, with a minority (9%–21%) reporting no qualifications. In Central Europe, a lower proportion of MSM had degrees ranging between 27% and 39% and in Hungary the mean number of years spent in education was 15.3. In Turkey, although 58% reported having a degree, 5% had no qualifications, and 11% reported finishing only primary school indicating considerable educational heterogeneity in the levels achieved by respondents. In the East, between 51% and 56% completed post-secondary education, which could include more academic or vocational training. Between 5% and 17% reported only that they had not completed a secondary education.

Occupation and Income

In the West, studies from Spain and the United Kingdom suggest that between 73% and 84% of MSMs are employed and between 5% and 20% of respondents are students. Unemployment ranged from 5% to 18% in some studies. Only one study (Hungary) in the review reported similar levels of employment in Central Europe: 61% in "white collar" jobs and; 16% in "blue collar" jobs; 50% of the respondents were students, at least part time. In the East the story varies a little more. Studies from Estonia and Russia indicate high levels of employment, 66% of the respondents in Estonia reporting an annual salary of over US$750. Central Asia reports lower median incomes: US$324 in Kazakhstan and US$114 in the Kyrgyz Republic, with 8%–13% having no income at all and 4%–18% having no certain occupation. This may reflect national-level employment patterns rather than characteristics of the MSM community itself.

Nationality or Ethnicity

The majority of MSM samples included in the systematic review originated from the country in which the research took place, with a small proportion of migrants sampled. In Spain between 20% and 24% of respondents were migrants, principally from Latin America (9%–12%) and other parts of Europe (4%–7%) [4–6]; the exception to this was a study that recruited from sex-worker apartments in Valencia, where nearly 80% of respondents were Latin American [7]. Swiss studies recruited a small proportion of migrants (16%–17%) from other European countries [8, 9]. Dutch and British studies recruited a smaller proportion of migrants (17%–13% and 4%–15%, respectively), and 10% were reported in Israel. However, some of the Dutch studies were limited to respondents who could speak and write in Dutch [10–17]. Few studies in Central Europe examined the country of origin of respondents. A study in Turkey, for instance, included 7% migrants [18]. In the East, migrants tended to originate from other countries in that region. One study in Estonia recruited 21% ethnic Russians and 8% of other origins [19]. Similarly, a Georgian study found that 17% of respondents were nonnationals, including 4% ethnic Armenians, 4% ethnic Russians and 9% from elsewhere. A study of MSWs in Moscow reported 38% of respondents not originating from Russia [20].

Risk Practices

Drug and Alcohol Use

Alcohol and drug use are frequently reported among MSM in the review. This may in part reflect bias associated with recruiting participants in gay venues where alcohol and drugs are available. The papers described here highlight recreational use, though detailed information on amount or frequency of use was lacking. In the West, alcohol use is most common with only 1 in every 10 men abstaining from alcohol [15]. In the past 12 months in Spain, 64% of respondents reported drinking alcohol before or during sex, compared to 54% of respondents in Italy [6, 21]. Amylnitrate or "Poppers" are the next most common drug: during the same time period in Spain, 41% of respondents took amylnitrate either before or during sex [6]. From 2012 to 2014 in the United Kingdom, 80% of respondents also took the drug in past two years. Poppers are favored by MSM since they have a side effect of relaxing the anal sphincter muscle, thereby facilitating anal sex [15]. While the Spanish and Italian studies show other drugs being used at relatively low levels (<20%), studies from the United Kingdom (2012–13) show high levels of Ecstasy use (44%–67%), cocaine (46%–59%), ketamine (3%–55%), Viagra (33%–53%), speed (18%–25%) and GHB (17%–25%), as well as lesser amounts of other drugs [15].

Several studies in Central Europe address alcohol and drug use among respondents. As it is in the West, alcohol is most popular in Central Europe, where 47%–85% of respondents reported drinking alcohol before or during sex in the past six months [17, 21]. A study in Hungary and Russia reported that 96% of respondents had used alcohol in the past month (not disaggregated by country) [22]. Proportionally fewer (42%) respondents in Albania drank daily [23]. Poppers were also common in Albania, where 21%–70% of respondents reported using them recently [17, 21]. Cannabis use was reported by 24% of respondents in Israel, in comparison to 10%–20% in most other countries. Other drugs used were similar to those reported in Western Europe.

In the East, alcohol use was again high, with 86%–96% having used it in the past month [22, 24], and between 4% and 8% reporting daily drinking [19, 22, 24, 25], In Georgia 89% of respondents reported using marijuana and 22% used buprenorphine; however, drug use was not explored further.

Buying and Selling Sex

Few data were found in the studies from Western Europe on frequency of sex work; however a study from Catalonia, Spain, found that 4.1% of respondents had charged for sex [6]. Another Spanish study in Valencia included participants from "prostitution apartments"; although no information was provided on the frequency of this practice, respondents recruited from these apartments tended to be younger, migrants, and more likely to have had an HIV test than the reference group recruited from saunas [4].

A study from Tirana, Albania, reported that 74% of respondents had anal intercourse (AI) with a commercial partner in the previous six months, although the proportions buying and selling were not clear [23]. In Croatia, 5% reported ever having sold sex [26]. In Israel, 11% reported having paid for sex [17]. Sex work was more common among the respondents in the Turkish samples, with 44% having sold sex, both as insertive and receptive partner, with more than one partner; 37% reported taking the receptive role only and 16% the insertive [18]. Three studies in Eastern Europe addressed the question of commercial sex: 21% reported having sold sex in the past year; 16% had paid for sex in the past 12 months in Russia; and 21% of respondents sold sex in Ukraine in the past 6 months [22, 24].

A man's relationship with sex work may change over time, with younger cohorts trading sex with older, richer cohorts. A qualitative study suggests that receiving payment in kind, such as drinks, rent, accommodations or presents from their partners is common among Balkan MSM [27]. This study also found that where sex is usually transactional, partner change-rates tend to be higher, a tendency which also correlates inversely with age across Bulgaria, Kosovo, FYR Macedonia, and Romania. It was noted that in a commercial encounter between men, it is the buyer who will dictate the terms of the sexual contact including type of sex act; who takes the insertive or receptive role, and condom use. Other studies confirm that decisions on condom use are made by clients in Georgia, and Russia [28, 29].

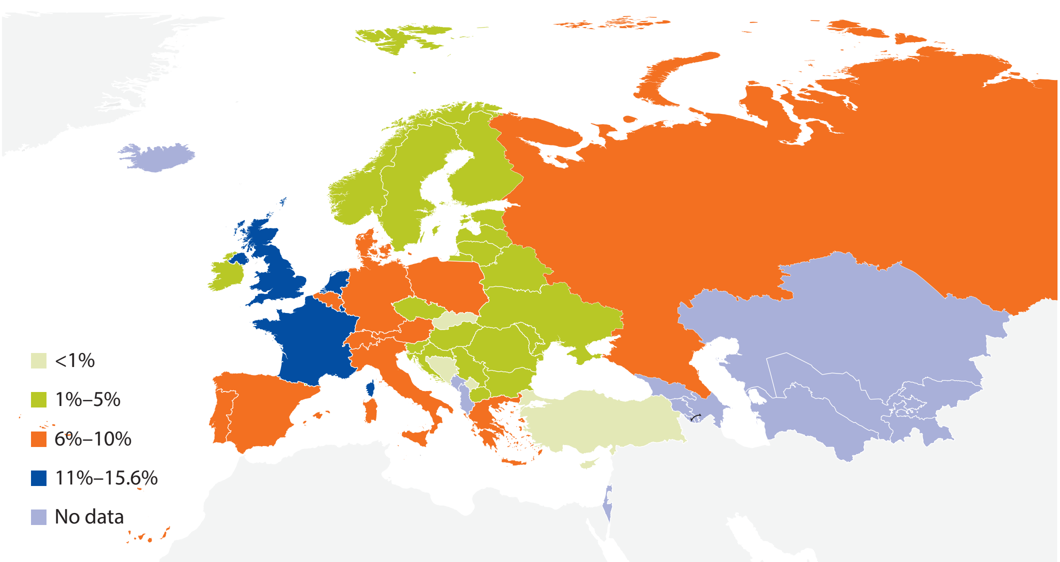
Prevalence and Incidence of HIV and STIs among MSM

We identified HIV prevalence data measured using biological samples in 33 countries and through self-report in 38 countries (see map 3.3, figures 3.21–3.24). Comparisons should be interpreted with caution because of the range of recruitment methods and settings as well as limitations associated with self-reported data. It should be noted that while gay venues generally refer to places that cater predominantly to self-identifying gay and bisexual men, these may be context specific and vary considerably across countries and even within cities.

Self-Reported Diagnosed HIV Prevalence

Self-reported HIV prevalence collected in 38 countries through the European Men Who Have Sex With Men Internet Survey (EMIS) varied from below 1%

Map 3.3 Self-Reported HIV Prevalence among MSM in Europe, European MSM Internet Survey



Source: Reference [30].
Note: HIV = human immunodeficiency virus; MSM = men who have sex with men.

in Bosnia and Herzegovina to over 15% in the Netherlands (map 3.3) [30]. Absolute sample sizes ranged from 123 in Malta and FYR Macedonia to over 55,000 in Germany. This translated to a response rate of 0.28 per 10,000 total population in Turkey to 6.82 per 10,000 total population in Germany. For the sake of accuracy and consistency, self-reported HIV prevalence estimates have been excluded from the results presented here.

HIV Prevalence and Incidence Studies Using Biological Samples among MSM

Our systematic review identified 65 sources containing HIV prevalence or incidence data among MSM in Europe, of which 55 were unique. Twenty-two papers were in Western Europe, with 19 reporting prevalence [103, 105–106, 275, 278, 283, 285, 297–308] and 3 reporting HIV incidence [11, 12, 31]; 14 papers were in Central Europe [18, 23, 32–43] and 14 were in Eastern Europe [20, 44–56], as well as 2 regional [57, 58] and 3 multicounty sources [21, 22, 59].

Evidence suggests that HIV incidence was 1.3 per 100 person years among a cohort in Amsterdam recruited between 1995 and 2002, with little increase from those recruited prior to 1995 (1.1 per 100 person years). However, significant increases in the incidence of syphilis (0–1.4 per 100 person years) and gonorrhea (1.1–6.0 per 100 person years) were recorded [11]. Another study in Amsterdam reported Increased incidence among MSM attending an STI clinic between 1999 and 2005; the estimated incidence was 3.8 per 100 person years and associated with older men (≥35 years) [12]. In Rome a retrospective cohort study of men recruited at an STI clinic showed incident rate to be 5.0 per 100 person years between 2000 and 2003 and a significant increase in HIV cumulative incidence in comparison with the period 1984–1995 (incidence rate ratio 2.20, P<0.001) [31].

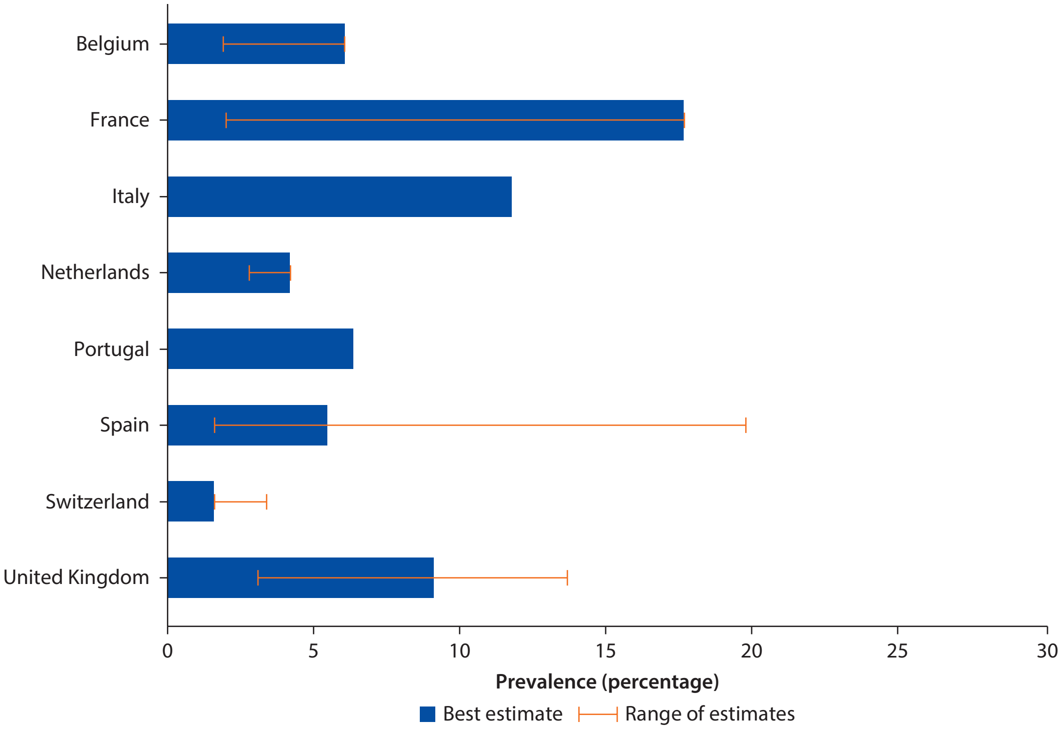
HIV prevalence among MSM in Europe varies from below 1% in Bosnia and Herzegovina [33] and Kazakhstan [50] up to nearly 20% in France [60]. In some countries, such as France, the Netherlands, and Switzerland, the self-reported HIV prevalence exceeds the prevalence estimated through biological testing. However, in other countries, for example, Spain and the United Kingdom, the multiple samples produce comparable results. These differences may reflect the different characteristics of the populations sampled.

Estimates of HIV Prevalence among MSM

With a wide variety of estimates from a wide range of biobehavioral studies of variable quality, it is challenging to draw conclusions about the state of the epidemic among MSM in Europe. To allow for better comparison of HIV prevalence across the region we selected the best estimates available to us for comparison. These are presented in figures 3.21–3.23, alongside the range of estimates reported where more than one estimate was identified.

In the West, eight countries had HIV prevalence s from biobehavioral surveys (figure 3.21). Prevalence among MSM was generally highest among countries in this subregion with recent estimates ranging from as low as 1.6% in a sauna-based sample in Valencia, Spain [4], and anonymous voluntary counseling and

Figure 3.21 Best Estimates of HIV Prevalence among MSM in Western Europe



Source: Table C.21.
Note: HIV = human immunodeficiency virus; MSM = men who have sex with men.

testing (VCT) clinics in Switzerland [9], up to nearly 20% in several community studies from Barcelona and Catalonia [21, 61].

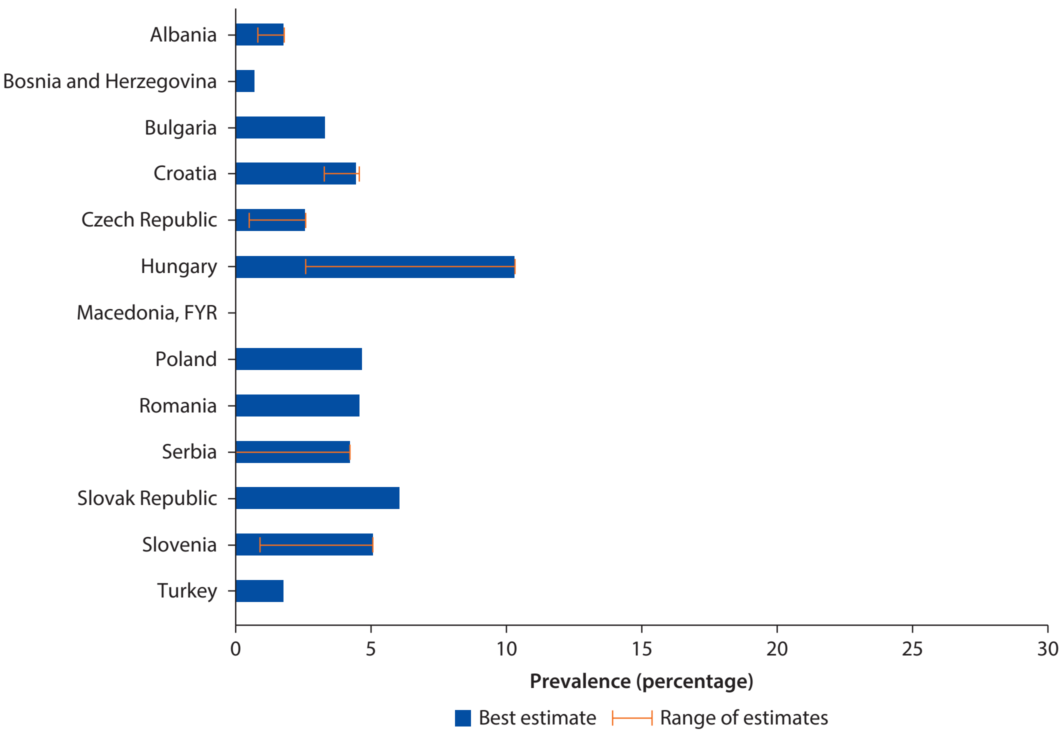
Thirteen countries in Central Europe have HIV prevalence estimates for MSM from biobehavioral surveys (figure 3.22). The prevalence among MSM in this subregion was lower than in the West. There were no cases of HIV among small community samples in Pristina in Kosovo [62], and FYR Macedonia [39]. Prevalence was over 5% among community samples in the capitals of Serbia [41], the Slovak Republic, and Slovenia [21]. Samples from Budapest, Hungary, showed varied prevalence estimates of 10.4% [22] and 2.6% [38].

Twelve countries in Eastern Europe have estimates for HIV prevalence among MSM from biobehavioral surveys (figure 3.23). Prevalence varied from 0.2% in community studies in Kazakhstan [59] and 0% in gay venues in Tomsk, in Russia [58] to 10% and over in a community-based study in Krivoy Rog and Nikolayev and as high as 30% in Kiev, in Ukraine [63].

Prevalence of STI Infections and HVC among MSM

STI infection among respondents is drawn from both biological data and self-reports of recent and older infections. Self-reported results may suffer from some

Figure 3.22 Best Estimates of HIV Prevalence among MSM in Central Europe

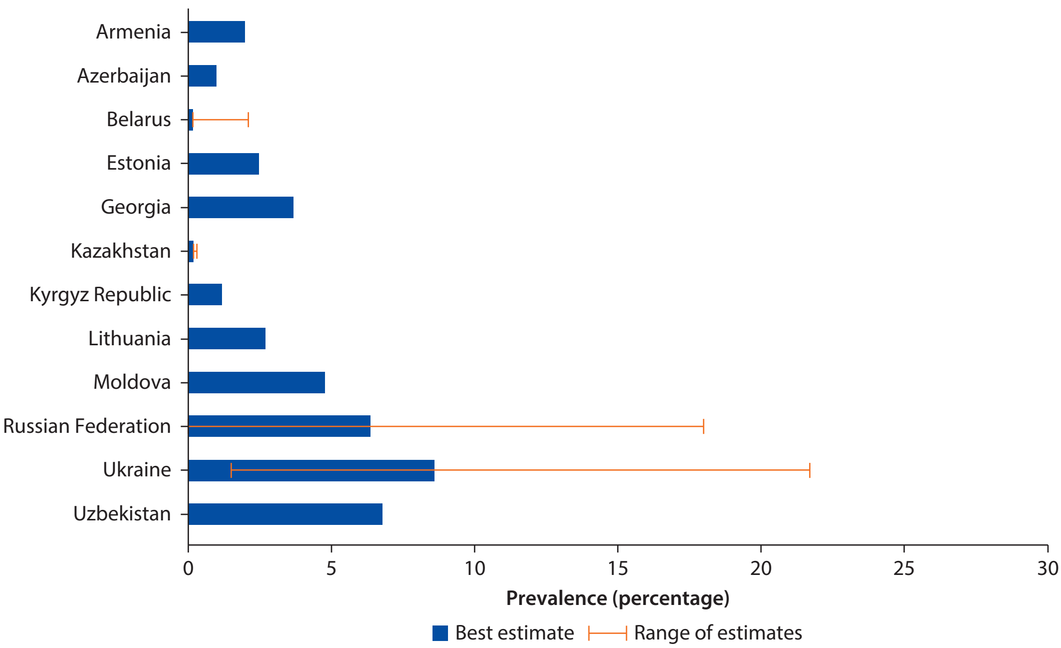


Source: Table C.22
Note: HIV = human immunodeficiency virus; MSM = men who have sex with men.

level of recall bias, with some participants remembering details of their infections more accurately than others, which may or may not be related to their HIV serostatus. Certain STIs can increase an individual's susceptibility to HIV transmission, and high levels of STIs in a population can indicate higher levels of sexual risk (including lower condom use) [64].

A study in Valencia, Spain, found syphilis prevalence to be 4% [4], while in Catalonia a study drawn from self-reported data suggested prevalence of syphilis was 3.3%, gonorrhea was 4.8%, and chlamydia was 2.5% (see figure 3.24) [6]. A study in the United Kingdom comparing newly diagnosed HIV cases to controls (newly diagnosed HIV negative) found a high prevalence of coinfection among HIV cases. Coinfection with gonorrhea was 27% among the cases and 9% in the controls, syphilis was far higher with 7% in the cases and 1% in the controls; chlamydia was lower in the cases (10%) than in the controls (19%) [15]. A study in Croatia found the prevalence of chlamydia was 9%, syphilis 10.6%, gonorrhea 13.2%, and HCV 3% [35]. A study in Albania found the prevalence of syphilis was 2.6% and HCV 3.5% [23]. In Turkey a study found prevalence of syphilis was 10.8%, gonorrhea 3%, and chlamydia 1.8% [18]. In the East, in Azerbaijan, HCV was 14% and syphilis 8%, although the study methods were

Figure 3.23 Best Estimates of HIV Prevalence among MSM in Eastern Europe



Source: Table C.23
Note: HIV = human immunodeficiency virus; MSM = men who have sex with men.

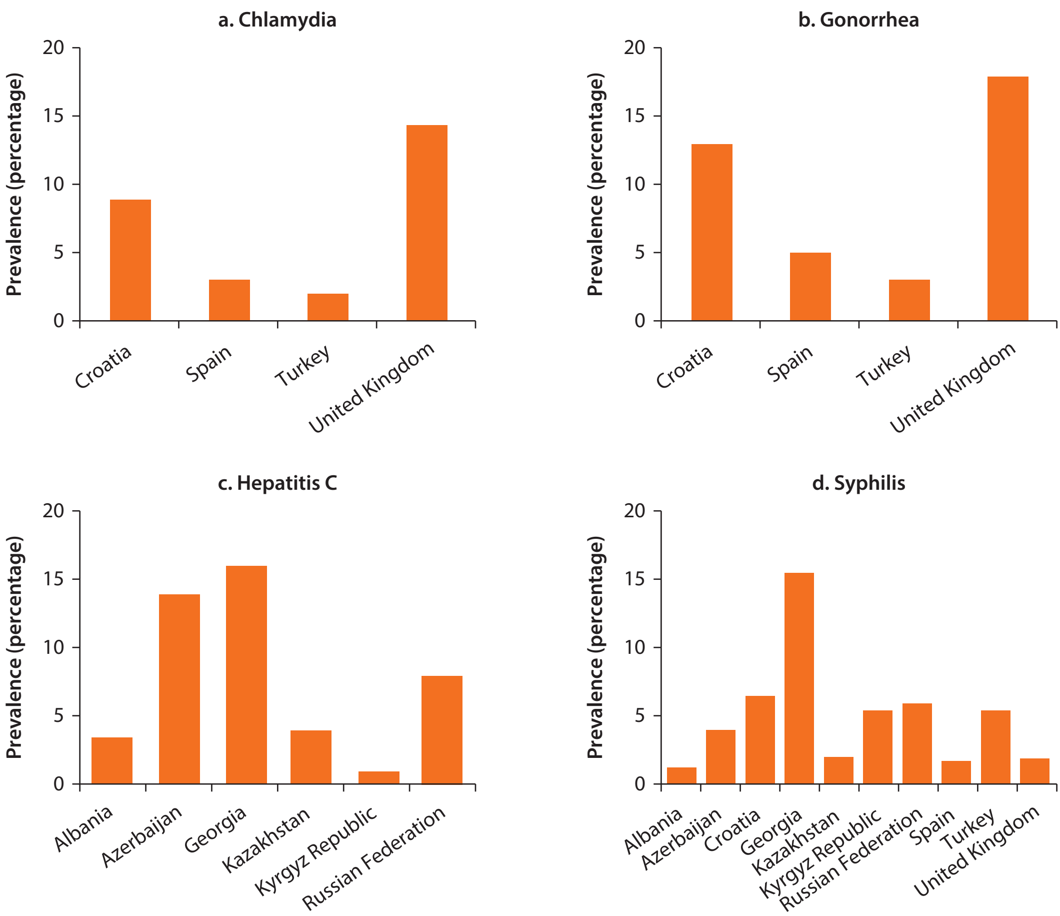
unclear [45]. In Georgia, the prevalence of syphilis was 31.4% (35.1% among those 25 years-old and under and 28.9% among those over 25-years old) and prevalence of HCV was 15.7% (14% among those 25-years-old and under and 16.9% among older age groups) [25]. Sentinel surveillance in Kazakhstan and the Kyrgyz Republic found prevalence of syphilis was 4.1% and 10.7%, respectively, and HCV was 4.2% and 1.2%, respectively [59]. A study among MSWs in Moscow found prevalence of syphilis was 12%, and antibodies to HCV 8% [20]. The lack of uniformity in the measures presented here make interpretation difficult. However, the relatively high proportions of respondents reporting particular infections imply low condom use or high rates of unsafe injecting by certain groups.

Factors Associated with HIV

Factors Associated with HIV: Multivariate Associations

Few of the identified studies examined risk factors associated with HIV or STI incidence and prevalence in multivariate models that adjust for confounding factors. Those that did are summarized in tables C.30–C.32. All the studies were conducted in Western Europe and tended to be in areas of high HIV prevalence among MSM recruited from gay venues or STI clinics, limiting the generalization of results to the wider MSM population. However, the results of these papers can be generalized to similar settings and to individuals attending similar sites.

Figure 3.24 Prevalence of STIs among MSM in Europe



Source: Tables C.24–C.26.
Note: MSM = men who have sex with men; STI = sexually transmitted infection.

Individual-Level Risk Factors

Individual risk factors associated with HIV prevalence include age, number of sex partners, use of condoms, drug use, and past experience of STIs. A Swiss study based in five cities [9] found that HIV prevalence was less common among 16–24 year olds than older age groups (25–34 and 35–44 years).

A U.K. study examining HIV prevalence in two Scottish cities [65] found older age to be associated with HIV prevalence. Studies from the Netherlands (based on a variety of settings in Rotterdam and Amsterdam [11, 12]) showed inconsistent relationships between HIV incidence and age. Studies from Amsterdam showed the same increased risk among 30- to 34-year-olds compared with younger MSM, but it found divergent findings with regards to those 35 years and older. The Rotterdam study showed decreased risk among both older-age groups compared with the respondents who were under 30 years old.

Several studies examined numbers of sex partners as a risk factor as well as condom use. In Switzerland, respondents with 1 or less or 6 or more partners had elevated odds of HIV compared with those reporting between 2 and 5 partners, and having a partner known to be HIV positive was linked to twice the odds of contracting HIV. Having a history of gonorrhea and to a lesser extent, syphilis, was associated with higher odds of HIV [9]. Risk of HIV was lower among MSM always using a condom with occasional partners than those reporting never or sometimes using a condom, but risk was higher compared to those reporting no occasional partners. In the United Kingdom, no real difference was seen among those having more than 10 sex partners in the past 12 months and those having less than 10; however, those reporting having more than 10 anal sex partners in that period had over four times the odds of higher HIV prevalence than those with less than 10 anal sex partners. The number of partners for UAI did not appear to be associated with HIV prevalence; however, respondents reporting an STI in the past year had over three times the odds of increased HIV prevalence than those without [65].

UAI with more than one partner, casual partners, and partners of unknown or discordant status were all independently associated with elevated odds of HIV prevalence. A study based in the same cities [15] found that HIV seroconversion was associated with some ancillary sexual behaviors including oral-anal contact, "rimming"; or "being fisted"; meeting men in "cruising grounds" [outdoor public-sex environments], or "backrooms" [indoor public-sex environments], or online; using certain drugs (poppers, Ecstasy, ketamine, and lysergic acid diethylamide [LSD]) before and during sex; and testing positive for certain STIs (gonorrhea and syphilis). Some factors were found to be protective of seroconversion including meeting men in gyms or public restrooms, using other drugs (marijuana and mushrooms), and the presence of certain STIs (chlamydia and pubic lice). In the Netherlands, reported UAI with a casual partner and STI coinfection were all found to be associated with increased risk of HIV [11, 12].

Structural Risk Factors

Structural factors associated with HIV included migration status, city, and use of STI clinics. In Switzerland, native Swiss MSM had lower odds of HIV than immigrants [9]. In Scotland there is some association between increased HIV prevalence and living in Edinburgh or outside of Scotland compared with Glasgow, and some association between lower HIV prevalence and living in Scotland outside of Glasgow or Edinburgh. No strong differences were found between the respondents surveyed in Glasgow or Edinburgh or between those surveyed in a sauna or a bar [65].

Two studies showed Dutch respondents to be at greater risk of contracting HIV than respondents born elsewhere, and a college-level education was shown to be associated with reduced risk of HIV prevalence [11, 12]. Another U.K. study based in three English cities [66] that adjusted for age and ethnicity found education after the age of 16 to be associated with reduced HIV prevalence. Employment was also associated with reduced prevalence. Having an STI in the previous 12 months and having attended a genitourinary medicine clinic (GUM) clinic in the past 12 months were both associated with HIV prevalence.

Sexual Vulnerability

Number of Sex Partners

Many studies collected data on numbers of sex partners (table 3.5). While time frames of either 6 or 12 months are generally used, there is much variation in

Table 3.5 Number of Sexual Partners Reported by MSM in Europe

Country (or city)	*Time period (months)*	*Regular partners*	*Casual partners*	*Commercial partners*
			(%/median/mean)	
Western Europe				
Italy [21]	6	1 median, 2.6 mean	6 median, 12.0 mean	
Spain [21]	6	1 median, 1.6 mean	10 median, 16.3 mean	
Denmark [67]	12	Median 3, mean 9.4		
France [68] (HIV+ men in regular relationships)	12	1–4, 23.1% 5+, 25.7%		
Netherlands [10]	12	10+, 51%		
Netherlands [69]	12		Median 4	
Netherlands [69]	12		Median 5	
Spain (Barcelona, Catalonia) [6]	12	20+, 45%		
Switzerland (Zurich) [8]	12	Median range 4–10		
Switzerland [70]	12	Mean 11+		
United Kingdom (Brighton) [71]	12	13+, 32%–35%		
United Kingdom (nationwide) [71]	12	1, 33.6%; 10+, 22.8%		
United Kingdom (southern England) [72]	12	Median range 10%–29%		
Central Europe				
Albania [23]	6	5+ noncommercial, 34%		
Czech Republic [21]	6	1 median, 2.7 mean	4 median, 7.5 mean	
Romania [21]	6	2 median, 3.3 mean	3 median, 7.1 mean	
Slovak Republic [21]	6	1 median, 2 mean	3 median, 6.1 mean	
Slovenia [21]	6	1 median, 2.1 mean	3 median, 5.7 mean	
Croatia (Zagreb) [26, 35]	12	0 AI partners 23%; 1 AI partner 21%–27%; 3–10 AI partners 21%–23%		
Eastern Europe				
Georgia [25]	6	1–5, 69%		
Lithuania (7 cities) [73]	6	10+, 4.7%		
Moldova (Chisinau) [74]	6	Mean 3.8		
The Russian Federation (Moscow) [75]	6	Mean 1.5	Mean 10.7	
The Russian Federation (Sochi) [75]	6	Mean 2.2	Mean 23.9	
Ukraine [24]	6		Median 4	Median 3
Kazakhstan[76]	12	Mean 2.2	Mean 5.8	Mean 8.1
Kyrgyz Republic [76]	12	Mean 2.3	Mean 4.5	Mean 2.4
Tajikistan [76]	12	Mean 5.1	Mean 20.2	Mean 21.4

Note: AI = anal intercourse; HIV+ = HIV-positive; MSM = men who have sex with men.

classification and quantification of partners. While this makes comparison very difficult, it is possible to see that where both measures are reported, means are generally higher than medians, showing that while the majority of respondents may report quite low numbers of partners, a small minority report very large numbers. There is little evidence of any pattern by region, although evidence of very high partner numbers in towns with well-known gay scenes such as Brighton and Amsterdam are visible, although this may reflect the characteristics of those attending the study recruitment locations only, and not the surrounding community (see tables C.21–C.23).

Condom Use

Many studies focused on the prevalence of condom use between men for AI. This was measured in a variety of ways, often disaggregated by a number of factors, which makes comparisons among the various studies complex. Many studies, including EMIS, measure condom use through the percentage of MSM reporting condom use the last time they had AI with another male (limited to the past six months), corresponding to an United Nations General Assembly Special Session (UNGASS) indicator [77]. Other studies chose to focus on participants reporting if they had any acts of UAI within a particular time frame, generally 6 months but ranging from 1 to 24 months. Both approaches have advantages and disadvantages: indicators covering longer time periods may be more representative of an individual's general risk practices: however, this may be subject to recall bias, and condom use at the last instance of AI may be a more valid measure.

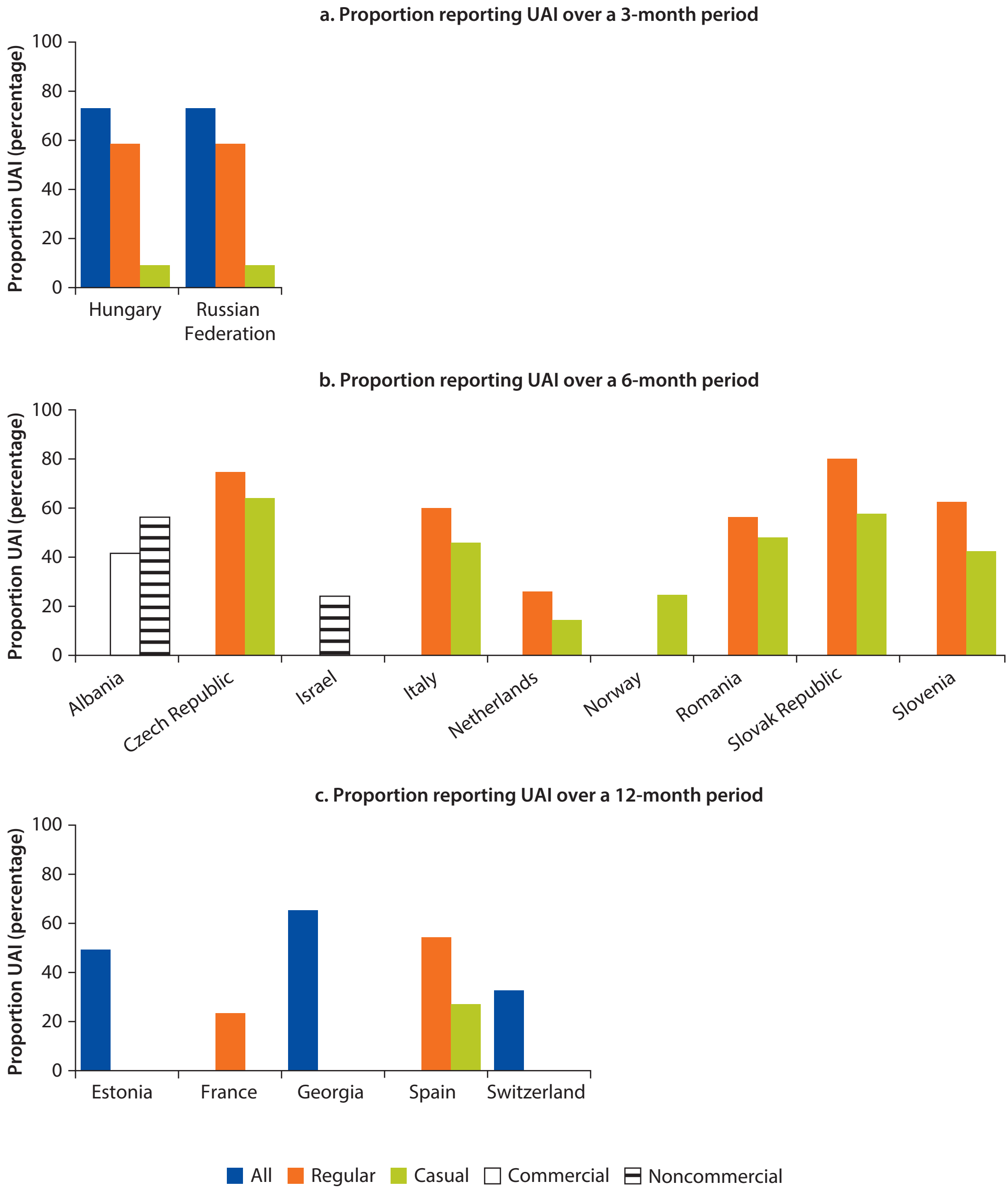
UAI in the Past Six Months

Data for this indicator came from a variety of studies. Therefore, they have been disaggregated into the proportion reporting UAI over (a) 3 months; (b) 6 months; and (c) 12 months. UAI is also consistently more common with regular or steady partners than with casual partners (figure 3.25). UAI over a six-month period was slightly less frequently reported in the West (Israel, Italy, the Netherlands, and Norway) than in Central Europe (the Czech Republic, Romania, the Slovak Republic, and Slovenia). Similarly UAI over a 12-month period was higher in Estonia and Georgia than France, Spain, and Switzerland.

Condom Use At Last Anal Intercourse

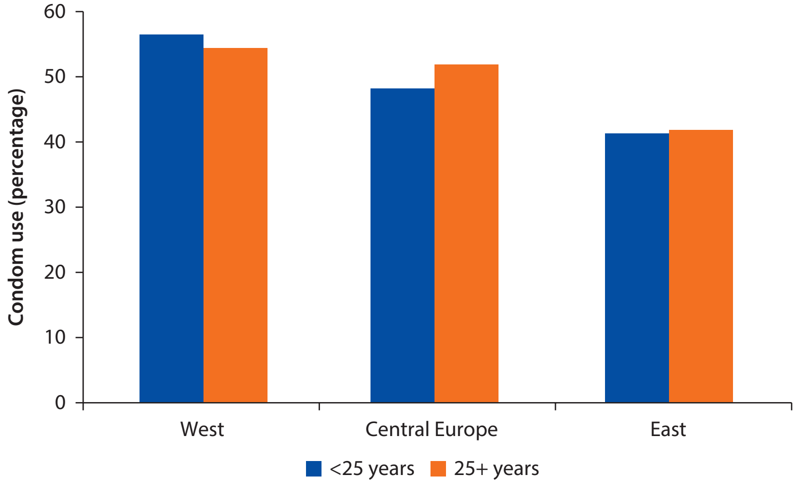
Findings of the EMIS study provide further evidence for this pattern with higher median condom use at the last act of AI in countries in the West, followed by Central Europe and then the East (figure 3.26). Among other countries, the Central Asian countries were not included in this study so these results cannot be generalized. The highest median condom use, as noted above, is found in the West, around 15% more than the reported use in the East. The minimum reported proportion in the West was 41% (Sweden), Central Europe 6% (FYR Macedonia), and 37% in the East (Belarus). The maximum reported proportions were 69% in the West (Greece), 60% in Central Europe (FYR Macedonia), and 58% in the East (Ukraine). Generally there is little difference between those

Figure 3.25 Proportion of UAI during Varying Time Periods Specified, by Partner Type



Source: Tables C.27–C.29.
Note: UAI = unprotected anal intercourse.

Figure 3.26 Condom Use at Last AI among MSM



Source: EMIS [78].
Note: AI = anal intercourse; MSM = men who have sex with men.

under and over 25 years old, although in Central Europe it appears that younger MSM are less likely to report condom use than their older counterparts.

Studies from outside the systematic review show that in some poorer countries, condoms may be unaffordable. For instance, "average" quality condoms cost US$0.30–0.40 in Georgia, in comparison with an average monthly salary of US$50–70 [79]. Qualitative data suggest that condom use among Georgian MSM was particularly rare in rural areas and among younger, more economically disadvantaged MSM, many of whom have emigrated from these rural areas [80].

Factors Associated with Unprotected Sex

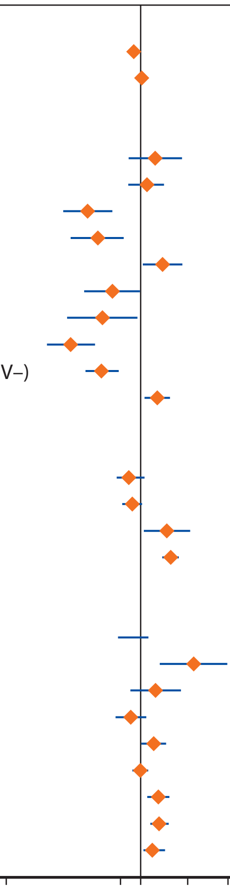
Eleven studies that examined risk factors associated with unprotected sexual intercourse measured by reported condom use at last anal intercourse (AI) or UAI were identified by the systematic review [6, 10, 17, 22, 24, 26, 81–85]. These studies are presented in figures 3.27–3.30.

Individual Risk Factors Associated with UAI

Individual risk factors associated with UAI among MSM in the region included partner types and numbers, drug use, HIV testing history, condom availability, and HIV status. Studies from the United Kingdom and Switzerland [82, 83] suggest that HIV-negative respondents and those who have not been tested are less likely to report UAI than their HIV-positive counterparts. A Spanish study focusing on men with steady male partners found that serodiscordant or both HIV-positive couples were less likely to practice UAI than both HIV-negative couples [81]. Although data from Israel [17] showed men with casual or steady and casual partners having higher odds of reporting UAI, a French study among

Figure 3.27 Adjusted Effect Estimates for Individual-Level Factors for UAI among MSM (A)

Risk factor	ES (95% CI)	Country	Reference
Age			
One year increase	0.89 (0.83, 0.97)	Switzerland	82
One year increase*	1.04 (0.98, 1.04)	United Kingdom	83
HIV status			
HIV+ (ref.: HIV–) self-report	1.65 (0.66, 4.14)	Switzerland	82
Unknown (ref.: HIV–) self-report	1.09 (0.65, 1.81)	Switzerland	82
HIV– (ref.: HIV+)*	0.16 (0.07, 0.38)	United Kingdom	83
Untested (ref.: HIV+)*	0.23 (0.09, 0.56)	United Kingdom	83
HIV+ (ref.: HIV–) self-report	2.12 (1.07, 4.20)	Spain	81
Unknown (ref.: HIV–) self-report	0.40 (0.15, 1.02)	Spain	81
Couple both HIV+ (ref.: both HIV–)	0.27 (0.08, 0.90)	Spain	81
Couple discordant (ref.: both HIV–)	0.09 (0.04, 0.21)	Spain	81
One or both partners untested (ref.: both HIV–)	0.26 (0.15, 0.47)	Spain	81
HIV+ (ref.: HIV–/unknown) self-report	1.77 (1.14, 2.74)	Spain	6
Partner type			
Stable relationship in past 12 months	0.73 (0.46, 1.14)	Switzerland	82
Sex with a casual partner while coupled‡	0.82 (0.64, 1.05)	France	84
Casual partners in past 6 months	2.45 (1.12, 5.43)	Israel	17
Steady partners and casual partner(s)	2.80 (2.10, 3.69)	Israel	17
Number of partners			
Above median # partners in past year	0.78 (0.46, 1.30)	Switzerland	82
HIV+ and # partners	6.14 (1.93, 19.60)	Switzerland	82
HIV– and # partners	1.67 (0.70, 3.97)	Switzerland	82
11–20 (ref.: 1–10) in past year	0.71 (0.42, 1.21)	Spain	6
21+ (ref.: 1–10) in past year	1.56 (1.03, 2.38)	Spain	6
>10 casual in the past year†	0.99 (0.86, 1.13)	France	84
>10 casual in the past year‡	1.83 (1.43, 2.35)	France	84
Number sexual encounters	1.88 (1.52, 2.27)	Israel	17
>20 partners in past 6 months	1.50 (1.10, 2.30)	Israel	85



Note: CI = confidence interval; ES = estimate; HIV = human immunodeficiency virus; HIV+ = HIV-positive; HIV– = HIV-negative; MSM = men who have sex with men; ref. = reference; UAI = unprotected anal intercourse.
† = HIV negative respondents only; ‡ = HIV positive respondents only; * = sample of Central and Eastern European immigrants only.

HIV-positive respondents reported that those who had sex with a casual partner while in a relationship had lower odds of reporting UAI [84]. Although the association between number of partners and UAI is unclear, studies showing separate models according to serostatus show that HIV-positive respondents with a higher number of partners have higher odds of reporting UAI than their HIV-negative counterparts with similar partner numbers [82, 84] (figure 3.27).

A French study found that engaging in a variety of ancillary sexual behaviors was associated with increased odds of UAI regardless of HIV status [84]. A Spanish study [81] found respondents reporting a combination of two or more drugs (poppers, alcohol, and others) had higher odds of UAI, ranging from 2.4 to 4.9 times greater than those who did not report any drug use. A later study in the same location [6] showed a clear increase in risk of UAI with number of drugs used. Compared with respondents not using drugs, those using 1–3 drugs reported 1.1 times the odds of UAI; those using 4–6 drugs reported 1.76 times the odds; and those using 7 or more drugs reported nearly 5 times the odds of UAI [6]. Other studies in France and the United Kingdom found drug and alcohol use associated with increased odds of UAI [83, 84]. A study among Central and Eastern European migrants in the United Kingdom found that a history of injecting in particular increased the likelihood of reporting UAI. The French study examined the associations for HIV-positive and HIV-negative respondents separately, and the association between drug and alcohol use and UAI appear to be stronger among HIV-positive respondents than the HIV-negative respondents. Sex work and having a history of STIs were both associated with greater odds of reporting UAI (figure 3.28).

Structural Factors Associated with UAI

Structural factors associated with UAI included level of education, country of origin, living arrangements; city of residence, recruitment site, venues used to meet sex partners, and experience of homophobic violence (figure 3.29). Studies in France and Israel clearly identified higher levels of education as being associated with lower odds of UAI [17, 84]; however, a study in Hungary and Russia found the opposite: additional years of education may be associated with increased odds of UAI [22]. Internet partner-seeking was associated with higher odds of UAI in Western European studies [6, 82], and although little difference could be observed between different gay venues in France where men may seek sex, HIV-positive men appeared to face a greater association between attending these venues and higher odds of UAI [84]. A Spanish study found little difference in risk of UAI based on recruitment site (sauna, sex shop, or cruising spot in the park), although respondents recruited via a gay organization's mailing list had lower odds of UAI (AOR 0.65, 95% CI 0.33–1.30) than those respondents recruited from a sauna [81]. A study in the United Kingdom found similar results [83] although an online study from France found that respondents recruited through special interest websites had higher odds of UAI than those recruited through general interest gay websites, particularly if they were HIV positive [84]. Respondents who reported that they were victims of aggression or verbal assaults in the past year had 1.7 times the odds of reporting UAI than their counterparts who had not been victims [81]. Internalized homophobia, or feeling negatively about oneself because of homosexuality, was also associated with increased odds of UAI in a Spanish study [6]. A Spanish study showed that nonnegative nationals were more likely to be at risk of UAI than nationals, with Latin American respondents in particular having over twice the odds of reporting UAI than Spanish respondents [6].

Multivariate Associations with Condom Use at Last AI

Factors associated with condom use at last AI include younger age, ever having had an HIV test or knowing where to obtain one, having occasional male rather than regular male or female partners, not using alcohol, and not engaging in sex

Figure 3.28 Adjusted Effect Estimates for Individual-Level Factors for UAI among MSM (B)

Risk factor	ES (95% CI)	Country	Reference
Type of sexual contact			
Sensation-seeking in the past year†	1.31 (1.15, 1.49)	France	84
Barebacked with a couple in the past year†	2.62 (2.28, 3.02)	France	84
Oral contact with sperm in the past year†	3.33 (2.84, 3.92)	France	84
Esoteric activity in the past year†	1.35 (1.18, 1.55)	France	84
Sensation-seeking in the past year‡	1.31 (1.04, 1.68)	France	84
Barebacked with a couple in the past year‡	4.10 (2.96, 5.69)	France	84
Oral contact with sperm in the past year‡	6.80 (4.88, 9.49)	France	84
Esoteric activity in the past year‡	1.52 (1.13, 2.04)	France	84
Drug or alcohol use			
Ever injected drugs	2.11 (0.91, 4.88)	United Kingdom	83
Recreational drug use in the past year	2.07 (1.40, 3.06)	United Kingdom	83
Poppers only before/during sex (ref.: none) in the past year	2.27 (0.77, 6.67)	Spain	81
Alcohol only before/during sex (ref.: none) in the past	1.07 (0.44, 2.59)	Spain	81
Poppers and alcohol only before/during sex (ref.: none) in the past year	1.77 (0.56, 5.59)	Spain	81
Poppers and other drugs before/during sex (ref.: none) in the past year	4.88 (1.39, 17.16)	Spain	81
Alcohol and other drugs before/ during sex (ref.: none) in the past year	2.60 (0.97, 6.99)	Spain	81
Alcohol, poppers, and other drugs before/during sex (ref.: none) in the past year	2.38 (1.08, 5.32)	Spain	81
Other drugs before/during sex (ref.: none) in the past year	1.21 (0.20, 7.20)	Spain	81
1–3 drugs used (ref.: none) in the past year	1.11 (0.76, 1.62)	Spain	6
4–6 drugs used (ref.: none) in the past year	1.76 (0.95, 3.25)	Spain	6
7+ drugs used (ref.: none) in the past year	4.90 (1.23, 19.50)	Spain	6
Used drugs in the past year†	1.10 (0.96, 1.26)	France	84
Had >5 units alcohol in one sitting at least weekly†	1.01 (0.86, 1.17)	France	84
Used drugs in the past year‡	1.93 (1.39, 2.68)	France	84
Had >5 units alcohol in one sitting at least weekly‡	1.23 (0.91, 1.67)	France	84
Sex work			
Paid for sex	2.20 (1.29, 3.77)	United Kingdom	83
Traded sex†	1.33 (1.03, 1.72)	France	84
Traded sex‡	1.50 (0.88, 2.55)	France	84
STI history			
Had an STI†	1.51 (1.23, 1.86)	France	84
Had an STI‡	2.68 (1.99, 3.61)	France	84

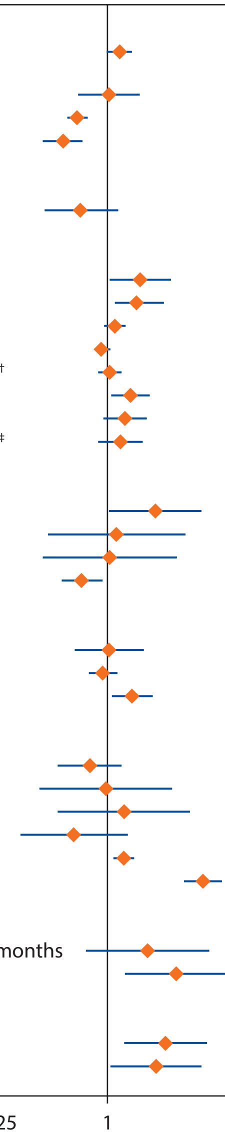
Reduced association with UAI 0.1 0.5 1 5 20 Increased association with UIA

Source: Table C.33.
Note: CI = confidence interval; ES = estimate; MSM = men who have sex with men; ref. = reference; STI = sexually transmitted infection; UAI = unprotected anal intercourse.
† = HIV-negative respondents only; ‡ = HIV-positive respondents only; * = sample of Central and Eastern European immigrants only.

work (figure 3.30). A Ukrainian study suggested that younger age was associated with condom use at last AI, and younger respondents were more likely to report using a condom at last AI, for example, 15–19 year olds had twice the odds of reporting condom use compared to those over 25 years old, and those 20–24 years old had 1.1 times the odds compared to their older counterparts [24]. A study in Croatia among HIV-negative men found that older respondents had higher odds of condom use at last AI with casual partners than did younger men [26]. Respondents reporting insertive AI in the past six months had higher odds

Figure 3.29 Structural-Level Adjusted Effect Estimates for UAI among MSM

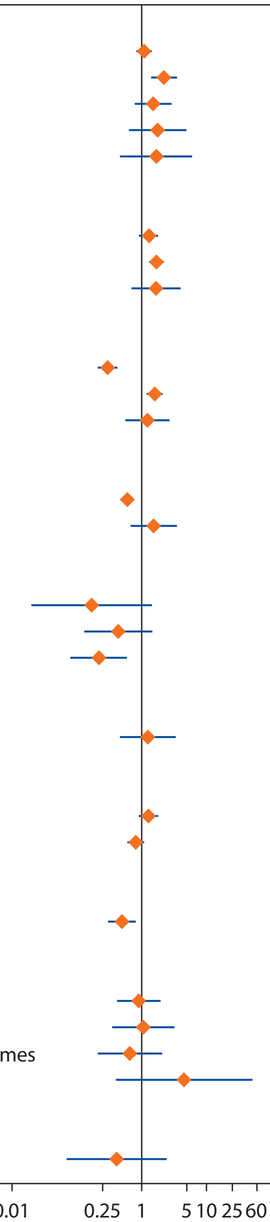
Risk factor	ES (95% CI)	Country	Reference
Education			
Education in years	1.17 (0.99, 1.37)	Hungary and Russian Federation	22
Completed higher education*	1.02 (0.69, 1.51)	United Kingdom	83
Some university (ref.: none)†	0.68 (0.60, 0.78)	France	84
Higher-level (ref.: lower)	0.57 (0.44, 0.73)	Israel	17
Employment			
Employed*	0.71 (0.45, 1.15)	United Kingdom	83
Locations to meet sex partners			
Internet partner-seeking	1.52 (1.03, 2.25)	Switzerland	82
Internet partner-seeking	1.45 (1.10, 2.06)	Spain	6
Sought sex/socialized at: outdoor sex venue†	1.10 (0.96, 1.26)	France	84
Sought sex/socialized at: bathhouse†	0.90 (0.87, 1.04)	France	84
Sought sex/socialized at: venue with a backroom†	1.03 (0.89, 1.20)	France	84
Sought sex/socialized at: outdoor sex venue‡	1.34 (1.05, 1.72)	France	84
Sought sex/socialized at: bathhouse‡	1.25 (0.95, 1.65)	France	84
Sought sex/socialized at: venue with a backroom‡	1.18 (0.89, 1.57)	France	84
Living arrangements			
Lives with with partner (m/f) (ref.: alone)	1.84 (1.02, 3.31)	Spain	81
Lives with friends (ref.: alone)	1.12 (0.47, 2.70)	Spain	81
Lives with parents/family (ref.: alone)	1.03 (0.44, 2.43)	Spain	81
Does not live alone	0.72 (0.56, 0.94)	Israel	17
City of residence			
London (ref.: elsewhere in United Kingdom)*	1.02 (0.66, 1.59)	United Kingdom	83
Paris (ref.: elsewhere in France)†	0.94 (0.79, 1.14)	France	84
Tel Aviv (ref elsewhere in Israel)	1.37 (1.06, 1.78)	Israel	17
Recruitment site			
Online at GayRomeo (ref.: Gaydar)*	0.80 (0.53, 1.20)	United Kingdom	83
Sex shop (ref.: sauna)	0.98 (0.42, 2.28)	Spain	81
Cruising site in park (ref.: sauna)	1.24 (0.53, 2.86)	Spain	81
Mailing list from gay organization (ref.: sauna)	0.65 (0.33, 1.30)	Spain	81
Specialist interest website (ref.: general website)†	1.23 (1.08, 1.41)	France	84
Specialist interest website (ref.: general website)‡	3.38 (2.65, 4.31)	France	84
Violence			
Victim of aggression or verbal assaults in past 12months	1.67 (0.76, 3.67)	Spain	81
Internalized homophobia (ref.: low) high	2.40 (1.25, 4.64)	Spain	6
Country of origin			
Latin America (ref.: Spain)	2.10 (1.24, 3.56)	Spain	6
Other (ref.: Spain)	1.86 (1.04, 3.32)	Spain	6



Source: Table C.33.
Note: CI = confidence interval; ES = estimate; M/F = male or female; MSM = men who have sex with men; ref. = reference; UAI = unprotected anal intercourse.
† = HIV-negative respondents only; ‡ = HIV-positive respondents only; * = sample of Central and Eastern European immigrants only.

of reporting condom use at last AI compared to those reporting receptive AI, maybe reflecting decision-making roles that accompany positions [24]. MSM respondents reporting a regular or female partner in the past six months had lower odds of condom use at last AI than their counterparts who reported male casual partners or no partners. Conversely, respondents reporting occasional

Figure 3.30 Adjusted Effect Estimates for Condom Use at Last AI among MSM



Risk factor	ES (95% CI)	Country	Reference
Age			
(ref.: 25+) 20–24	1.10 (0.80, 1.40)	Ukraine	24
(ref.: 25+) 15–19	2.20 (1.40, 3.50)	Ukraine	24
<25 years‡	1.51 (0.78, 2.90)	France	84
(ref.: 18–25) 26–33	1.77 (0.64, 4.88)	Croatia	26
(ref.: 18–25) 34+	1.70 (0.46, 6.04)	Croatia	26
HIV test			
Knows where to get an HIV test	1.30 (0.90, 1.80)	Ukraine	24
Ever had an HIV test	1.70 (1.30, 2.20)	Ukraine	24
Ever had an HIV test	1.67 (0.70, 3.99)	Croatia	26
Partner type			
Partner type in past 6 months: main	0.30 (0.20, 0.40)	Ukraine	24
Partner type in past 6 months: occasional	1.60 (1.20, 2.10)	Ukraine	24
In a stable relationship	1.23 (0.56, 2.71)	Croatia	26
Sexual contact with females			
In the past 6 months	0.60 (0.50, 0.80)	Ukraine	24
Ever	1.54 (0.68, 3.49)	Croatia	26
Number of partners			
1 (ref.: 8+) in past 5 years	0.17 (0.02, 1.45)	Croatia	26
2–3 (ref.: 8+) in the past 5 years	0.44 (0.13, 1.47)	Croatia	26
4–7 (ref.: 8+) in the past 5 years	0.22 (0.08, 0.59)	Croatia	26
Education			
Higher-level (ref.: lower)	1.25 (0.46, 3.36)	Croatia	26
Type of sexual contact			
Insertive AI in past 6 months	1.20 (0.90, 1.80)	Ukraine	24
Receptive AI in past 6 months	0.80 (0.60, 1.10)	Ukraine	24
Drug or alcohol use			
Alcohol in the past month	0.50 (0.30, 0.80)	Ukraine	24
Locations to meet sex partners			
Internet partner-seeking	0.91 (0.42, 1.95)	Croatia	26
Frequency of cruising (ref.: never) rarely	1.06 (0.35, 3.19)	Croatia	26
Frequency of cruising (ref.: never) sometimes	0.66 (0.21, 2.08)	Croatia	26
Frequency of cruising (ref.: never) often	4.52 (0.40, 50.71)	Croatia	26
Sex work			
Sold sex	0.41 (0.07, 2.45)	Croatia	26

Source: Table C.33.
Note: AI = anal intercourse; CI = confidence interval; ES = estimate; HIV = human immunodeficiency virus; MSM = men who have sex with men; ref. = reference.
† = HIV-negative respondents only; ‡ = HIV-positive respondents only; * = Sample of Central and Eastern European migrants only.

partners in the same time period had higher odds of using a condom at the last AI. Finally, while using alcohol in the last month was associated with lower odds of using a condom at last intercourse, ever having had an HIV test and knowing where to get an HIV test were associated with higher odds of condom use at last AI.

Ukrainian and Croatian studies found that respondents reporting ever having had an HIV test were associated with less risky behavior: the odds of using a condom at last AI were around 1.7 times higher among respondents reporting a history of testing [24, 26]. Although respondents reporting rare or occasional cruising were not at increased or decreased risk of condom use, respondents who cruised often had higher odds of condom use at last AI (odds ratio [OR] = 4.5 95% CI 0.4–50.71). Other sexual characteristics, such as sex with a woman, selling sex, or being in a stable relationship did not appear to be associated with condom use at last AI.

Concluding Comment

The systematic review demonstrates that HIV prevalence level is highest in the West (9–18%), and generally lower or medium in Central Europe and the East (<5%). Structural risk factors associated with UAI included levels of education, employment, experience of violence, and country of origin.

Note

1. Odds ratios are not presented in the original Sethi et al. (2006) paper and therefore are not presented here.

References

Note: References below are also cited in Appendix C.

People Who Inject Drugs

1. Mathers, B. M., et al., Global epidemiology of injecting drug use and HIV among people who inject drugs: a systematic review. *The Lancet*, 2008. 372(9651): p. 1733–1745.
2. Bargagli, A. M., et al., Drug-related mortality and its impact on adult mortality in eight European countries. *European Journal of Public Health*, 2006. 16(2): p. 198–202.
3. Degenhardt, L., W. Hall, and M. Warner-Smith, Using cohort studies to estimate mortality among injecting drug users that is not attributable to AIDS. *Sexually Transmitted Infections*, 2006. 82(suppl. 3): p. iii56–iii63.
4. European Centre for Disease Prevention and Control/WHO Regional Office for Europe, *HIV/AIDS surveillance in Europe 2009*, 2010, European Centre for Disease Prevention and Control: Stockholm.
5. Baggaley, R. F., et al., Risk of HIV-1 transmission for parenteral exposure and blood transfusion: a systematic review and meta-analysis. *AIDS*, 2006. 20(6): p. 805–812. 10.1097/01.aids.0000218543.46963.6d.

6. Boily, M. -C., et al., Heterosexual risk of HIV-1 infection per sexual act: systematic review and meta-analysis of observational studies. *The Lancet, Infectious Diseases*, 2009. 9(2): p. 118–129.
7. Stvilia, K., et al., Prevalence of hepatitis C, HIV, and risk behaviors for blood-borne infections: a population-based survey of the adult population of T'bilisi, Republic of Georgia. *Journal of Urban Health*, 2006. 83(2): p. 289–298.
8. Kuniholm, M. H., et al., Not all injection drug users are created equal: heterogeneity of HIV, hepatitis C virus, and hepatitis B virus infection in Georgia. *Substance Use & Misuse*, 2008. 43(10): p. 1424–1437.
9. Gambashidze, N., et al., Evaluation of pilot methadone maintenance therapy in Georgia (Caucasus). *Georgian Medical News*, 2008. 7–8: p. 160–161.
10. Shapatava, E., K. Nelson, T. Tsertsvadze, and C. del Rio, Risk behaviors and HIV, hepatitis B, and hepatitis C seroprevalence among injection drug users in Georgia. *Drug and Alcohol Dependency*, 2006. 82: p. S35–S38.
11. Smolskaya, T. T., et al., *HIV sentinel surveillance in high-risk groups in Azerbaijan, the Republic of Moldova and in the Russian Federation*. 2004, World Health Organization (WHO), Europe.
12. UNGASS, *Country progress report: Georgia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
13. Chikovani, I., et al., Unsafe injection and sexual risk behavior among injecting drug users in Georgia. *Journal of Urban Health-Bulletin of the New York Academy of Medicine*, 2011. 88(4): p. 736–748.
14. Ataiants, J., et al., Tailored harm reduction approaches bring healthcare and social support to women who use drugs in Georgia, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
15. Soliev, A., Analysis on epidemiological situation and responses based on second generation sentinel surveillance system among injecting drug users, Tajikistan, Kazakhstan, Kyrgyzstan, 2006–2009. 2010.
16. Busza, J. R., et al., Street-based adolescents at high risk of HIV in Ukraine. *Journal of Epidemiology and Community Health*, 2011. 65(12): p. 1166–70.
17. Jauffret-Roustide, M., et al., Estimation de la séroprévalence du VIH et du VHC et profils des usagers de drogues en France, étude InVS-ANRS Coquelicot, 2004. *Bulletin épidémiologique hebdomadaire*, 2006. 33.
18. Cleland, C. M., et al., HIV risk behaviors among female IDUs in developing and transitional countries. *BMC Public Health*, 2007. 7(1): p. 271.
19. Ncube, F., et al., Gender and drug injecting related risk and health harms in the United Kingdom: a need for targeted interventions, in International Harm Reduction Conference, April 20–23, 2009: Bangkok.
20. Brugal, M. T., et al., Injecting, sexual risk behaviors and HIV infection in young cocaine and heroin users in Spain. *European Addiction Research*, 2009. 15(3): p. 171–8.
21. Talu, A., et al., HIV infection and risk behavior of primary fentanyl and amphetamine injectors in Tallinn, Estonia: implications for intervention. *International Journal of Drug Policy*, 2010. 21(1): p. 56–63.
22. Quaglio, G., et al., Patients in long-term maintenance therapy for drug use in Italy: analysis of some parameters of social integration and serological status for infectious diseases in a cohort of 1091 patients. *BMC Public Health*, 2006. 6(1): p. 216.

23. Napoli, C., et al., Risk factors for HBV/HIV/HCV in drug addicts: a survey of attendees of a department of pathological dependence. *Journal of Preventive Medicine & Hygiene*, 2010. 51(3): p. 101–104.
24. Jauffret-Roustide, M., et al., Impact of a harm-reduction policy on HIV and hepatitis C virus transmission among drug users: recent French data—the ANRS-Coquelicot Study. *Substance Use & Misuse*, 2006. 41(10–12): p. 1603–1621.
25. Dumchev, K. V., et al., HIV and hepatitis C virus infections among hanka injection drug users in central Ukraine: a cross-sectional survey. *Harm Reduction Journal*, 2009. 6(1): p. 23.
26. Taran, Y. S., et al., Correlates of HIV risk among injecting drug users in sixteen Ukrainian cities. *AIDS and Behavior*, 2011. 15(1): p. 65–74.
27. Abdala, N., et al., Comparing sexual risks and patterns of alcohol and drug use between injection drug users (IDUs) and non-IDUs who report sexual partnerships with IDUs in St. Petersburg, Russia. *BMC Public Health*, 2010. 10: p. 676.
28. Wall, M., et al., Sex, drugs and economic behavior in Russia: a study of socio-economic characteristics of high-risk populations. *International Journal of Drug Policy*, 2011. 22: p. 133–139.
29. Richardson, L., E. Wood, T. Kerr, Analysing the relationship between employment levels and HIV-related risk among people who inject drugs, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
30. Strathdee, S. A., et al., HIV and risk environment for injecting drug users: the past, present, and future. *The Lancet*, 2010. 376(9737): p. 268–284.
31. Degenhardt L, M. B., et al., Prevention of HIV infection for people who inject drugs: why individual, structural, and combination approaches are needed. *The Lancet*, 2010. 376: p. 285–301.
32. Jürgens, R., et al., People who use drugs, HIV, and human rights. *The Lancet*, 2010. 376(9739): p. 475–485.
33. Beyrer, C., et al., Drug use, increasing incarceration rates, and prison-associated HIV risks in Thailand. *AIDS and Behavior*, 2003. 7(2): p. 153–161.
34. Choopanya, K., et al., Risk factors and HIV seropositivity among injecting drug users in Bangkok. *AIDS*, 1991. 5(12): p. 1509–1513.
35. Pollini, R. A., et al., Syringe possession arrests are associated with receptive syringe sharing in two Mexico–US border cities. *Addiction*, 2008. 103(1): p. 101–108.
36. Rhodes, T., et al., Injecting equipment sharing among injecting drug users in Togliatti City, the Russian Federation: maximizing the protective effects of syringe distribution. *Journal of Acquired Immune Deficiency Syndromes*, 2004. 35(3): p. 293–300.
37. Kerr, T., W. Small, and E. Wood, The public health and social impacts of drug market enforcement: a review of the evidence. *International Journal of Drug Policy*, 2005. 16(4): p. 210–220.
38. Bluthenthal, R. N., et al., Collateral damage in the war on drugs: HIV risk behaviors among injection drug users. *International Journal of Drug Policy*, 1999. 10(1): p. 25–38.
39. Booth, R., et al., Police brutality is independently associated with sharing injection equipment among injection drug users in Odessa, Ukraine, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
40. International Harm Reduction Association. *The global state of harm reduction 2010: key issues for broadening the response*, edited by C. Cook, Editor 2010.

41. Beyrer, C., et al., Characterization of the emerging HIV type 1 and HCV epidemics among injecting drug users in Dushanbe, Tajikistan. *AIDS Research and Human Retroviruses*, 2009. 25(9): p. 853–860.
42. Judd, A., et al., Improving survey methods in sero-epidemiological studies of injecting drug users: a case example of two cross-sectional surveys in Serbia and Montenegro. *BMC Infectious Diseases*, 2009. 9(1): p. 14.
43. Rhodes, T., et al., Situational factors influencing drug injecting, risk reduction and syringe exchange in Togliatti City, The Russian Federation: a qualitative study of micro risk environment. *Social Science & Medicine*, 2003. 57(1): p. 39–54.
44. Sarang, A., et al., Policing drug users in Russia: risk, fear, and structural violence. *Substance Use & Misuse*, 2010. 45(6): p. 813–864.
45. Cooper, H., et al., The impact of a police drug crackdown on drug injectors' ability to practice harm reduction: a qualitative study. *Social Science & Medicine*, 2005. 61(3): p. 673–684.
46. European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). Statistical Bulletin 2010. 2010. Available from: http://www.emcdda.europa.eu/stats10.
47. Uuskula, A., et al., Expanded syringe exchange programs and reduced HIV infection among new injection drug users in Tallinn, Estonia. *BMC Public Health*, 2011. 11.
48. Expanding Network for Comprehensive and Coordinated Action on HIV/AIDS prevention among IDUs and Bridging Population (ENCAP). *Prevalence of HIV and other infections and risk behavior among injecting drug users in Latvia, Lithuania and Estonia in 2007*. 2009.
49. Vassilev, Z. P., et al., Needle exchange use, sexual risk behavior, and the prevalence of HIV, hepatitis B virus, and hepatitis C virus infections among Bulgarian injection drug users. *International Journal of STD & AIDS*, 2006. 17(9): p. 621–626.
50. Kivela, P. S., et al., High prevalence of unprotected sex among Finnish HIV-positive and HIV-negative injecting drug users. *Scandinavian Journal of Public Health*, 2009. 37(4): p. 357–363.
51. Aceijas, C., and T. Rhodes, Global estimates of prevalence of HCV infection among injecting drug users. *International Journal of Drug Policy*, 2007. 18(5): p. 352–358.
52. Rhodes, T., et al., Hepatitis C virus infection, HIV co-infection, and associated risk among injecting drug users in Togliatti, Russia. *International Journal of STD & AIDS*, 2005. 16(11): p. 749–754.
53. Jauffret-Roustide, M., et al., A national cross-sectional study among drug-users in France: epidemiology of HCV and highlight on practical and statistical aspects of the design. *BMC Infectious Diseases*, 2009. 9(1): p. 113.
54. Kolaric, B., et al., Seroprevalence of blood-borne infections and population sizes estimates in a population of injecting drug users in Croatia. *Central European Journal of Public Health*, 2010. 18(2): p. 104–109.
55. Gyarmathy, V., and A. Neaigus, Marginalized and socially integrated groups of IDUs in Hungary: potential bridges of HIV infection. *Journal of Urban Health*, 2005. 82(3 Suppl. 4): p. iv101–iv112.
56. Loebstein, R., et al., Hepatitis C, B, and human immunodeficiency virus infections in illicit drug users in Israel: prevalence and risk factors. Ramat Gan, ISRAEL: Israel Medical Association. 2008. 10: p. 4.
57. Craine, N., et al., Characteristics of injecting drug users accessing different types of needle and syringe programme or using secondary distribution. *Journal of Public Health*, 2010. 32(3): p. 328–335.

58. Hartnoll, R., A. Gyarmathy, and T. Zabransky, Variations in problem drug use patterns and their implications for harm reduction, in harm reduction: evidence, impacts and challenges, edited by T. Rhodes, D. Hedrich, Editor 2010, Publications Office of the European Union: Luxembourg. p. 462.
59. European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), *Polydrug Use: Patterns and Responses*, 2009: Luxembourg.
60. Grund, J. -P., et al., The fast and furious–cocaine, amphetamines and harm reduction, in harm reduction: evidence, impacts and challenges, edited by T. Rhodes, D. Hedrich, Editor 2010, Publications Office of the European Union: Luxembourg. p. 191–232.
61. Camoni, L., et al., Prevalence and correlates of infection with human immunodeficiency virus, hepatitis B virus, and hepatitis C virus among drug users in Italy: a cross-sectional study. *Scandinavian Journal of Infectious Diseases*, 2009. 41(6–7): p. 520–523.
62. Nordén, L., and C. Lidman, Differentiated risk behavior for HIV and hepatitis among injecting drug users (IDUs). *Scandinavian Journal of Infectious Diseases*, 2005. 37(6–7): p. 493–496.
63. Van Den Berg, C., et al., Full participation in harm reduction programmes is associated with decreased risk for human immunodeficiency virus and hepatitis C virus: evidence from the Amsterdam Cohort studies among drug users. *Addiction*, 2007. 102(9): p. 1454–1462.
64. Huntington, S., et al., Prevalence of human immunodeficiency virus and hepatitis C virus, and associated factors among injecting drug users in Catalonia. *Enfermedades Infecciosas y Microbiologia Clinica*, 2010. 28(4): p. 236–238.
65. Removille, N., et al., A hepatitis A, B, C and HIV prevalence and risk factor study in ever injecting and non-injecting drug users in Luxembourg associated with HAV and HBV immunisations. *BMC Public Health*, 2011. 11: p. 351.
66. Rhodes, T., et al., Crack–heroin speedball injection and its implications for vein care: qualitative study. *Addiction*, 2007. 102(11): p. 1782–1790.
67. Alho, H., et al., Abuse liability of buprenorphine-naloxone tablets in untreated IV drug users. *Drug and Alcohol Dependence*, 2007. 88(1): p. 75–78.
68. Scutelniciuc, O., and E. Ilinschi. *Assessment of risk of HIV infection among most at risk adolescents*. 2009. Ministry of Health of the Republic of Moldova, National Center of Health Management Monitoring and Evaluation of National Health Programmes, National Drug Observatory: Chisinau.
69. Pohorila, N., et al., Behavior monitoring and HIV-infection prevalence among injection drug users, 2010, ICF "International HIV/AIDS Alliance in Ukraine": Kyiv.
70. Abel-Ollo, K., et al., Knowledge of HIV serostatus and risk behavior among injecting drug users in Estonia. *AIDS Care*, 2009. 21(7): p. 851–857.
71. Platt, L., et al., High HIV prevalence among injecting drug users in Estonia: implications for understanding the risk environment. *AIDS*, 2006. 20(16): p. 2120–2123. 10.1097/01.aids.0000247586.23696.20.
72. Alini, E., The first step is denial: Russia blames NATO policies for its heroin crisis. But is Afghanistan just a scapegoat for a broader problem? in Macleans.ca 2011, Kenneth Whyte: Toronto.
73. Grund, J. -P., et al., Stimulant use in Central and Eastern Europe: how recent social history shaped current drug consumption patterns, in *Interventions for Amphetamine Misuse*, edited by R. Pates, D. Riley. 2009, Wiley Blackwell: Oxford.

74. Chintalova-Dallas, R., et al., Boltushka: a homemade amphetamine-type stimulant and HIV risk in Odessa, Ukraine. *International Journal of Drug Policy*, 2009. 20(4): p. 347–351.

75. Márványkövi, F., K. Melles, and J. Rácz, Sex and drugs: the correlations of injecting drug users' risk perception and behavioral patterns. *Substance Use & Misuse*, 2009. 44(4): p. 569–577.

76. Rácz, J., et al., Injecting equipment sharing and perception of HIV and hepatitis risk among injecting drug users in Budapest. *AIDS Care: Psychological and Socio-medical Aspects of AIDS/HIV*, 2007. 19(1): p. 59–66.

77. Colfax, G., et al., Amphetamine-group substances and HIV. *The Lancet*, 2010. 376(9739): p. 458–474.

78. Griffiths, P., et al., Quite a lot of smoke but very limited fire—the use of methamphetamine in Europe. *Drug and Alcohol Review*, 2008. 27(3): p. 236–242.

79. Gyarmathy, A. V., A. Neaigus, and E. Ujhelyi, Vulnerability to drug-related infections and co-infections among injecting drug users in Budapest, Hungary. *The European Journal of Public Health*, 2009. 19(3): p. 260–265.

80. Abdala, N., et al., Can home-made injectable opiates contribute to the HIV epidemic among injection drug users in the countries of the former Soviet Union? *Addiction*, 2006. 101(5): p. 731–737.

81. Rhodes, T., et al., HIV transmission and HIV prevention associated with injecting drug use in the Russian Federation. *International Journal of Drug Policy*, 2004. 15(1): p. 1–16.

82. European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). *Annual Report 2010*. The State of the Drugs Problem in Europe, 2010: Luxembourg.

83. Van Beek, I., R. Dwyer, and A. Malcolm, Cocaine injecting: the sharp end of drug-related harm! *Drug and Alcohol Review*, 2001. 20(3): p. 333–342.

84. Kruse, G., et al., Drug choice, spatial distribution, HIV risk, and HIV prevalence among injection drug users in St. Petersburg, Russia. *Harm Reduction Journal*, 2009. 6(1): p. 22.

85. Kozlov, A. P., et al., HIV incidence and factors associated with HIV acquisition among injection drug users in St. Petersburg, Russia. *AIDS*, 2006. 20(6): p. 901–906. 10.1097/01.aids.0000218555.36661.9c.

86. Booth, R. E., et al., Stimulant injectors in Ukraine: the next wave of the epidemic? *AIDS and Behavior*, 2008. 12(4): p. 652–661.

87. Shulga, L., and P. Smyrnov, Increased stimulant use in Ukraine: focus-groups results, in International Harm Reduction Conference, April 20–23, 2009: Bangkok.

88. Hope, V., et al., Stimulant injection a focus for harm: an examination of data from England, Wales and Northern Ireland, in International Harm Reduction Conference, April 20–23, 2009: Bangkok.

89. Mathers, B. M., et al., HIV prevention, treatment, and care services for people who inject drugs: a systematic review of global, regional, and national coverage. *The Lancet*, 2010. 375: p. 1014–1028.

90. Platt, L., et al., Impact of gender and sex work on sexual and injecting risk behaviors and their association with HIV positivity among injecting drug users in an HIV epidemic in Togliatti City, the Russian Federation. *Sexually Transmitted Diseases*, 2005. 32(10): p. 605–612.

91. Platt, L., et al., Changes in HIV prevalence and risk among new injecting drug users in a Russian City of high HIV prevalence. *Journal of Acquired Immune Deficiency Syndromes*, 2008. 47(5): p. 623–631. 10.1097/QAI.0b013e318165dbf7.
92. Gyarmathy, V. A., et al., Liquid drugs and high dead space syringes may keep HIV and HCV prevalence high—a comparison of Hungary and Lithuania. *European Addiction Research*, 2010. 16(4): p. 220–228.
93. Rhodes, T., et al., Prevalence of HIV, hepatitis C and syphilis among injecting drug users in Russia: a multi-city study. *Addiction*, 2006. 101(2): p. 252–266.
94. Longfield, K., et al., Youth perspectives on drug use, heroin, and risk for HIV/AIDS in Tajikistan and Uzbekistan, Central Asia. 2005. Population Services International Research Division.
95. Todd, C. S., et al., Prevalence and correlates of risky sexual behaviors among injection drug users in Tashkent, Uzbekistan. *AIDS Care*, 2007. 19(1): p. 122–129.
96. Uuskula, A., et al., High prevalence of blood-borne virus infections and high-risk behavior among injecting drug users in Tallinn, Estonia. *International Journal of STD & AIDS*, 2007. 18(1): p. 41–46.
97. Bruckova, M., et al., Short report: HIV infection among commercial sex workers and injecting drug users in the Czech Republic. *American Journal of Tropical Medicine and Hygiene*, 2006. 75(5): p. 1017–1020.
98. UNGASS, *Country progress report: Finland*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
99. Stark, K., et al., A syringe exchange programme in prison as prevention strategy against HIV infection and hepatitis B and C in Berlin, Germany. *Epidemiology and Infection*, 2005. 134(04): p. 814.
100. Nikolaou, K., et al., Hepatitis C, Hepatitis B and HIV infections in intravenous drug users in Greece and associated risk behavior. *Clinical Toxicology*, 2010. Conference: 2010 International Congress of the European Association of Poisons Centres and Clinical Toxicologists, Bordeaux, France. Conference Start: May 11, 2010 to May 14, 2010. Conference Publication: (var.pages). 48(3) (pp. 307).
101. Grogan, L., et al., Bloodborne virus infections among drug users in Ireland: a retrospective cross-sectional survey of screening, prevalence, incidence and hepatitis B immunisation uptake. *Irish Journal of Medical Science*, 2005. 174(2): p. 14–20.
102. Barrio, G., et al., Prevalence of HIV infection among young adult injecting and non-injecting heroin users in Spain in the era of harm reduction programmes: gender differences and other related factors. *Epidemiology and Infection*, 2006. 135(04): p. 592.
103. de la Fuente, L., Injecting and HIV prevalence among young heroin users in three Spanish cities and their association with the delayed implementation of harm reduction programmes. *Journal of Epidemiology & Community Health*, 2006. 60(6): p. 537–542.
104. Folcha, C., M. Meroñob, and J. Casabona, Factores asociados a la práctica de compartir jeringuillas usadas entre usuarios de droga por vía parenteral reclutados en la calle. *Medicina clinica* (Barcelona). 2006. 127(14): p. 526–532.
105. Hurtado Navarro, I., et al., Differences between women and men in serial HIV prevalence and incidence trends. *European Journal of Epidemiology*, 2008. 23(6): p. 435–440.

106. Muga R, S. A., et al., Significant reductions of HIV prevalence but not of hepatitis C virus infections in injection drug users from metropolitan Barcelona: 1987–2001. *Drug and Alcohol Dependence*, 2006. 82: p. S29–S33.

107. Prasad, L. R., et al., Changing epidemiology of HIV anonymous testing in Switzerland for 1996–2006. *Swiss Medical Weekly*, 2009. 139(17–18): p. 256–263.

108. Gerlich, M., et al., Prevalence of hepatitis and HIV infections and vaccination rates in patients entering the heroin-assisted treatment in Switzerland between 1994 and 2002. *European Journal of Epidemiology*, 2006. 21(7): p. 545–549.

109. Health Protection Scotland, *HPS weekly report*, 2006, NHS National Services Scotland.

110. Health Protection Scotland, *HPS weekly report*, 2007, NHS National Services Scotland.

111. Judd, A., et al., Incidence of hepatitis C virus and HIV among new injecting drug users in London: prospective cohort study. *BMJ*, 2005. 330: p. 24–25.

112. Health Protection Agency, Health Protection Scotland, Public Health Wales, Communicable Disease Surveillance Centre Northern Ireland, and the Centre for Research on Drugs and Health Behaviour, *Shooting up: infections among injecting drug users in the United Kingdom 2010. An update*. Public Health England.

113. Public Health England, U., London, Unlinked Anonymous Survey of Injecting Drug Users (IDUs).

114. UNGASS, *Country progress report: Republic of Armenia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2008.

115. UNGASS, *Country progress report: Republic of Armenia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.

116. UNGASS, *Country progress report: Azerbaijan*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.

117. Kechin, E. A., Studies conducted within the National System for monitoring and evaluation of HIV/AIDS in the Republic of Belarus in 2009: a collection of articles, edited by E. A. Kechin, 2010, State Republican Center of Hygiene, Epidemiology and Public Health: Minsk.

118. UNGASS, Republic of Belarus: National report on the implementation of the declaration of commitment on HIV/AIDS, United Nations General Assembly Special Session on HIV/AIDS, Editor 2008: Minsk.

119. Wilson, T. E., et al., The HIV prevention needs of injection drug users in Estonia. *International Journal of STD & AIDS*, 2007. 18(6): p. 389–391.

120. UNGASS, *Country Progress Report: Estonia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.

121. Uuskula, A., et al., Emergent properties of HIV risk among injection drug users in Tallinn, Estonia: synthesis of individual and neighbourhood-level factors. (Special Issue: Epidemiology and prevention of STDs: the role of emergent properties and structural patterns). *Sexually Transmitted Infections*, 2010. 86(Suppl. 3): p. iii79–iii84.

122. Todadze, K., and G. Lezhava, Implementation of drug substitution therapy in Georgia. *Central European Journal of Public Health*, 2008. 16(3): p. 121–123.

123. Dershem, L., et al., Characteristics, high-risk behaviors and knowledge of STI/HIV/*AIDS*, and STI/HIV prevalence of facility-based female sex workers in Batumi,

Georgia: 2004–2006. Report on two behavioral surveillance surveys with a biomarker component for the SHIP Project. USAID Cooperative Agreement No. 114–A-00–02–00095–002007: Tbilisi, *Save the Children*, 2007 Sep.

124. UNGASS, *Country progress report: Latvia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
125. UNGASS, *Country progress report: Republic of Moldova*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010: Chisinau.
126. Abdala, N., et al., Sexually transmitted infections, sexual risk behaviors and the risk of heterosexual spread of HIV among and beyond IDUs in St. Petersburg, Russia. *European Addiction Research*, 2008. 14(1): p. 19–25.
127. Gyarmathy, V. A., et al., Correlates of unsafe equipment sharing among injecting drug users in St. Petersburg, Russia. *European Addiction Research*, 2009. 15(3): p. 163–170.
128. Shaboltas, A. V., et al., HIV prevalence, sociodemographic, and behavioral correlates and recruitment methods among injection drug users in St. Petersburg, Russia. *Journal of Acquired Immune Deficiency Syndromes*, 2006. 41(5): p. 657–663. 10.1097/01.qai.0000220166.56866.22.
129. Raj, A., et al., Correlates of any condom use among Russian narcology patients reporting recent unprotected sex. *AIDS and Behavior*, 2008. 13(2): p. 310–317.
130. *Country Report of the Russian Federation on the Implementation of the Declaration of Commitment on HIV/AIDS*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2008.
131. *Federal Service for Surveillance of Consumer Rights Protection and Human Well-Being, M.o.H.a.S.D.o.t.R.F.*, Country Progress Report of the Russian Federation on the Implementation of the Declaration of Commitment on HIV/AIDS, 2010: Moscow.
132. Gyarmathy, V. A., et al., Unprotected sex in heterosexual partnerships of injecting drug users in St. Petersburg, Russia. *European Addiction Research*, 2011. 15(1): p. 58–64.
133. Niccolai, L. M., et al., The potential for bridging of HIV transmission in the Russian Federation: sex risk behaviors and HIV prevalence among drug users (DUs) and their non-DU sex partners. *Journal of Urban Health*, 2009. 86(Suppl. 1): p. 131–143.
134. Booth, R. E, et al., Predictors of HIV sero-status among drug injectors at three Ukraine sites. *AIDS*, 2006. 20(17): p. 2217–2223.
135. SOCIS-CSPS, I.I.H.A.A.i.U., *Monitoring the Behavior of Injecting Drug Users*, 2008: Kyiv.
136. Booth, R. E., et al., Individual and network interventions with injection drug users in 5 Ukraine cities. *American Journal of Public Health*, 2011. 101(2): p. 336–343.
137. Robbins, C. L., et al., Multicity HIV seroprevalence in street youth, Ukraine. *International Journal of Std & AIDS*, 2010. 21(7): p. 489–496.
138. Sanchez, J. L., et al., High HIV prevalence and risk factors among injection drug users in Tashkent, Uzbekistan, 2003–2004. *Drug and Alcohol Dependence*, 2006. 82: p. S15–S22.
139. Kryukova, V., Overview of epidemiological situation & national response to HIV-infection epidemic in Central Asian countries, in 4th Central Asian HIV Partnership Forum 2009.

140. Inogamov, Z. I., State of the HIV epidemic in the Republic of Uzbekistan Results of the SS in 2007: the results of sentinel surveillance of HIV infection among injecting drug users in 14 sentinel sites of the Republic of Uzbekistan, 2007, 2008: Tashkent.
141. Family Health International (FHI), Albania—Behavioral and Biological Surveillance Study Report, 2006.
142. UNGASS, *National AIDS program: country progress report: Albania*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
143. UNICEF, *Biological and behavioral survey among injection drug users, Bosnia and Herzegovina*, 2007, UNICEF Bosnia and Herzegovina.
144. Baćak, V., et al., *Report on behavioral and biological surveillance among injection drug users in Bosnia and Herzegovina*. 2009, A respondent driven sampling survey, 2009.
145. UNGASS, *Country progress report on monitoring the declaration of commitment on HIV/AIDS: Republic of Bulgaria*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
146. Gjenero-Margan, I., and B. Kolari, Epidemiology of HIV infection and AIDS in Croatia—an overview. *Collegium Antropologicum*, 2006. 30(1): p. 11–16.
147. Begovac, J., Zekan, Šime, Skoko-Poljak, Twenty years of human immunodeficiency virus infection in Croatia—an epidemic that is still in an early stage. *Collegium Antropologicum*, 2006. 30(1): p. 17–23.
148. UNGASS, *Country progress report: Republic of Croatia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
149. UNGASS, *Country progress report: Hungary*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
150. Family Health International (FHI), I., Behavioral and Biological Survey Kosovo 2006.
151. UNGASS, *Country progress report: Republic of Macedonia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
152. UNGASS, *Country progress report: Montenegro*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
153. United Nations Office on Drugs and Crime (UNODC). *HIV, HBV and HCV Behavioral Surveillance Survey among Injecting Drug Users in Bucharest, Romania*. 2010: Bucharest.
154. UNGASS, *Country progress report: Republic of Serbia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
155. UNGASS, *Country progress report: Slovenia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
156. ICON Institute for Public Health. Operational research on key STIs and HIV in Turkey, 2007: Ankara.
157. EuroHIV, *HIV/AIDS Surveillance in Europe*. Mid-year report 2007, Institut de Veille Sanitaire: Saint-Maurice.
158. World Health Organization (WHO). Total population, 2006. Available from: http://www.who.int/countries/en/.
159. European Centre for Disease Prevention and Control/WHO Regional Office for Europe. HIV/AIDS Surveillance in Europe 2010, 2011, European Centre for Disease Prevention and Control: Stockholm.

160. Department of Health and Social Development of the Russian Federation, F.S.f.S.o.C.P.a.H.W., Federal Government Central Science Research Agency Institute of Epidemiology, Federal Research and Methodological Center for Prevention and Control of *AIDS, HIV Infection Newsletter № 35*, 2011: Moscow.
161. Platt, L., et al., High HIV prevalence among injecting drug users in Estonia: implications for understanding the risk environment. *AIDS*, 2006. 20(16): p. 2120–2123.
162. Platt, L., et al., Changes in HIV prevalence and risk among new injecting drug users in a Russian city of high HIV prevalence. *Journal of Acquired Immune Deficiency Syndrome*, 2008. 47(5): p. 623–631.
163. Stachowiak, J. A., et al., Marked ethnic differences in HIV prevalence and risk behaviors among injection drug users in Dushanbe, Tajikistan, 2004. *Drug and Alcohol Dependence*, 2006. 82: p. S7–S14.
164. Niccolai, L. M., et al., High HIV prevalence, suboptimal HIV testing, and low knowledge of HIV-positive serostatus among injection drug users in St. Petersburg, Russia. *AIDS and Behavior*, 2010. 14(4): p. 932–941.
165. Uusküla, A., et al., Outcomes of large-scale syringe exchange in Tallinn, Estonia, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
166. Varban, M., A. Dovbakh, and K. Maksymenko, Violence of sexual partner as a vulnerability factor of female IDU to HIV infection, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
167. Roberts, A., B. Mathers, and L. Degenhardt, Transition to injection: an examination of the HIV risks and contexts of women's initiation to injection drug use, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
168. Rhodes, T., A. Sarang, and M. Simic, Police violence and "fear-based policy" as barriers to HIV prevention: qualitative case studies in Russia and Serbia, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
169. Rhodes, T., et al., Trust, disruption and responsibility in accounts of injecting equipment sharing and hepatitis C risk. *Health, Risk & Society*, 2008. 10(3): p. 221–240.
170. Des Jarlais, D. C., et al., Meta-analysis of the international literature on racial/ethnic disparities in HIV infection among IDUs: first results, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
171. Ursan, M., et al., Harm reduction initiative for Roma injecting drug users, in International Harm Reduction Conference, April 20–23, 2009: Bangkok.
172. Latypov, A., Understanding post 9/11 drug control policy and politics in Central Asia. *International Journal of Drug Policy*, 2009. 20(5): p. 387–391.
173. Bobrova, N., et al., Barriers to accessing drug treatment in Russia: a qualitative study among injecting drug users in two cities. *Drug and Alcohol Dependence*, 2006. 82: p. S57–S63.
174. Platt, L., et al., Measuring risk of HIV and HCV among injecting drug users in the Russian Federation. *The European Journal of Public Health*, 2009. 19(4): p. 428–433.
175. European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). Statistical bulletin 2011. 2011; Available from: http://www.emcdda.europa.eu/stats11.
176. March, J. C., E. Oviedo-Joekes, and M. Romero, Romero, Inconsistent condom use among socially excluded heroin users. *Gaceta Sanitaria*, 2007. 21(4): p. 321–328.
177. Bravo, M. J., et al., Use of supervised injection facilities and injection risk behaviors among young drug injectors. *Addiction*, 2009. 104(4): p. 614–619.

178. Etcheverry, M. F., et al., Pilot study assessing HIV vaccine trial readiness among female sex workers, injection and non-injection drug users, and men who have sex with men in Spain. *AIDS and Behavior*, 2010. 14(3): p. 607–617.
179. UNGASS, *Country progress report: Sweden*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
180. Dubois-Arber F., et al., Trends in drug consumption and risk of transmission of HIV and hepatitis C virus among injecting drug users in Switzerland, 1993–2006. *Eurosurveillance*, 2008. 13(22).
181. Judd, A., et al., Incidence of hepatitis C virus and HIV among new injecting drug users in London: prospective cohort study. *BMJ*, 2005. 330(7481): p. 24–25.
182. UNGASS, *Country progress report: Bosnia and Herzegovina*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
183. Racz, J., Injecting drug use, risk behavior and risk environment in Hungary: a qualitative analysis. *International Journal of Drug Policy*, 2005. 16(5): p. 353–362.
184. UNGASS, *Country progress report: Romania*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
185. Rhodes, T., et al., Police violence and sexual risk among female and transvestite sex workers in Serbia: qualitative study. *BMJ*, 2008. 337: p.a811.
186. UNGASS, *Republic of Belarus: National Report on the Implementation of the Declaration of Commitment on HIV/AIDS*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010: Minsk.
187. Uusküla, A., et al., Surveillance of HIV, hepatitis B virus, and hepatitis C virus in an Estonian injection drug–using population: sensitivity and specificity of testing syringes for public health surveillance. *Journal of Infectious Diseases*, 2006. 193(3): p. 455–457.
188. UNGASS, *Country Progress Report: Georgia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
189. *Save The Children*, T.-C.f.I.a.C.o.R.H., Infectious Diseases, AIDS and Clinical Immunology Research Center, Characteristics, High-Risk Behaviors and Knowledge of STI/HIV/AIDS, and Prevalence of HIV, Syphilis and Hepatitis Among MSM in Tbilisi, Georgia: 2007, 2008, PATH, USAID.
190. UNGASS, *Country report: Kazakhstan*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
191. UNGASS, *Country progress report: Lithuania*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
192. Badrieva, L., et al., Lower injection-related HIV-1 risk associated with participation in a harm reduction program in Kazan, Russia. *AIDS Education and Prevention*, 2007. 19(1): p. 11.
193. Samet, J. H., et al., Mitigating risky sexual behaviors among Russian narcology hospital patients: the PREVENT (Partnership to reduce the epidemic via Engagement in Narcology Treatment) randomized controlled trial. *Addiction*, 2008. 103(9): p. 1474–1483.
194. Walley, A. Y., et al., Implications of cannabis use and heavy alcohol use on HIV drug risk behaviors in Russian heroin users. *AIDS and Behavior*, 2007. 12(4): p. 662–669.
195. Russian Federation Federal Service for Surveillance of Consumer Rights Protection and Human Well-Being. *Country Report of the Russian Federation on the Implementation*

of the Declaration of Commitment on HIV/AIDS. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010: Moscow.

196. Gyarmathy, V. A., et al., Injecting equipment sharing in Russian drug injecting dyads. *AIDS and Behavior*, 2010. 14(1): p. 141–151.
197. Cepeda, J., et al., Injecting drug network size, stability, and trust among injecting drug users in St. Petersburg, Russia are significantly associated with HIV-risk behaviors, in XVIII International AIDS Conference, July 18-13, 2010: Vienna, Austria.
198. Booth, C. L., et al., Prevalence and predictors of antiretroviral drug resistance in newly diagnosed HIV-1 infection. *Journal of Antimicrobial Chemotherapy*, 2007. 59(3): p. 517–524.
199. UNGASS, *National report on monitoring progress towards the UNGASS declaration of commitment on HIV/AIDS: Ukraine*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010: Kyiv.
200. UNGASS, *Country progress report: Uzbekistan*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
201. March, J., et al., Controlled trial of prescribed heroin in the treatment of opioid addiction. *Journal of Substance Abuse Treatment*, 2006. 31(2): p. 203–211.
202. Folch, C., et al., Social characteristics, risk behaviors and differences in the prevalence of HIV/sexually transmitted infections between Spanish and immigrant female sex workers in Catalonia, Spain. [Spanish]. *Medicina Clinica*, 2009. 132(10): p. 385–388.
203. de la Fuente, L., et al., Increasing early diagnosis of HIV through rapid testing in a street outreach program in Spain. *AIDS Patient Care and STDs*, 2009. 23(8): p. 625–629.
204. Hurtado, I., et al., Trends in HIV testing, serial HIV prevalence and HIV incidence among people attending a center for AIDS prevention from 1988 to 2003. *Sexually Transmitted Infections*, 2006. 83(1): p. 23–28.
205. Folch, et al., Factors associated with unprotected sexual intercourse with steady male, casual male, and female partners among men who have sex with men in Barcelona, Spain. 2006. 18. New York, NY, ETATS-UNIS: Guilford. p. 16.
206. Booth, R. E., et al., Gender differences in sex risk behaviors among Ukraine injection drug users. Journal of Acquired Immune Deficiency Syndrome, 2007. 46(1): p. 112–117.

Sex Workers

1. Donoghoe, M. C., and A. R. Stengaard, Access to antiretroviral therapy (ART) for injecting drug users in the WHO European Region 2002–2008, in XVIII International AIDS Conference, July 18–13, 2010: Vienna, Austria.
2. UNAIDS, *Sex work, HIV/AIDS: A technical update*. 2002.
3. TAMPEP and L. Brussa, Sex work in Europe: a mapping of the prostitution scene in 25 countries, in sex work, migration and health, TAMPEP. International, Editor. 2009, TAMPEP International: Amsterdam.
4. Platt, L., et al., Risk of sexually transmitted infections and violence among indoor-working sex workers in London: the effect of migration from Eastern Europe. *Sexually Transmitted Infections*, 2011. 87(5): p. 377–84.
5. Day, S., and H. Ward, Approaching health through the prism of stigma: research in seven European countries, in sex work, mobility and health in Europe, edited by H. W. S. Day. 2006, Kegan Paul: London.

6. Creighton, S., S. Tariq, and G. Perry, Sexually transmitted infections among United Kingdom street-based sex workers. *Sexually Transmitted Infections*, 2008. 84(1): p. 32–33.
7. Trani, F., et al., Female street sex workers and sexually transmitted infections: their knowledge and behavior in Italy. *Journal of Infection*, 2006. 52(4): p. 269–275.
8. Wiessing, L., et al., EMCDDA annual report 2009: cocaine and heroin maintain firm hold on Europe's drug scene. *Eurosurveillance*, 2009. 14(46).
9. Cwikel, J. G., et al., Sexually transmissible infections among illegal female sex workers in Israel. *Sexual Health*, 2006. 3(4): p. 301–303.
10. Linhart, Y., et al., Sexually transmitted infections among brothel-based sex workers in Tel-Aviv area, Israel: high prevalence of pharyngeal gonorrhea. *International Journal of STD and AIDS*, 2008. 19(10): p. 656–659.
11. Smolskaya, T. T., et al., HIV sentinel surveillance in high-risk groups in Azerbaijan, the Republic of Moldova and the Russian Federation, WHO Regional Office for Europe, Editor. 2004, WHO: Copenhagen.
12. Shakarishvili, A., et al., Sex work, drug use, HIV infection, and spread of sexually transmitted infections in Moscow, the Russian Federation. *The Lancet*, 2005. 366(9479): p. 57–60.
13. Platt, L., et al., Impact of gender and sex work on sexual and injecting risk behaviors and their association with HIV positivity among injecting drug users in an HIV epidemic in Togliatti City, the Russian Federation. *Sexually Transmitted Diseases*, 2005. 32(10): p. 605–612.
14. Platt, L., et al., Effects of sex work on the prevalence of syphilis among injection drug users in 3 Russian cities. *American Journal of Public Health*, 2007. 97(3): p. 478–485.
15. Sergeyev, B., and A. Fedorova, the Russian Federation (2006): HIV/AIDS TRaC study among health services and health providers targeting high-risk groups in St. Petersburg. First round. Social Marketing Research Series; PSI Dashboard. 2006: Washington, D.C., PSI, Research Division, 2006. p. 35.
16. Gazi, H., et al., Prevalence of Chlamydia trachomatis/Neisseria gonorrheae and human papilloma virus among women-at risk in the Aegean region of Turkey, and their knowledge about HIV/AIDS. *West Indian Medical Journal*, 2008. 57(4): p. 398–402.
17. Family Health International (FHI). Behavioral and biological surveillance study Kosovo 2006, in impact: implementing AIDS prevention and care project. 2007, Family Health International.
18. Bruckova, M., et al., HIV infection among commercial sex workers and injecting drug users in the Czech Republic. *American Journal of Tropical Medicine and Hygiene*, 2006. 75(5): p. 1017–1020.
19. van Veen, M. G., et al., HIV and sexual risk behavior among commercial sex workers in the Netherlands. *Archives of Sexual Behavior*, 2010. 39(3): p. 714–723.
20. Papadogeorgaki, H., et al., Prevalence of sexually transmitted infections in female sex workers in Athens, Greece–2005. *European Journal of Dermatology*, 2006. 16(6): p. 662–665.
21. Vall-Mayans, M., et al., Sexually transmitted Chlamydia trachomatis, Neisseria gonorrheae, and HIV-1 infections in two at-risk populations in Barcelona: female street prostitutes and STI clinic attendees. *International Journal of Infectious Diseases*, 2007. 11(2): p. 115–122.
22. Church, S., et al., Violence by clients towards female prostitutes in different work settings: questionnaire survey. *BMJ*, 2001. 322: p. 524–525.

23. Sanders, T. and R. Campbell, Designing out vulnerability, building in respect: violence, safety and sex work policy. *The British Journal of Sociology*, 2007. 58(1): p. 1–19.
24. International HIV/AIDS Alliance, Behavioral monitoring and HIV infection prevalence among female sex workers as a component of second generation surveillance. 2009, International HIV/AIDS Alliance: Kiev.
25. Jeal, N., and C. Salisbury, Health needs and service use of parlour-based prostitutes compared with street-based prostitutes: a cross-sectional survey. *British Journal of Obstetrics and Gynaecology*, 2007. 114(7): p. 875–881.
26. Sexton, S., Over the parapet: a short study into the needs and aspirations of sex workers in Edinburgh, SCOT-PEP, Editor. 2009: Edinburgh.
27. Belza, M. J., Prevalence of HIV, HTLV-I and HTLV-II among female sex workers in Spain, 2000–2001. *European Journal of Epidemiology*, 2004. 19(3): p. 279–282.
28. Folch, C., et al., Prevalence of human immunodeficiency virus, Chlamydia trachomatis, and Neisseria gonorrheae and risk factors for sexually transmitted infections among immigrant female sex workers in Catalonia, Spain. *Sexually Transmitted Diseases*, 2008. 35(2): p. 178–183.
29. Matteelli, A., et al., Chlamydia trachomatis genital infection in migrant female sex workers in Italy. *International Journal of STD & AIDS*, 2003. 14(9): p. 591–595.
30. Ward, H., et al., Declining prevalence of STIs in the London sex industry, 1985 to 2002. *Sexually Transmitted Infections*, 2004. 80(5): p. 374–376.
31. UNFPA and UNICEF, *Consultation on strategic information and HIV prevention among most-at-risk adolescents*. Research Tool-kit. 2009. UNICEF.
32. Kyrychenko, P., and V. Polonets, High HIV risk profile among female commercial sex workers in Vinnitsa, Ukraine. *Sexually Transmitted Infections*, 2005. 81(2): p. 187–188.
33. Smolskaya, T. T., et al., HIV sentinel surveillance in high-risk groups in Azerbaijan, the Republic of Moldova and in the Russian Federation 2003, World Health Organization.
34. Population Services International Research Division, the Russian Federation (2006): HIV/AIDS TRaC study among injecting drug users in Samara and Saratov first round, in social marketing research series. 2007, PSI: Moscow.
35. Dershem, L., et al., *Characteristics, high-risk behaviors and knowledge of STI/HIV/AIDS, and STI/HIV prevalence of street-based female sex workers in Tbilisi, Georgia: 2004–06*. Report on three behavioral surveillance surveys with a biomarker component for the SHIP Project. USAID Cooperative Agreement No. 114–A-00–02–00095–00. 2007: Tbilisi, Georgia, *Save the Children*, 2007 Sep.
36. Uuskula, A., et al., A study on HIV and hepatitis C virus among commercial sex workers in Tallinn. *Sexually Transmitted Infections*, 2008. 84(3): p. 189–191.
37. International Harm Reduction Development Program, Women, Harm Reduction, and HIV, in *Assessment in Action*. 2009, Open Society Institute.
38. Cusick, L., A. Martin, and T. May, Vulnerability and involvement and in drug use and sex work. 2003, Home Office: London.
39. Ward, H., et al., Health issues associated with increasing use of "crack" cocaine among female sex workers in London. *Sexually Transmitted Infections*, 2000. 76: p. 292–293.
40. Sloss, C. M. and G. W. Harper, When street sex workers are mothers. *Archives of Sexual Behavior*, 2004. 33(4): p. 329–341.

41. Bell, J. and L. Harvey-Dodds, Pregnancy and injecting drug use. *BMJ*, 2008. 336(7656): p. 1303–1305.
42. Gupta, P., L. Guglani, and D. Shah, Exploring the power of Powerpoint. *Indian Pediatrics*, 2002. 39(6): p. 539–548.
43. Dunkle, K. L., et al., Gender-based violence, relationship power, and risk of HIV infection in women attending antenatal clinics in South Africa. *The Lancet*, 2004. 363(9419): p. 1415–1421.
44. Campbell, J. C., Health consequences of intimate partner violence. *The Lancet*, 2002. 359(9314): p. 1331–1336.
45. Watts, C., C. Zimmerman, and B. Roche, Violence against women and trafficking: a priority for HIV programmes? HIV/AIDS in Europe: moving from death sentence to chronic disease management, edited by S. Matic, J. V. Lazarus, and M. C. Donoghoe, Editors, 2006, Geneva: World Health Organization.
46. Watts, C. and C. Zimmerman, Violence against women: global scope and magnitude. *The Lancet*, 2002. 359(6): p. 1232–1237.
47. Rhodes, T., et al., Police violence and sexual risk among female and transvestite sex workers in Serbia: qualitative study. *BMJ*, 2008. 337(7669).
48. Shannon, K., et al., Prevalence and structural correlates of gender-based violence among a prospective cohort of female sex workers. *BMJ*, 2009. 339: p. b2939.
49. Shannon, K., et al., Structural and environmental barriers to condom use negotiation with clients among female sex workers: implications for HIV-prevention strategies and policy. *American Journal of Public Health*, 2009. 99(4): p. 659–665.
50. Simic, M. and T. Rhodes, Violence, dignity and HIV vulnerability: street sex work in Serbia. *Sociology of Health & Illness*, 2009. 31(1): p. 1–16.
51. Scambler, G., Sex work stigma: opportunist migrants in London. Sociology-the *Journal of the British Sociological Association*, 2007. 41(6): p. 1079–1096.
52. Strathdee, S., *Health risks and power among female sex workers in Moscow*. SIECUS Report, Editor. 2005.
53. Markosyan, K. M., et al., Correlates of HIV risk and preventive behaviors in Armenian female sex workers. *AIDS and Behavior*, 2007. 11(2): p. 325–334.
54. Stulhofer, A., et al., Female sex work and HIV risks in Croatia. AIDS Care-Psychological and Socio—Medical Aspects of AIDS/HIV, 2009. 21(11): p. 1439–1446.
55. Baral, S., et al., Male sex workers in Moscow, Russia: a pilot study of demographics, substance use patterns, and prevalence of HIV-1 and sexually transmitted infections. *AIDS Care*, 2010. 22(1): p. 112–118.
56. Crago, A. L., Arrest the violence. Human rights abuses against sex workers in Central and Eastern Europe and Central Asia. 2009, Sex Workers' Rights Advocacy Network in Central and Eastern Europe and Central Asia.
57. Gorry, J., K. Roen, and J. Reilly, Selling yourself? The psychological impact of street sex work and factors affecting support seeking. *Health & Social Care in the Community*, 2010. 18(5): p. 492–499.
58. Grenfell, P., et al., Eastern European women selling sex in London: social networks, agency and risk, in International Harm Reduction Conference, April 20–23, 2009: Bangkok.

59. Sanders, T., A continuum of risk? The management of health, physical and emotional risks by female sex workers. *Sociology of Health & Illness*, 2004. 26(5): p. 557–574.
60. Sanders, T., Behind the personal ads: the indoor sex markets in Britain. Sex Work Now, edited by R. O. N. Campbell, M, Editor 2006: Willan Publishing, Cullompton.
61. Cox, G. and T. Whitaker, Drug use, sex work and the risk environment in Dublin. 2009, National Advisory Committee on Drugs.
62. Whitaker, T., P. Ryan, and G. Cox, Stigmatization among drug-using sex workers accessing support services in Dublin. *Qualitative Health Research*, 2011. e pub.
63. Rössler, W., et al., The mental health of female sex workers. *Acta Psychiatrica Scandinavica*, 2010. 122: p. 143–152.
64. European Centre for Disease Prevention and Control, Implementing the Dublin Declaration on Partnership to Fight HIV/AIDS in Europe and Central Asia: 2010 progress report. 2010, ECDC: Stockholm.
65. Gutierrez, M., et al., Prevalence of HIV-1 non-B subtypes, syphilis, HTLV, and hepatitis B and C viruses among immigrant sex workers in Madrid, Spain. *Journal of Medical Virology*, 2004. 74(4): p. 521–527.
66. Linhart, Y., et al., Sexually transmitted infections among brothel-based sex workers in Tel-Aviv area, Israel: high prevalence of pharyngeal gonorrhea. *International Journal of STD & AIDS*, 2008. 19(10): p. 656–659.
67. Nigro, L., et al., Prevalence of HIV and other sexually transmitted diseases among Colombian and Dominican female sex workers living in Catania, eastern Sicily. *Journal of Immigrant and Minority Health*, 2006. 8(4): p. 319–323.
68. EuroHIV, HIV/AIDS Surveillance in Europe. Mid-year report 2006, in HIV/AIDS Surveillance in Europe, EuroHIV, Editor. 2007, Institut de Veille Sanitaire: Saint-Maurice.
69. Nielsen, S., et al., STI rates and risk factors among female sex workers attending STI testing sites in Germany, in International Society for Sexually Transmitted Disease Research. 2011: Quebec.
70. Day, S. and H. Ward, Approaching health through the prism of stigma: research in seven European countries, in *Sex Work, Mobility and Health in Europe*, edited by H. W. S. Day, 2004, Kegan Paul: London.
71. Ola, T. M. and V. Wiwoloku, HIV prevalence, AIDS knowledge and sexual behavior among female migrant sex workers in Palermo, Italy, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
72. Country Coordination Committee, R.o.K., *UNGASS 2010 Country Progress Report*, Republic of Kazakhstan. 2010: Almaty.
73. UNGASS, *Country progress report: Bosnia and Herzegovina*, United Nations General Assembly Special Session on HIV/AIDS, Editor. 2010.
74. Belgrade Ministry of Health. Research among populations at higher risk of HIV and among people living with HIV/AIDS. Basic results of surveillance research 2009–2010, 2010: Belgrade, Ministry of Health, Republic of Serbia.
75. Gjenero-Morgan, I., and B. Kolarić, Epidemiology of HIV infection and AIDS in Croatia—an overview. *Collegium Antropologicum* 2006. 30(Suppl. 2): p. 11–16.
76. UNGASS, *Country progress report: Republic of Macedonia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
77. Suleymanova, J., H. Gadirova, and S. Khasiyev. Seroepidemiological research of HIV, hepatitis B, C, syphilis and behavioral risk factors among most-at-risk groups in

Azerbaijan, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.

78. Tsereteli, N. and G. Lomidze, Low HIV prevalence among female sex workers in two cities of Georgia—contributing factors, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
79. National Report on the Implementation of the Declaration of Commitment on HIV/AIDS: Lithuania, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010: Vilnius.
80. Republic of Belarus: National Report on the Implementation of the Declaration of Commitment on HIV/AIDS., United Nations General Assembly Special Session on HIV/AIDS, Editor. 2010: Minsk.
81. Country Report of the Russian Federation on the Implementation of the Declaration of Commitment on HIV/AIDS, United Nations General Assembly Special Session on HIV/AIDS, Editor 2008.
82. Rhodes, T., et al., Prevalence of HIV, hepatitis C and syphilis among injecting drug users in Russia: a multi-city study. *Addiction*, 2006. 101(2): p. 252–266.
83. Lomax, N., et al., Management of a syphilis outbreak in street sex workers in east London. *Sexually Transmitted Infections*, 2006. 82(6): p. 437–438.
84. Todd, C. S., et al., Prevalence and correlates of human immunodeficiency virus infection among female sex workers in Tashkent, Uzbekistan. *Sexually Transmitted Diseases*, 2006. 33(8): p. 496–501.
85. Todd, C. S., et al., Prevalence and factors associated with human immunodeficiency virus infection among sex workers in Samarkand, Uzbekistan. *Sexually Transmitted Diseases*, 2009. 36(2): p. 70–72.
86. Sethi, G., et al., HIV, sexually transmitted infections, and risk behaviors in male sex workers in London over a 10 year period. *Sexually Transmitted Infections*, 2006. 82(5): p. 359–363.
87. Reference Group to the United Nations on HIV and Injecting Drug Use, Consensus Statement of the Reference Group to the United Nations on HIV and Injecting Drug Use 2010. 2010.
88. Ongoeva, D., HIV-infection epidemiological analysis among sex workers in Central Asia. 2010: Oblast AIDS Centre, the Kyrgyz Republic.
89. Kolemasova, S., Review of HIV prevention and risk factors associated with HIV infection among sex workers in Uzbekistan, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
90. Saleri, N., et al., Prevalence and incidence of syphilis among South American transgender sex workers in Northern Italy. *Sexually Transmitted Diseases*, 2006. 33(5): p. 334–335.
91. Spizzichino, L., et al., HIV infection among immigrant sex workers in Rome: comparing men, women and transgenders, in XVII International AIDS Conference, August 3–8, 2008: Mexico City, Mexico.
92. Belza, M. J., Risk of HIV infection among male sex workers in Spain. *Sexually Transmitted Infections*, 2005. 81(1): p. 85–88.
93. Mak, R. P., L. Van Renterghem, and A. Traen, Chlamydia trachomatis in female sex workers in Belgium: 1998–2003. *Sexually Transmitted Infections*, 2005. 81(1): p. 89–90.

94. Hourihan, M., et al., Lessons from the syphilis outbreak in homosexual men in east London. *Sexually Transmitted Infections*, 2004. 80(6): p. 509–511.
95. Leuridan, E., et al., Male sex workers in Antwerp, Belgium: a descriptive study. *International Journal of STD and AIDS*, 2005. 16(11): p. 744–748.
96. Aral, S. O., et al., The social organization of commercial sex work in Moscow, Russia. *Sexually Transmitted Diseases*, 2003. 30(1): p. 39–45.
97. Aral, S. O., et al., Commercial sex work, drug use, and sexually transmitted infections in St. Petersburg, Russia. *Social Science & Medicine*, 2005. 60(10): p. 2181–2190.
98. Wasserheit, J. N. and S. O. Aral, The dynamic topology of sexually transmitted disease epidemics: implications for prevention strategies. *Journal of Infectious Diseases*, 1996. 174(Suppl. 2): p. S201–S213.
99. Brunham, R. C. and F. A. Plummer, A general model of sexually transmitted disease epidemiology and its implications for control. *Emergency Medicine Clinics of North America*, 1990. 74(6): p. 1339–1352.
100. D'Antuono, A., et al., Prevalence of STDs and HIV infection among immigrant sex workers attending an STD centre in Bologna, Italy. *Sexually Transmitted Infections*, 2001. 77(3): p. 220.
101. Dershem, L., et al., *Characteristics, high-risk behaviors and knowledge of STI/HIV/AIDS, and STI/HIV prevalence of facility-based female sex workers in Batumi, Georgia: 2004–2006*. Report on two behavioral surveillance surveys with a biomarker component for the SHIP Project. USAID Cooperative Agreement No. 114–A-00–02–00095–00. 2007: Tbilisi, Georgia, *Save the Children*, 2007 Sep.
102. The United Kingdom Collaborative Group for HIV and STI Surveillance, Testing times. HIV and other sexually transmitted infections in the United Kingdom. 2007, H. P. Agency, Editor 2007, Public Health England, Centre for Infections: London.
103. Free, C., I. Roberts, and M. McGuire, Sex workers' accounts of condom use: implications for condom production, promotion and health policy. *Journal of Family Planning and Reproductive Health Care*, 2007. 33(2): p. 107–111.
104. Spruyt, A., et al., Identifying condom users at risk for breakage and slippage: findings from three international sites. *American Journal of Public Health*, 1998. 88(2): p. 239–244.
105. Messiah, A., et al., Condom breakage and slippage during heterosexual intercourse: a French national survey. French National Survey on Sexual Behavior Group (ACSF). *American Journal of Public Health*, 1997. 87(3): p. 421–424.
106. Todd, C. S., et al., Prevalence and correlates of condom use and HIV testing among female sex workers in Tashkent, Uzbekistan: implications for HIV transmission. *AIDS and Behavior*, 2007. 11(3): p. 435–442.
107. EuroHIV, *HIV/AIDS Surveillance in Europe*. Mid-year report 2005. 2006, Institut de veille sanitaire: Saint-Maurice.
108. Ward, H., and S. E. Day, What happens to women who sell sex? Report of a unique occupational cohort. *Sexually Transmitted Infections*, 2006. 82(5): p. 413–417.
109. Platt, L., et al., Risk of sexually transmitted infections and violence among indoor-working female sex workers in London: the effect of migration from Eastern Europe. *Sexually Transmitted Infections*, 2011. 87(5): p. 377–84.
110. Qyra, S. T., et al., Behavioral risk factors and prevalence of HIV and other STIs among female sex workers in Tirana, Albania. *New Microbiologica*, 2011. 34(1): p. 105–108.

111. UNGASS, *Country progress report: Bosnia and Herzegovina*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
112. EuroHIV, *Report on the EuroHIV 2006 Survey on HIV and AIDS Surveillance in the WHO European Region*. 2007, Institut de Veille Sanitaire: Saint-Maurice.
113. UNGASS, *Country progress report on monitoring the declaration of commitment on HIV/AIDS: Republic of Bulgaria*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
114. Gjenero-Margan, I., and B. Kolari, Epidemiology of HIV infection and AIDS in Croatia—an overview. *Collegium Antropologicum*, 2006: p. 11–16.
115. Bruckova, M., et al., *Short report: HIV infection among commercial sex workers and injecting drug users in the Czech Republic*. *American Journal of Tropical Medicine and Hygiene*, 2006. 75(5): p. 1017–1020.
116. UNGASS, *Country progress report: Republic of Macedonia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
117. UNGASS, *Country progress report: Montenegro*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
118. Belgrade Ministry of Health, Research among populations at higher risk to HIV and among people living with HIV/AIDS. Basic results of surveillance research 2009–2010. 2010, Ministry of Health, Republic of Serbia: Belgrade.
119. Family Health International (FHI), Serbia—Behavioral and Biological Surveillance Study Report. 2006.
120. ICON Institute for Public Health, Operational Research on key STIs and HIV in Turkey. 2007: Ankara.
121. UNGASS, *Country progress report: Republic of Armenia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
122. UNGASS, *Country progress report: Republic of Armenia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2008.
123. Suleymanova, J., H. Gadirova, and S. Khasiyev, Seroepidemiological research of HIV, hepatitis B, C, syphilis and behavioral risk factors among most-at-risk groups in Azerbaijan, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
124. Smolskaya, T. T., et al., HIV sentinel surveillance in high-risk groups in Azerbaijan, the Republic of Moldova and in the Russian Federation. 2004, World Health Organization, Europe.
125. UNGASS, *Country progress report: Belarus*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
126. UNGASS, *Country progress report: Lithuania*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
127. UNGASS, *Country progress report: Republic of Moldova*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010: Chisinau.
128. Federal Service for Surveillance of Consumer Rights Protection and Human Well-Being Ministry of Health and Social Development of the Russian Federation, Country Progress Report of the Russian Federation on the Implementation of the Declaration of Commitment on HIV/AIDS. 2010: Moscow.
129. UNGASS, *National report on monitoring progress towards the UNGASS declaration of commitment on HIV/AIDS: Ukraine*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010: Kyiv.

130. Pohorila, N., et al., Behavior monitoring and HIV-infection prevalence among injection drug users. 2010, ICF "International HIV/AIDS Alliance in Ukraine": Kyiv.
131. Diez, M., et al., HIV prevalence among men and transgender sex workers in Spain, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.
132. UNGASS, *Country progress report: Kyrgyzstan*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
133. USAID, USAID IDUs Tbilisi, Georgia 2007. l.
134. Sirmatel, F., et al., Chlamydia trachomatis antigen positivity in women in risk groups and its relationship with the use of antibiotics. *Japanese Journal of Infectious Diseases*, 2005. 58(1): p. 41–43.
135. United Nations Office on Drugs and Crime (UNODC). *HIV, HBV and HCV Behavioral Surveillance Survey among Injecting Drug Users in Bucharest, Romania*. 2010: Bucharest.
136. Ilić, D., S. Šipetić, and V. Bjegović, Risk of HIV infection among indoor and street sex workers and their use of health services in Belgrade, Serbia. *Srpski arhiv za celokupno lekarstvo*, 2010. (3–4): p. 219–224.
137. Markosyan, K., et al., A randomized controlled trial of an HIV prevention intervention for street-based female sex workers in Yerevan, Armenia: preliminary evidence of efficacy. *AIDS and Behavior*, 2010. 14(3): p. 530–537.
138. Sergeyev, B., and A. Fedorova, the Russian Federation (2006): HIV/AIDS TRaC study among street-based female sex workers in Samara and Saratov. Social Marketing Research Series; PSI Dashboard. 2006: Washington, DC: PSI, Research Division; p. 27.
139. Kyrychenko, P., and V. Polonets, High HIV risk profile among female commercial sex workers in Vinnitsa, Ukraine. *Sexually Transmitted Infections*, 2005. 81(2): p. 187–188.
140. Todd, C. S., et al., Utilization of contraception and abortion and its relationship to HIV infection among female sex workers in Tashkent, Uzbekistan. *Contraception*, 2006. 74(4): p. 318–323.

Men Who Have Sex with Men

1. Jin, F., et al., UAI, risk reduction behaviors, and subsequent HIV infection in a cohort of homosexual men. *AIDS*, 2009. 23(2): p. 243–252. 10.1097/QAD.0b013e32831fb51a.
2. del Romero, J., et al., Evaluating the risk of HIV transmission through unprotected or genital sex. *AIDS*, 2002. 16(9): p. 1296–1297.
3. Vitinghoff, E., et al., Per-contact risk of human immunodeficiency virus transmission between male sexual partners. *American Journal of Epidemiology*, 1999. 150(3): p. 306–311.
4. Hurtado, I., et al., Intervention preventiva en lugares de interaccion social de hombres que mantienen relaciones sexuales con otros hombres. *Gaceta Sanitaria*, 2010. 24(1): p. 78–80.
5. Fernández-Dávila, P., and K. Zaragoza Lorca, Internet and sexual risk in men who have sex with men. *Gaceta Sanitaria*, 2009. 23(5): p. 380–387.
6. Folch, C., R. Munoz, K. Zaragoza, and J. Casabona, Sexual risk behavior and its determinants among men who have sex with men in Catalonia, Spain 2009,

Saint-Maurice, FRANCE: Centre européan pour la surveillance épidémiologique du sida. 7.

7. Hurtado Navarro, I., et al., Differences between women and men in serial HIV prevalence and incidence trends. *European Journal of Epidemiology*, 2008. 23(6): p. 435–440.
8. Schwappach, D. L. B., and P. Bruggmann, An integrated model of care to counter high incidence of HIV and sexually transmitted diseases in men who have sex with men—initial analysis of service utilizers in Zurich. *BMC Public Health*, 2008. 8: p. 180.
9. Prasad, L. R., et al., Changing epidemiology of HIV anonymous testing in Switzerland for 1996–2006. *Swiss Medical Weekly*, 2009. 139(17–18): p. 256–263.
10. Adam, P. C., I. Teva, and J. B. de Wit, Balancing risk and pleasure: sexual self-control as a moderator of the influence of sexual desires on sexual risk-taking in men who have sex with men. *Sexually Transmitted Infections*, 2008. 84(6): p. 463–467.
11. van der Bij, A. K., et al., Increase of sexually transmitted infections, but not HIV, among young homosexual men in Amsterdam: are STIs still reliable markers for HIV transmission? *Sexually Transmitted Infections*, 2005. 81: p. 34–37.
12. Dukers, N. H., et al., HIV incidence and HIV testing behavior in men who have sex with men: using three incidence sources, the Netherlands, 1984–2005. *AIDS*, 2007. 21(4): p. 491–499.
13. Stolte, I. G., et al., Low HIV-testing rates among younger high-risk homosexual men in Amsterdam. *Sexually Transmitted Infections*, 2007. 83: p. 387–391.
14. Brown, A. E., et al., Implications for HIV testing policy derived from combining data on voluntary confidential testing with viral sequences and serological analyses. *Sexually Transmitted Infections*, 2009. 85(1): p. 4–9.
15. Macdonald, N., et al., Factors associated with HIV seroconversion in gay men in England at the start of the 21st century. *Sexually Transmitted Infections*, 2008. 84(1): p. 8–13.
16. Arumainayagam, J., et al., Value of targeting at-risk populations at outreach venues: findings from a local sauna. *International Journal of STD & AIDS*, 2009. 20(9): p. 642–643.
17. Mor, Z., et al., Gay men who engage in substance use and sexual risk behavior: a dual-risk group with unique characteristics. *International Journal of STD & AIDS*, 2008. 19(10): p. 698–703.
18. ICON Institute for Public Health, Operational research on key STIs and HIV in Turkey, 2007: Ankara.
19. Tripathi, A., K. Rüütel, and R. D. Parker, HIV risk behavior knowledge, substance use and unprotected sex in men who have sex with men in Tallinn, Estonia. *Eurosurveillance* 2009. 14(48).
20. Baral, S., et al., Male sex workers in Moscow, Russia: a pilot study of demographics, substance use patterns, and prevalence of HIV-1 and sexually transmitted infections. *AIDS Care*, 2010. 22(1): p. 112–118.
21. Mirandola, M., et al., HIV bio-behavioral survey among men who have sex with men in Barcelona, Bratislava, Bucharest, Ljubljana, Prague and Verona, 2008–2009. (Special Issue: HIV/AIDS and other sexually transmitted infections [STI] in men who have sex with men [MSM]—trends and behavioral surveillance.) *Eurosurveillance*, 2009. 14(48): p. 19427.

22. Amirkhanian, Y. A., et al., HIV/STD prevalence, risk behavior, and substance use patterns and predictors in Russian and Hungarian sociocentric social networks of men who have sex with men. *AIDS Education and Prevention*, 2009. 21(3): p. 266–279.
23. Sharra, E., and R. Bani, An analysis of HIV-related risk behaviors of men having sex with men (MSM), using respondent driven sampling (RDS), in Albania. *Archives: The International Journal of Medicine*, 2009. 2(2): p. 231–234.
24. Kasianczuk, M. G., et al., Risk factors associated with condom use among men who have sex with men in Ukraine. *Journal of LGBT Health Research*, 2009. 5(1–2): p. 51–62.
25. *Save The Children*, T.-C.f.I.a.C.o.R.H., Infectious Diseases, AIDS and Clinical Immunology Research Center, Characteristics, High-Risk Behaviors and Knowledge of STI/HIV/AIDS, and Prevalence of HIV, Syphilis and Hepatitis Among MSM in Tbilisi, Georgia: 2007, 2008, PATH, USAID.
26. Štulhofer, A., et al., HIV-related sexual risk taking among HIV-negative men who have sex with men in Zagreb, Croatia. *AIDS and Behavior*, 2008. 12(3): p. 505–512.
27. Longfield, K., et al., Men who have sex with men in Southeastern Europe: underground and at increased risk for HIV/STIs. *Culture, Health & Sexuality*, 2007. 9(5): p. 473.
28. Meyer, et al., 'We are ordinary men': MSM identity categories in Tbilisi, Georgia. Culture, *Health and Sexuality*, 2010. 12(8):955–971.
29. Population Services International Research Division, the Russian Federation (2006): HIV/AIDS TRaC study among injecting drug users in Samara and Saratov first round, in *Social Marketing Research Series 2007*, PSI: Moscow.
30. Schmidt, A. J., et al., Hospers, H. J, EMIS Community Report 1, 2010.
31. Giuliani, M., et al., Increased HIV incidence among men who have sex with men in Rome. *AIDS*, 2005. 19(13): p. 1429–1431.
32. Family Health International (FHI), Albania—Behavioral and Biological Surveillance Study Report, 2006.
33. UNGASS, *Country progress report: Bosnia and Herzegovina*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
34. UNGASS, *Country progress report on monitoring the declaration of commitment on HIV/AIDS: Republic of Bulgaria*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
35. Bozicevic, I., et al., Prevalence of sexually transmitted infections among men who have sex with men in Zagreb, Croatia. *AIDS and Behavior*, 2009. 13(2): p. 303–309.
36. Gjenero-Margan, I., and B. Kolari, Epidemiology of HIV infection and AIDS in Croatia—an overview. *Collegium Antropologicum*, 2006: p. 11–16.
37. UNGASS, *Country progress report: Republic of Croatia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
38. UNGASS, *Country progress report: Hungary*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
39. UNGASS, *Country progress report: Republic of Macedonia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
40. Izdebski, Z., Research on men who have sex with men, 2004, TNS OBOP for National AIDS Centre: Warsaw.

41. UNGASS, *UNGASS country progress report: Republic of Serbia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
42. Family Health International (FHI), *Serbia—Behavioral and Biological Surveillance Study Report*, 2006.
43. UNGASS, *Country progress report: Slovenia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
44. UNGASS, *Country progress report: Republic of Armenia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
45. UNGASS, *Country progress report: Azerbaijan*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
46. UNGASS, *Republic of Belarus: national report on the implementation of the declaration of commitment on HIV/AIDS*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010: Minsk.
47. Kechin, E. A., Studies conducted within the National System for monitoring and evaluation of HIV/AIDS in the Republic of Belarus in 2009: a collection of articles, edited by E. A. Kechin, 2010, State Republican Center of Hygiene, Epidemiology and Public Health: Minsk.
48. UNGASS, *Country progress report: Estonia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
49. UNGASS, *Country progress report: Georgia*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
50. Country Coordination Committee, R.o.K., *UNGASS 2010 country progress report, Republic of Kazakhstan*, 2010: Almaty.
51. UNGASS, *2010 Country progress report: Lithuania*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
52. UNGASS, *Country progress report: Republic of Moldova*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010: Chisinau.
53. Federal Service for Surveillance of Consumer Rights Protection and Human Well-Being Ministry of Health and Social Development of the Russian Federation, Country Progress Report of the Russian Federation on the Implementation of the Declaration of Commitment on HIV/AIDS, 2010: Moscow.
54. UNGASS, *Country progress report*: the Russian Federation, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
55. UNGASS, *National report on monitoring progress towards the UNGASS declaration of commitment on HIV/AIDS*. Ukraine, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010: Kyiv.
56. UNGASS, *Country progress report: Uzbekistan*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
57. EuroHIV, *HIV/AIDS surveillance in Europe*. Mid-year report 2005, 2006, Institut de Veille Sanitaire: Saint-Maurice.
58. Smolskaya, T. T., et al., HIV sentinel surveillance in high-risk groups in Azerbaijan, the Republic of Moldova and in the Russian Federation, 2004, World Health Organization, Europe.
59. Ismailova, A., HIV-infection situation analysis among MSM in Central Asia, 2010: Almaty.

60. Velter, A., et al., HIV prevalence and HIV testing behavior among men who attend commercial gay venues in Paris (France), PREVAGAY 2009 Survey. (Numero thematique—L'infection a VIH-side en France 2009: depistage, nouveaus diagnostics et incidence.) [French]. *Bulletin Epidemiologique Hebdomadaire*, 2010. 45(46): p. 464–467.
61. Folch, C., et al., Incremento en la prevalencia del VIH y en las conductas de riesgo asociadas en hombres que tienen sexo con hombres: 12 anos de encuestas de vigilancia conductual en Cataluna. *Gaceta Sanitaria*, 2010. 24(1): p. 40–46.
62. Family Health International (FHI), I., Behavioral and biological survey Kosovo 2006. 2006.
63. Balakireva, O. M., et al., Monitoring behavior of men having sex with men as a component of second generation epidemiological surveillance, 2008, ICF "International HIV/AIDS Alliance in Ukraine": Kyiv.
64. Rottingen, J. -A., D. W. Cameron, and G. P. Garnett, A systematic review of the epidemiologic interactions between classic sexually transmitted diseases and HIV. How much really is known? *Sexually Transmitted Diseases*, 2001. 28(10): p. 579–597.
65. Williamson, L. M., and G. J. Hart, HIV prevalence and undiagnosed infection among a community sample of gay men in Scotland. *Journal of Acquired Immune Deficiency Syndromes*, 2007. 45(2): p. 224–230.
66. Dodds, J. P., et al., A tale of three cities: persisting high HIV prevalence, risk behavior and undiagnosed infection in community samples of men who have sex with men. *Sexually Transmitted Infections*, 2007. 83(5): p. 392–396.
67. Cowan, et al., HIV and risk behavior among men who have sex with men in Denmark—the 2006 sex life survey. *Eurosurveillance*, 2008. 13(48).
68. Bouhnik, A. -D., et al., Unprotected sex in regular partnerships among homosexual men living with HIV: a comparison between sero-nonconcordant and seroconcordant couples (ANRS-EN12—VESPA Study). *AIDS*, 2007. 21: p. S43–S48. 10.1097/01.aids.0000255084.69846.97.
69. Hospers, H. J., et al., A new meeting place: chatting on the Internet, e-dating and sexual risk behavior among Dutch men who have sex with men. *AIDS*, 2005. 19(10): p. 1097–1101.
70. Moreau-Gruet, F., Dubois-Arber, F., and A. Jeannin, Long-term HIV/AIDS-related prevention behaviors among men having sex with men: Switzerland 1992—2000. *AIDS Care*, 2006. 18: p. 35–43.
71. Mercer, C. H., et al., Behaviorally bisexual men as a bridge population for HIV and sexually transmitted infections? Evidence from a national probability survey. *International Journal of STD & AIDS*, 2009. 20(2): p. 87–94.
72. Frankis, J. S., and P. Flowers, Cruising for sex: sexual risk behaviors and HIV testing of men who cruise, inside and out with public sex environments (PSE). *AIDS Care*, 2006. 18(1): p. 54–59.
73. Caplinskas, S., I. Caplinskiene, and A. Gricius, Risk factors of HIV spread in Lithuanian men having sex with men (MSM) community, in XV International AIDS Conference, July 11–16, 2004: Bangkok, Thailand.
74. Reynolds, L., et al., HIV among men who have sex with men in Central and Eastern Europe: a review of 30 countries, World Health Organization, Editor 2011, WHO.
75. Population Services International (PSI), LaSky Russia MSM, 2010.

76. Population Services International, Study among men who have sex with men in Almaty, Bishkek, Chui and Dushanbe, 2010, Population Services International.
77. UNAIDS, *An introduction to indicators*. UNAIDS monitoring and evaluation fundamentals, 2010.
78. Schmidt, A. J., et al., for the EMIS consortium, European Men Who Have Sex with Men Internet Survey (EMIS), UNGASS indicators, 2010.
79. Stvilia, K., K. Todadze, and G. Nizharadze, HIV and AIDS in Georgia: a socio-cultural approach, in HIV and AIDS in the Caucuses Region: a socio-cultural approach. UNESCO, 2005.
80. Costenbader, E., et al., Secrecy and risk among MSM in Tbilisi, Georgia. *AIDS Care*, 2009. 21: p. 591–597.
81. Folch, et al., Factors associated with unprotected sexual intercourse with steady male, casual male, and female partners among men who have sex with men in Barcelona, Spain. 2006. 18. New York, NY, ETATS-UNIS: Guilford. p. 16.
82. Balthasar, H., et al., Intentional risk reduction practices of men in Switzerland who have anal intercourse with casual male partners. *Journal of Acquired Immune Deficiency Syndromes*, 2010. 54(5): p. 542–547. 10.1097/QAI.0b013e3181e19a6b.
83. Evans, A. R., et al., Central and East European migrant men who have sex with men: an exploration of sexual risk in the United Kingdom. *Sexually Transmitted Infections*, 2011. 87(4): p. 325–330.
84. Leobon, A., et al., A relative profile of HIV-negative users of French websites for men seeking men and predictors of their regular risk taking: a comparison with HIV-positive users. *AIDS Care*, 2011. 23(1): p. 25–34.
85. Mor, Z., et al., High-risk behavior in steady and in casual relationships among men who have sex with men in Israel. *Sexually Transmitted Infections*, 2011. 87(6): p. 532–537.
86. Sasse, A., et al., High HIV prevalence among patients choosing anonymous and free testing in Belgium, 1990–2002. *International Journal of STD & AIDS*, 2006. 17(12): p. 817–820.
87. Berghe, W. V., et al., A venue-based HIV prevalence and behavioral study among men who have sex with men in Antwerp and Ghent, Flanders, Belgium, October 2009 to March 2010. *Eurosurveillance*, 2011. 16(28): p. 19914.
88. Stolte, I. G., et al., Low HIV-testing rates among younger high-risk homosexual men in Amsterdam. *Sexually Transmitted Infections*, 2007. 83(5): p. 387–391.
89. Williamson, L. M., et al., Sexual risk behavior and knowledge of HIV status among community samples of gay men in the United Kingdom. *AIDS*, 2008. 22(9): p. 1063–1070.
90. Focus: HIV prevalence among non-IDU heterosexuals, IDUs, and men who have sex with men who undergo attributable HIV testing in Scotland: 2006 update. *HPS Weekly Report*, 2007. 41(30): p. 2007.
91. McDaid, L. M., and Hart, G. J., Contact with HIV prevention services highest in gay and bisexual men at greatest risk: cross-sectional survey in Scotland. *BMC Public Health*, 2010. 10: p. 798.
92. Health Protection Scotland, *HPS Weekly Report*, 7 September 2007, NHS National Services Scotland.
93. Health Protection Scotland, *HPS Weekly Report*, 2006, NHS National Services Scotland.

94. UNGASS, *National AIDS program: country progress report: Albania*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
95. UNGASS, *Country progress report: Belarus*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
96. UNGASS, *Country progress report: Belarus*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2008.
97. UNGASS, *Country progress report: Kazakhstan*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
98. Russian Federation Federal Service for Surveillance of Consumer Rights Protection and Human Well-Being, Country Report of the Russian Federation on the Implementation of the Declaration of Commitment on HIV/AIDS, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010: Moscow.
99. WHO, *HIV prevalence and risk among men having sex with men in Moscow and St. Petersburg*, 2007, World Health Organization Regional Office for Europe: Copenhagen.
100. UNGASS, *Country progress report: Norway*, United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
101. Bonell, C. P., et al., Methamphetamine use among gay men across the United Kingdom. *International Journal of Drug Policy*, 2010. 21(3): p. 244–246.
102. Hickson, F., et al., Illicit drug use among men who have sex with men in England and Wales. *Addiction Research & Theory*, 2010. 18(1): p. 14–22.
103. Lattimore, S., et al., Changing patterns of sexual risk behavior among London gay men: 1998–2008. *Sexually Transmitted Diseases*, 2011. 38(3): p. 221–229.

CHAPTER 4

Responses to HIV in Key Populations

HIV Surveillance Responses

As we noted in chapter 2, human immunodeficiency virus (HIV) surveillance activities are generally well established in Europe. The availability of data on HIV diagnoses from almost the entire region is a particular strength. We earlier noted that two-thirds of countries have undertaken studies to monitor directly measured HIV prevalence or risk in at least two of the populations most affected by HIV. We consider here how HIV surveillance responses among key populations can be further strengthened.

Reporting HIV Diagnoses

While comprehensive, data on HIV diagnoses are not without their limitations. They indicate the patterns and extent of diagnoses, but do not reflect the current patterns or extent of HIV transmission. This is because newly diagnosed HIV cases will include both new and past infections. Diagnoses reports also reflect the uptake of diagnostic testing for HIV, the effectiveness of case finding, and patterns of reporting, all of which will vary from country to country. Countries with the largest number of reported diagnoses could therefore be those most successful at case finding, rather than those with the worst epidemics. Countries across the region use different approaches to collate HIV diagnoses data, and these variations will affect data comparability.

Timeliness (Reporting Delay)

In 2006, a European-wide survey of HIV surveillance systems in 44 countries found that among the 16 countries that had examined reporting delay [1], 75% of HIV diagnoses were reported within 6 months, while for 13 countries 90% of their diagnoses were reported within 6 months. Data can be adjusted if the extent and pattern of past reporting delay is known. All countries should regularly assess and report on reporting delay so that adjustments can be made.

Completeness (Underreporting)

The extent of underreporting is unknown. In the 2006 survey of European HIV surveillance systems, less than 40% of countries had assessed the extent of underreporting [1]. In those that had, underreporting ranged from less than 2% in Belarus to 37% in France. Furthermore, Italy and Spain currently do not have national coverage of diagnoses reporting systems. All countries should periodically assess and estimate the extent of underreporting, publishing the results. When underreporting is high—greater than 10%—efforts should be made to reduce this problem.

Duplication (Overcounting)

An individual may have more than one positive HIV test as a result of receiving health care in different settings or using both anonymous and named testing services. Furthermore, a single positive test could be reported more than once, for example, by both the laboratory undertaking the testing and the clinician. To overcome duplicative reporting, many systems collect identifiers, such as full name and date of birth of the patient, or a code identifier based on a combination of identification data. Identifiers are not always possible to collect, when testing is anonymous or when subject to privacy-related legal restrictions. A survey of 40 European countries showed that 28 (72%) used a coded identifier and 12 (28%) used full names [1]. In countries where reports lack identifiers, the extent of overreporting should be assessed periodically.

Consistency of Details on Risk Factors

The type and completeness of the information requested on cases, including risk factors, vary between countries. For example, in 2010, 49 of the countries reporting data to the European Centre for Disease Prevention and Control (ECDC) and the World Health Organization (WHO) [2] provided data on age, with an overall completeness ranging from 78% to 100% (99.3% overall), while only 34 countries provided data on country of birth, with completeness ranging from 1.5% to 100% (37% overall). Of concern is that, for over one quarter of the diagnoses reported in Europe there is no information available on exposure category. The proportion of diagnoses lacking exposure information is highest in the East and Central Europe, at over a one-third and a one-quarter, respectively. Some countries, such as the United Kingdom, provide follow-up reports with missing exposure category information, and these reports may then be revised. All countries should ensure that their systems collect information on exposure category (at minimum, the main risk), and try to follow-up on all reports where these data are missing. All countries should also try to collect an exposure subcategory for all reports associated with heterosexual exposure.

HIV Testing Practices

HIV testing practices have a direct effect on the extent to which HIV infections are diagnosed and reported. Approaches to HIV testing vary widely in the region [3], but most countries have a policy or strategy to offer HIV testing and counseling to men who have sex with men (MSM), people who inject drugs (PWID) and sex workers (SWs) [4–6]. The 2006 survey found that 37 (84%) of the 44 countries routinely offered HIV testing to pregnant women; 32 (73%) did so for PWID; 26 (59%) did so for patients of sexually transmitted infection (STI) clinics; and 21 (48%) did so for tuberculosis (TB) patients [1]. However, testing was only routinely offered by health care providers to SW in 17 countries (39%) and to MSM in 16 countries (36%) [1]. Mandatory HIV testing of blood donors was reported in all countries [1]. In addition, in a few countries mandatory HIV testing was reported among immigrants (Andorra, Azerbaijan, and Russian Federation), military personnel (Croatia, Lithuania, Moldova, Romania, Ukraine), SWs (Austria, Greece, Moldova, and Turkey), and pregnant women (the Czech Republic and Estonia) [1]. A survey on testing strategies in Europe found that 14 countries (from 24 responders) had policies recommending provider-initiated opt-out testing in prenatal care and 12 in other settings, such as STI clinics or drug treatment centers (Russia) [7]. In addition 19 countries promote HIV testing through outreach, with PWID being the most widely served population [7]. Testing is generally provided free of charge, even to nonresidents, but free testing may be restricted to certain facilities [7]. Moreover, access to testing services varies between countries reflecting differences in perceptions of risk, levels of HIV-related stigma and accessibility of HIV treatment and care [4]. In addition to ensuring ease of access to HIV testing, it is important for all countries to monitor the number of diagnostic HIV tests undertaken annually (distinguishing tests undertaken during blood screening and antenatal care, and excluding tests undertaken as part of unlinked anonymous studies).

Regionwide Collation of HIV Case Reports

Since 2008, ECDC and the WHO Regional Office for Europe have been jointly collating HIV and acquired immune deficiency syndrome (AIDS) data from across the European region. Case-based data are submitted annually to a joint database, The European Surveillance System. Four types of data on HIV/AIDS are collected in a standardized way: HIV case-based, HIV aggregated, AIDS case-based, and HIV tests (aggregated). This standardized data collection system makes comparisons across the region easier, and improves data quality and consistency; therefore, it is important to maintain this data collection. Every year by the end of November, ECDC and the WHO Regional Office jointly publish the data in the HIV/AIDS surveillance report. Case study 4.1 illustrates how HIV surveillance data can be used to detect outbreaks.

Estimates of HIV prevalence derived directly from targeted studies among key populations of PWID, SWs, and MSM help generate more accurate indicators of current epidemic patterns than reliance on case reporting alone. Our analysis of the published literature indicates that around two-thirds of countries in Europe had undertaken studies to either directly measure HIV prevalence or risk behaviors in all three populations of PWID, SWs, and MSM. However, only 18 had evidence suggestive of monitoring (that is, undertaking several studies over time that could provide repeated measures) of either HIV prevalence or risk behaviors

Case Study 4.1 Use of HIV Case Reports to Detect Outbreaks

In 2011 increases in new diagnoses of HIV were reported in Greece and Romania. In Greece during the first 10 months of 2011, cases among PWID increased to 190. Historically, Greece has been a low-prevalence country. Prior to 2010, between 2 and 5 cases of HIV attributed to injecting drug use were reported annually in Romania, but in 2010 this increased to 12 cases and in 2011 to 62 cases. Both countries maintain that surveillance has not changed over the time period, ruling out the observed increases as a consequence of enhanced surveillance. A behavioral survey undertaken in Bucharest highlighted some changes in drug-taking practices, suggesting increased use of amphetamine-type stimulants in place of heroin, with reports of more frequent injection and needle/syringe sharing.

Causes of the outbreaks have been attributed to low coverage of opioid substitution therapy (OST) among PWID in Greece and Romania (<20 per 100 PWID); long waiting times for OST (up to 7 years in Greece and from 1 to 6 months in Romania); and insufficient distribution of needles/syringes. The recent economic crisis has been blamed for increasing the vulnerability of young people to drug use, especially with the reductions in public health budgets and HIV-prevention programs in Europe.

While further epidemiological investigation is required to understand the extent of the outbreaks and associated risk factors, the benefit of HIV case reports in detecting outbreaks as well as the role of behavioral data to interpret changes is evident. Other countries such as Iceland or Italy, that have been severely affected by the recession need to be carefully monitored, and attempts must be made to ensure that funding cuts do not affect the delivery of HIV-prevention and treatment services.

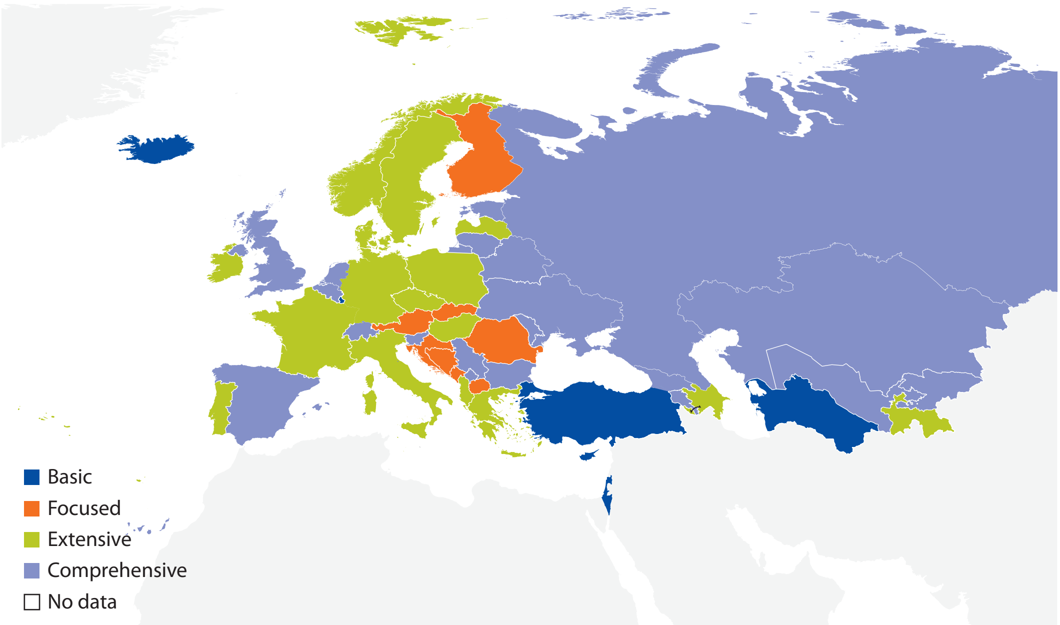
in all three of these populations, while another 18 countries had evidence of this undertaking among two of these populations (map 4.1). In five (10%) countries, no evidence was identified, suggesting monitoring among these populations.

These findings should be interpreted cautiously as our literature review collated documents in English, French, Russian, and Spanish only and thus may underestimate the extent to which surveys directly measure HIV prevalence or risk behaviors, especially among other vulnerable and key populations such as migrants.

Monitoring HIV in Key Populations

Second-generation HIV surveillance systems in countries with either a concentrated or a low-level epidemic, such as those found in the Europe, try to combine monitoring of HIV diagnoses with monitoring of HIV prevalence and related risk in higher risk groups. The 55 countries we considered all had HIV case reporting systems. In one-third of the countries (18) there was evidence to suggest "comprehensive" surveillance among PWID, MSM, and SWs (i.e., monitoring HIV prevalence or risk in all three groups), in another one-third of the countries (18) there was "extensive" surveillance (i.e., monitoring HIV prevalence or risk in two

Map 4.1 Monitoring of HIV Prevalence or Behaviors among MSM, PWID, and SWs



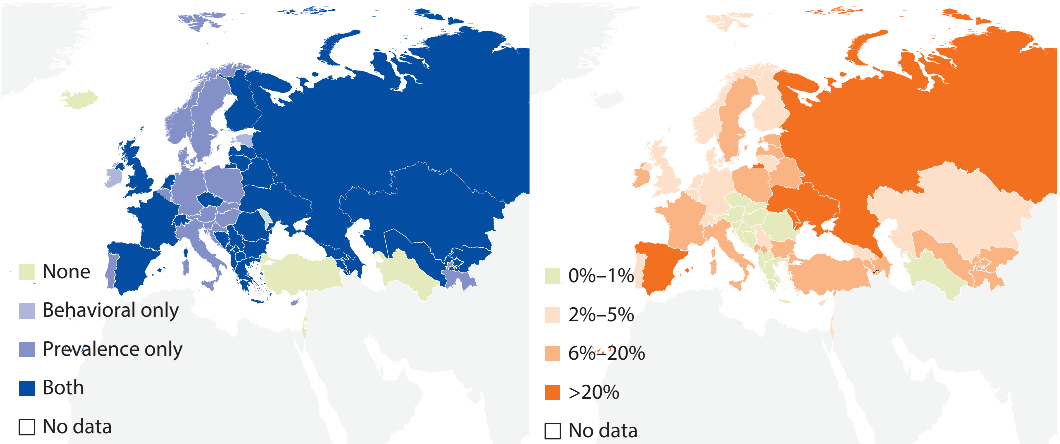
Source: Literature Review. See tables B.7–B.10.
Note: All these countries have HIV case reporting systems. HIV = human immunodeficiency virus; MSM = men who have sex with men; PWID = people who inject drugs; SWs = sex workers.

of the groups); in 9 of the countries there was "focused" surveillance (i.e., monitoring HIV prevalence or risk in one of the groups), and in 5 countries there was a "basic" approach relying solely on HIV case reports (map 4.1).

Monitoring HIV and the Level of the HIV Epidemic

HIV prevalence was 5% or more in the best estimate studies of PWID in 21 of the countries where studies were identified. Of these, 18 had repeated studies monitoring HIV prevalence among PWID and 16 of risk behavior (map 4.2). In Turkey which had high prevalence (>5%) among PWID, there was no evidence found indicating the monitoring of prevalence or risk behavior. In Ireland prevalence was over 5% (although the sample size was small), and there was no evidence of repeated measures of HIV prevalence among PWID. The annual average of HIV diagnoses linked to injecting drug use was 8.8 per million people between 2006 and 2010, a rate higher than the average linked to injecting in the rest of Europe (4 per million). Of the 14 countries with moderate HIV prevalence (>1% and <5%) among PWID, there was only one country (Israel) with no evidence of targeted monitoring of either prevalence or risk behavior. This indicates that studies among PWID to directly monitor risk need to be implemented in Israel and Turkey, and expanded in Ireland to include monitoring of prevalence among PWID.

Map 4.2 Monitoring HIV and Risk among PWID and the Extent of the HIV Epidemic



Biobehavioral surveillance among PWID in Europe HIV prevalence among PWID

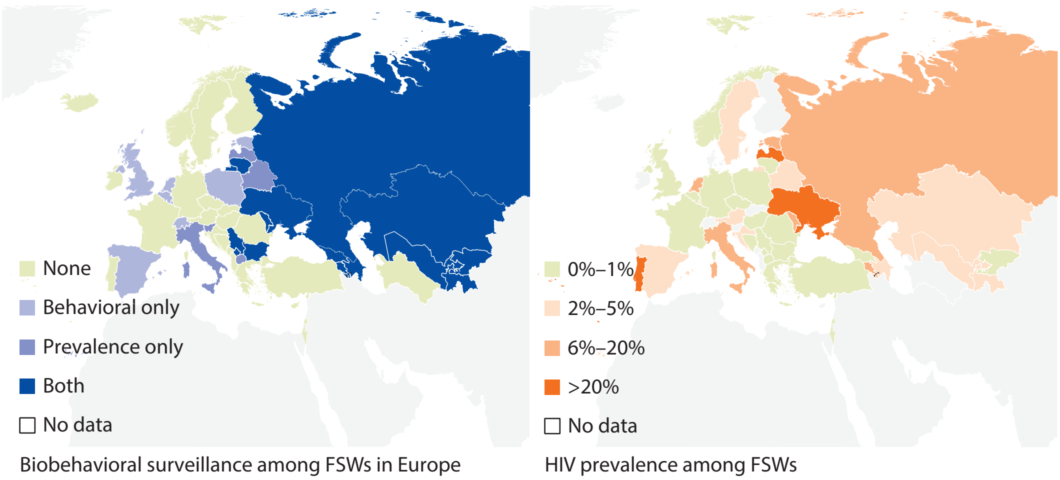
Source: Table B.7.
Note: HIV = human immunodeficiency virus; PWID = people who inject drugs.

In the 10 countries with high HIV prevalence (>5%) among SWs, 6 had undertaken repeated studies to monitor HIV prevalence, and 7 had undertaken studies to monitor risk behavior (see map 4.3 for data on female sex workers [FSWs]). In two countries of high prevalence (>5%) among SWs (Portugal and Turkey), there was no evidence of direct monitoring of either HIV prevalence or risk behavior. Of the 15 countries with moderate HIV prevalence (<1% and >5%) among SWs, 4 had no direct measures of prevalence or risk behaviors over time (Croatia, the Czech Republic, Norway, and Romania). Studies to provide repeated measures among SWs thus need to be implemented in Portugal and Turkey, and improved in Estonia and the Netherlands. This is particularly important given the lack of routine HIV/STI epidemiological data in relation to sex work in Europe [8].

Studies of male SWs were found in only six countries across the region, all of which reported high HIV prevalence (>5%). Three of these studies were conducted in the countries with the highest annual average HIV case reports per million people between 2006 and 2010 (the Netherlands, Spain, and the United Kingdom). Other countries with annual above average cases among MSM (such as Denmark, France, Greece, Ireland, Luxembourg, Portugal, and Switzerland) should consider implementing targeted prevalence studies among male SWs.

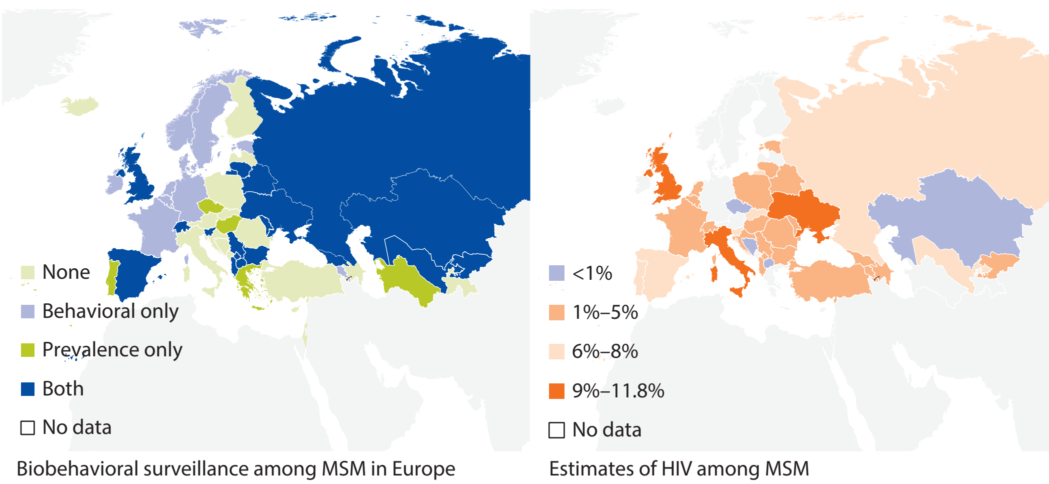
In four countries of high prevalence (>5%) among MSM, there was no evidence of repeated targeted studies to monitor prevalence or risk behaviors (Italy, Luxembourg, Poland, and the Slovak Republic) (map 4.4). In Israel, the one country without a prevalence estimate but with an annual average of 10 or more HIV diagnoses among MSM per million people between 2006 and 2010, there was also no evidence of monitoring. Of the 23 countries with moderate HIV prevalence among MSM (between >1% and <5%), 8 had no monitoring of either

Map 4.3 Monitoring HIV Prevalence and Risk among FSWs and the Extent of the Epidemic



Source: Table B.8.
Note: FSWs = female sex workers; HIV = human immunodeficiency virus.

Map 4.4 Monitoring HIV Prevalence and Risk among MSM and the Extent of the Epidemic



Source: Table B.10.
Note: HIV = human immunodeficiency virus; MSM = men who have sex with men.

prevalence or risk behaviors (Azerbaijan, Croatia, Cyprus, Finland, Malta, Latvia, Romania, and Turkey). There is a need, therefore, to implement studies to directly monitor HIV risk among MSM in 12 countries, and to expand monitoring activities to include measures of prevalence in other countries as well.

Evidence thus shows that activities to directly monitor HIV prevalence or risk are well established in Europe among PWID, but less so among SWs and MSM. It is important that macroeconomic transitions, including spending cuts in the area of public health, do not deter nations from resourcing targeted studies to directly monitor HIV among key populations, especially in countries where HIV prevalence is above 1% in populations at risk.

Strategies for Strengthening Surveillance Studies

There is likely scope to strengthen the methods of targeted surveys used to directly measure HIV prevalence and risk in populations at risk. Key indicators of quality in the methods of targeted population surveys of prevalence and risk include the ability to (a) recruit broadly reflective samples of the populations; (b) measure biological outcomes; (c) collect reliable behavioral data; and (d) obtain sufficient sample sizes. For surveillance studies which may need to be sustained over years, if not decades, a pragmatic balance between robustness and cost will be needed. Ideally, surveillance systems (a) use a standardized definition of the population (if not across different geographical locations at least over time); (b) collect repeated data from the same or comparable location(s) in order to monitor trends; (c) generate data on risk exposure and practices, including structural risk factors; and (d) collect biological indicators in relation to HIV, hepatitis C virus (HCV), and STIs while using consistent or comparable methodologies over time [9–16].

Sampling Vulnerable and Key Populations

Of critical importance is consistently using an appropriate sampling methodology to obtain a sufficiently large sample [17–18]. Community-based methods, such as the use of respondent-driven sampling [19–22] in combination with methods to assess recruitment network effects [20, 23], as well as time location sampling [24, 25] and chain referral sampling [26–28], are well suited to researching key populations. Our review gave particular emphasis to studies of prevalence and risk that adopted community-based and multilocation sampling methods that seek to avoid potential biases linked to recruiting key populations in clinical settings. However, these sampling methods can be relatively complex and potentially costly, and thus are often not well suited as routine tools of public health monitoring [29]. It is also important to note that these sampling methods are subject to their own biases (and may overrecruit particular subpopulations or networks). While potentially less robust methodologically, pragmatic and cost-efficient sampling approaches suitable for surveillance studies typically involve recruitment through existing structures, such as low-threshold services, known venues and congregational sites, outreach, and Internet sites. However, sampling only through clinical and treatment settings (such as STI and OST clinics) should be avoided.

Centralizing Data Collation

At present there is no centralized portal for the collation and synthesis of HIV prevalence data at the European level, a former responsibility of Euro HIV [30]. The development and maintenance of monitoring activities at a national level could be aided by the European-wide central collation of core data on HIV prevalence and risk behaviors. The extent of surveillance among PWID in European Union (EU) countries, especially in medium-prevalence settings, is likely an indirect consequence of the central collation system operated for HIV prevalence among PWID by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) [31]. Data on directly measured HIV prevalence among key populations of PWID, SW, and MSM should be collated centrally. Consideration should also be given to collecting risk behaviors data centrally, as well as data from other populations at risk, including migrants.

Measuring HIV Incidence

Consideration should be given to estimating HIV incidence in key populations at high risk. Cohort studies are costly and complex, yet incidence can be assessed in other ways, including via laboratory testing algorithms and data from serial cross-sectional surveys. Laboratory testing algorithms, such as the Serological Testing Algorithm for Recent HIV Sero-conversion (STAHRS), may be particularly fruitful [32–34]. Using STARHS to assess HIV incidence in prevalence studies of hidden populations of PWID and MSM has proved particularly useful [35]. STARHS data should be considered among PWID and MSM along with the collection of data on past HIV testing and the uptake of antiretroviral therapy (ART) in countries with high prevalence (<5%) in these populations.

Estimating Population Size

In addition to surveys that directly measure HIV prevalence and risk, a key element of an effective public health surveillance program is the capacity to quantify the size of populations at risk. Most countries have published estimates of the size of populations of PWID and SWs, although these may not be recent, and few countries have published estimates of the size of MSM populations. Without an estimate of the denominator, or the population group at risk, it is difficult to measure whether HIV prevalence at a general population level is increasing or whether it is the size of the population group that is changing. Estimating the size of a population at risk not only assists in the allocation of intervention resources but is essential for estimating the coverage, and thereby impact of interventions [36–38]. As we note further below, intervention coverage, in combination with epidemic situation and behavior change, is a critical determinant of HIV prevention [39, 40]. There is now established guidance, as well as evidence, on the methods best used to assess the size of hidden populations at risk [41–43].

The Social Context of Surveillance

A key challenge in collecting data to inform interventions is the political context in which sex work, drug use, and MSM takes place. In contexts where, for example, sex work is heavily regulated or MSM is stigmatized, conducting surveillance among people with few rights or representation may create ethical and safety concerns for the populations involved. Proposals for surveillance need to be conducted in full consultation with the populations in question and their advocates, in order to include appropriate protections in surveillance systems [8].

HIV-Prevention Responses among People Who Inject Drugs

To complement our systematic review of epidemiological data presented in chapter 3, here we draw on a variety of data sources, including recently published systematic reviews [1–5] and HIV-prevention data collated by the EMCDDA [6]. We do this in order to synthesize key estimates of intervention "coverage" as well as to describe how policy environments mediate the delivery of HIV prevention for PWID. We emphasize the potential enhanced impact of HIV-prevention interventions that operate in combination and of interventions targeting policy and environmental change.

Combination HIV Prevention for PWID

HIV prevention targeting PWID is increasingly envisaged as a product of "combination intervention," with a strategy comprising a package of interventions tailored to local settings and needs [2, 5, 7–9]. This combination of interventions may draw on those identified by WHO and other international agencies essential to evidence-based HIV-prevention targeting PWID, including needle and syringe exchange programs (NSPs), OST, ART, the provision of drug consumption rooms (DCRs), peer education and outreach, HIV testing and counseling services, and the promotion of public policies and other structural changes conducive to protecting the health of populations at risk [10]. We will concentrate here on the three cornerstone HIV-prevention interventions of NSPs, OST, and ART, but will also emphasize the importance of increasing uptake of HIV testing in order to identify those in need of ART (box 4.1). The two most recent systematic reviews of evidence of the effectiveness of HIV-prevention targeting PWID are those by Degenhardt et al. [40] and Kimber et al. (2010) [295].

Reviews conclude that there is strong evidence linking NSPs to reduced levels of HIV risk among PWID, as well as evidence linking NSPs with the reduction of HIV incidence among PWID [12, 15–17]. Intervention coverage appears pivotal, with the intervention effect likely proportional to the volume of needles and

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Box 4.1 Four Core HIV-Prevention Interventions

NSPs provide sterile needles/syringes and other injecting equipment to PWID, via fixed-sites, outreach, peer PWID networks, vending machines, and pharmacies. By maximizing the number of clean injecting equipment in circulation, we minimize the time infected equipment remains in use and the proportion of unsafe injections [11].

OST is prescribed to dependent users to diminish the use and effects of illicitly acquired opiates. It is usually taken orally and therefore reduces the frequency of injection and unsafe injecting practices [12].

ART is prescribed to HIV-positive PWID to reduce viral load and consequently can reduce HIV transmission [13, 14].

HIV testing is expanded to enable timely start of treatment.

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syringes distributed and in circulation and the proportion of sufficient clean versus unclean equipment [2, 18]. There is also a large body of evidence showing the effectiveness of OST in HIV prevention [2, 4]. Sufficiently high doses of OST in combination with sufficient retention in treatment are linked to reductions in both drug use and HIV risk [19–21], including a reduction in HIV incidence [4, 22–28]. Given the evidence of effectiveness of both methadone and buprenorphine [20, 29], the WHO lists these as essential medicines for the treatment of opioid dependence worldwide. Despite this evidence some resistance remains to the provision of OST to PWID in the region, notably in Russia; reasons for this are examined in case study 4.2. In addition, regarding the HIV-prevention impact of ART, evidence suggests that lowering viral load prevents HIV transmission in serodiscordant partners, thereby reducing HIV incidence [30, 31]. A prospective cohort study found that among PWID, the concentration in plasma of HIV-1 RNA predicted community-level HIV incidence, including after adjustments for injecting and sexual risk behaviors [32]. This decline occurred as the coverage of ART among PWID increased from 43% to 70% and as the proportions treated with ART increased from 8% to 99%.

Combination Intervention Effects

Evidence points towards the enhanced impact of HIV-prevention interventions when they are delivered in combination [2, 7]. Cohort and modeling studies have shown that the impact of NSP and OST on reduced incidence of infectious disease among PWID can be modest if delivered as "stand-alone" interventions but they are markedly more effective when delivered in combination, with sufficient willingness among PWID to use both methods [2, 7]. This may be especially the case in reducing the incidence of HCV among PWID [15]. To date, there is only one European study showing that "full participation" across combined interventions (NSP and OST) can reduce HIV incidence (by 57%) and

Case Study 4.2 The HIV-Prevention Impact of Introducing OST in the Russian Federation

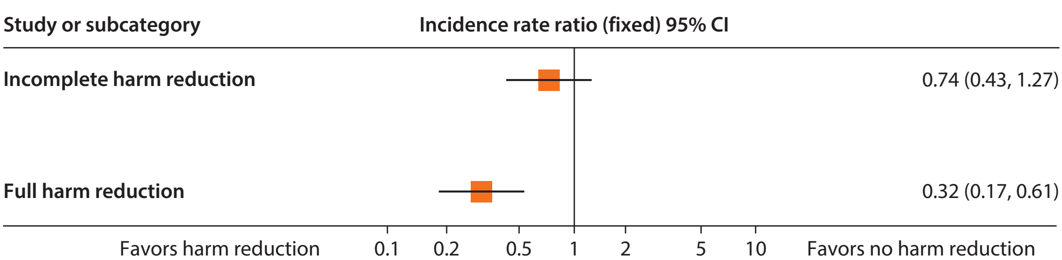
One of the strongest voices of policy resistance to OST emanates from Russia, where the use of methadone and buprenorphine in treating opioid dependence is legally prohibited. Resistance stems from efforts to preserve existing drug treatment systems and to prevent the diversion of new medicines (such as methadone or buprenorphine) to the illicit market or to monitor the safe use of these drugs. More fundamentally, resistance to substitution treatments is grounded in the history and teaching of "narcology," a subdivision of Soviet criminal psychiatry, which conceives of treatment from addiction in abstinence terms. Narcologists have opposed the use of methadone in opioid treatment as a "vicious practice," using a "toxic" substance that creates an even more severe *addiction*; they also see it as one step removed from "legalizing" drug use, as a failing intervention of the West, and most significantly, as a failure to deal with the criminality of drug users [33–35].

HCV incidence (by 64%) [7]. Based in Amsterdam, this cohort study recruited PWID from 1985. The study found that HIV incidence among PWID was independently associated with accessing a higher level of HIV prevention and harm-reducing interventions (see figure 4.1). Multivariate analyses found that after adjustment, clients participating "fully" in available services (daily full dose of methadone and either no injecting or always using NSPs) were at 57% less risk (95% confidence interval [CI] 13%–79%) of HIV than participants not accessing such services; those participating in a "limited" fashion (either full NSP and less regular methadone, or full methadone and less regular NSP) were at 13% reduced risk (95% CI 52% greater risk to 50% less risk) of HIV than participants not accessing these services [36]. Similar findings have emerged from a study in four Central Asian countries conducted over 18 months [37].

Just as the effectiveness of NSP and OST services may be enhanced when combined, there is an enhanced impact relationship between participation in OST and adherence to ART among PWID [38–40]. Similarly, low-threshold access to HIV testing is an important combinative component of HIV prevention. In Western Europe, there is a considerable level of homogeneity in policy priorities regarding measures to limit the spread of infectious diseases among drug users, with NSP being offered either in combination with voluntary counseling and testing (VCT) for infectious diseases, or in combination with the dissemination of information, education, and communication materials [41]. Additionally, the integration of ART with TB treatment and prevention is a critical feature determining health outcomes in people living with HIV [42], especially so in Eastern Europe where TB drug resistance among PWID is most frequently reported [43]. While documented examples are sparse, descriptive evidence suggests that fully integrating services facilitates retention in treatment. For instance, in Dnipropetrovsk, Ukraine, a program combining OST, ART, and testing for TB, HIV, viral load, and CD4, with counseling and psychosocial support, reported an overall retention rate of 70% (n = 428) among PWID [44]. In figure 4.1 we explore further the effect of different interventions on HIV incidence and prevalence among PWID.

Drawing on the exemplar of the Amsterdam cohort noted above [7], recent mathematical modeling studies have sought to project the effects of escalating

Figure 4.1 Effect of Full and Partial Combined Interventions on HIV Incidence



Source: Van Den Berg et al. 2008 [51].
Note: CI = confidence interval; HIV = human immunodeficiency virus.

coverage of NSP, OST, and ART interventions delivered in combination to PWID [2]. Figure 4.2 reproduces these findings, showing the effect of different intervention combinations and yearly recruitment rates on HIV incidence among PWID after five years. Figure 4.2 shows that single interventions may have limited effect, whereas interventions in combination have greater effect, and that medium- to high-intervention coverage is required in order to have a substantial effect on HIV incidence. In addition, the HIV prevention impacts of ART are appreciable (37%), especially when delivered to all HIV-positive PWID with CD4 counts lower than 350 cells per μl.

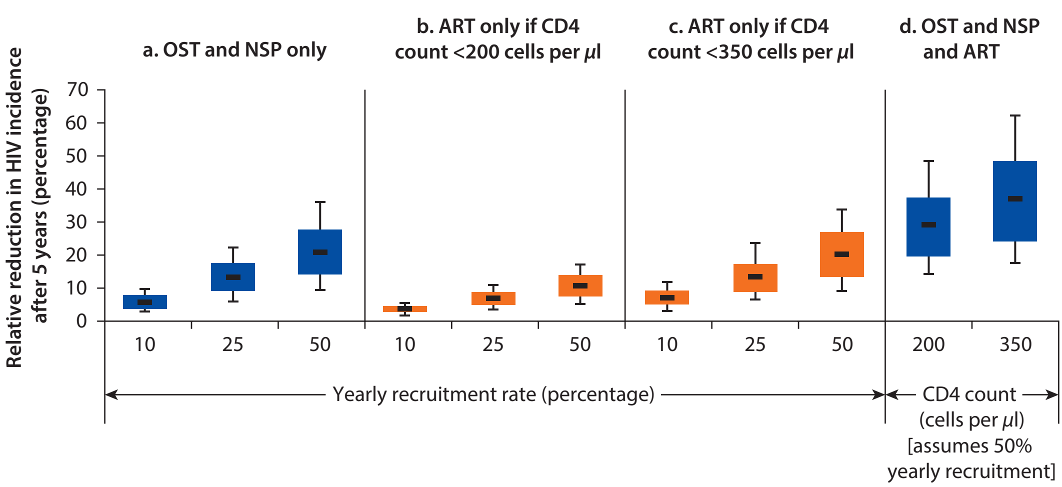
Coverage of HIV-Prevention Interventions among PWID

Coverage has been defined as the proportion of the population at risk reached by an intervention, ideally with sufficient intensity to have probable impact, and is a critical determinant of assessing HIV-prevention effectiveness [2, 18, 45, 46]. Data summarizing the coverage of HIV-prevention interventions was drawn primarily from published reviews that emerged from the Reference Group to the United Nations (UN) on HIV and Injecting Drug Use. These reviews draw on data from a variety of sources including the United Nations General Assembly Special Session (UNGASS), WHO, and systematic reviews of scientific literature [1] and country-level data collected by the EMCDDA, which draws on data from routine reports from European governments [47].

Needle and Syringe Exchange Programs

The systematic review showed [1] that 53 of the 54[1] European countries (as defined by WHO) reported evidence of injecting drug use, and all but 5 have NSPs.

Figure 4.2 Effect of HIV-Prevention Interventions in Combination



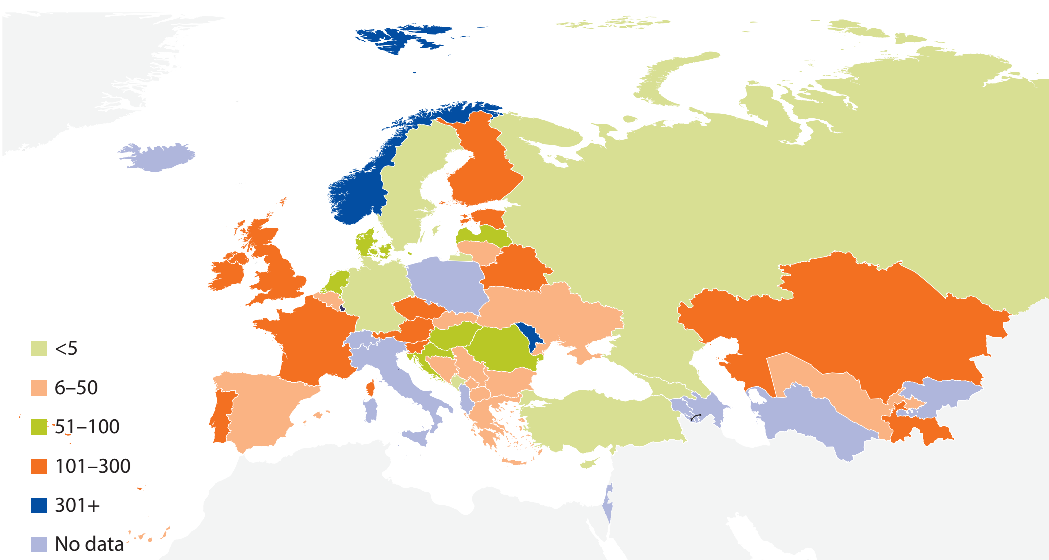
Source: Degenhardt, et al. [40].
Note: ART = antiretroviral therapy; HIV = human immunodeficiency virus; NSP = needle and syringe exchange program; OST = opioid substitution therapy.

Of the five countries not providing NSPs (Andorra, Iceland, Monaco, San Marino, and Turkey), only Turkey has a total population of over 500,000.

There is wide variability in the estimated coverage of NSPs, and coverage itself can be measured in a variety of ways [46]. The review defined coverage to be the number of needles distributed per PWID per year. The data do not include purchases from pharmacies (see map 4.5) which may constitute a significant proportion of the equipment in circulation, especially in Eastern Europe. The operating rules of NSPs can also differ with some programs offering unlimited needle/syringe distributions and others offering exchanges only. Some NSPs limit the number of needle/syringes that can be exchanged to only a few at a time, increasing the number of contacts a person has with an exchange program and compelling them to retain used needles for longer periods of time than they might do otherwise. This may increase the likelihood of PWID reusing the needles as well as increase the likelihood of police harassment in some countries [48–50]. It also does not account for possible secondary distribution and may underestimate the number of PWID benefiting from NSPs. Finally, the number of syringes a PWID needs in order to use a sterile needle for every injection will depend on their personal drug use, which may include such factors as duration of injecting, types of drugs injected, and whether or not they use OST. Given these limitations, comparisons between the coverage data presented here should be interpreted cautiously.

In Finland in 2009, over 13,000 PWID (about 85% of the total), received over three million syringes, an average of around 230 per person [6]. In Russia in 2008,

Map 4.5 Number of Needles Distributed per PWID in 2009 or Most Recent Year



Sources: EMCDDA Statistical Bulletin [50]; Mathers et al. [36].
Note: PWID = people who inject drugs.

only 7% of PWID (less than 130,000 individuals) accessed NSPs, receiving an average of only 56 needles per person [1]. Coverage estimates vary widely even within European subregions. In Eastern Europe, for example, the percentage of PWID accessing NSPs is estimated between 1% (0.6%–11%) in Georgia in 2008 and 68% (52%–97%) in Lithuania in 2007 [1]. In Western Europe access ranges from 4% (2%–6%) in France in 2007 to the much higher rate of 81% in Finland in 2007. There are less data for Central Europe, but 15% of PWID in the Slovak Republic accessed NSPs in 2008 and 50% in Hungary in 2007. The estimated number of syringes distributed per estimated PWID in 2009 (or the latest year for which data are available), range from under 5 syringes in Russia (a very high prevalence country; see chapter 3) to over 300 in Norway and over 500 in Moldova.

Social-structural factors may play a large role in why so few needles and syringes are accessed by PWID in some parts of the region. Reports from Ukraine of unjustified police harassment outside NSPs and narcology clinics where OST is administered may deter many PWID from visiting or returning to obtain clean needles or treatment. Stories of detention, compulsory drug testing, and subjection to humiliating procedures are commonplace in cities such as Sumy and Ternopil [52]. A mixed-methods study from three cities in Russia involving over 200 interviews and 1,500 questionnaires with PWID reported 93% of injectors accessing clean syringes from pharmacies and only 7% ever having been in contact with city NSPs [48, 53]. Pharmacies were described as being extremely easy to access, unlike NSPs that could be situated far away; furthermore, travel costs outweighed the benefits of free equipment and using NSPs increased the likelihood of police interference. One-for-one exchange policies at NSPs were also described as unreasonable because storing and transporting used syringes increased the risk of being discovered as a drug user by relatives or the police. NSPs were seen as useful for receiving additional benefits such as health care and for being an understanding environment [48, 54].

Given the mixed coverage of NSPs in the region, pharmacies provide a significant point of access for sterile syringes in many parts of Europe. Accounts from the East often describe pharmacies as the preferred method of obtaining sterile injecting equipment and may be the primary source of sterile needles: in a survey of three Russian cities involving nearly 1,500 PWID, 93% of respondents used pharmacies as their main source of clean injecting equipment [48]. In Northern Ireland in the United Kingdom, free syringes are only available through pharmacies [55]. In Sweden, however, pharmacy sales are legally restricted, and needles are only available through two hospital-based outlets, denying PWID clean equipment from this source [45, 55].

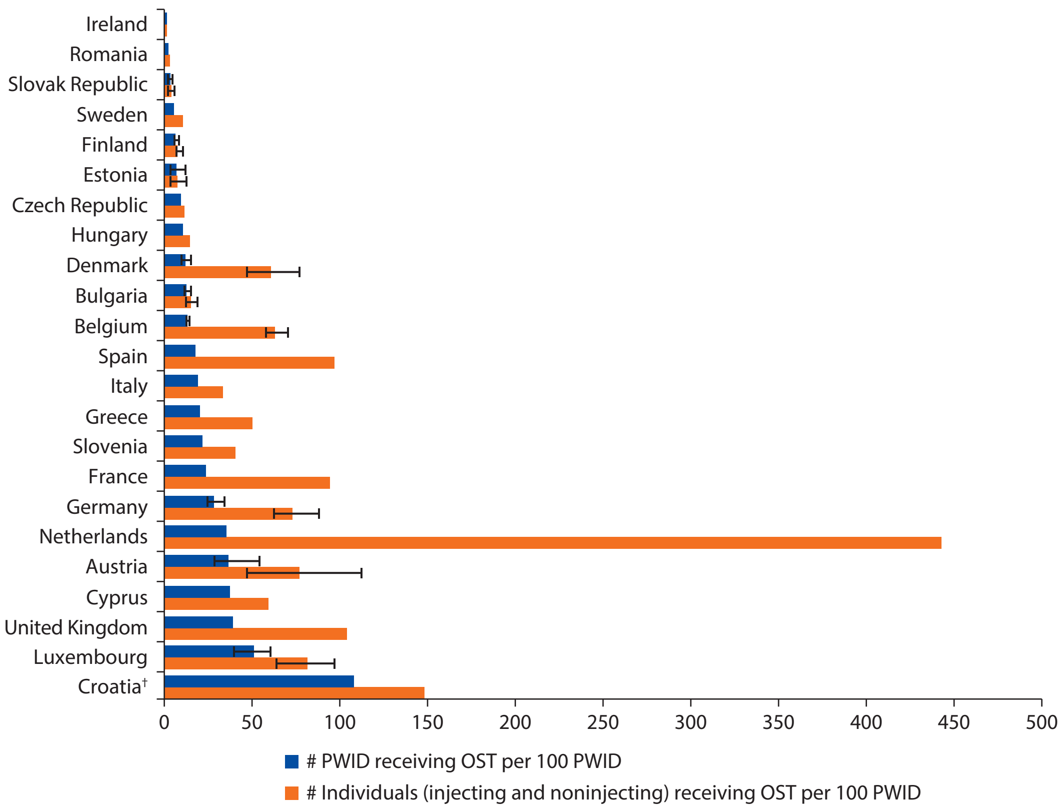
Although both NSPs and pharmacies may be accessible to PWID in some regions, in other settings the possession of a syringe, especially a used one, may constitute evidence of drug use and/or lead to harassment or arrest [48, 50]. In Ukraine, for example, the threshold for the offense of legal possession of drugs in 2010 was reduced to 0.005 g of the most commonly injected drug, hanka, the possession of which could potentially lead to a jail term of three years. While this threshold has been increased in recent years, these possession laws worked against the widespread transportation and distribution of injecting equipment to PWID and have also compromised the work of NSP staff [56].

OST

In Europe, OST comprises methadone- or buprenorphine-based treatments, and in fewer cases, heroin-assisted treatment and sometimes morphine. In a systematic review of coverage [1], 6 of the 53 countries reporting evidence of injecting drug use did not provide OST (including Russia, Turkey, Turkmenistan, and Uzbekistan).

As with NSP, the coverage of OST varies greatly throughout the region (figure 4.3). It is more complicated to compare the uptake of OST across the countries since OST is available to both injectors and those who use opiates through other modes of administration. So the denominator is often not standardized across the countries. In Spain or the Netherlands, for example, less than 10% of opiate users inject [6]. A country with low-injecting rates among opiate

Figure 4.3 OST Coverage in Europe for 2009 or Most Recent Year



Sources: [1, 6].
Note: Black bars show the range of estimates available; OST = opioid substitution therapy: PWID = people who inject drugs.
† = Croatia estimate of PWID receiving OST per 100 PWID is implausible; however it is included for completeness.

users would have an overestimated rate of OST per 100 PWID, compared with countries where the majority of opiate users inject. In some central European countries including the Czech Republic, the Slovak Republic, and increasingly Hungary, many injectors report amphetamines and methamphetamines as their primary drug, for which no substitution treatment exists. As a result, these countries will have a low rate of OST per 100 PWID compared with countries where opiates are more common.

The highest reported absolute number of individuals receiving OST are in France, Italy, and the United Kingdom, where over 100,000 individuals received OST in 2009 or in the last year recorded [6]. Of the countries with reported data and excluding Russia and Uzbekistan where OST is unavailable, the smallest reported absolute numbers of individuals receiving OST are in Ireland, Montenegro, and Tajikistan, where less than 50 individuals received OST in the last year recorded. Accounting for the number of PWID and estimated rates of injecting among opiate users (assuming equal access to OST by injectors and noninjectors), Luxembourg had the highest plausible number of PWID receiving OST (51 out of 100 PWID), followed by Cyprus and the United Kingdom (41 each). Without knowing exactly how many opioid-dependent injectors exist and are receiving OST in Europe, it is difficult to draw conclusions; however, it is clear that generally OST coverage is low and very low outside of the West, with no country in the two subregions reporting more than 30 opiate users receiving OST per 100 PWID, and it is likely that much fewer injectors receive OST. It is not clear why coverage appears low, although limited treatment sites as well as geographic location of the service may play a part, or as in the case of Kazakhstan, implementation of OST has been limited to pilot projects in need of scale-ups [57].

ART

As with NSPs and OST, the global availability of ART for HIV-positive PWID was described recently by Mathers, et al., although there are generally less data available than there are for the other treatment services. Throughout the whole region (where data exist) less than 100 PWID receive ART per 100 PWID living with HIV. However, data on ART access for other risk groups or the general population are not provided, so we cannot draw conclusions about access for PWID compared with other groups. However, a WHO report on PWID access to ART across the region [58] describes how in 2002, 46% of HIV cases in the region occurred among PWID while only 10% of those receiving ART occurred among PWID. By 2008 this inequality had decreased, with 42% of HIV cases and 31% of ART recipients occurring among PWID. However, this does not include data from Russia, which undermines the comparability of the data because of Russia's magnitude of PWID and HIV among PWID [58]. Data from 2008 indicate that while PWID make up 83% of HIV cases in Russia and 60.5% in Ukraine, they only constitute between 20% and 30% and 24% of ART recipients, respectively [3].

In Western Europe the number ranges from 10 (6–22) PWID receiving ART per 100 HIV-positive PWID in Portugal to 70 in Luxembourg, although in absolute numbers this means only 39 PWID have accessed ART. Spain has the most PWID accessing ART at nearly 40,000, although this number may be proportionally smaller because of Spain's much larger HIV-positive PWID population. In Eastern Europe and the former Soviet Union, the rates vary from less than 1% (<1–33%) in Russia to 18% (8%–48%) in Armenia. There are less data for Central Europe, but the Czech Republic reports 81 PWID receiving ART for every 100 HIV-positive PWID, although this is based on very small numbers of HIV-positive PWID.

The view that PWID are less likely to adhere to ART unless they have either stopped injecting or are receiving full OST services is increasingly challenged. A study from Amsterdam, for instance, found that PWID who are currently receiving ART are similar in number to drug users regularly accessing OST and NSP as well as those who were no longer injecting or relying on harm-reduction programs [59].

Combination HIV Prevention for PWID

Despite emerging evidence, especially from mathematical modeling studies [2], of the potential impact of developing HIV-prevention interventions in combination for PWID, data on the coverage of combination interventions are not routinely or systematically collected in the region.

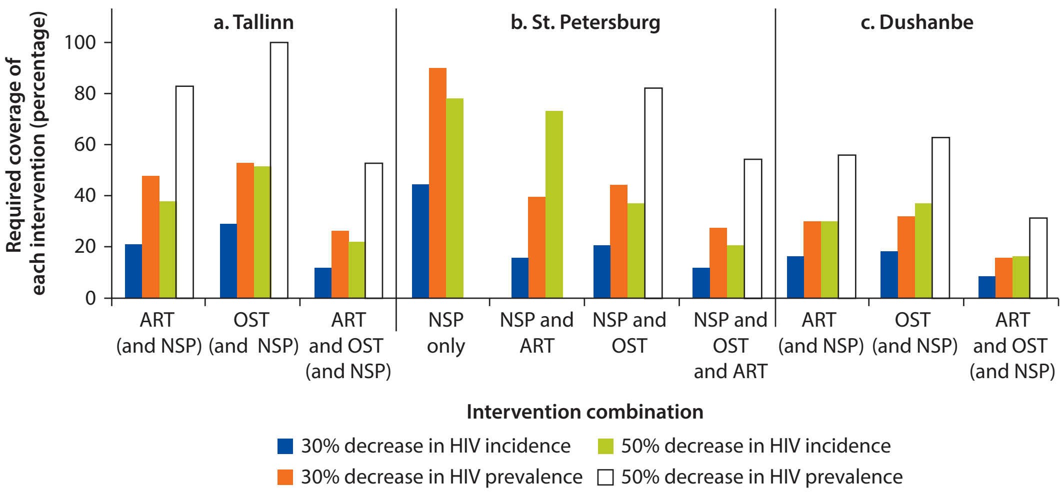
Modeling the Impact of Combination HIV-Prevention

As we have noted above, there is evidence of the effectiveness of OST, ART, and NSP in reducing HIV risk and prevalence; yet in most Central and Eastern subregions coverage remains low, especially when these interventions are considered in combination. OST is unavailable in Russia and programs in Estonia and Ukraine are believed to reach only around 7% and 2% of PWID respectively [60]. ART coverage is disproportionately low among PWID in Europe compared with the general population [58], and it is particularly low in high-prevalence settings where the proportion of HIV-positive PWID receiving ART is estimated to be much less than 10% [60].

Drawing on a mathematical modeling analysis, we also consider here the potential impact that OST, ART, and NSP prevalence has had on HIV incidence in three illustrative epidemic scenarios in Russia, Estonia and Tajikistan. Two of the scenarios are based on the high HIV prevalence (>40%) settings of St. Petersburg (Russia) and Tallinn (Estonia), whereas the third is based on a lower HIV prevalence (<20%) setting of Dushanbe (Tajikistan). All three settings currently have very low coverage of OST and ART among PWID at less than 10%. NSP coverage is high in Tallinn (~70 syringes per PWID per year [61]), moderate in Dushanbe (10–20 syringes per PWID per year [62]) and low in St. Petersburg (personal communication Robert Heimer).

Figure 4.4 below shows the required coverage over 10 years of different intervention combinations for achieving a 30 or 50% relative decrease in HIV incidence or prevalence compared to baseline. Different combinations are considered for each setting because Tallinn already has high baseline coverage NSP,

Figure 4.4 Coverage to Decrease HIV Incidence or Prevalence by 30 Percent or 50 Percent in 10 Years



Source: Modeling analysis.
Note: Tallinn and Dushanbe baselines include high or moderate NSP; ART = antiretroviral therapy; HIV = human immunodeficiency virus; NSP = needle and syringe exchange program; OST = opioid substitution therapy.

which is taken as the comparator for that setting, while Dushanbe has moderate coverage NSP.

For St. Petersburg, the projections highlight that high-coverage levels of NSP on their own (79% coverage for a 50% reduction in HIV incidence over 10 years) are required to achieve a 30%–50% decrease in incidence over 10 years—similar to the high-NSP coverage already achieved in Tallinn. However, if NSP is combined with ART or OST in St. Petersburg, then the required coverage level for each intervention is decreased by one-half to two-thirds of what it was for NSP only. When all three interventions are combined, the required coverage levels decrease further by 25%–50%, with only a 12% coverage of each intervention required to achieve a 30% reduction in HIV incidence over 10 years in St. Petersburg.

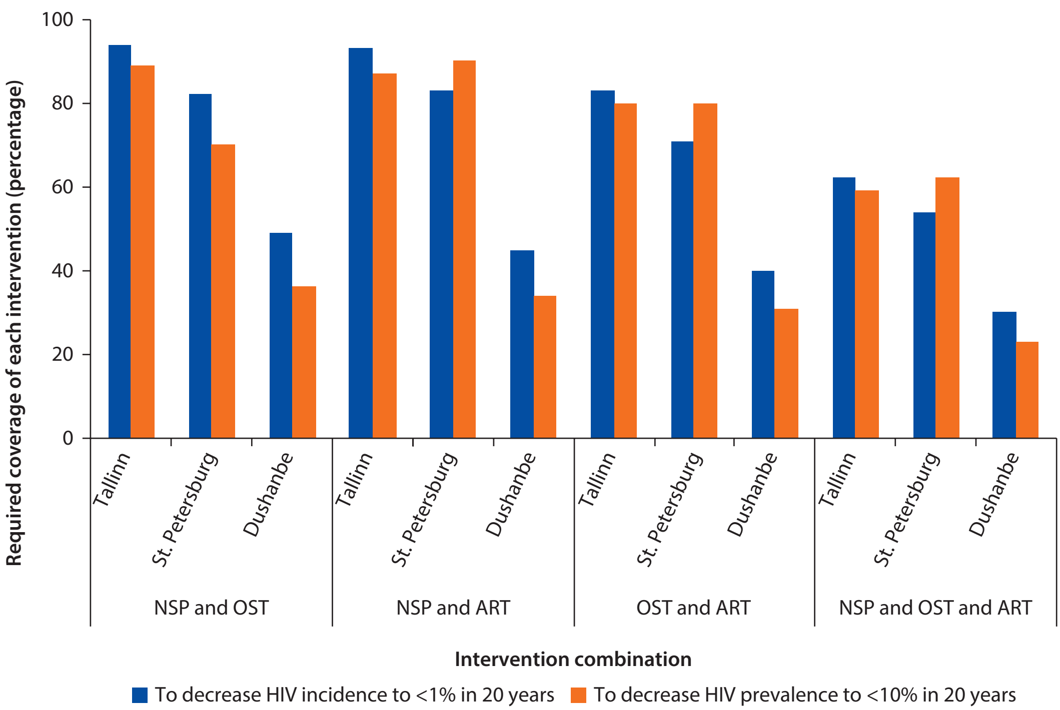
Similar findings are obtained for Tallinn and Dushanbe except that the coverage required for a single additional intervention (OST or ART on top of the existing NSP) to reduce incidence by 30% or 50% are about one-half of the levels required in St. Petersburg. This can be explained by the lower baseline HIV incidence in Tallinn and Dushanbe in 2012 due both to the preexisting moderate- or high-coverage NSP interventions and the lower overall risk of HIV in Dushanbe.

In any of the three settings over a 10 year period, about double the coverage level is required in order to achieve the same reductions in HIV prevalence (relative to previous requirements for achieving the same reduction in HIV incidence in each setting). The required increase in coverage is also more pronounced if ART is involved because ART extends survival rates, thereby extending the time that HIV infected PWID remain in the population.

Figure 4.5 considers the required coverage of each intervention combination to either reduce HIV incidence to less than 1% or HIV prevalence to less than 10% over 20 years. The projections for single interventions are not shown because they were unable to achieve these impact targets, except for Dushanbe, where coverage levels of about 85% and 65% of any single intervention reduced HIV incidence to <1% or prevalence to <10% after 20 years, respectively. For any pair of interventions, projections suggest that very high coverage levels of above 80% are generally required to achieve these targets for the higher prevalence settings of Tallinn and St. Petersburg, whereas much lower coverage levels (30%–50%) are needed in Dushanbe. Lastly, if all three interventions are combined, these coverage requirements are reduced by one-quarter in all settings, from 55% to 62% coverage of each intervention being required in Tallinn and St. Petersburg to 23%–30% in Dushanbe.

These projections suggest that high but achievable coverage levels of NSP can result in large decreases (>30%) in HIV incidence and prevalence in settings with high HIV prevalence among PWID. Required coverage levels are much lower when interventions are combined or in lower prevalence settings. The analysis also highlights the importance of combination interventions for reducing HIV incidence and prevalence to low levels in high-prevalence settings. Only high

Figure 4.5 Coverage to Decrease HIV Incidence to <1 Percent or HIV Prevalence to 10 Percent in 20 Years



Source: Modeling analysis.
Note: ART = antiretroviral therapy; HIV = human immunodeficiency virus; NSP = needle and syringe exchange program; OST = opioid substitution therapy.

coverage in the lower prevalence setting of Dushanbe (or no single intervention elsewhere) is able to reduce HIV incidence to less than 1% or prevalence to less than 10% in 20 years. However, in combination these targets become more feasible, although still considerable, with about 60% coverage of all three interventions being required to achieve these targets in Tallinn and St. Petersburg over 20 years, and about 30% coverage in Dushanbe.

HIV Testing Services

In Western Europe a high proportion, generally over 90%, of PWID participating in studies reported having previously been tested for HIV. An exception to this was in 2005 in Italy where only 61% reported being previously tested for HIV [63]. In the East levels varied widely, from 11% to 95% of PWID ever having previously been tested for HIV. In the previous 12 months, the estimated proportion of PWID who had been tested and who knew the results varied from as low as 5% in Baku and Lenkoran in Azerbaijan [64] to as high as 72% in Vilnius, Lithuania [65], although more typically the figure varied from around 23% to 57% [65]. Elsewhere in the region HIV testing among this population was generally lower. In Central Europe studies from Romania and Serbia showed between 19% and 22% of PWID who had been tested for HIV in the last 12 months and knew the results [66, 67]. In Bosnia and Herzegovina, Bulgaria, and the former Yugoslav Republic of Macedonia, the proportion grew to between 36% and 48% [68–70]. In Albania in Tirana only about one-third of PWID surveyed in 2005 and 2008 reported ever having had an HIV test [71, 72]. The highest reported proportions in the subregion were in Croatia where 83% of PWID reported ever having had a test [73]. Studies from Central Asia varied from the low rates of 13%–15% of PWID having ever been tested for HIV in Tajikistan and Uzbekistan to higher (although still modest) levels of 40%–56% in Kazakhstan and the Kyrgyz Republic [74, 75].

High-testing rates in the East generally may be due to mandatory testing of migrants and opt-out rather than opt-in testing polices at a variety of locations including narcology centers, TB centers, prisons, antenatal clinics, and presurgery [76, 77]. Evidence shows that a history of HIV testing has been associated with reduced risk of HIV prevalence in some cities in Russia [78], although such high levels of HIV testing are at odds with low levels of OST, NSP, and ART availability for PWID.

A Note on Age and Other Restrictions Regarding Service Access

Despite data from Eastern Europe indicating that initiation to injecting can happen well before the age of 18 [79], young people (under 20 years old) are often less able to access the above cornerstone HIV-prevention services than their older counterparts. Qualitative data from Ukraine, for example, describe multiple barriers keeping vulnerable youth from harm-reduction services including the need for parental consent and identity papers; distrust of authorities; fear of registration; deportation by the police; forced detoxification; institutionalization into state child care facilities; inaccessibility of services; and discriminatory attitudes by health providers [80]. Programs are missing a window of opportunity to prevent vulnerable young people from transitioning to injecting or from learning risk-reduction strategies that may help them avoid injecting-related harms.

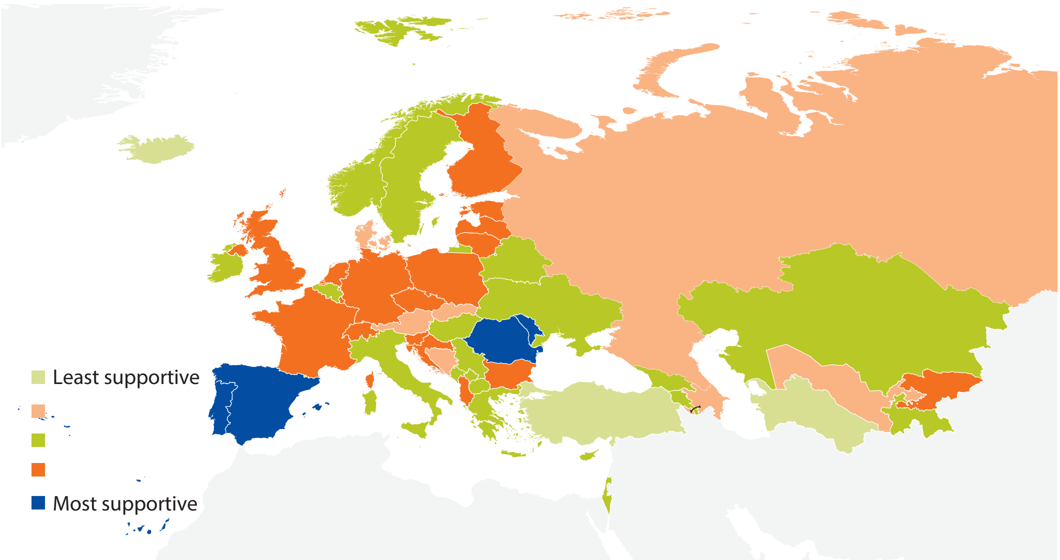
In addition, among some countries in the East—including Georgia, Russia, and Ukraine—access to drug treatment requires prior registration as an addict [81]. Such registration can last for up to five years and can also result in loss of various rights as well as reduce access to employment opportunities, increase feelings of being stigmatized, and increase vulnerability to police intervention. Concerns about registration are often cited as a significant barrier to accessing harm-reduction services [48, 53].

Policy Environments Mediating HIV Prevention among PWID

The policy environment, in combination with other social and structural factors, mediates the development and impact of HIV-prevention targeting PWID [82–84]. Our reviews of evidence have noted the potential role of policing practices, law enforcement policies, social–material factors, gender, and social stigma as social forces shaping risk and prevention responses. Recognizing HIV epidemics as features of their social contexts emphasizes the potentially pivotal role of interventions in creating environments that are enabling, rather than constraining, of evidence-based HIV prevention [82–84]. As noted in "Methods" section a crude index of enabling policy environment for HIV prevention among PWID may include, but is not restricted to, the following domains: (a) the meaningful engagement of key stakeholders (including PWID) in policy formation and programming; (b) a coordinated multisectoral national HIV-prevention strategy emphasizing an evidence-based public health and rights-oriented approach; (c) the generation of research and surveillance on HIV epidemic spread and response; and (d) the development and scale-up of a package of evidence-based interventions, including the removal of structural obstacles limiting their implementation [2, 85]. Accordingly, there have been increasing calls to de-emphasize the criminalization of PWID by developing public policies emphasizing public health above law enforcement dominated approaches, and for the rapid scaling-up of HIV prevention along with community action and social support interventions [2, 85–88].

The findings generated by our simple index of enabling policy environment (see "Methods" section) are shown in map 4.6 below. Of the 50 countries to which we applied the index, 14 have national organizations for drug users. Forty-four explicitly and supportively mentioned harm reduction in their national strategies. Thirty-seven countries have carried out at least one HIV prevalence and one behavioral study among PWID in the last 10 years. OST and NSP are available in 46 countries (OST is unavailable in Russia, Turkey, Turkmenistan, and Uzbekistan, and NSPs are unavailable in Turkey), and in 8 countries, OST and NSP are available. Ten countries use administrative rather than criminal penalties for people found possessing small quantities of drugs for personal use.

Map 4.6 Policy Environments for HIV among PWID in Europe



Sources: INPUD; HRI; EMCDDA; Mathers et al. [36]; systematic review.
Note: HIV = human immunodeficiency virus; PWID = people who inject drugs.

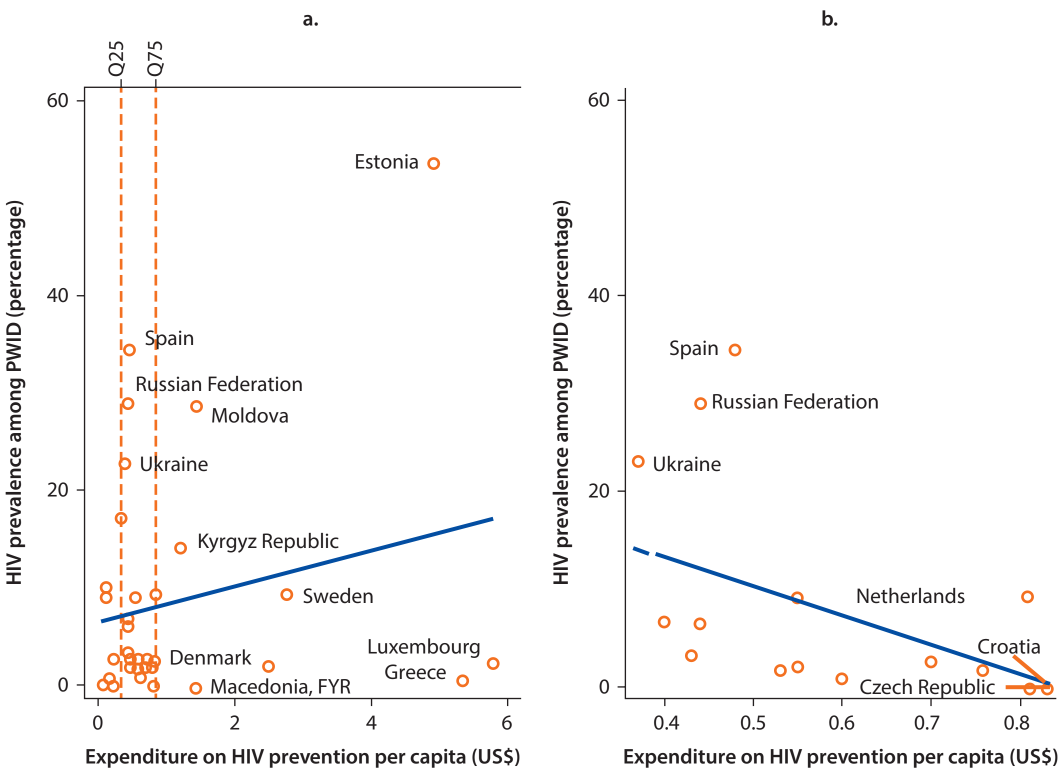
The index suggests that the country with the most supportive policy environment is Spain, followed by Moldova, Portugal, and Romania. Spain earned positive scores for each of the five indicators we used for the index. Spain and Moldova are among the five countries that are most negatively affected by HIV in Europe. The HIV prevalence among PWID in these countries is extremely high at over 20%. The other countries with comparable prevalence levels are Estonia, Russia, and Ukraine, which appear to have midrange levels of supportive policy environments.

The country with the seemingly least supportive environment is Turkmenistan, followed by Iceland and Turkey. Turkmenistan does not exhibit any of the characteristics of a supportive environment; however Turkey has undertaken a biological prevalence and a behavioral study recently, and OST and NSP are available in Iceland, outside of prison settings. Among the other low scoring-countries, both Russia and Turkey reported having undertaken prevalence and behavioral monitoring among PWID in the past 10 years, and in Iceland OST is available to PWID.

We do not suggest that countries characterized as being more supportive by the index have optimal policy environments for HIV-prevention among PWID, and we acknowledge the limits of this crude index of policy environment. Another key factor indicating a government's commitment to HIV prevention is the amount of money spent; this is illustrated below in case study 4.3. Some countries (Moldova and Spain) receive high scores on the policy index, but they also have high HIV prevalence among PWID. These scores may be a result of timing, with changes in

Case Study 4.3 Evidence of Commitment to HIV Prevention

One of the most straightforward ways to measure the level of a government's commitment to HIV prevention is to measure how much money they spend on it. Examining the amount (U.S. dollars) spent per capita on HIV prevention versus HIV prevalence among PWID may allow us to draw crude comparisons between the countries in the region where these data are available. The most money spent was reported by Luxembourg and Greece at over US$5.00 each per capita, followed by Estonia at US$4.93. The least reported amount spent was in Bosnia and Herzegovina, Cyprus, and Malta with less than US$0.10 spent in each per capita. Although they are relatively low-prevalence countries, Azerbaijan and Poland, with around 1 in 10 PWID infected with HIV, reported only marginally more dollars spent, at US$0.10 and US$0.11 per capita each, respectively. There was some evidence of an association between the money spent on HIV prevention per capita and HIV prevalence among PWID (see figure, below). With the exception of Estonia, it is clear that countries with higher reported HIV prevalence among injecting drug users (IDUs) are among those reporting HIV prevention spending per capita at the lower end of the spectrum. In panel a of the figure below, prevalence appears to increase with each extra dollar spent when looking at all the data; when focusing on the interquartile range, excluding the more extreme values of expenditure per capita, the prevalence appears



Note: HIV = human immunodeficiency virus; PWID = people who inject drugs.

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Case Study 4.3 Evidence of Commitment to HIV Prevention *(continued)*

to decrease for every US$0.10 spent, suggesting some association that is not best characterized by a linear relationship. It could well be that there is an optimum amount of money per capita that needs to be spent on HIV prevention before prevalence declines or that expenditure needs to be focused on targeted interventions.

It is important to highlight the limitations around this variable, which is subject to considerable reporting bias. Data on HIV prevention spending per capita were collated from the Dublin Declaration [6] and can include a wide range of interventions. Some countries include antiretroviral therapy (ART), while others do not. It may also be that countries receiving international funding will more accurately report expenditure than countries without external funding or with more integrated health systems that cannot disaggregate HIV prevention funding from broader sexual health services.

Source: Dublin Declaration Progress Report 2010 [6].
Note: a = relationship between HIV prevalence among PWID and per capita HIV prevention expenditure among all countries; b = restricted to the middle 50% of countries only; HIV = human immunodeficiency virus; PWID = people who inject drugs.

the policy environment being made as a result of high HIV prevalence. However, the scores may also reflect aspects of the environment not captured here. For example, despite the legal availability of methadone for PWID in prison in Moldova, availability is relatively low and access is limited. It is not available in community settings, which means that many PWID who may want to use OST are unable to, and if they do manage to access it inside or outside of prison, they may not be able to continue if those circumstances change [89]. Less than 50% of PWID have access to OST in Europe, with coverage lowest in the East (see above).

Furthermore, it is important to note that the distinction made in the index between drug use being regulated as an administrative offense is not necessarily indicative of a more supportive environment; in fact, this distinction may be arbitrary in some settings. Findings from our systematic review show higher rates of arrest and incarceration among PWID in the East where drug possession is more frequently associated with criminal rather than administrative penalties but, even in countries where possession of drugs is an administrative offense, a high proportion of PWID report being incarcerated. This suggests that for PWID, other factors increase vulnerability to arrest and imprisonment, factors that also need to be explored further.

Criminalization as a Feature of the HIV Risk Environment

The data gathered from the systematic review suggest that contact with police and time spent in prison can be linked to increased risk of HIV. Case study 4.4 provides an illustration of how policing practices can mediate risk. Drawing on the average national prison populations in the region (see "Methods" section) we find a positive relationship between the HIV prevalence among PWID and the number of people imprisoned in a country (figure 4.6). For every additional person imprisoned per 100,000 population in a country, the HIV prevalence

Case Study 4.4 Contact with Criminal Justice Systems in Central Asia

Kazakhstan has the strictest drug laws in Central Asia with penalties of up to 20 years imprisonment possible for possession of between 0.01 g and 1 g of heroin, which is considered a "large amount"; sufficient for criminal rather than administrative punishment [92]. In addition to this there are documented reports of police planting drugs on drug users as well as extorting bribes from them and their families. Harassment, physical violence, and unauthorized arrests of PWID by the police are reportedly common [93]. Qualitative studies have noted similar findings in other parts of Eastern Europe [94].

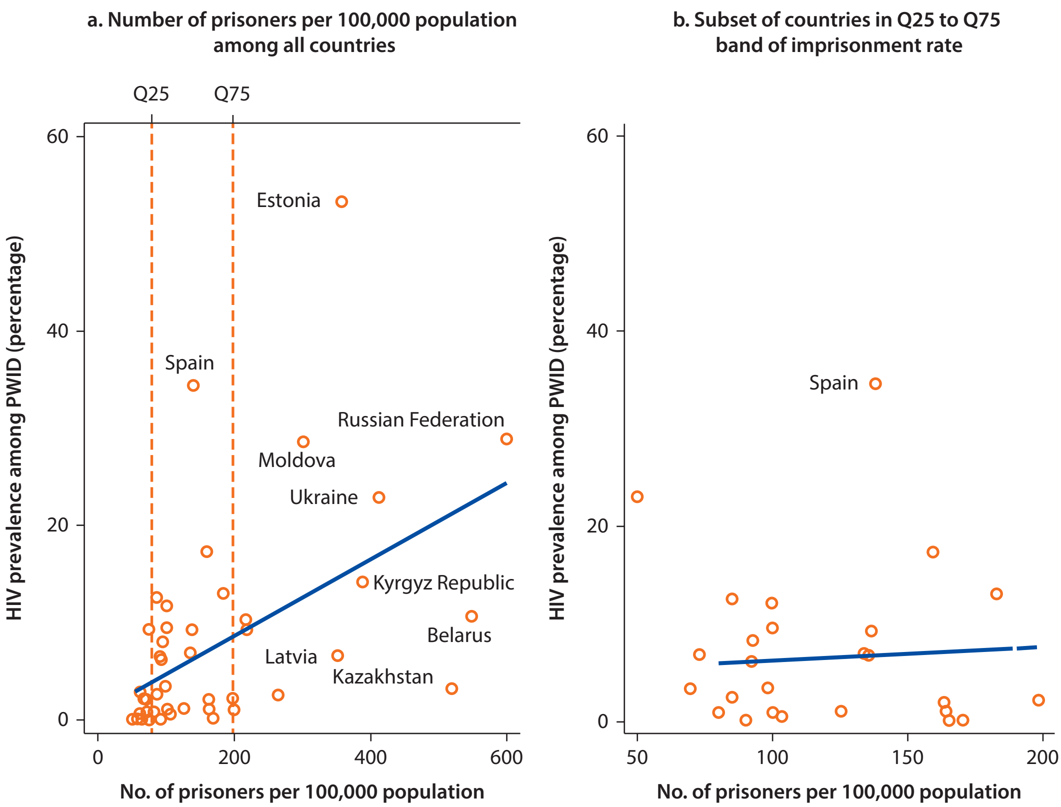
The Kyrgyz Republic reports good working relationships between nongovernment organizations (NGOs) working with PWID and Ministry of Interior officials and senior police who support harm-reduction services for drug users. However, a study in the high-prevalence areas of Osh and Jalal-Abad among 73 female PWID revealed that half had spent time in prison, primarily for the possession of small amounts of drugs. There are almost no HIV-prevention interventions in prisons for women. Some respondents could recall up to 50 instances of detention by the police, many of which took place near drug dealing points although the dealers themselves were apparently left alone. Bribes, free sex, and information were required by police for their freedom [95]. A study in Bishkek among drug users reported that about 36% get their drug supplies directly from the police [96].

Tajikistan also reports police harassment and physical abuse toward PWID, and this is recognized in the 2007–10 national HIV-prevention strategy as a major reason for poor uptake of HIV-prevention services by PWID [97].

among PWID in the country increases by 0.039% (95% CI 0.019%–0.058%). The majority of countries with high rates of incarceration are in the East, which may influence the relationship. However, by excluding the countries with the very high and very low rates the positive association remains, although it is much weaker and indicates that even among countries with similar, and moderate, rates of incarceration, the relationship with HIV prevalence among PWID exists. The links between incarceration and individual risk of HIV are well documented (see chapter 3), yet the relationship at a national level is less clear and is likely to be mediated by an interplay of social factors, such as historical levels of investment in criminal justice and public health systems and national cultural responses toward criminal justice.

Interventions that specifically attempt to decrease the occurrence of new infections and mitigate the impact of infections that occur among PWID are generally aimed at changing the individual behaviors of PWID and may do little to alter the broader risk environment [48]. A growing body of evidence substantiates the role played by social-structural factors in shaping HIV risk and by social-structural interventions in HIV prevention [2, 49, 82]. Case study 4.5 provides an illustration of national policy change designed to remove the adverse effects of criminalization on HIV risk and HIV prevention.

Figure 4.6 Associations between HIV Prevalence among PWID and Number of Prisoners



Source: *World Prison Population List* (7th Edition), International Centre for Prison Studies.
Note: HIV = human immunodeficiency virus; PWID = people who inject drugs.

Case Study 4.5 Trends Toward an Enabling Environment: Portugal

Despite generally low drug use among the population as a whole compared with the rest of Europe, Portugal has suffered from relatively high rates of heroin use and HIV among PWID. Following the recommendations of a report by the Commission for the National Strategy to Fight against Drugs, the Portuguese government took the significant step of becoming the first European country to explicitly decriminalize drug use and personal possession, a law that took effect in July 2001 [99, 100]. Crucially, in addition to moving from criminal to administrative punishment for using and possessing drugs, the strategy called for a number of additional principles for guiding action in this area. The National Operational Plan for Integrated Responses (PORI) was put in place, and localized rapid assessments of the situation and needs at the structural, community, and individual levels were carried out so that Programs of Integrated Response (PRIs) could be put in place. These included access to primary prevention and harm reduction interventions and reinforcing social reintegration

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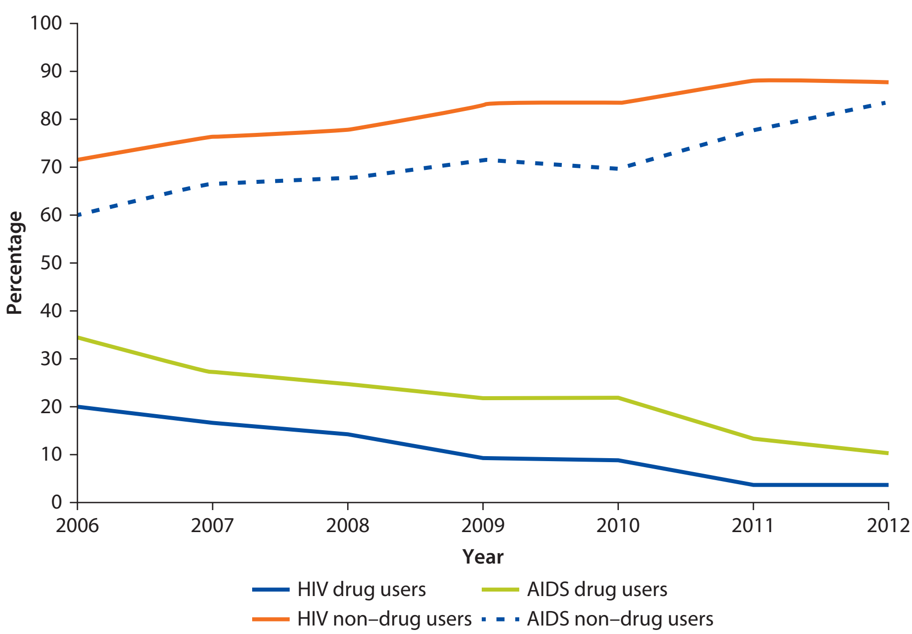
Case Study 4.5 Trends Toward an Enabling Environment: Portugal *(continued)*

and drug treatment for drug users as alternatives to prison as well as a number of other measures focusing on supply reduction and increasing the resources invested in the area, with an additional 10% increase in funding for treatment and harm-reduction services annually for three years [101].

Although the impact of the new policy is yet to be fully evaluated, a report published in 2009 [101] showed that in the subsequent seven years following the enactment of the law, changes in lifetime prevalence of drug use did not differ significantly from trends seen in other European countries, and the massive increase in drug use, as feared by opponents of the new law, did not materialize. It is notable that lifetime prevalence of drug use had in fact decreased among those younger than 18 years old, an important age group in terms of future drug trends [102]. This decrease has been seen among all drug types. In addition the number of drug-related deaths has declined from nearly 400 in 1999 to 290 in 2006, and HIV and AIDS notification among drug users has decreased, both in total numbers and in the proportional share of the national burden [103].

It is Important to note that in terms of limiting the spread of HIV and other drug-related harms among those already using drugs, Portugal has seen a huge increase in the number of people in substitution treatment, detoxification, therapeutic communities, and half-way houses since the change in law. This has been attributed to multiple factors including a reduction in fear of punishment previously associated with admitting drug use; the ability to seek treatment freely in an environment with increased capacity for dealing with drug use; increase in resources and the number of treatment places available; and reduced waiting times for treatment [104].



Note: AIDS = acquired immune deficiency syndrome; HIV = human immunodeficiency virus.

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Case Study 4.5 Trends Toward an Enabling Environment: Portugal *(continued)*

Although the impact of the new strategy is yet to be fully evaluated, several reports have already been published interpreting the early results of the policy [101, 106]. Drug policy tends to provoke polarizing opinions and it is possible that data have been selectively used to support arguments on both sides of the debate [107]. However, it is likely that in the past 10 years the improvements seen in health and social outcomes for PWID in the past 10 years can be attributed to a comprehensive and coordinated national strategy that is not centered around legal solutions, but instead strives to achieve goals by using the core tools of reducing harm and promoting treatment [108].

Source: Relatório Anual 2012, A situação do País em material de Drogas e Toxicodependências [294].

HIV Prevention Responses among SWs

In this section, we consider selected targeted interventions in the development of HIV prevention responses for SWs, especially FSWs. We then consider aspects of the policy environment mediating HIV risk and prevention and emphasize the need for social-structural intervention responses to target harms associated with sex work in addition to STIs and HIV.

Targeted HIV Prevention for SWs

Specialist Services and Coverage

There is a wealth of evidence showing the positive impact of specialist services in reducing risk of HIV and STIs among SWs from both Europe and internationally. Targeted services have the advantages of opening at convenient times and are staffed by people familiar with sex work–related issues and are nonjudgmental [1]. Yet in many parts of Europe the provision of specialist services is low and narrowly focuses on STI/HIV treatment rather than addressing broader social and health issues that affect SWs (see case study 4.6). We collated data on the number of specialist services across the region that provide a range of social, legal, and sexual health services for SWs. These data exclude STI services provided at general STI clinics. Across the region, Germany, Russia, Slovenia, and Spain have the fewest number of sex worker targeted services (<0.2 per 1000 FSWs). Finland, Luxembourg, and Norway have the largest number (>2.8) (map 4.7).

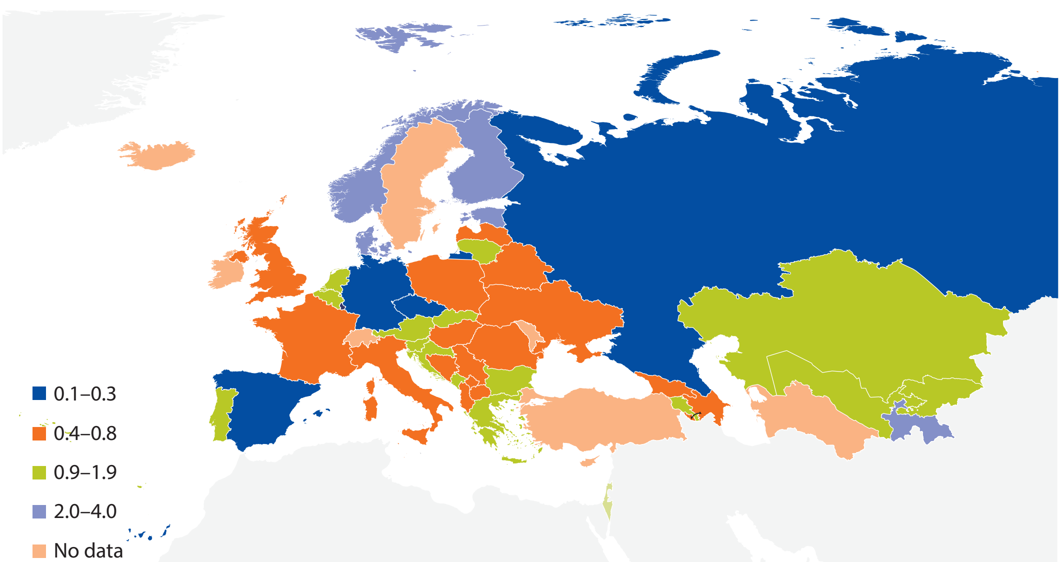
Other data collected on coverage achieved by STI/HIV clinics are inconsistent and patchy. For example, the WHO indicator documenting the number of targeted service delivery points for SWs where STI services are provided was only completed by nine countries in 2008 [2]. Within these countries interpretation of the indicator varied. For example Germany and Hungary which included all dermatovenerology (skin and venereal disease) services that treat SWs, reported 350 and 125 services, respectively, whereas some countries report that they have no specialized services and did not include general STI services. Serbia reports a total of five preventive programs implemented by nongovernmental organizations among SWs in five cities [2].

Case Study 4.6 Sex Worker Services in Eastern Europe

In the East, the vast majority of services for SWs are attached to harm-reduction services for PWID, which may have a separate component conducting outreach or providing sexual health information for SWs. There is some evidence to suggest male PWID resent women attending these services, which may restrict attendance by FSWs [14]. Evidence from the United States suggests that street SWs using drugs receive an enhanced intervention for SWs engaged in fewer acts of unprotected oral sex. They also experience less sexual violence than PWID who receive a standard harm-reduction intervention, suggesting that targeting interventions for SWs is important [15].

The majority of harm-reduction projects provide STI/HIV screening services for SWs, but don't address broader sexual health issues [16]. Other evidence from Eastern Europe reported barriers to sexual health services including no links between sexual health and drug treatment services, as well as FSW concerns about losing custody of their children. Data from Russia suggest that pregnant drug users have poorer access to antiretroviral therapy than nondrug users for the prevention of mother-to-child transmission. Data from the region show that mother-to-child transmission rates among HIV-positive injecting drug users are higher than among other HIV-positive women [14]. Specialist services for SWs in the East need to expand their focus on broader sexual health issues.

Map 4.7 Number of Specialist Sex Worker Services per 1,000 FSWs



Sources: services4sexworkers.org; Global Fund; International HIV/AIDS Alliance; TAMPEP.
Note: Services offered include a wide range of sexual health, social support, and legal services and exclude standard STI clinics and health services that treat non-sex-working populations; FSWs = female sex workers.

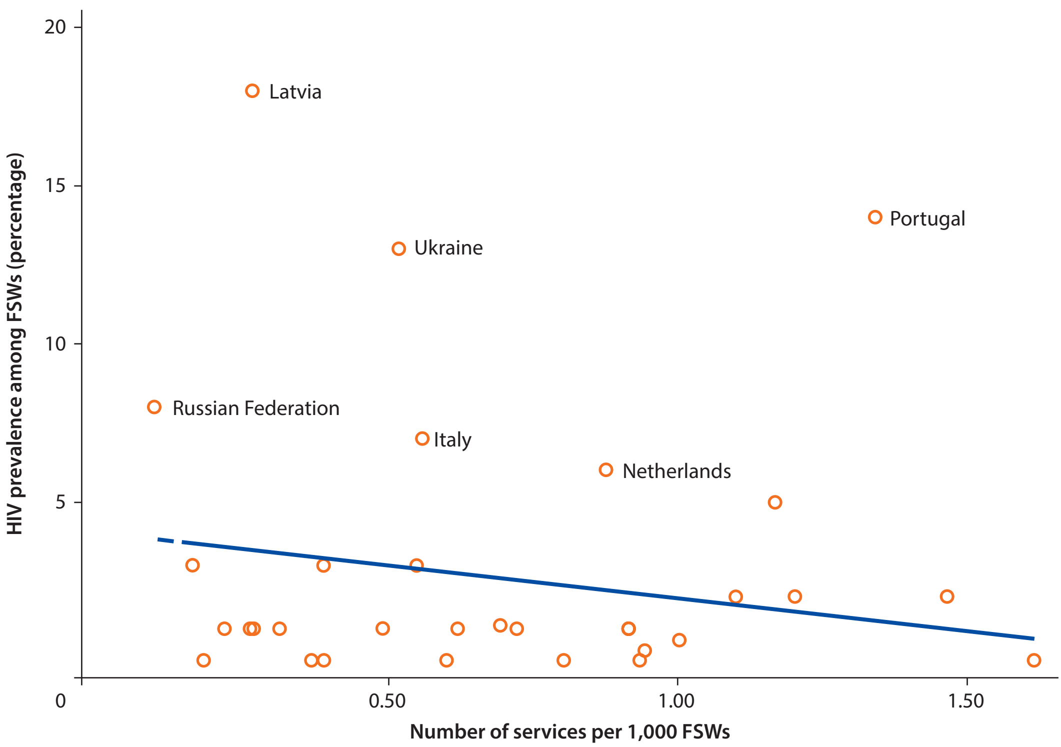
UNGASS indicators monitoring sex work measure the proportion of SWs reached with an HIV prevention program in the last 12 months; the proportion of female and male SWs reporting the use of a condom with their most recent client; and the proportion of SW who are HIV positive. There has been no analysis of these indicators published, but an analysis of indicators for PWID suggests that reporting is inconsistent across the countries [3].

We looked at the relationship between numbers of services per 1000 FSWs and the prevalence of HIV among FSW (figure 4.7). When looking at the relationship between HIV and numbers of services restricting the analysis to the midrange number of services, HIV prevalence appears to decline in relation to the increase in the number of sex worker–specific services. It is worth noting that the scattering of data points around the regression lines is not very evenly distributed, and while a relationship may exist between the variables it may not be best represented by a straight line. However, this analysis does point to the importance of treating HIV/STI in the context of broader social and health issues relating to sex work.

HIV Testing

Across the region mandatory health checks including HIV testing of SWs exist in Austria, Greece, Hungary, Latvia, Switzerland, and Turkey only. HIV testing in

Figure 4.7 HIV Prevalence and Number of Services per 1,000 FSWs



Sources: services4sexworkers.org; Global Fund; International HIV/AIDS Alliance; TAMPEP.
Note: Data restricted to the middle 50% range; FSW = female sex worker; HIV = human immunodeficiency virus.

the Central Asian republics is compulsory and in other countries in the region it is frequently enforced following arrest or imprisonment. A qualitative study showed how forced HIV or STI testing following arrest was used by the police as another way of extorting bribes or controlling SWs [4]. A study of HIV testing patterns among SWs in St. Petersburg suggested that the majority of women had been tested for HIV (97%), but a large proportion had not voluntarily sought out testing; rather, testing had occurred during antenatal care or in prison [5].

In the United Kingdom, a study suggested that 37% of FSWs were tested for HIV in the last 12 months [6]. Of the 31 HIV-positive SWs recruited in the study in the Netherlands, 23 (74%) were unaware of their HIV-positive status [7]. In Russia proportions of FSWs who reported ever being tested for HIV was high overall (above 37%). High coverage is partly explained by the widespread availability of HIV testing in the region, which encourages voluntary testing, in addition to the compulsory testing following police arrest or imprisonment. A study examining factors associated with no history of HIV testing found that younger women who had engaged in sex work for shorter periods of time and who reported sharing drugs with clients had increased odds of not being tested for HIV, suggesting that the HIV screening program is missing some of the more vulnerable SWs [8]. Access to HIV testing was as high in Central Europe as it was in the East; among samples of SWs, more than 50% had been tested in Bulgaria, Croatia, and Romania [9–11] and between 28% and 40% had been tested in Kosovo and Bosnia and Herzegovina [12–13].

Managed Street Zones

Findings from the systematic review indicate that working on the street can increase risk of HIV among SWs. Previous research has shown that street-based FSWs are more vulnerable to physical and sexual violence than off-street FSWs [17]. They are also more prone to arrests and problems with the police. However, street-based sex work has some advantages for women in that they are more mobile, they have fewer time restrictions, and they can more easily work intermittently. From the perspective of intervention services it is also easier to find street SWs [18–19]. Nevertheless, it is evident that strategies are needed to increase safety among street-based SWs. Some examples of how sex work can be organized to minimize risks in both street and off-street settings are given in case study 4.7 below.

There are currently nine countries in Europe with managed street-based sex-work zones (Austria, Belgium, the Czech Republic, Germany, Greece, Hungary, Luxembourg, the Netherlands, and Switzerland). The purpose of these managed areas is to provide a place where SWs can sell sex without fear of arrest; it also moves sex work away from residential or business areas. More established systems such as those operating in Utrecht (the Netherlands) provide security cameras to deter assaults on SWs and there are restrictions on drug use and drug dealing. They also provide health and social services and a registration system for SWs operating from the area [20]. Some evidence from Germany and the

Case Study 4.7 The Importance of Location and Organization of Sex Work in Facilitating Safer Sex Work: Examples from Tallinn and Moscow

In Moscow, street-based female sex workers (FSWs) are hired for a fixed price rather than a specific service and time. This can make a woman more vulnerable as she negotiates the service, particularly if she is outnumbered. Sixty-eight incidents of gang rape by multiple clients have been reported in qualitative studies among FSWs in Moscow [22–23]. In other Western European countries street workers negotiate a specific service and a price prior to leaving with the client and employ safety strategies such as working in pairs or groups or recording car registration numbers of clients [18].

Sex work in Tallinn (Estonia), however, almost exclusively operates from apartments and hotels, with street-based sex work mainly confined to drug users. Sex work is widely dispersed throughout the city. Soliciting and locating clients is conducted on the Internet, via mobile phones, and through taxi drivers who act as both pimp and security guard. This system illustrates a supportive working environment, as drivers provide effective security and screen clients for drunkenness and potential disruptive behaviors [24].

Qualitative data from Central and Eastern Europe suggest that SWs working in off-street locations experienced higher levels of sexual and physical violence from clients when there was a lack of cooperation from managements that supported women's ability to refuse certain clients or provide certain services [4, 25]. Research from the United Kingdom suggests that women who work off-street employ a range of safety strategies to prevent and manage violence, including using security cameras and secure doors with peep holes, employing receptionists to screen clients, and working in groups. Both SWs and receptionists' interpersonal skills were judged to be of paramount importance including the use of humor and the ability to defuse a tense situation [25].

Netherlands suggests that regulatory provision through managed street sex-work zones reduces incidences of violence and insecurity [19]. Legislation introduced in 1999 in Hungary made it mandatory to establish a "tolerance zone" in urban areas populated by more than 50,000 inhabitants. Nevertheless, only two zones were established in the towns of Miskolc and Nyiregyhaza; both were greeted with such intense protests from local communities that the Nyiregyhaza zone was dissolved. The legislation failed to provide details on how the zone should operate or what authority was responsible for its upkeep. As a consequence the remaining zone in Miskolc has little infrastructure and is run by criminal gangs. Projects report that the new legislation resulted in more abuse of SWs by clients and police rather than less [21]. Box 4.2 summarizes different types of systems to help legislate sex work.

Outreach Work

Both internationally and in the United Kingdom there is evidence to suggest that sending outreach workers into sex-work locations to distribute condoms, health promotion services, and STI testing reduces risk of HIV/STI among off-street and

Box 4.2 Models of Regulation

Across Europe, sex-work legislation can be categorized into four groups:

1. Regulatory systems that involve registering and licensing everyone working in the sex industry.
2. Decriminalization, which involves the removal of most of the criminal penalties applied to adult sex work.
3. Prohibitionist systems that prohibit or criminalizes most or all aspects of sex work.
4. Abolitionist systems that are designed to abolish systematic sex work such as soliciting and living off the earnings of a sex worker [42, 43].

street-based SWs beyond the provision of fixed site STI clinics [1, 26–28]. With an increasing number of SWs working off-street, projects use more innovative ways to contact SWs such as (a) contacting SWs who advertise their services online by email and sending information about services; (b) reminding SWs about checkups and other information on a regular basis; and (c) using Internet chat rooms frequented by male sex workers to promote services [29].

Interventions with Clients

Evidence from this review suggests that condom use with clients is high, but when condoms are not used this is often related to violence from clients or police, the need to earn more money, or the experience of condom breakage in the past. Some of these problems could be addressed in part through interventions with clients. There are no documented examples of interventions among clients in Eastern Europe; however, there are some examples of innovative intervention in Western Europe, particularly in Germany, with clients of SWs. A study in Switzerland suggested that the provision of HIV testing to men who buy sex from street-based sex-work locations resulted in a high uptake of testing and a large proportion who had previously not been tested [30]. One innovative project in Germany targeting clients who want to purchase sex without a condom involved the distribution of cards to men presented in the same style as a sex worker advertisement. If they call the phone number on the card, they will hear a prerecorded message between a client and SW discussing why the SW does not sell sex without a condom. An evaluation of the project showed that following the campaign, there was in an increase in the number of male patients attending the local sexual health clinic. Similarly in France, health promotion experts used World AIDS Day to launch a media campaign to target clients. In Spain, services set up a designated website for clients informing them of sex work regulations and their rights [29].

Peer-Driven Interventions

There is some evidence to suggest that peer interventions among SWs in low- and high-income settings have proved successful in increasing condom use, safety, and access to harm-reduction services [31–36]. Other research from the United Kingdom has shown that the peer-driven interventions may be complicated by the diversification of the sex work industry. The increased representation of migrant SWs may reduce opportunities for peer-driven interventions. In a qualitative study examining social networks of migrant SWs conducted in London, findings showed that relationships between colleagues were often limited by transience, competition, and racial prejudice, although peer networks were described as being highly effective sources of practical and informational support [37–38]. Projects in Eastern Europe report difficulties in recruiting peer outreach workers because of a lack of trust and respect from other SWs, problems with managers, and the transience of the sex work scene [16]. Other barriers implementing peer-driven interventions are concerns from SWs that overdependence on peer networks in the sex industry may be seen as a potential barrier to ultimately leaving the industry [38, 39]. Studies in Montenegro, Russia, and Serbia found that due to the small size of sex work social networks, as well as the tightly controlled and hidden nature of sex work and inadequate financial incentives, recruitment of SWs into surveys via social networks was problematic [40]. The lack of specialist services with close links to SW populations in these sites may have limited further recruitment efforts. In London, SWs spoke very highly of specialist SW services, a factor that could be harnessed and potentially facilitate more positive interactions between peers in work and nonwork settings [38].

Policy Environments Mediating HIV Prevention among SWs

Legislation

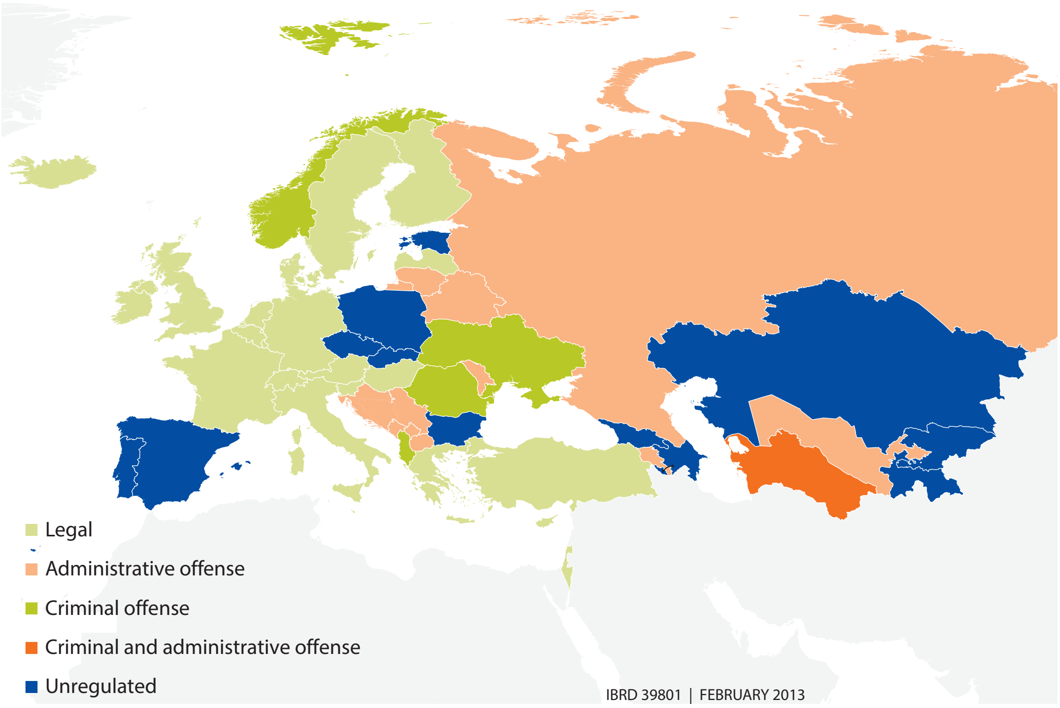
Legislation regulating sex work is one of the most important structural factors influencing the health and safety of SWs. There is clear evidence of the influence of different policies and related activities in promoting supportive or discriminatory practices towards SWs and their subsequent impact on the ability of SWs to access necessary services and protect their rights.

Legislation of sex work in Europe (i.e., most countries in the West) is largely characterized by a prohibitive model that does not criminalize the act of selling sex (map 4.8); however, it does criminalize activities around sex work such as working in groups or running brothels, which can limit SWs' ability to organize their work safely (e.g., in Denmark, France, Iceland, Ireland, Italy, Sweden, and the United Kingdom) (map 4.9). In most countries in Central Europe and the East (with the exceptions of Hungary, Latvia, and Slovenia) the act of selling sex constitutes a criminal or administrative offense.

In countries where sex work–related activities are decriminalized (such as Germany or the Netherlands), they are often accompanied by licensing and regulation. Critics of decriminalization argue that by distinguishing between legal and voluntary and illegal involuntary sex work may further marginalize the most vulnerable underaged, coerced or nonresident SWs.

In Germany and the Netherlands, benefits of regulation (such as social welfare) are denied to migrant SWs without legal residency rights as they are not

Map 4.8 Legal Status of Selling Sex in Europe

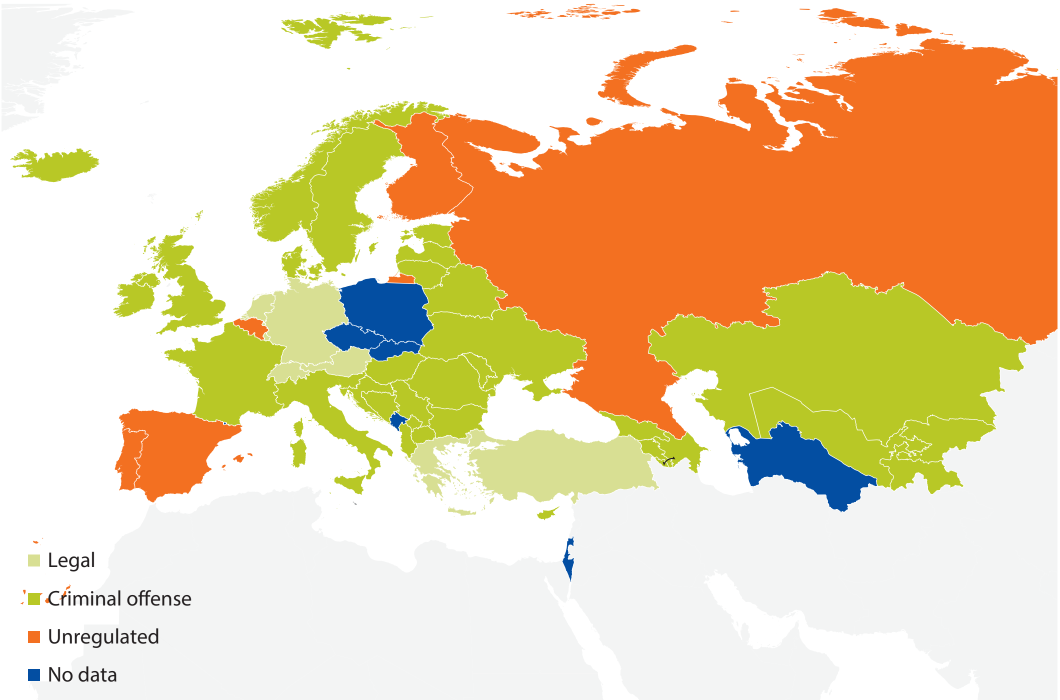


Sources: services4sexworkers.org; Global Fund; International HIV/AIDS Alliance; TAMPEP [4, 50–52].

accorded the same rights as nonmigrants [43, 44]. In other countries (Austria, Greece, Switzerland, and Turkey) where sex work–related activities are also legal, a system of mandatory testing operates. Some international evidence suggests that mandatory testing reduces access to STI clinics for more vulnerable populations [45]. However, research in Mexico suggested that SWs registered at a municipal health department used more condoms than nonregistered SWs. All SWs were involved in a behavioral intervention, but findings suggest that registration may play a role in reducing sexual risk behaviors [46, 47]. In all countries in Eastern Europe (except for Estonia and Lithuania) mandatory testing for HIV/STIs has been frequently reported by SWs and projects irrespective of whether sex work is unregulated or a criminal offense. Testing is generally conducted following detention or arrest by the police, although there is no official legislation enforcing mandatory testing [4, 16].

An abolitionist model of regulation is in operation in Norway and Sweden, that criminalizes clients of SWs [42]. This model has been criticized as it rarely allows SWs freedom to practice sex work and it is often restricted by local administrative regulations or police harassment. Opponents of this model also state that it is not grounded in reduction of harm to women [48] but ignores the welfare of SWs and drives markets into more dangerous areas [49] [43].

Map 4.9 Legal Status of Selling Sex with Others in Europe



Sources: services4sexworkers.org; Global Fund; International HIV/AIDS Alliance; TAMPEP [4, 50–52].

Structural Violence Arising from Legislation

The International Committee on the Rights of Sex Workers (ICRSW) in Europe has documented multiple human rights violations against SWs across Europe brought about as a function of sex worker regulation policies or as a result of prejudice and stigma associated with sex work. In Finland legislation prohibiting a third party from profiting from sex work or "pimping" has led to SWs being banned from working together for their own protection without facing prosecution for "pimping" one another. Similarly in France, a SW's child, on reaching the age of majority, may be prosecuted with "living off" the SW's earnings. In Portugal SWs lose custody of their children through social services or family courts solely because of their occupation. Other violations include refusal of access to health care in the Slovak Republic on the grounds of occupation and not being able to marry while working in sex work in Greece [44].

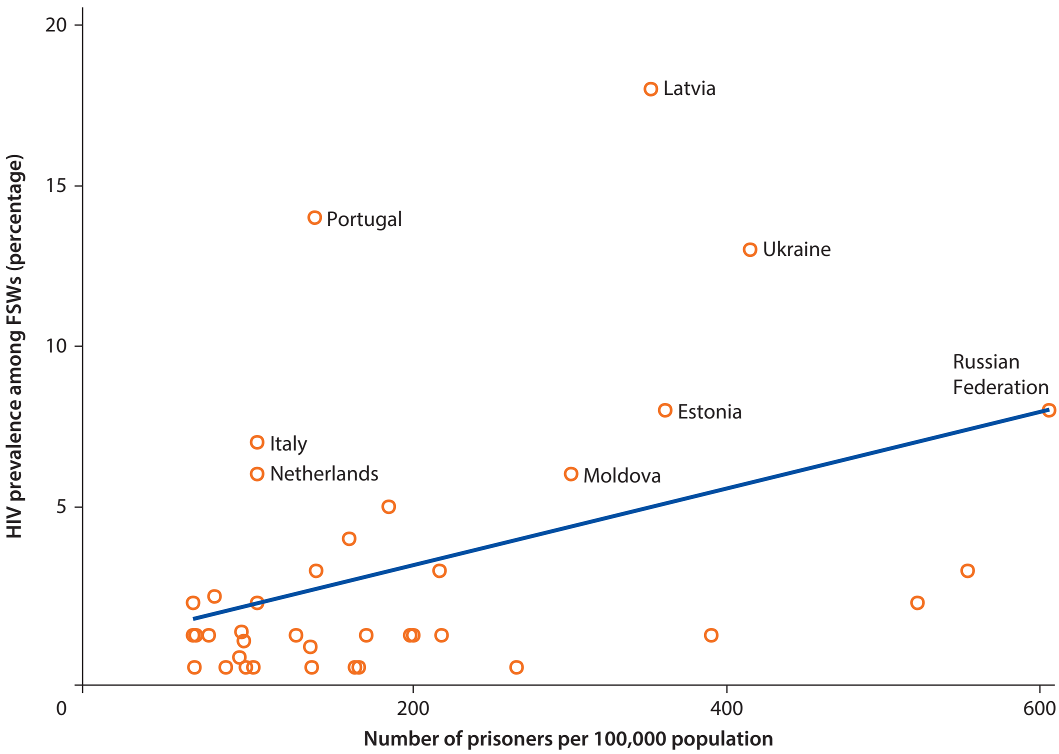
Police-Related Violence

Police violence was most frequently reported in the countries of Eastern Europe where the act of selling sex is primarily a criminal or administrative offense, and activities related to sex work are either unregulated or an administrative offense, creating opportunities for police corruption and abuses of SWs within the legal system. SWs report incidences of violence from the police, administered during detention or at sex work-locations. Reports from projects and qualitative studies in 11 countries across the region highlight police involvement, including demands for financial remuneration or sex in lieu of rent or avoiding arrest [4, 14]. Police involvement in the sex industry often means that women have nowhere to report other incidences of violence, particularly when police are the perpetrators [4, 22, 53, 54]. Fear of violence from police and a lack of legal recourse further entrenches the stigma attached to sex work [14]. Other qualitative work from the region documents very high levels of sexual and physical abuse from the police [55]. Police violence can increase the risk of HIV directly by confiscating condoms as evidence or by forcing women to have sex, as well as indirectly reducing their income through the enforcement of bribes, thereby increasing financial pressure and the need to engage in higher risk behaviors such as selling sex without a condom to make up for the loss of income [4, 54, 56]. The threat of police violence also reduces SWs ability to work independently and increases their need for boyfriends or pimps to be involved in their work.

There is little evidence showing that any criminalization of sex work reduces the demand for sex or the number of SWs [57]. We looked at the relationship between prevalence of HIV among FSWs and the size of the prison population at a country level (figure 4.8). Prevalence of HIV increases among FSWs in relation to the number of prisoners per 100,000 people. There are well-documented reasons why prison and individual-level risks of HIV are associated, but at a national level the reasons may be different. One possibility is that the indicator is a proxy for a national attitude toward prison as a punitive rather than rehabilitative environment but the relationship serves to demonstrate the detrimental effects of punitive approaches to HIV and SWs. At a macrostructural level, some researchers state that prohibitionist and abolitionist polices that criminalize the purchase of sex reinforces negative attitudes and violence towards SWs. Opinions on sex work and violence is dominated by the idea that people who engage in a criminal activity such as sex work are knowingly exposing themselves to violence and therefore are somehow at fault [41, 58]. Evidence suggests that prohibitionist policies such as anti-kerb crawling strategies serve to disperse SWs widely, further restricting women's abilities to work in groups and look out for each others' safety [41]. Other evidence suggests that SWs in the unregulated street-based sector had poorer mental health than those working in regulated off-street locations [59]. In comparison, the mental health scores of off-street SWs were no worse than those among women who did not sell sex [60, 61].

Research from Europe and internationally has shown that criminalization and enforcement-based approaches toward sex work can increase the risk of physical and sexual violence against women [62–64] as well as the risk of STIs [48, 65], greater social stigma, loss of children, problems with family and friends, and housing [48]. Policies and legislation connected to sex work should focus on facilitating safer working environments rather than enforcing approaches that can further marginalize women. The recent Joint United Nations Programme on HIV/AIDS (UNAIDS) report on HIV and Sex Work define good practice in

Figure 4.8 HIV Prevalence among FSWs and the Size of the Prison Population



Source: World Prison Population List (7th Edition), International Centre for Prison Studies [66].
Note: FSWs = female sex workers; HIV = human immunodeficiency virus.

relation to both public health and human rights to be (a) creating a legal and policy environment where policies regulating sex work do not violate SWs' rights or dignity (including avoiding mandatory testing as part of regulations), nor hinder their access to due process of law; (b) ensuring policies that promote work place safety and protection from violence, exploitation and discrimination; and (c) ensuring unimpeded access to HIV prevention, treatment, and care [57]. Case study 4.8 above describes some successful interventions to reduce violence among SWs.

In 2002, the ICRSW created the "Declaration of the rights of Sex Workers in Europe." This document identifies the current violations of the rights of SWs across Europe, affirms the rights SWs have under current human rights legislation in Europe, and identifies measures that need to be taken by states to respect, protect, and fulfill the rights of SWs. This declaration was elaborated on and endorsed by 120 SWs and 80 allies from 30 countries at the European Conference on Sex Work, Human Rights, Labour and Migration in Brussels, Belgium [44]. Fourteen other discrete advocacy projects were identified in Austria, Belgium, the Czech Republic, France, Germany, Italy, Norway, the Slovak Republic and Spain that target the general public, policy makers, and

Case Study 4.8 Intervention to Reduce Violence

An example of a community-level intervention to reduce violence is the "Ugly Mugs" scheme in the United Kingdom that distributes warnings about dangerous clients. This has been successful in reducing client-perpetrated violence and is highly valued by FSWs. While 77% of U.K. projects (members of the United Kingdom Global Network of Sex Work Projects [NWSP]) currently run "Ugly Mugs" schemes [41], sex worker projects and police have also been criticized for being reactive rather than proactive. That is, they expect the FSW to be responsible for preventing violence rather than focusing on reducing opportunities for violence to occur by creating a safer work environment [19]. "Ugly Mugs" is currently only available in English, so it is of limited use to migrants with poor English-language skills; funding is being sought for translation. The majority of "ugly mugs" schemes are also limited in that they focus on clients. One exception is the "Sex work Empowerment" project (SWEET) in Huddersfield that records all incidents of violence by perpetrator. Data from the project demonstrate that SWs often experience violence outside of sex work. Among the 61 incidences reported in a 9-month period in 2007, 34% were related to violence from a client, 31% to a partner or ex-pimp; 31% to other (including drug dealers, vigilantes, other SWs, etc.), and 3% related to violence from family members, suggesting that interventions are needed to reduce violence among women universally and not just among incidences related to sex work [41].

The recently established Sex Workers' Rights Advocacy Network (SWAN) advocates for reduction in violence against SWs in the countries of Central and Eastern Europe and has participating organizations in each of the following countries: Albania, Bulgaria, the Czech Republic, Hungary, Kazakhstan, the Kyrgyz Republic, Latvia, Lithuania, the former Yugoslav Republic of Macedonia, Montenegro, Poland, Romania, Russia (Barnaul, St. Petersburg), Serbia, the Slovak Republic, and Ukraine. One advocacy tool has been to document SWs' experiences of violence, including police violence, and disseminating the findings in a report [4]. This is an important step forward in addressing violence against SWs in the region.

police to raise awareness of SWs rights [29]. Governments and policy makers need to work closely with SWs and sex worker advocacy groups such as the ICRSW when designing policies and health programs for SWs in order to ensure that interventions are based on the needs of SWs in that local area to enable more effective policies and programs [57].

Social-Structural Interventions

There is a growing body of evidence demonstrating the effect of structural interventions in HIV prevention among SWs in changing the context of risk [67–71]. Structural interventions that promote community mobilization have been the most comprehensively documented. Evaluations have shown that reducing HIV/STI prevalence and improving the health and safety of SWs is possible when SWs are encouraged to (a) advocate for their rights with the police, brothel owners, and clients to implement HIV interventions at work; (b) organize interventions to reduce illiteracy; (c) increase child immunization; and (d) seek legal advice [1, 68, 72]. A recent evaluation of a community mobilization intervention in India showed that exposure to the intervention was associated with consistent condom use as well as increased control over type of sex sold and the amount charged [73]. The intervention combined a traditional HIV intervention strategy using peer educators distributing condoms and promoting condom use as well as promoting a sense of collective identity and agency by promoting the idea of sex work as labor similar to other manual labors and encouraging the organization of community-based organizations for SWs and led by SWs.

There is also evidence showing the impact of national policy changes in reducing HIV risk behaviors such as the national campaigns in the Dominican Republic and Thailand that promote 100% condom use [74, 75]. Other evidence shows the importance of economic interventions and microfinance at a community level to reduce poverty, thereby reducing the number of sex work clients [68, 72, 76–78]. Evaluating the multiple determinants of health that are affected by structural interventions is complex. While methods of measuring the size of effect between structural factors and HIV prevalence or risk behaviors are well established, it is harder to measure or recognize the pathways that link the levels of determinants [79], and as a consequence, it is difficult to establish which aspects of the structural interventions are effective and why [1]. Methodological developments are needed to facilitate evaluation because the need for structural interventions and removing structural barriers is increasingly recognized as a core strategy of HIV prevention for SWs [80, 81].

HIV Prevention Responses among Men Who Have Sex with Men

We draw here on a variety of data sources, including data from the systematic review, European Men Who Have Sex with Men Internet Survey (EMIS), and other international evidence to describe the HIV prevention context for MSM in Europe. We draw attention to the role of selected targeted interventions in HIV prevention as well as how the legislative and policy environment mediates individual and community capacities for risk reduction.

Targeted HIV Prevention for MSM

Two recent reviews have focused on the effectiveness of HIV-prevention interventions targeting MSM [1, 2]. In the first review [235], strategies that were found to be effective in reducing unprotected anal intercourse (UAI) among MSM included individual, small-group, and community-level interventions. Individual-level interventions included counseling and the provision of social and behavioral support. Small-group and community interventions included group counseling or workshops, interventions targeting community-wide areas, the training of community leaders, and community-building empowerment activities [1]. The majority of the studies were conducted among predominantly white communities in high-income countries, limiting the ability to generalize the findings in the lower- and middle-income parts of Europe. The second review [2] found that associations between peer education and gay-specific genitourinary medicine clinic (GUM) services were inconclusive. Cognitive behavioral techniques and sexual diary keeping intended to reduce the number of self-identified high-risk men reporting sero-discordant or unknown status UAI were found to be more effective than standard counseling interventions alone. We further summarize evidence relating to the coverage of selected targeted interventions below.

HIV Testing Interventions

It is desirable for both public and individual health that people know their correct HIV status. In most circumstances HIV testing is the only route through which this can be achieved. The ongoing validity of HIV test results is called into question by subsequent risk behavior, so the extent of HIV testing required in a population to ensure extensive and correct knowledge of HIV status will depend on the level of sexual risk behaviors in that population.

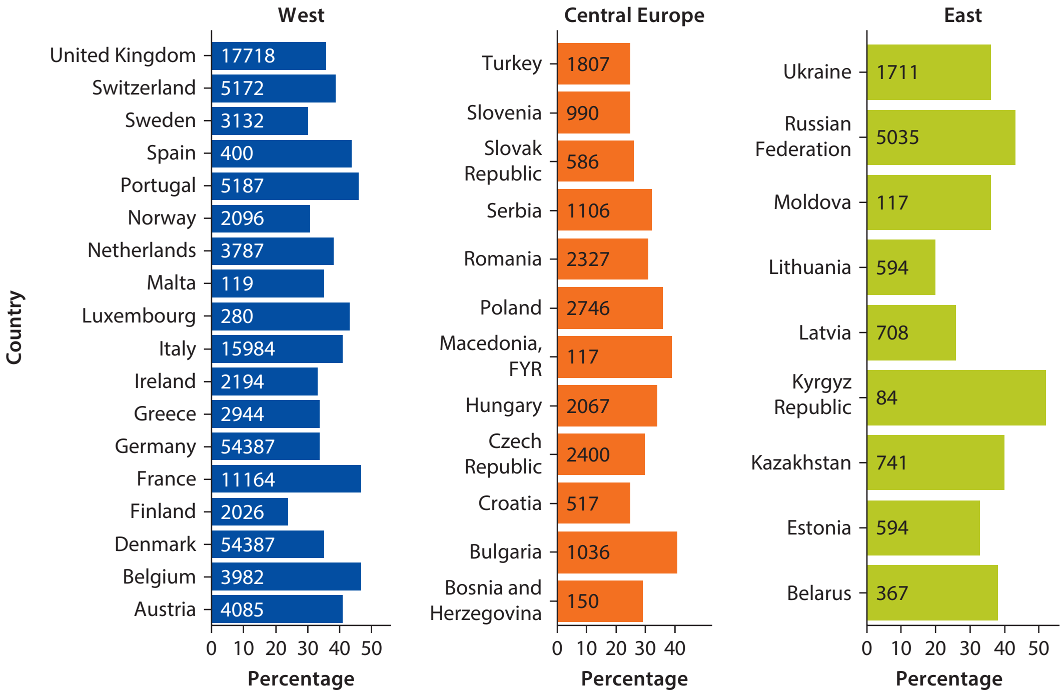
HIV testing interventions also provide an opportunity for MSM to access other prevention interventions, such as counseling. There is evidence from Croatia, Hungary, and Ukraine that HIV testing is associated with increased condom use [3–5]. This association, however, is more likely when post-test counseling is undertaken [4]. The coverage of HIV testing interventions can be summarized by the proportion of MSM who have ever been tested and the proportion that have tested in the past year. The proportion of MSM who have ever been tested for HIV is variable across Europe, including for instance, 70% in Germany (recruited in 2006) [6] and 54% in the Netherlands (recruited in 2002) [7]. Moreau-Gruet, et al. [246] found that 72% of Swiss MSM (surveyed online) had been tested for HIV in the past three years. There is some evidence that levels of HIV testing may be increasing in Denmark [10], Switzerland [11], and the United Kingdom [8, 9].

Recorded rates of HIV testing in the past 12 months also vary within and across subregions (figure 4.9). In the East it varies from 13% in Tajikistan to over 40% in Bulgaria, Georgia, Kazakhstan, and Russia. As a key public health intervention, HIV testing should be free of charge. In much of the region, this is not yet the case, and such fees may be a barrier to compliance. In Georgia, study participants cited unemployment and the cost of health care as barriers to seeking VCT services [12]. Provision of widespread and accessible HIV testing and treatment services are an essential element of a national HIV response. Ensuring that these services meet the needs of MSM should be a priority of service policy.

Antiretroviral Treatment for HIV Disease

There have been some promising results from international studies on the efficacy of antiretroviral therapy (ART) to reduce HIV transmission by reducing viral load in people with HIV. However, there remain questions regarding the practical implications of making HIV prevention a core objective of HIV treatment. Modeling has shown the effectiveness of ART in eliminating HIV transmission in generalized epidemics, including both heterosexual [15, 16] and

Figure 4.9 Percentage of MSM Tested for HIV in the Past Year and Number of Results



Source: EMIS (except the Kyrgyz Republic and Kazakhstan) [13, 14].
Note: Numbers in bars denote sample size. HIV = human immunodeficiency virus; MSM = men who have sex with men.

homosexual transmission [17]. However, these models do not take account of the much higher risk of transmission from acute cases [18]. Other evidence suggests that the population-level impact of widespread and effective treatment is likely to have a short-term impact only, since antiretroviral resistance typically takes several years to develop and spread within a population [19]. In HIV-positive men who regularly acquire new UAI partners, the level of suppression offered by ART may decline over time as they acquire resistant HIV through mutation or super-infection [20].

Other evidence highlights the issue of "risk compensation," suggesting that in Western Europe where ART has now been available for many years, the practice of UAI is more likely among MSM who reported less concern about HIV prevention because of highly active antiretroviral therapy (HAART) [19, 21–25] (although this was a minority view among the MSM sampled) [24–27]. In Catalonia, data suggested that HIV positive MSM who believed that ART considerably reduced the risk of transmission were 7.5 times more likely to engage in UAI with casual partners [21].

While ART reduces the infectivity of HIV-positive individuals, it is also thought to be able to reduce susceptibility to infection among HIV-negative people, thereby reducing the probability of transmission when exposure occurs.

A recent review of studies into the effectiveness of ART as pre-exposure prophylaxis (PrEP) located only one study meeting their criteria, but this study focused on women and was incomplete. It concluded that there is no current evidence for the effectiveness of PrEP, and more trials are needed. A recent study not included in the review and involving 2,499 high-risk males in a number of countries found that PrEP reduced HIV incidence by 44% (95% CI 15%–63%), though the strengths of this study are limited by the relatively short follow-up period, which did not exceed 2.8 years [28]. Further research is also needed to better understand drug resistance and risk compensation in relation to PrEP [29].

Strategic Positioning and Serosorting

With the advent of increased testing and improved access to ART in many countries, especially Western Europe, some MSM are beginning to employ intervention techniques other than condoms to reduce their risk of contracting HIV. One study noted several noncondom risk-reduction practices employed by MSM including (a) strategic positioning, in which the HIV-positive or unknown-status partner takes the receptive role and the HIV-negative partner or unknown-status partner takes the insertive role, thereby acknowledging that transmission is more effective from the insertive to the receptive partner rather than the other way around; (b) serosorting, in which men try to have sex only with those of their own serostatus; and (c) withdrawal, in which the insertive partner withdraws before ejaculation to limit the risk of passing on infections carried in semen [30].

Even in Western Europe, only a few studies focus on such interventions. Balthasar et al. [31], used a cross-sectional survey that recruited respondents via the gay press and other venues, and online on prominent Swiss gay websites. The survey restricted responses to the 1,689 men who reported at least one episode of anal intercourse with a casual partner in the previous 12 months. They found that 67% consistently used condoms; 24% did not, but employed one or more different risk reduction strategies; and 9% did not make any consistent attempt to reduce the chance of HIV transmission. Consistent condom use was similar (around 70%) among those who reported being HIV-negative or not knowing their status, but only 48% of HIV-positive respondents reported the same condom use. Very few (7%) of the HIV-negative respondents reported using no risk-reduction practice at all, compared to 10% of those of unknown status and 48% of the HIV-positive respondents. Respondents with unknown status (19%) reported using other risk-reduction strategies, compared with 24% of the HIV-negative respondents and 35% of the HIV-positive respondents. Respondents using a risk reduction strategy other than condoms (74%) reported doing so intentionally. Of those using alternative strategies, 50% reported using serosorting, 33% strategic positioning, and 62% withdrawal before ejaculation. Of the three practices, 53% reported using one, 38% reported using two, and 9% reported using all three.

International evidence suggests that of the three options, strategic positioning appears to have a greater risk-reduction effect than serosorting or withdrawal, with a hazard ratio of 1.54 (95% CI 0.45–5.26), which is not significantly different from the reference category of no UAI [32]. This study differentiates between serosorting as UAI with HIV-negative partners, and a more reliable practice, termed here "negotiated safety," which includes only UAI with primary regular partners and requires a number of other criteria that enable a man in a regular relationship to be more assured of his primary partner's status [33]. This study found negotiated safety to have a hazard ratio of 1.67 (95% CI 0.59–4.76). This differs from the more general form of serosorting mentioned above, which was found to have a hazard ratio of 2.17 (95% CI 0.88–5.39). Withdrawal was found to have a hazard ratio of 5.00 (95% CI 1.94–12.92).

There are epidemiological consequences of serosorting and some evidence that identify this strategy as one of the factors that may account for the recent rise in German HIV prevalence after the country had successfully stabilized at low prevalence in the 1980s and 1990s [6]. A major risk of serosorting is that newly infected men, unaware of their status, will seek HIV-negative partners in order to protect themselves, thereby risking further transmission of HIV. Transmission could be to an HIV-negative partner [6] or to an HIV-positive partner who could be reinfected, possibly with a more aggressive subtype or a drug-resistant strain, which would be highly undesirable at an individual level, but also at a population level if viral recombination takes place before the HIV is transmitted further [2, 34, 35]. Because antibody-based HIV tests produce negative results for those in acute infection (i.e., the antibody response needs some weeks to develop), serosorting will tend to encourage unprotected sex with these very high-risk individuals [36, 37]. Studies suggest that around half of transmissions among MSM occur during this acute phase of infection, with clusters of phylogenetically related incident cases accounting for a high proportion of incident cases [36, 37]. In addition to the limitations posed because of such "seroguessing," serosorting has the disadvantage of not accounting for the presence of other STIs, leading in some cases to increases in their incidence and prevalence among communities where serosorting is a common practice [38].

STI Testing and Treatment Interventions

STIs can have synergistic effects with HIV whereby the presence of another infection makes the transmission of HIV more likely. This means swift or delayed detection and treatment of other STIs among MSM (both HIV infected and HIV uninfected) which has an impact on HIV incidence. Integrating HIV and STI testing and treatment services provides opportunities to normalize HIV within sexual health services and can provide lower threshold access to testing—people can attend for reasons other than HIV and get an HIV test at the same time. Since HIV is a risk factor for other STIs (and vice versa), those who get tested for HIV are proportionately more likely to need screening for other infections. Integrated services also emphasize on the needs of the whole person, unlike the states that focus on tracking down HIV (or people with HIV).

Many Western European cities have STI treatment facilities able to provide nonjudgmental services to MSM. Such facilities are far less available in Central Europe and the East. Consequently, MSM report reluctance to visit STI clinics and

VCT centers, some MSM experience mistreatment from staff when they become aware of their orientation. One tactic that MSM use to deal with this problem is nondisclosure of orientation to medical staff [39]. This results in inferior standards of care (especially in relation to rectal and oral STIs) and misattribution of HIV cases across exposure categories (hence the understatement of MSM in official HIV data). This lack of evidence of HIV transmission between MSM then perpetuates neglect of the provision of targeted prevention and treatment services.

Rectifying this situation can be done in two ways. In the short term service planners can set up MSM-designated clinics, or directly advertise and promote general population clinics to MSM, ensuring and conveying that clinic staff are competent and nonjudgmental. Over the longer term institutional homophobia needs to be tackled.

Designated gay men's services and interventions carried out in gay settings may disproportionately fail to reach men of lower socioeconomic status, men from minority cultures, and male sex workers [40]. In homophobic environments, MSM will not want to be indentified attending MSM specific services. The focus should be on generic services that are able to respond adequately to the range of human sexuality and that respect the diverse ways in which sexual lives are organized. Such services will benefit all sections of the sexually active population. Further barriers exist for migrants who may have difficulties in accessing prevention services. In the former Soviet Union, HIV and STI treatment requires official residency; such a requirement excludes migrant MSM [41]. In migrant populations, the target groups were often unaware of existing programs to serve their needs. Case study 4.9 below describes the issues around measuring coverage of interventions for MSM.

Access to the Internet

The settings in which MSM meet have long been used as places of contact for interventions and the Internet is increasingly exploited as an HIV prevention interface. Like other populations, MSM use the Internet for a wide variety of purposes, including to meet potential sexual partners. Internet access is not equally distributed across countries, or across demographic groups within countries. It is generally less accessible to many in Eastern Europe, especially in less-affluent areas. However, access is only likely to grow in coming years.

MSM HIV prevention programs need to go beyond gay-scene settings (bars, clubs, saunas, and shops) to reach a significant and diverse proportion of the population. Websites for MSM are an essential part of HIV prevention programs since they are used both by men who are involved with the gay-scene and those who are not. Educational mass media messaging targeting all sexually active men can also be designed to be of benefit to MSM through sensitive use of language and imagery [41].

Community Mobilization

In the presence of widespread institutional homophobia (see below), community mobilization is a social intervention that has a long history in HIV prevention [45].

Case Study 4.9 Measuring Coverage of Interventions for MSM

The EMIS 2010 used three criteria to determine if individual MSM are eligible for coverage in prevention programs: (a) not having engaged in UAI in the last 12 months solely due to the lack of a condom; (b) having seen or heard MSM-specific information about HIV or STIs in the last 12 months, or having called a telephone helpline; and (c) if diagnosed HIV positive, having seen a doctor for medical monitoring in the last six months, or if not HIV positive, being confident of the ability to access an HIV test.

The five key United Nations General Assembly Special Session (UNGASS) indicators [42] include (a) the proportion of MSM who have been diagnosed with HIV; (b) the number of men who have used a condom the last time they had anal sex with a male partner; (c) the ability to correctly identify ways of preventing the sexual transmission of HIV and reject major misconceptions about HIV transmission; (d) the receipt of an HIV result in the past 12 months; and (e) contact with HIV prevention programs in the last 12 months. No analysis has been published as yet; however, an analysis of the indicators for PWID suggest inconsistent reporting across countries [43].

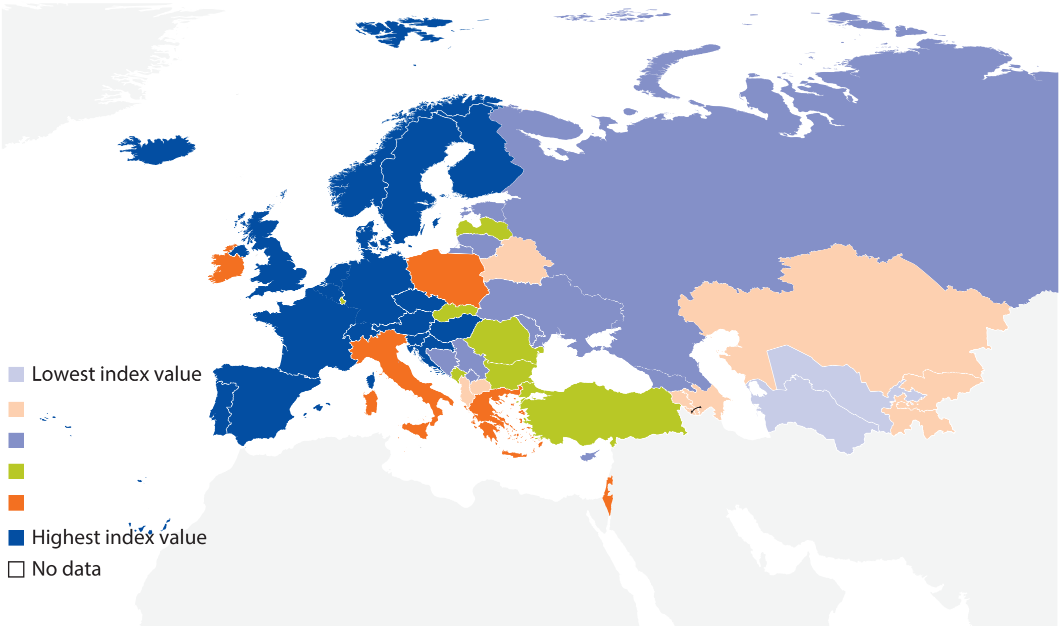
The 2010 Dublin Declaration report on the progress of European countries in their HIV response summarizes the UNGASS indicator data provided by the countries through the UNGASS reports. It should be noted that the problem of nonrepresentative sampling in MSM research becomes acute in the case of intervention coverage. In many cases sampling was carried out in the same settings in which interventions were delivered, giving a greatly inflated coverage figure. In addition, coverage was measured differently in most countries and can include websites for MSM, peer education, counseling, or community press. We should therefore be extremely cautious about these data as they suggest that the coverage of interventions in different countries is almost certainly uneven [44].

The driver for mobilization can come from volunteer work within the community or externally through donors and advocates. Wright (2005) [275] notes that mobilization by MSM against HIV in Western Europe benefited from two elements largely historically absent in Eastern and Central Europe [40]. The first is the politicization of MSM in the 1960s and 1970s around human rights causes and the consequent creation of an open gay community. This political mobilization enabled a strategic response to the emergence of HIV in some Western communities. The second factor is the presence of long-standing civil society networks that are relatively absent in most of the transition countries. Initiatives led by civil society agencies tend to have greater impact among people engaging in stigmatized behaviors than those led by government or other formal authorities [40].

Policy Environments Mediating HIV Prevention among MSM

The legal environment framing MSM varies widely across the region. Map 4.10 summarizes an aggregated index of social-inclusivity to explore how the legislative and social environment in which MSM live differ across the region.

Map 4.10 Legislative and Social Environments Affecting MSM throughout Europe



Source: Aggregated index of social-inclusivity of MSM, based on literature review.
Note: Index composed of five indicators: (1) legislation against male–male sex; (2) whether the legislation predates 1981; (3) legislation against discrimination on the grounds of sexual orientation; (4) the presence of an annual Gay Pride activity; and (5) the recognition of civil partnership or marriage between people of the same gender; MSM = men who have sex with men.

The index includes the following indicators: (a) the existence of legislation against male–male sex; (b) the existence of legislation that pre-dates 1981; (c) the existence of legislation against discrimination on the grounds of sexual orientation; (d) the presence of an annual Gay Pride activity; and (e) the recognition of civil partnership or marriage between people of the same gender.

Although a somewhat crude measure of the restrictiveness of environments in which MSM live, there is a clear pattern of increased restrictiveness in the East compared to the West. In part this is because membership in the EU requires the repeal of antihomosexuality legislation, and the Treaty of Amsterdam requires its member states to enact antidiscrimination legislation [46]. However, there are only six countries in the European region (Belgium, Norway, the Netherlands, Spain, Sweden, and the United Kingdom) that legally recognize same sex partnerships. In Turkmenistan and Uzbekistan criminal codes state that MSM is punishable by imprisonment of up to two and three years, respectively.

The legal situation facing MSM varies widely across the region. Although this is a very crude measure of the environments in which MSM live, there is a clear pattern of increased restrictiveness in the East compared to the West. Nineteen countries displayed every feature of an enabling environment that we used here (Austria, Belgium, Croatia, the Czech Republic, Denmark, Finland, France, Germany, Hungary, Iceland, Luxembourg, the Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom). Turkmenistan and Uzbekistan scored lowest on the index, with neither country displaying any features of an enabling policy environment. They are also the only two countries where sex between two consenting male adults remains illegal. In Turkmenistan and Uzbekistan criminal codes state that MSM is punishable by imprisonment of up to two and three years, respectively. However, only 26 of the 51 countries (51%) included in the index had such a law in place prior to 1981; the remaining 23 countries have made changes in the intervening years. In 33 countries (65%), discrimination on the grounds of sexual orientation is legislated against. In part this is because membership in the EU requires the repeal of antihomosexuality legislation, and the Treaty of Amsterdam requires its member states to enact antidiscrimination legislation [46]. An annual Gay Pride event is held in 37 of the 51 countries (73%). Within the European region, only 21 countries (41%) recognize civil partnerships or same-sex marriages.

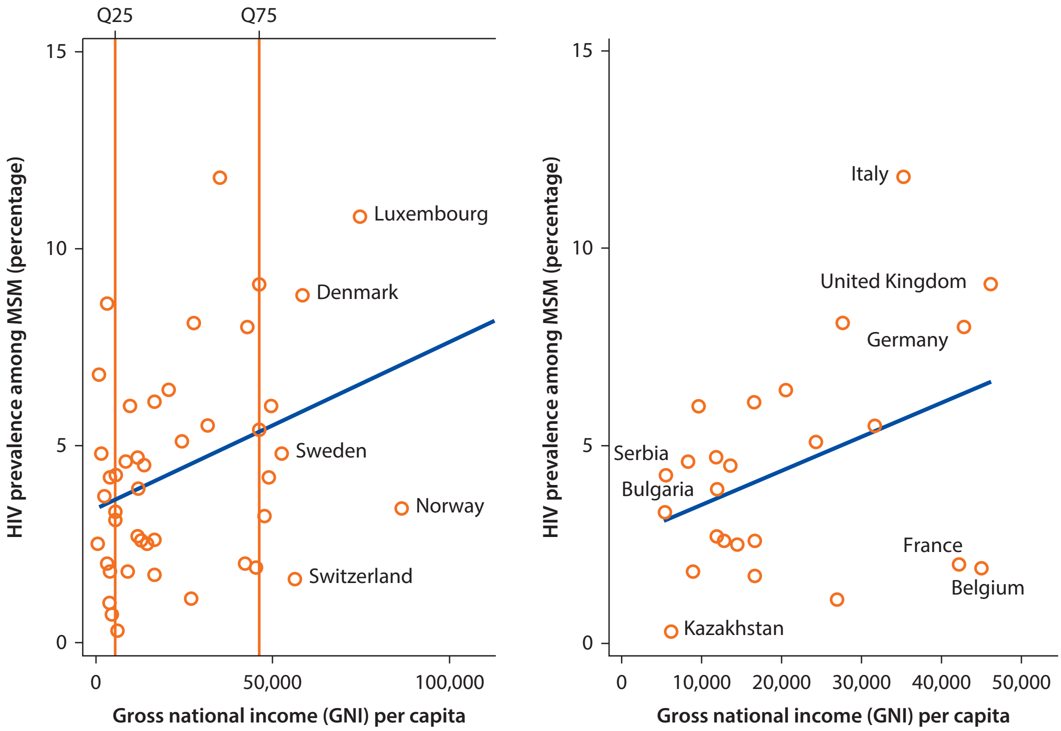
Legislative equality is an important step toward social inclusion. It also increases the validity of surveillance systems by reducing the need to suppress information on risk behaviors. Governments should act to (a) remove legal prohibitions on sex between MSM; (b) set up a mechanism to prosecute police involved in harassment, assault or extortion of MSM; (c) require police to enforce the laws against assault for MSM on equal terms with the rest of the population; and (d) provide legal recognition and protection of same-sex relationships.

Supportive Policy Environments and HIV Prevalence

Results from the systematic review and HIV case reports indicate that HIV prevalence among MSM is higher in countries in the West than in the East. Comparing these data with our policy index suggests that the more supportive the policy environment, the higher the HIV prevalence. More supportive environments will lead to more openness in reporting sex with men as a risk factor in HIV case reports. This could also partly be explained by timing: liberalization of policies towards MSM may have occurred after increases in HIV prevalence as well as the scale-up of HIV interventions. Higher HIV prevalence may also be attributed to migration of MSM from countries with less-supportive environments. A more supportive policy environment might lead to the increased availability of venues where gay men can meet and have sex, increasing the chances of unprotected sex. Findings from the systematic review from studies in France and Switzerland suggest how a core group of HIV-positive MSM engage in UAI [31, 47]. There is also evidence that other structural factors will interact with the policy environment to mediate risk of HIV among MSM. When looking at the relationship between gross national income (GNI) and HIV prevalence among MSM, for example, it is evident that prevalence increases along with GNI per capita, with higher GNI in the West than in the East (figure 4.10).

While more liberal policies might create environments in which HIV transmission can occur, less liberal policies may breach fundamental human rights conventions as well lead to adverse health outcomes. Evidence from the review

Figure 4.10 Relationship between HIV Prevalence among MSM and GNI



Source: Tables C.23–C.25, GNI from World Development Indicators, World Bank.
Note: GNI = gross national income; HIV = human immunodeficiency virus; MSM = men who have sex with men.

suggests little regional difference in the numbers of sex partners reported in the East with more repressive environments than in Central Europe or the West. Repressive polices do not support MSM in maintaining exclusive and cohabiting relationships. Instead, they encourage clandestine networks of casual sex partners that provide sexual relief but little of the social capital of regular partnerships. Paradoxically then, suppression fosters sexual partner turnover that carries risk but prevents supportive longer term relationships. Our systematic review noted that UAI was more frequently reported in samples in the East and condom use at last AI less frequently reported [14]. An example of the detrimental effects of homophobic policies is given in case study 4.10 below.

Violence against MSM

The systematic review identified the experience of internalized homophobia or feeling negative about one's sexuality to be associated with increased risk of UAI. Few studies in the review addressed homophobic violence but those that did suggest that verbal, physical, and sexual attacks on the basis of sexual orientation are common. In the West, a Spanish study found that 10.7% of respondents had been the victim of aggression or verbal assaults in the past 12 months alone [48]. In the East, in Georgia, 21% of respondents reported ever having experienced

Case Study 4.10 The Impact of Homophobic Polices in the Russian Federation

Although homosexuality in Russia was decriminalized in 1993 with the fall of the Soviet Union, homophobic activities are widespread, with demonstrations to mark the decriminalization of homosexuality frequently banned by city authorities, and attempts to protest the ban met with physical violence from homophobic mobs and police [55]. Evidence suggests that policies in Russia towards men who have sex with men (MSM) are becoming more repressive. In March 2012, the government put forward a homophobic bill banning "propaganda of sodomy, lesbianism, bisexualism and transgenderism, and pedophilia to minors." Passing of this bill would mean that fines could be imposed on people engaging in "public activities to promote sodomy, lesbianism, bisexuality and transsexuality" that might be observed by minors. The vague terminology of the language could lead to a ban on wearing a gay-supportive logo or holding lesbian, gay, bisexual, transgender (LGBT) themed rallies in the city. Similar laws have been passed in other cities in Russia. The bill also links pedophilia and homosexuality, further reinforcing homophobic sentiment in the society. The environment for LGBT is already hostile, and reports of activists being physically attacked are common [56]. There is little published about sexual identity in Russia, with scant data on lifetime experience of same-sex activities. Evidence suggests that many gay men marry in order to conceal their identity. The Russian LGBT Network and Helsinki Group have documented incidences of discrimination in relation to employment as well as restrictions to setting up non-government organizations (NGOs) to support LGBT groups [57]. While the HIV epidemic remains concentrated among PWID, it is likely that discrimination and stigma will lead to major underreporting in HIV case reports and emerging evidence that HIV is growing among this population. Nevertheless, interventions and policies remain unsupportive to promoting effective interventions.

physical violence; 14% reported verbal attacks and 7% reported sexual attacks including rape [49]. Personal homophobia among the social contacts of MSM (family, neighbors, social circles) has multiple negative effects on MSM. For example, in Georgia, stigma mitigates against the development of regular partnerships among men, who are afraid to meet a new partner again, in case others notice this new friendship [12]. In much of the region, hostile and exploitative police attitudes effectively create impunity for sexual assault against MSM [50–54].

Institutional Homophobia

Institutional homophobia is the behavior of organizations that is differentially detrimental to MSM independent of any of the individuals within it. While it is difficult for homophobes to act homophobically in nonhomophobic institutions, homophobic institutions encourage everyone (including gay people) to act homophobically. One manifestation of institutional homophobia is workplace tolerance of hate speech. A study in Northern Ireland of 752 lesbian, gay, bisexual, transgender (LGBT) people found that 31% of community and voluntary sector workers, 40% of public sector staff, and 42.5% of private sector employees said they had heard antigay remarks at work. Around one-quarter reported hiding their sexuality at work [58]. Workplace conduct policy and the apparatus for its application determine how people behave at work.

Institutional homophobia manifests itself in different guises across the region. One manifestation of institutional homophobia is legal discrimination against MSM (and absence of protective legislation) [51]. Eliminating unequal treatment in legislation and in law enforcement is essential to creating an environment in which MSM feel free to seek specific information about their HIV risks, and community organizations can provide it without harassment.

Note

1. This is because Liechtenstein data are reported via Switzerland.

References

Note: References below are also cited in Appendix C.

1. EuroHIV. *Report on the EuroHIV 2006 survey on HIV and AIDS surveillance in the WHO European Region*. 2007, Institut de Veille Sanitaire, Saint-Maurice.
2. European Centre for Disease Prevention and Control/WHO Regional Office for Europe. HIV/AIDS surveillance in Europe 2009. 2010, European Centre for Disease Prevention and Control. Stockholm.
3. European Centre for Disease Prevention and Control (ECDC). *HIV testing: increasing uptake and effectiveness in the European Union*. 2010. Stockholm: ECDC.
4. Deblonde, J., et al. Barriers to HIV testing in Europe: a systematic review. *European Journal of Public Health*, 2010. 20(4): p. 422–432.
5. Khotenashvili, L., S. Matic, and J. V. Lazarus. HIV testing and counselling policies and practices in Europe: lessons learned, ways forward. *HIV Medicine*, 2008. 9: p. 30–33.
6. European Centre for Disease Prevention and Control (ECDC). *Implementing the Dublin Declaration on Partnership to Fight HIV/AIDS in Europe and Central Asia: 2010 progress report*. 2010. Stockholm.
7. Mounier-Jack, S., S. Nielsen, and R. J. Coker. HIV testing strategies across European countries. *HIV Medicine*, 2008. 9: p. 13–19.
8. European Centre for Disease Prevention and Control (ECDC). Mapping of HIV/STI behavioral surveillance in Europe. In ECDC Technical Report. 2009, Stockholm.
9. Garnett, G. P., et al. Behavioral data as an adjunct to HIV surveillance data. *Sexually Transmitted Infections*, 2006. 82(Suppl. 1): p. i57–62.
10. Gupta, G. R., et al. Structural approaches to HIV prevention. *The Lancet*, 2008. 372(9640): p. 764–775.
11. Rehle, T., et al. Second-generation HIV surveillance: better data for decision-making. *Bulletin of the World Health Organization*, 2004. 82(2): p. 121–127.
12. Sharma, M., D. Burrows, and R. Bluthenthal. Coverage of HIV prevention programmes for injection drug users: confusions, aspirations, definitions and ways forward. *International Journal of Drug Policy*, 2007. 18(2): p. 92–8.

13. UNAIDS/WHO. *Initiating second generation HIV surveillance systems: practical guidelines*. 2002. Geneva, Switzerland.
14. WHO. *Introduction of second generation HIV surveillance guidelines in some newly independent states of Eastern Europe*. 2001.
15. Wiessing, L., et al. State of Second Generation HIV Surveillance for IDUs in Europe. International Harm Reduction Conference 2010, Liverpool.
16. Zaba, B., et al. The role of behavioral data in HIV surveillance. *AIDS*, 2005. 19(Suppl. 2): p. S39–S52.
17. Des Jarlais, D. C., K. Dehne, and J. Casbona. HIV Surveillance among injecting drug users. *AIDS*, 2001. 14(Suppl. 3): p. S13–S22.
18. Magnani, R., et al. Review of sampling hard-to-reach and hidden populations for HIV surveillance. *AIDS*, 2005. 19(Suppl. 2): p. S67–S72.
19. Goel, S., and M. J. Salganik. Assessing respondent-driven sampling. *Proceedings of the National Academy of Sciences. U.S.A.*, 2010. 107(15): p. 6743–6747.
20. Heckathorn, D. D., et al. Extensions of Respondent Driven Sampling: A new approach to the study of injection drug users aged 18–25. *AIDS and Behavior*, 2002. 6(1): p. 55–67.
21. Johnston, L. G., et al. The effectiveness of respondent driven sampling for recruiting males who have sex with males in Dhaka, Bangladesh. *AIDS and Behavior*, 2008. 12(2): p. 294–304.
22. Simic, M., et al. Attempting respondent driven sampling in sex worker populations in Eastern Europe: emerging evidence and key issues for formative research. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 2006. 83(Suppl. 1): p. 6–15.
23. Salganik, M. J., and D. D. Heckathorn. Sampling and estimation in hidden populations using respondent-driven sampling. *Sociological Methodology*, 2004: p. 1–28.
24. Diaz, T., et al. New strategies for HIV surveillance in resource-constrained settings: an overview. *AIDS*, 2005. 19(Suppl. 2): p. S1–S8.
25. Semaan, S., J. Lauby, and J. Liebman. Street and network sampling in evaluation studies of HIV risk-reduction interventions. *AIDS Reviews*, 2002. 4: p. 231–223.
26. Platt, L., et al. Methodologies to recruit hard-to-reach groups in Russia and Estonia: Comparisons of two chain referral sampling methods across nine studies. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 2006. 83(7): p. i39–i53.
27. Power, R. Some methodological and practical implications of employing drug users as indigenous field workers. In *Challenge and Innovation: methodological advances in social research on HIV/AIDS*, M. Boulton, Editor. 1994, London: Taylor and Francis. p. 97–111.
28. Watters, J. K., and P. Biernacki. Targeted sampling: options for the study of hidden populations. *Social Problems*, 1989. 46: p. 416–430.
29. European Centre for Disease Prevention and Control (ECDC). Mapping of HIV/STI behavioral surveillance in Europe. 2009, European Centre for Disease Prevention and Control, Stockholm.
30. EuroHIV. *HIV/AIDS Surveillance in Europe. Mid-year report 2007*. 2007, Saint-Maurice: Institut de Veille Sanitaire.
31. European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). Available from: http://www.emcdda.europa.eu/.

32. Fisher, M., et al. Serological testing algorithm shows rising HIV incidence in a United Kingdom cohort of men who have sex with men: 10 years application. *AIDS*, 2007. 21(17): p. 2309–2314. 10.1097/QAD.0b013e3282ef9fed.
33. Semaille, C. C. F., et al. Recently acquired HIV infection in men who have sex with men (MSM) in France, 2003–2008. *Eurosurveillance*, 2009. 14(48): p. 19425.
34. Romero, A., et al. Recently acquired HIV infection in Spain (2003–2005): introduction of the serological testing algorithm for recent HIV seroconversion. *Sexually Transmitted Infections*, 2009. 85(2): p. 106–110.
35. Remis, R. S. Reaching for the STARHS. *Sexually Transmitted Infections*, 2010. 86(7): p. 486–487.
36. Mathers, B. M. D. L., et al. HIV prevention, treatment, and care services for people who inject drugs: a systematic review of global, regional, and national coverage. *The Lancet*, 2010. 375: p. 1014–1028.
37. Mathers, B. M., et al. Global epidemiology of injecting drug use and HIV among people who inject drugs: a systematic review. *The Lancet*, 2008. 372(9651): p. 1733–1745.
38. Heimer, R., Community coverage and HIV prevention: assessing metrics for estimating HIV incidence through syringe exchange. *International Journal of Drug Policy*, 2008. 19(Suppl 1): p. 65–73.
39. Vickerman, P., et al. Model projections on the required coverage of syringe distribution to prevent HIV epidemics among injecting drug users. *Journal of Acquired Immune Deficiency Syndrome*, 2006. 42(3): p. 355–361. 10.1097/01.qai.0000219788.73539.47.
40. Degenhardt, L. M. B., et al. Prevention of HIV infection for people who inject drugs: why individual, structural, and combination approaches are needed. *The Lancet*, 2010. 376: p. 285–301.
41. Hickman, M., et al. Estimating drug prevalence: review of methods with special reference to developing countries. *UN Bulletin on Narcotics*, 2002. LIV (1 and 2).
42. Hickman, M., et al. Estimating the prevalence of problem drug use in inner London: a discussion of three capture-recapture studies. *Addiction*, 1999. 94(11): p. 1653–1662.
43. Family Health International. *Estimating the size of populations at risk for HIV: Issues and Methods*. 2003, The UNAIDS/WHO Working Group on HIV/AIDS/STI Surveillance.
44. Chapter 4, section “HIV-Prevention Responses among People Who Inject Drugs.”
45. Mathers, B. M. D. L., et al. HIV prevention, treatment, and care services for people who inject drugs: a systematic review of global, regional, and national coverage. *The Lancet*, 2010. 375: p. 1014–1028.
46. Degenhardt, L, M. B., et al. Prevention of HIV infection for people who inject drugs: why individual, structural, and combination approaches are needed. *The Lancet*, 2010. 376: p. 285–301.
47. Wolfe, D., M. P. Carrieri, and D. Shepard. Treatment and care for injecting drug users with HIV infection: a review of barriers and ways forward. *The Lancet*, 2010. 376(9738): p. 355–366.
48. Room, R. The ambiguity of harm reduction—goal or means, and what constitutes harm? In *Harm reduction: evidence, impacts and challenges*, T. Rhodes, Hedrich, D., Editor 2010, Luxembourg: Publications Office of the European Union. p. 108.

49. Strathdee, S. A., et al. HIV and risk environment for injecting drug users: the past, present, and future. The *Lancet*, 2010. 376(9737): p. 268–284.
50. European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). Statistical bulletin 2011. 2011; Available from: http://www.emcdda.europa.eu/stats11.
51. Van Den Berg, C., et al. Full participation in harm reduction programmes is associated with decreased risk for Human Immunodeficiency Virus and hepatitis C virus: evidence from the Amsterdam Cohort Studies among drug users. *Addiction*, 2007. 102(9): p. 1454–1462.
52. Grund, J.-P., et al. The fast and furious—cocaine, amphetamines and harm reduction. In *Harm reduction: evidence, impacts and challenges*, T. Rhodes, Hedrich, D., Editor 2010, Luxembourg: Publications Office of the European Union. p. 191–232.
53. Rhodes, T., and D. Hedrich. Harm reduction and the mainstream. In *Harm reduction: evidence, impacts and challenges*, T. Rhodes, Hedrich, D., Editor 2010, Luxembourg: Publications Office of the European Union. p. 462.
54. World Health Organization (WHO), UNODC, and UNAIDS. Technical Guide for countries to set targets for universal access to HIV prevention, treatment and care for injecting drug users, 2009.
55. Kaplan, E. H., and R. Heimer. A Model-based estimate of HIV infectivity via needle sharing. *Journal of Acquired Immune Deficiency Syndromes*, 1992. 5(11): p. 1116–1118.
56. Tilson, H., A. Aramrattana, and S. Bozzette. *Preventing HIV infection among injecting drug users in high-risk countries: an assessment of the evidence*. 2007, Washington, DC: Institute of Medicine.
57. World Health Organization (WHO). Consensus statement: addressing knowledge gaps in the public health approach to delivering antiretroviral therapy and care. Aug 4, 2008.
58. Montaner, J. S. G., et al. The case for expanding access to highly active antiretroviral therapy to curb the growth of the HIV epidemic. *The Lancet*, 2006. 368(9534): p. 531–536.
59. Palmateer, N., et al. Evidence for the effectiveness of sterile injecting equipment provision in preventing hepatitis C and human immunodeficiency virus transmission among injecting drug users: a review of reviews. *Addiction*, 2010. 105: p. 844–859.
60. Gibson, D. R., N. M. Flynn, and D. Perales. Effectiveness of syringe exchange programs in reducing HIV risk behavior and HIV seroconversion among injecting drug users. *AIDS*, 2001. 15(11): p. 1329–1341.
61. Wodak, A., and A. Cooney. *Effectiveness of sterile needle and syringe programming in reducing HIV/AIDS among injecting drug users*. World Health Organization Evidence for Action Technical Papers 2004. Geneva: World Health Organization (WHO).
62. Vickerman, P., et al. Model projections on the required coverage of syringe distribution to prevent HIV epidemics among injecting drug users. *Journal of Acquired Immune Deficiency Syndromes*, 2006. 42(3): p. 355–361. 10.1097/01.qai.0000219788.73539.47.
63. Faggiano, F., et al. Methadone maintenance at different dosages for opioid dependence. *Cochrane Database Systematic Reviews*, 2009. 3.
64. Mattick, R. P., et al. Buprenorphine maintenance versus placebo or methadone maintenance for opioid dependence. *Cochrane Database Systematic Review*, 2009. 3.

65. Wong, K. -H., et al. Adherence to methadone is associated with a lower level of HIV-related risk behaviors in drug users. *Journal of Substance Abuse Treatment*, 2003. 24(3): p. 233–239.
66. Hartel, D. M., and E. E. Schoenbaum. Methadone treatment protects against HIV infection: two decades of experience in the Bronx, New York City. *Public health reports (Washington, DC: 1974)*, 1998. 113(Suppl. 1): p. 107–15.
67. Metzger, D. S. Human immunodeficiency virus seroconversion among intravenous drug users in- and out-of-treatment: an 18-month prospective follow-up. *Journal of Acquired Immune Deficiency Syndromes*, 1993. 6(9): p. 1049–1056.
68. Moss, A. R., et al. HIV seroconversion in intravenous drug users in San Francisco, 1985–1990. *AIDS*, 1994. 8(2): p. 223–232.
69. Williams, A. B., et al. Methadone maintenance treatment and HIV type 1 seroconversion among injecting drug users. *AIDS Care: Psychological and Socio-medical Aspects of AIDS/HIV*, 1992. 4(1): p. 35–41.
70. Rhoades, H. M., et al. Retention, HIV risk, and illicit drug use during treatment: methadone dose and visit frequency. *American Journal of Public Health*, 1998. 88(1): p. 34–39.
71. Serpelloni, G., et al. Methadone treatment as a determinant of HIV risk reduction among injecting drug users: a nested case-control study. *AIDS Care: Psychological and Socio-medical Aspects of AIDS/HIV*, 1994. 6(2): p. 215–220.
72. Novick, D. M., et al. *Absence of antibody to Human Immunodeficiency Virus in long-term, socially rehabilitated methadone maintenance patients*. Vol. 150. 1990, Chicago, IL: American Medical Association.
73. Sullivan, L. E., et al. Decreasing international HIV transmission: the role of expanding access to opioid agonist therapies for injection drug users. *Addiction*, 2005. 100(2): p. 150–158.
74. Attia, S., et al. Sexual transmission of HIV according to viral load and antiretroviral therapy: systematic review and meta-analysis. *AIDS*, 2009. 23(11): p. 1397–1404 10.1097/QAD.0b013e32832b7dca.
75. Quinn, T. C., et al. Viral load and heterosexual transmission of Human Immunodeficiency Virus type 1. Vol. 342. 2000, Waltham, MA: Massachusetts Medical Society.
76. Wood, E., et al. Longitudinal community plasma HIV-1 RNA concentrations and incidence of HIV-1 among injecting drug users: prospective cohort study. *BMJ*, 2009. 338.
77. Rhodes, T., et al. Policy resistance to harm reduction for drug users and potential effect of change. *BMJ*, 2010. 341.
78. Elovich, R., and E. Drucker. On drug treatment and social control: Russian narcology's great leap backwards. *Harm Reduction Journal*, 2008. 5(1): p. 23.
79. Babayan, E., and M. H. Gonopolsky. Textbook on alcoholism and drug abuse in the Soviet Union. 1985. International Universities Press.
80. Beyrer, C., et al. Characterization of the emerging HIV type 1 and HCV epidemics among injecting drug users in Dushanbe, Tajikistan. *AIDS Research and Human Retroviruses*, 2009. 25(9): p. 853–860.
81. Deryabina, A., et al. High coverage of injecting drug users (IDUs) with comprehensive HIV prevention services reduces HIV risk in Central Asia. XVIII International AIDS Conference 2010. Vienna, Austria.

82. Malta, M., et al. Adherence to antiretroviral therapy among HIV-infected drug users: a meta-analysis. *AIDS and Behavior*, 2010. 14(4): p. 731–747.

83. Palepu, A., et al. Antiretroviral adherence and HIV treatment outcomes among HIV/HCV co-infected injection drug users: the role of methadone maintenance therapy. *Drug and alcohol dependence*, 2006. 84(2): p. 188–194.

84. Lert, F., and M. D. Kazatchkine. Antiretroviral HIV treatment and care for injecting drug users: an evidence-based overview. *International Journal of Drug Policy*, 2007. 18(4): p. 255–261.

85. Hedrich, D., A. Pirona, and L. Wiessing. From margin to mainstream: the evolution of harm reduction responses to problem drug use in Europe. *Drugs: Education, Prevention, and Policy*, 2008. 15(6): p. 503–517.

86. Sylla, L., et al. Integration and co-location of HIV/AIDS, tuberculosis and drug treatment services. *International Journal of Drug Policy*, 2007. 18(4): p. 306–312.

87. World Health Organization (WHO). Policy guidelines for collaborative TB and HIV services for injecting and other drug users: an integrated approach. Evidence for action technical papers, 2008.

88. Vlasenko, L., et al. Methadone based integrated care for IDUs in Dnipropetrovsk region of Ukraine. XVIII International AIDS Conference 2010. Vienna, Austria.

89. Wiessing, L., et al. Associations between availability and coverage of HIV-prevention measures and subsequent incidence of diagnosed HIV infection among injection drug users. *American Journal of Public Health*, 2009. 99(6): p. 1049–1052.

90. Heimer, R. Community coverage and HIV prevention: assessing metrics for estimating HIV incidence through syringe exchange. *International Journal of Drug Policy*, 2008. 19(Suppl. 1): p. 65–73.

91. European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). Statistical bulletin 2010. 2010; Available from: http://www.emcdda.europa.eu/stats10.

92. Sarang, A., T. Rhodes, and L. Platt. Access to syringes in three Russian cities: implications for syringe distribution and coverage. *International Journal of Drug Policy*, 2008. 19(Suppl. 1): p. 25–36.

93. Booth, R., et al. Police brutality is independently associated with sharing injection equipment among injection drug users in Odessa, Ukraine. XVIII International AIDS Conference 2010. Vienna, Austria.

94. Spicer, N., et al. 'It's risky to walk in the city with syringes': understanding access to HIV/AIDS services for injecting drug users in the former Soviet Union countries of Ukraine and Kyrgyzstan. *Globalization and Health*, 2011. 7(22).

95. Mathers, B. M., et al. Global epidemiology of injecting drug use and HIV among people who inject drugs: a systematic review. *The Lancet*, 2008. 372(9651): p. 1733–1745.

96. Skala, P. Criminalization of drug users in Ukraine as a factor hindering the scale up of access to HIV/AIDS prevention and treatment programmes. XVIII International AIDS Conference 2010. Vienna, Austria.

97. Bobrova, N., et al. Barriers to accessing drug treatment in Russia: a qualitative study among injecting drug users in two cities. *Drug and Alcohol Dependence*, 2006. 82: p. S57–S63.

98. Russian Federation Federal Service for Surveillance of Consumer Rights Protection and Human Well-Being. *Country Report of the Russian Federation on the Implementation of the Declaration of Commitment on HIV/AIDS*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010. Moscow.

99. Cook, C., J. Bridge, and G. V. Stimson. The diffusion of harm reduction in Europe and beyond. In *Harm reduction: evidence, impacts and challenges*, T. Rhodes, Hedrich, D., Editor 2010, Luxembourg: Publications Office of the European Union. p. 462.
100. Judice, N., O. Zaglada, and R. Mbuya-Brown. HIV Policy Assessment: Ukraine. 2011, Futures Group, Health Policy Project: Washington, DC.
101. European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). *Annual report 2011: the state of the drugs problem in Europe*. 2011. Luxembourg.
102. Donoghoe, M. C., and A. R. Stengaard. Access to antiretroviral therapy (ART) for injecting drug users in the WHO European Region 2002–2008. XVIII International AIDS Conference 2010. Vienna, Austria.
103. Lambers, F., et al. Harm reduction intensity—its role in HAART adherence among drug users in Amsterdam. XVIII International AIDS Conference 2010. Vienna, Austria.
104. Mathers, B. M., et al. HIV prevention, treatment, and care services for people who inject drugs: a systematic review of global, regional, and national coverage. *The Lancet*, 2010. 375(9719): p. 1014–28.
105. Uuskula, A., et al. Expanded syringe exchange programs and reduced HIV infection among new injection drug users in Tallinn, Estonia. *BMC Public Health*, 2011. 11: p. 517.
106. Ulugbek Aminov, H. P. M. UNDP Tajikistan, Personal communication. E. Jolley, Editor 2012.
107. Camoni, L., et al. Prevalence and correlates of infection with human immunodeficiency virus, hepatitis B virus, and hepatitis C virus among drug users in Italy: A cross-sectional study. *Scandinavian Journal of Infectious Diseases*, 2009. 41(6–7): p. 520–523.
108. Smolskaya, T. T., et al. HIV Sentinel Surveillance in High-Risk Groups in Azerbaijan. The Republic of Moldova and in the Russian Federation, 2004, World Health Organization (WHO), Europe.
109. Expanding Network for Comprehensive and Coordinated Action on HIV/AIDS prevention among IDUs and Bridging Population (ENCAP). *Prevalence of HIV and other infections and risk behavior among Injecting Drug Users in Latvia, Lithuania and Estonia in 2007*. 2009.
110. UNGASS. *Country Progress Report: Romania*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
111. UNGASS. *Country Progress Report: Republic of Serbia*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
112. UNGASS. *Country Progress Report: Republic of Macedonia*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
113. UNGASS. *Country Progress Report on Monitoring the Declaration of Commitment on HIV/AIDS: Republic of Bulgaria*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
114. UNGASS. *Country Progress Report: Bosnia and Herzegovina*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.
115. Family Health International (FHI). *Albania—Behavioral and Biological Surveillance Study Report*. 2006.
116. National AIDS Program, I.o.P.H., Albania, and UNGASS. *Country Progress Report: Albania*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010. Tirana.

117. The Ministry of Health and Social Welfare, and R.o.C. *Country Progress Report: Croatia*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010.

118. Soliev, A. Analysis on epidemiological situation and responses based on second generation sentinel surveillance system among injecting drug users, Tajikistan, Kazakhstan, Kyrgyzstan, 2006–2009. 2010.

119. Sanchez, J. L., et al. High HIV prevalence and risk factors among injection drug users in Tashkent, Uzbekistan, 2003–2004. *Drug and Alcohol Dependence*, 2006. 82: p. S15–S22.

120. Mounier-Jack, S., S. Nielsen, and R. J. Coker. HIV testing strategies across European countries. *HIV Medicine*, 2008. 9: p. 13–19.

121. Samet, J. H. Russia and Human Immunodeficiency Virus—beyond crime and punishment. *Addiction*, 2011. 106(11): p. 1883–5.

122. Platt, L., et al. Impact of gender and sex work on sexual and injecting risk behaviors and their association with HIV positivity among injecting drug users in an HIV epidemic in Togliatti City, the Russian Federation. *Sexually Transmitted Diseases*, 2005. 32(10): p. 605–612.

123. Busza, J. R., et al. Street-based adolescents at high risk of HIV in Ukraine. *Journal of Epidemiology and Community Health*, 2010.

124. Sakovych, O., O. Balakireva, and S. Ancker. Service access barriers in Ukraine seen through the eyes of adolescent injecting drug users and female sex workers—using the results of a qualitative study in the design of targeted HIV prevention interventions. XVIII International AIDS Conference 2010. Vienna, Austria.

125. International Harm Reduction Development Program. The Effects of Drug User Registration Laws on People's Rights and Health: Key Findings from Russia, Georgia, and Ukraine. Assessment in Action Series 2009, Open Society Institute, New York.

126. Blankenship, K., et al. Structural interventions: concepts, challenges and opportunities for research. *Journal of Urban Health*, 2006. 83(1): p. 59–72.

127. Gupta, G. R., et al. Structural approaches to HIV prevention. *The Lancet*, 2008. 372(9640): p. 764–75.

128. Rhodes, T., and M. Simic. Transition and the HIV risk environment. *BMJ*, 2005. 331(7510): p. 220–223.

129. World Health Organization (WHO). Policy and Programming Guide for HIV/AIDS Prevention and Care among Injecting Drug Users. 2005.

130. Beyrer, C., et al. Time to act: a call for comprehensive responses to HIV in people who use drugs. *The Lancet*, 2010. 376(9740): p. 551–563.

131. Wood, E., et al. The war on drugs: a devastating public-policy disaster. *The Lancet*, 2009. 373(9668): p. 989–90.

132. Joint United Nations Program on AIDS (UNAIDS). International Guidelines on HIV/AIDS and Human Rights: 2006 Consolidated Version. 2006.

133. Hoover, J., and R. Jürgens. Harm reduction in prison: the Moldova model. R. Saucier, Shkurpela, D., Silva, P., Editor 2009, International Harm Reduction Development Program, Open Society Institute Public Health Program.

134. European Centre for Disease Prevention and Control. *Implementing the Dublin Declaration on Partnership to Fight HIV/AIDS in Europe and Central Asia: 2010 progress report*. 2010, Stockholm: ECDC.

135. Walmsley, R. *World Prison Population List (7th edition)*. 2009, International Centre for Prison Studies.
136. United Nations Office on Drugs and Crime (UNODC), R.O.f.C.A., and Canadian HIV/AIDS Legal Network. Accessibility of HIV Prevention, Treatment and Care Services for People who Use Drugs and Incarcerated People in Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan: Legislative and Policy Analysis and Recommendations for Reform. 2010, United Nations Office on Drugs and Crime, Regional Office for Central Asia, Ashgabat.
137. Human Rights Watch. Fanning the flames: how human rights abuses are fueling the AIDS epidemic in Kazakhstan. 2003.
138. Sarang, A., et al. Policing drug users in Russia: risk, fear, and structural violence. *Substance Use & Misuse*, 2010. 45(6): p. 813–864.
139. Dzhalbieva, I., I. Ermolaeva, and M. Tokombaeva. The limitation of services and psycho-psychological factors influencing the spread of HIV among female IDUs in the southern region of Kyrgyzstan. *Report on research results*, 2009, Bishkek: Public Foundation “Asteria.”
140. Lewis, D. High times on the Silk Road: The Central Asian paradox. *World Policy Journal*, 2010. 27(1): p. 39–49.
141. The Government of Tajikistan. Programme for countering HIV/AIDS epidemic in the Republic of Tajikistan for the period 2007–2010. 2007.
142. Latypov, A. Drug dealers, drug lords and drug warriors-cum-traffickers: Drug crime and the narcotics market in Tajikistan. 2011, Eurasian Harm Reduction Network, Vilnius.
143. AIDSMark regional lessons learned. Eastern Europe. USAID Award No. HRN-A-00–97–00021–002007, Washington, DC, PSI, AIDSMark, 2007.
144. Portuguese Government. Portuguese National Strategy for the fight against drugs. 1999.
145. Greenwald, G. Drug decriminalization in Portugal: lessons for creating fair and successful drug policies. 2009, The Cato Institute.
146. Degenhardt, L., et al. Toward a global view of alcohol, tobacco, cannabis, and cocaine use: findings from the WHO world mental health surveys. *PLoS Med*, 2008. 5(7): p. e141.
147. European Centre for Disease Prevention and Control/WHO Regional Office for Europe. HIV/AIDS surveillance in Europe 2010. 2011, European Centre for Disease Prevention and Control, Stockholm.
148. In Russia, stigma and discrimination add to the burden of HIV-positive mothers and children. *Connections*, 2005. p. 2.
149. Instituto da Droga e da Toxicodependência de Portugal (Institute on Drugs and Drug Addiction of Portugal). *The national situation relating to drugs and dependency*. 2006 Annual Report, 2007.
150. Pinto Coelho, M. *The ‘resounding success’ of Portuguese drug policy: the power of an attractive fallacy*. 2010, Lisbon: Association for a Drug Free Portugal.
151. Hughes, C. E., and A. Stevens. A resounding success or a disastrous failure: re-examining the interpretation of evidence on the Portuguese decriminalisation of illicit drugs. *Drug and Alcohol Review,* 2012. 31(1): p. 101–113.

152. Domosławski, A. Drug policy in Portugal: the benefits of decriminalizing drug use, in lessons for drug policy 2011, Open Society Foundations.
153. Chapter 4, section "HIV Prevention Responses among SWs."
154. Shahmanesh, M., et al. Effectiveness of interventions for the prevention of HIV and other sexually transmitted infections in female sex workers in resource poor setting: a systematic review. *Tropical Medicine & International Health*, 2008. 13(5): p. 659–79.
155. WHO. Monitoring and reporting on the health sector response to HIV/AIDS towards Universal Access. Editor. 2009, WHO, UNICEF, UNAIDS.
156. Mathers, B. M., et al. Estimating the level of HIV prevention coverage, knowledge and protective behavior among injecting drug users: what does the 2008 UNGASS reporting round tell us? *Journal of Acquired Immune Deficiency Syndrome*, 2009. 52(Suppl. 2): p. S132–42.
157. Crago, A. L. Arrest the violence. Human rights abuses against sex workers in Central and Eastern Europe and Central Asia. 2009, Sex Workers' Rights Advocacy Network in Central and Eastern Europe and Central Asia.
158. King, E., V. Dudina, and S. Maman. Understanding decisions to test for HIV among female sex workers in St. Petersburg, Russia. XVIII International AIDS Conference 2010. Vienna, Austria.
159. Platt, L., et al. Risk of sexually transmitted infections and violence among indoor-working female sex workers in London: the effect of migration from Eastern Europe. *Sex Trans Infect*, 2011. 87(5): p. 377–84.
160. van Veen, M. G., et al. HIV and sexual risk behavior among commercial sex workers in the Netherlands. *Archives of Sexual Behavior,* 2010. 39(3): p. 714–723.
161. Todd, C. S., et al. Prevalence and correlates of condom use and HIV testing among female sex workers in Tashkent, Uzbekistan: implications for HIV transmission. *AIDS and Behavior,* 2007. 11(3): p. 435–442.
162. Country Coordination Committee, R.o.K., and UNGASS, *Country progress report: Republic of Kazakhstan*. United Nations General Assembly Special Session on HIV/AIDS, Editor 2010. Almaty.
163. Stulhofer, A., et al. Female sex work and HIV risks in Croatia. *AIDS Care*–Psychological and Socio-Medical Aspects of AIDS/HIV, 2009. 21(11): p. 1439–1446.
164. UNFPA and UNICEF. Consultation on strategic information and HIV prevention among most-at-risk adolescents. Research Tool-kit. 2009.
165. UNGASS. *Country Progress Report: Bosnia and Herzegovina*. United Nations General Assembly Special Session on HIV/AIDS, Editor. 2010.
166. Family Health International. 2006 Behavioral and Biological Surveillance Study Kosovo, in Impact: Implementing AIDS Prevention and Care Project. 2007, Family Health International.
167. International Harm Reduction Development Program. Women, Harm Reduction, and HIV, in Assessment in Action. 2009, Open Society Institute.
168. Surratt, H. L., and J. A. Inciardi An effective HIV risk-reduction protocol for drug-using female sex workers. *Journal of Prevention & Intervention in the Community,* 2010. 38(2): p. 118–31.

169. Sex work, HIV/AIDS, and human rights in Central and Eastern Europe and Central Asia. *A report from the Central and Eastern European Harm Reduction Network. 2005*. Vilnius, Lithuania, CEEHRN, 2005 July 119.
170. Church, S., et al. Violence by clients towards female prostitutes in different work settings: questionnaire survey. *BMJ*, 2001. 322: p. 524–525.
171. TAMPEP and L. Brussa *Sex work in Europe: a mapping of the prostitution scene in 25 countries, in sex work, migration and health*, T. International, Editor. 2009, TAMPEP International, Amsterdam.
172. Sanders, T., and R. Campbell. Designing out vulnerability, building in respect: violence, safety and sex work policy. *British Journal of Sociology*, 2007. 58(1): p. 1–19.
173. Bellis, M. A., et al. Comparative views of the public, sex workers, businesses and residents on establishing managed zones for prostitution: analysis of a consultation in Liverpool. *Health Place*, 2007. 13(3): p. 603–16.
174. Oberzaucher, N. *HIV and sexually transmitted infection prevention among sex workers in Eastern Europe and Central Asia*. UNAIDS Best Practice Collection; UNAIDS/06.10E. 2006, Geneva, Switzerland: Joint United Nations Programme on HIV / AIDS [UNAIDS], 2006 May. 63.
175. Aral, S. O., et al. The social organization of commercial sex work in Moscow, Russia. *Sexually Transmitted Diseases*, 2003. 30(1): p. 39–45.
176. Strathdee, S. *Health risks and power among female sex workers in Moscow*, SIECUS report, Editor. 2005.
177. Aral, S. O., J. S. St. Lawrence, and A. Uuskula. Sex work in Tallinn, Estonia: The sociospatial penetration of sex work into society. *Sexually Transmitted Infections*, 2006. 82(5): p. 348–353.
178. International HIV/AIDS Alliance. Behavioral monitoring and HIV infection prevalence among female sex workers as a component of second generation surveillance. 2009, International HIV/AIDS Alliance, Kiev.
179. Platt, L., et al. Risk of sexually transmitted infections and violence among indoor-working female sex workers in London: the effect of migration from Eastern Europe. *Sexually Transmitted Infections*, 2011. 87(5): p. 377–84.
180. Rou, K., et al. A five-city trial of a behavioral intervention to reduce sexually transmitted disease/HIV risk among sex workers in China. *AIDS*, 2007. 21 Suppl. 8: p. S95–101.
181. Wendell, D. A., et al. Street outreach for HIV prevention: effectiveness of a state-wide programme. *International Journal of STD & AIDS*, 2003. 14(5): p. 334–40.
182. TAMPEP. *Work safe in sex work*. A European Manual on Good Practices in Work with and for Sex Workers, in TAMPEP 8, V. Munk, Editor. 2009, European Network for HIV/STI Prevention and Health Promotion among Migrant Sex Workers, the Netherlands.
183. Diserens, E. A., et al. Clients of sex workers in Switzerland: it makes sense to counsel and propose rapid test for HIV on the street: a preliminary report. *BMC Infectious Diseases*, 2010. 10: p. 74.
184. Janssen, P. A., et al. Peer support using a mobile access van promotes safety and harm reduction strategies among sex trade workers in Vancouver's Downtown Eastside. *Journal of Urban Health*, 2009. 86(5): p. 804–9.

185. Luchters, S., et al. Impact of five years of peer-mediated interventions on sexual behavior and sexually transmitted infections among female sex workers in Mombasa, Kenya. *BMC Public Health*, 2008. 8(1): p. 143.

186. Ziersch, A., J. Gaffney, and D. R. Tomlinson. STI prevention and the male sex industry in London: evaluating a pilot peer education programme. *Sexually Transmitted Infections*, 2000. 76(6): p. 447–453.

187. Ford, K., et al. Evaluation of a peer education programme for female sex workers in Bali, Indonesia. *International Journal of STD & AIDS*, 2000. 11(11): p. 731–3.

188. Luchters, S., et al. Impact of five years of peer-mediated interventions on sexual behavior and sexually transmitted infections among female sex workers in Mombasa, Kenya. *BMC Public Health*, 2008. 8: p. 143.

189. Aklilu, M., et al. Factors associated with HIV-1 infection among sex workers of Addis Ababa, Ethiopia. *AIDS*, 2001. 15(1): p. 87–96.

190. Cooper, K., et al. Maids, migrants and occupational health in the London sex industry. *Anthropology & Medicine*, 2007. 14(1): p. 41–53.

191. Grenfell, P., et al. Eastern European women selling sex in London: social networks, agency and risk. International Conference on the Reduction of Drug Related Harm. 2009. Bangkok.

192. Chimienti, M., Selling sex in order to migrate: the end of the migratory dream? *Journal of Ethnic and Migration Studies*, 2010. 36(1): p. 27–45.

193. Simic, M., et al. Attempting respondent driven sampling in sex worker populations in Eastern Europe: emerging evidence and key issues for formative research. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 2006. 83(Suppl. 1): p. 6–15.

194. Kinnell, H. *Violence and sex work in Britain*. 2008, Cullompton: Willan Publishing. 290.

195. Harcourt, C., S. Egger, and B. Donovan. Sex work and the law. *Sex Health*, 2005. 2(3): p. 121–128.

196. Thomas, R. M., et al. *Female migrant sex workers: at risk in Europe. HIV/AIDS in Europe: moving from death sentence to chronic disease management*. S. Matic, J. V. Lazarus, and M. C. Donoghoe. Editor. 2006, Geneva: World Health Organization.

197. International Committee on the Rights of Sex Workers in Europe. The declaration on the rights of sex workers in Europe. European Conference on Sex Work, Human Rights, Labour and Migration. 2005. Brussels, Belgium.

198. Samaranayake, A., et al. Legislation requiring monthly testing of sex workers with low rates of sexually transmitted infections restricts access to services for higher-risk individuals. *Sexually Transmitted Infections*, 2009. 85(7): p. 540–2.

199. Sirotin, N., et al. Effects of government registration on unprotected sex amongst female sex workers in Tijuana; Mexico. *International Journal of Drug Policy*, 2010. 21(6): p. 466–470.

200. Sirotin, N., et al. A comparison of registered and unregistered female sex workers in Tijuana, Mexico. *Public Health Reports*, 2010. 125(Suppl. 4): p. 101–109.

201. Rekart, M. L., Sex-work harm reduction. *The Lancet*, 2005. 366: p. 2123–2134.

202. Goodyear, M. D., and L. Cusick. Protection of sex workers. *BMJ*, 2007. 334(7584): p. 52–3.

203. Central and Eastern European Harm Reduction Network, Sex work, HIV/AIDS, and human rights in Central and Eastern Europe and Central Asia. *A report from the Central and Eastern European Harm Reduction Network. 2005*. Vilnius, Lithuania, CEEHRN, 2005 Jul. 119.

204. Cwikel, J. G., et al. Sexually transmissible infections among illegal female sex workers in Israel. *Sexual Health*, 2006. 3(4): p. 301–303.

205. Gjenero-Margan, I., and B. Kolari. Epidemiology of HIV infection and AIDS in Croatia—An Overview. C*ollegium Antropologicum*, 2006: 30(Suppl. 2): p. 11–16.

206. Aral, S. O., et al. Commercial sex work, drug use, and sexually transmitted infections in St. Petersburg, Russia. *Social Science and Medicine*, 2005. 60: p. 2181–2190.

207. Rhodes, T., et al. Police violence and sexual risk among female and transvestite sex workers in Serbia: qualitative study. *BMJ*, 2008. 337(7669).

208. Crago, A. L., et al. Central & Eastern Europe and Central Asia: police raids and violence put sex workers at risk of HIV. *HIV/AIDS Policy & Law Review/Canadian HIV/AIDS Legal Network*, 2008. 13(2–3): p. 71–72.

209. Simic, M., and T. Rhodes. Violence, dignity and HIV vulnerability: street sex work in Serbia. *Sociology of Health & Illness*, 2009. 31(1): p. 1–16.

210. UNAIDS Advisory Group on HIV and Sex Work. *The report of the UNAIDS advisory group on HIV and sex work*. 2011, UNAIDS.

211. Campbell, R., and M. Storr. Challenging the Kerb Crawler rehabilitation programme. *Feminist Review*, 2001. 67: p. 94–108.

212. Seib, C., J. Fischer, and J. M. Najman. The health of female sex workers from three industry sectors in Queensland, Australia. *Social Science & Medicine*, 2009. 68(3): p. 473–478.

213. Boyle, F. M., et al. Psychological distress among female sex workers. *Australian and New Zealand Journal of Public Health*, 1997. 21(6): p. 643–646.

214. Romans, S. E., et al. The mental and physical health of female sex workers: a comparative study. *Australian and New Zealand Journal of Psychiatry*, 2001. 35(1): p. 75–80.

215. Boynton, P., and L. Cusick. Sex workers to pay the price. *BMJ*, 2006. 332(7535): p. 190–1.

216. Cusick, L., et al. Wild guesses and conflated meanings? Estimating the size of the sex worker population in Britain. C*ritical Social Policy*, 2009. 29: p. 703–719.

217. Shannon, K., et al. Prevalence and structural correlates of gender based violence among a prospective cohort of female sex workers. *BMJ*, 2009. 339: p. b2939.

218. Platt, L., et al. Effects of sex work on the prevalence of syphilis among injection drug users in 3 Russian cities. *American Journal of Public Health*, 2007. 97(3): p. 478–485.

219. Walmsley, R. *World Prison Population List (7th edition)*. 2009, International Centre for Prison Studies.

220. Pal, D., D. K. Raut, and A. Das. A study of HIV/STD infections amongst commercial sex workers in Kolkata (India). Part-I: some socio-demographic features of commercial sex workers. *Journal of Communicable Diseases*, 2003. 35(2): p. 90–5.

221. Basu, I., et al. HIV prevention among sex workers in India. *Journal of Acquired Immune Deficiency Syndromes*, 2004. 36(3): p. 845–52.

222. Williams, J. R., et al. What is the achievable effectiveness of the India AIDS Initiative intervention among female sex workers under target coverage? Model projections from southern India. *Sexually Transmitted Infections,* 2006. 82(5): p. 372–380.
223. Pickles, M., et al. Interim modelling analysis to validate reported increases in condom use and assess HIV infections averted among female sex workers and clients in southern India following a targeted HIV prevention programme. *Sexually Transmitted Infections,* 2010. 86(Suppl. 1): p. i33–43.
224. Chandrashekar, S., et al. The effects of scale on the costs of targeted HIV prevention interventions among female and male sex workers, men who have sex with men and transgenders in India. *Sexually Transmitted Infections,* 2010. 86(Suppl. 1): p. i89–94.
225. Swendeman, D., et al. Empowering sex workers in India to reduce vulnerability to HIV and sexually transmitted diseases. *Social Science & Medicine*, 2009. 69(8): p. 1157–1166.
226. Blankenship, K. M., et al. Power, community mobilization, and condom use practices among female sex workers in Andhra Pradesh, India. *AIDS*, 2008. 22(Suppl. 5): p. S109–S116.
227. Celentano, D. D., et al. HIV-1 infection among lower class commercial sex workers in Chiang Mai, Thailand. *AIDS*, 1994. 8(4): p. 533–537.
228. Kerrigan, D., et al. Environmental-structural factors significantly associated with consistent condom use among female sex workers in the Dominican Republic. *AIDS*, 2003. 17(3): p. 415–423.
229. Sherman, S. G., et al. The evaluation of the JEWEL project: an innovative economic enhancement and HIV prevention intervention study targeting drug using women involved in prostitution. *AIDS Care*, 2006. 18(1): p. 1–11.
230. Aidala, A., et al. Housing status and HIV risk behaviors: implications for prevention and policy. *AIDS and Behavior* 2005. 9(3): p. 251–265.
231. Gupta, G. R., et al. Structural approaches to HIV prevention. *The Lancet*, 2008. 372(9640): p. 764–775.
232. Galea, S., C. Hall, and G. A. Kaplan. Social epidemiology and complex system dynamic modelling as applied to health behavior and drug use research. *International Journal of Drug Policy,* 2009. 20(3): p. 209–216.
233. UNAIDS. *World AIDS day report*. 2011, Joint United Nations Programme on HIV/AIDS, Geneva.
234. UNAIDS. *UNAIDS guidance note on HIV and sex work*. 2009, Geneva: Joint United Nations Programme on HIV/AIDS.
235. Chapter 4, section “HIV Prevention Responses among Men Who Have Sex with Men.”
236. Johnson, W. D., et al. Behavioral interventions to reduce risk for sexual transmission of HIV among men who have sex with men. *Cochrane Database of Systematic Reviews,* 2008(3): p. CD001230.
237. Rees, R., et al. HIV health promotion and men who have sex with men (MSM): A systematic review of research relevant to the development and implementation of effective and appropriate interventions. 2004, EPPI-Centre, Social Science Research Unit, Institute of Education, University of London, London.
238. Csepe, P., et al. HIV risk behavior among gay and bisexual men in Budapest, Hungary. *International Journal of STD & AIDS,* 2002. 13(3): p. 192–200.

239. Kasianczuk, M. G., et al. Risk factors associated with condom use among men who have sex with men in Ukraine. *Journal of LGBT Health Research*, 2009. 5(1–2): p. 51–62.

240. Štulhofer, A., et al. HIV-related sexual risk taking among HIV-negative men who have sex with men in Zagreb, Croatia. *AIDS and Behavior,* 2008. 12(3): p. 505–512.

241. Marcus, U., et al. HIV incidence increasing in MSM in Germany: factors influencing infection dynamics. *Eurosurveillance,* 2006. 11: p. 157–160.

242. Stolte, I. G., et al. Low HIV-testing rates among younger high-risk homosexual men in Amsterdam. *Sexually Transmitted Infections,* 2007. 83: p. 387–391.

243. Grulich, A. E., and J. M. Kaldor. Trends in HIV incidence in homosexual men in developed countries. *Sex Health,* 2008. 5(2): p. 113–118.

244. Williamson, L. M., et al. HIV testing trends among gay men in Scotland, United Kingdom (1996–2005): implications for HIV testing policies and prevention. *Sexually Transmitted Infections,* 2009. 85(7): p. 550–554.

245. Cowan, et al. HIV and risk behavior among men who have sex with men in Denmark—The 2006 Sex Life Survey. Vol. 13. 2008, Saint-Maurice, France, Centre européen pour la surveillance épidémiologique du sida. 6.

246. Moreau-Gruet, F., F. Dubois-Arber, and A. Jeannin. Long-term HIV/AIDS-related prevention behaviors among men having sex with men: Switzerland 1992–2000. *AIDS Care,* 2006. 18: p. 35–43.

247. Costenbader, E., et al. Secrecy and risk among MSM in Tbilisi, Georgia. *AIDS Care,* 2009. 21: p. 591–597.

248. Ismailova, A. HIV-Infection situation analysis among MSM in Central Asia. 2010. Almaty.

249. Schmidt, A. J., et al. The European men who have sex with men internet survey (EMIS) UNGASS indicators. 2010.

250. Montaner, J. S. G., et al. Association of highly active antiretroviral therapy coverage, population viral load, and yearly new HIV diagnoses in British Columbia, Canada: a population-based study. *The Lancet,* 2010. 376(9740): p. 532–539.

251. Granich, R. M., et al. Universal voluntary HIV testing with immediate antiretroviral therapy as a strategy for elimination of HIV transmission: a mathematical model. *The Lancet*, 2009. 373(9657): p. 48–57.

252. Blower, S. M., H. B. Gershengorn, and R. M. Grant. A tale of two futures: HIV and antiretroviral therapy in San Francisco. *Science*, 2000. 287(5453): p. 650–654.

253. Cohen, M. S. HIV treatment as prevention: to be or not to be? *Journal of Acquired Immune Deficiency Syndromes,* 2010. 55(2): p. 137–138. 10.1097 /QAI.0b013e3181f0cbf3.

254. Vanable, P. A., et al. Impact of combination therapies on HIV risk perceptions and sexual risk among HIV-positive and HIV-negative gay and bisexual men. *Health Psychology,* 2000. 19(2): p. 134–145.

255. Smith, R. J., et al. Evolutionary dynamics of complex networks of HIV drug-resistant strains: the case of San Francisco. *Science,* 2010. 327(5966): p. 697–701.

256. Folch, C., et al. Factors associated with unprotected sexual intercourse with steady male, casual male, and female partners among men who have sex with men in Barcelona, Spain. Vol. 18. 2006, New York, NY, ETATS-UNIS, Guilford. 16.

257. Elford, J., et al. Combination therapies for HIV and sexual risk behavior among gay men. *Journal of Acquired Immune Deficiency Syndromes*, 2000. 23(3): p. 266–71.

258. Elford, J., et al. HIV positive and negative homosexual men have adopted different strategies for reducing the risk of HIV transmission. *Sexually Transmitted Infections*, 2001. 77(3): p. 224–225.

259. Kelly, J. A., and S. C. Kalichman. Reinforcement value of unsafe sex as a predictor of condom use and continued HIV/AIDS risk behavior among gay and bisexual men. *Health Psychology*, 1998. 17(4): p. 328–335.

260. Ostrow, D. E., et al. Attitudes towards highly active antiretroviral therapy are associated with sexual risk taking among HIV-infected and uninfected homosexual men. *AIDS*, 2002. 16(5): p. 775–780.

261. Stolte, I. G., et al. Association between "safer sex fatigue" and rectal gonorrhea is mediated by unsafe sex with casual partners among HIV-positive homosexual men. *Sexually Transmitted Diseases*, 2006. 33(4): p. 201–208. 10.1097/01.olq.0000194596.78637.8e.

262. Elford, J., G. Bolding, and L. Sherr. High-risk sexual behavior increases among London gay men between 1998 and 2001: what is the role of HIV optimism? *AIDS*, 2002. 16(11): p. 1537–1544.

263. Grant, R. M., et al. Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. *New England Journal of Medicine*, 2010. 363(27): p. 2587–2599.

264. Okwundu, C. I. O. C. Antiretroviral pre-exposure prophylaxis (PrEP) for preventing HIV in high-risk individuals. *Cochrane Database Syst. Rev*, 2009. 1.

265. van Kesteren, N. M. C., H. J. Hospers, and G. Kok. Sexual risk behavior among HIV-positive men who have sex with men: a literature review. *Patient Education and Counseling*, 2007. 65(1): p. 5–20.

266. Balthasar, H., et al. Intentional risk reduction practices of men in Switzerland who have anal intercourse with casual male partners. *Journal of Acquired Immune Deficiency Syndromes*, 2010. 54(5): p. 542–547. 10.1097/QAI.0b013e3181e19a6b.

267. Jin, F., et al. UAI, risk reduction behaviors, and subsequent HIV infection in a cohort of homosexual men. *AIDS*, 2009. 23(2): p. 243–252. 10.1097/QAD.0b013e32831fb51a.

268. Kippax, S., et al. Sexual negotiation in the AIDS era: negotiated safety revisited. *AIDS*, 1997. 11(2): p. 191–197.

269. Bourne, A. D., et al. Relative safety II: risk and UAI among gay men with diagnosed HIV. 2009, London: Sigma Research.

270. Parsons, J. T., et al. Sexual harm reduction practices of HIV-seropositive gay and bisexual men: serosorting, strategic positioning, and withdrawal before ejaculation. *AIDS*, 2005. 19: p. S13–S25.

271. Brenner, B. G., et al. Quebec Primary HIV Infection Study Group. High rates of forward transmission events after acute/early HIV-1 infection. *Journal of Infectious Diseases*, 2007. 195(7): p. 951–959.

272. Fisher, M., et al. Determinants of HIV-1 transmission in men who have sex with men: a combined clinical, epidemiological and phylogenetic approach. *AIDS*, 2010. 24(11): p. 1739–1747. 10.1097/QAD.0b013e32833ac9e6.

273. Truong, H.-H. M., et al. Increases in sexually transmitted infections and sexual risk behavior without a concurrent increase in HIV incidence among men who have sex

with men in San Francisco: a suggestion of HIV serosorting? *Sexually Transmitted Infections*, 2006. 82(6): p. 461–466.

274. Kizub, D., et al. Advocating for HIV and STI prevention services and strengthening the advocacy capacity of groups representing men who have sex with men in the Russian Federation: study of the needs of men who have sex with men with respect to HIV and STI prevention and medical care in Russia. 2009, AIDS Infoshare, Moscow.
275. Wright, M. T. Homosexuality and HIV/AIDS prevention: the challenge of transferring lessons learned from Western Europe to Central and Eastern European Countries. *Health Promotion International*, 2005. 20(1): p. 91–98.
276. Peryshkina, A., et al. Men who have sex with men (MSM), physicians, and non-government organizations (NGOs): finding agreement on the HIV risk environment and service provision for MSM in Russia. International AIDS Conference 2010. 2010. Vienna, Austria.
277. UNAIDS. An introduction to indicators: UNAIDS monitoring and evaluation fundamentals. 2010.
278. European Centre for Disease Prevention and Control/WHO Regional Office for Europe. *HIV/AIDS surveillance in Europe 2009*. 2010, Stockholm: ECDC.
279. European Centre for Disease Prevention and Control. *Implementing the Dublin Declaration on Partnership to Fight HIV/AIDS in Europe and Central Asia: 2010 progress report*. 2010, Stockholm: ECDC.
280. Merson, M. H., et al. The history and challenge of HIV prevention. *The Lancet*, 2008. 372(9637): p. 475–88.
281. De Schutter, O. Homophobia and discrimination on grounds of sexual orientation in the EU member states: Part 1–legal analysis. 2008, European Union Agency for Fundamental Rights.
282. Leobon, A., et al. A relative profile of HIV-negative users of French websites for men seeking men and predictors of their regular risk taking: a comparison with HIV-positive users. *AIDS Care*, 2011. 23(1): p. 25–34.
283. Folch, C. M. R., K. Zaragoza, and J. Casabona. Sexual risk behavior and its determinants among men who have sex with men in Catalonia, Spain. 2009, Centre européan pour la surveillance épidémiologique du sida. 7, Saint-Maurice, France.
284. Save the Children, T.-C.f.I.a.C.o.R.H., Infectious Diseases, AIDS and Clinical Immunology Research Center. Characteristics, high-risk behaviors and knowledge of STI/HIV/AIDS, and prevalence of HIV, syphilis and hepatitis among MSM in Tbilisi, Georgia: 2007. 2008, PATH, USAID.
285. Baral, S., et al. Male sex workers in Moscow, Russia: a pilot study of demographics, substance use patterns, and prevalence of HIV-1 and sexually transmitted infections. *AIDS Care*, 2010. 22(1): p. 112–118.
286. Beyrer, C., et al. *The global HIV epidemics among men who have sex with men*. 2011, Washington, DC: World Bank.
287. Crago, A. L. Arrest the violence. Human rights abuses against sex workers in Central and Eastern Europe and Central Asia. 2009, Sex Workers' Rights Advocacy Network in Central and Eastern Europe and Central Asia.
288. Crago, A. L., et al. Central & Eastern Europe and Central Asia: police raids and violence put sex workers at risk of HIV. *HIV/AIDS Policy & Law Review/Canadian HIV/AIDS Legal Network*, 2008. 13(2–3): p. 71–72.

289. Rhodes, T., et al. Police violence and sexual risk among female and transvestite sex workers in Serbia: qualitative study. *BMJ,* 2008. 337(7669).
290. Young, C. Anti-gay Russia. Why is a former Communist country so homophobic? *Reason,* 2007; Available from: http://reason.com/archives/2007/06/08/anti-gay-russia
291. Human Rights Watch. Russia: Block St. Petersburg homophobic law. 2012.
292. Russian LGBT Network. Discrimination on grounds of sexual orientation and gender identity in health care, education, employment and social security in the Russian Federation in UN Committee on Economic, Social and Cultural Rights. 2011. Geneva.
293. Rainbow Project. Through our eyes—experiences of lesbian, gay and bisexual people in the workplace. 2011.
294. SICAD. General-directorate for intervention on addictive behaviors and dependencies, 2012. Relatório Anual 2012, A situação do País em material de Drogas e Toxicodependências.
295. Kimber, J., N. Palmateer, S. J. Hutchinson, M. Hickman, D. J. Goldberg, and T. Rhodes. Harm reduction among injecting drug users: Evidence of effectiveness. In: Harm reduction: Evidence, impacts and challenges. European Monitoring Centre for Drugs and Drug Addiction, Lisbon, April 2010. p.115–163.
296. Serviço de Intervenção nos Comportamentos Aditivos e nas Dependências: Divisão de Estatística e Investigação e Divisão de Informação e Comunicação. Editor: Serviço de Intervenção nos Comportamentos Aditivos e nas Dependências Morada: Avenida da República n.º 61-do 1.º ao 3.º e do 7.º ao 9.º 1050–189. Lisboa Edição: 2013 Impressão: Editorial do Ministério da Educação e Ciência.

CHAPTER 5

Conclusion

The HIV Epidemics of Europe in Key Populations at High Risk

Despite decreases in the rate of the spread of human immunodeficiency virus (HIV) in the last decade, the number of HIV cases in Europe continue to increase, and by 2011, reached over 1.2 million individuals, with over half a million diagnoses reported in the past five years. Between 2006 and 2010, there have been 127 new diagnoses each year per million people in Europe. Our review of national case reports indicates that the continuing increase in new HIV cases in Europe is fueled by epidemics in the East. Whereas an average of 74 new diagnoses per million were reported in the West and 11 in Central Europe between 2006 and 2010, 273 per million people were diagnosed in the East. In the past five years, new diagnoses have been relatively stable in the West and Central Europe, but they have increased by around 30% in the East, with the highest rates of new diagnoses in Estonia, the Russian Federation, and Ukraine. The proportion of cases among women is declining in the West and Central Europe, but remains consistent in the East at 41%.

HIV among People Who Inject Drugs

Between 2006 and 2010, 25% of case reports in Europe were associated with injecting drug use, with higher proportions in the East (33%) than in the West (5%) and Central Europe (7%). Whereas there was an annual average of 89 reported HIV diagnoses associated with injecting drug use per million people in the East in this five year period, there were 3.6 per million in the West and 0.8 per million in Central Europe. The countries with the highest levels of reported diagnosed cases among people who inject drugs (PWID) in Europe were Ukraine (153 per million people), Russia (98 per million people), and Kazakhstan (78 per million people).

Findings from HIV prevalence studies show that prevalence among PWID is highest in Estonia (55.3%), Spain (34.5%), Russia (28.9%), Moldova (28.6%), and Ukraine (22.9%). Our review of multivariate risk factors linked to HIV among PWID shows that a history of injecting with previously used injecting equipment, injecting with greater frequency, and a longer history of injecting career were linked to HIV. When aggregated across multivariate studies, being of female gender emerges as a risk factor.

HIV among SWs

With few exceptions, European countries do not collate risk factor information concerning sex work as part of case reporting. Our review of HIV prevalence studies shows that HIV remains low among female sex workers (FSWs) who do not inject drugs, at less than 1% in the West [1–12]. HIV prevalence among FSWs in the East is generally higher than in the West and Central Europe, from around 2% to 8%).

Our review shows a clear relationship between higher HIV prevalence and higher prevalence of injecting drug use among sex workers (SWs). In our review of multivariate studies, a history of injecting drug use emerges as a prime risk factor for HIV among SWs in many countries [13–15], though not universally [16]. Other factors linked to higher odds of HIV or sexually transmitted infections (STIs) among SWs included: migration from Africa [15], though other studies show no associations with migration [2, 4, 17], lack of service contact through outreach [17]; contact with HIV testing and STI services [2, 12, 13]; street-based sex work [12, 13, 16]; unprotected sex with nonpaying partners [17]; and unprotected sex with clients [18]. In the West, HIV prevalence is higher among male and transgender SWs than FSWs, even when injecting is lower, reflecting the higher prevalence of HIV among men who have sex with men (MSM), the main client group of male sex workers (MSWs).

HIV among Men Who Have Sex with Men

Case reporting data show that MSM was reported for 10% of all HIV diagnoses in Europe, and it was higher in the West (36%), than in Central Europe (22%) or the East (0.5%). Between 2006 and 2010, the annual average diagnoses linked to MSM per million people was 27 in the West compared with 2.5 in Central Europe and 1.4 in the East, and it was highest in the United Kingdom (43.4), the Netherlands (43), and Spain (37.3). But Central Europe and the East have witnessed marked increases in the number of reported diagnoses associated with MSM in the past five years.

Our review also shows that estimates of HIV prevalence are highest in the West, but vary from as low as 1.6% in Switzerland to nearly 20% in Spain. We also noted a relative lack of targeted HIV prevalence and risk behavior in a survey among MSM throughout the region. Our review of multivariate studies investigating HIV risk factors among MSM linked HIV to inconsistent condom use, unprotected anal intercourse (UAI), and a history of STIs. Findings from our systematic review also suggest that the epidemics among MSM in the West may be perpetuated by a core group of MSM and HIV-positive MSM engaging in high-risk behaviors with a high number of sex partners [19, 20].

Overview

We find, then, that the HIV epidemics of Europe are greatest in their burden and momentum in the East, where transmission remains primarily linked to injecting drug use. While the epidemics in the West remain primarily linked to MSM, we see recent increases in such case reports in the East and Central Europe. It is important to note that such case report data are only as robust as the HIV surveillance systems producing them. Underreporting of risk status, especially among MSM, is likely in settings where social stigma is greatest, arguably in the East. Our synthesis of case report and HIV prevalence data suggest that the allocation of HIV prevention resources should concentrate on bolstering and expanding prevention responses targeting PWID and their sexual partners in the East, introducing prevention responses among MSM in the East and Central Europe, and reinvigorating prevention responses among MSM in the West.

Intersecting Epidemics

The HIV epidemics of Europe in key populations at high risk are intersecting epidemics, in which a key site is sexual risk intersecting with risks related to injecting drug use.

The Risk of Generalizing Epidemics through Sexual Transmission

Our review shows that there is potential for the epidemic to generalize beyond key populations of PWID, SW, and MSM, with increasing heterosexual transmission in some countries in the East, notably Estonia, Russia, and Ukraine, for instance, has seen an increased number of HIV case reports associated with heterosexual exposure and a high proportion of them among women with high-risk sex partners. This is further supported by outbreaks of STIs in the general population and high prevalence of syphilis (4%) and HIV (12%) among SWs in some cities, despite lower levels of recent injecting than reported elsewhere (15%) [21]. This study suggested that FSWs who reported having regular male partners who were injectors had increased odds of HIV (odds ratio [OR] = 2.2 95% confidence interval [CI] 1.52–3.24) [21].

There is also emerging evidence in Europe of the potential for sexual transmission of HIV among PWID involved in sex work. In Estonia, HIV was not associated with injecting drug use among SWs and they had correspondingly lower prevalence of Hepatitis C virus (HCV) suggesting less risky injecting behaviors [16]. A similar pattern has been observed in Russia where a study showed reduced odds of HCV among females who inject drugs (including both SWs and non-SWs), but increased odds of syphilis pointing to the potential for sexual transmission [22, 23]. The high prevalence of syphilis reported along with HIV observed in the Central Asian republics, Moldova, Russia, and Ukraine, suggests that conditions may exist for increased sexual transmission of HIV among SWs in the East.

Our review shows that SWs involved in injecting drug use have higher HIV prevalence than SWs who do not inject drugs, and that HIV prevalence among SWs is highest in the East where HIV prevalence is highest among PWID. There is considerable overlap between sex work and drug injecting in the East, with some studies of SWs suggesting that the majority are also PWID [24], and studies of PWID suggesting that between one-quarter and one-half have exchanged sex for money or drugs [25, 26]. Our review finds that SWs who inject drugs are more vulnerable not only to HIV, but also to violence, increased problems with mental health, reduced condom use and unwanted pregnancies [27, 29]. Furthermore, a high proportion of male and transgender SWs report injecting drugs [30–34]. HIV-prevention interventions need to give priority to targeting the intersection of sex work and injecting drug use.

Furthermore, among PWID in Europe the majority of men may have sexual partners who do not inject drugs. In Russia, for instance, one study among PWID suggested that 41% of male PWID had regular female partners who were also PWID, whereas this was the case for 70% of female PWID and 68% of female PWID also involved in sex work [35]. There are contradictory reports as to whether female PWID having a male partner who also injects acts as protective factor by reducing the likelihood of them engaging in risky sexual and injecting behaviors outside of their partnership or whether it increases the risk of sexual transmission because the female will engage in sex work to support both her and her partner's drug use [28, 36–38].

While European studies suggest relatively high levels of noninjecting recreational drug use among MSM, there are few estimates regarding injecting drug use, though some studies in the East suggest that high proportions of MSM may also inject drugs [39, 40]. Our review noted that a substantial proportion of MSM in the region, especially in the East, report also having sex with women.

Taken together, HIV surveillance systems need to increase the accuracy of risk-factor data among heterosexual exposures as well as target surveillance among the sexual partners of PWID. It is fundamental that HIV-prevention responses should integrate sexual health and drug-related health. Among SWs, sexual risk-reduction interventions need to better address sexual transmission risk in nonpaying and regular relationships. While our review shows consistent condom use with clients is generally the norm among SWs, it is much less common with nonpaying partners. Among PWID, sexual health concerns have been eclipsed by an almost exclusive focus on preventing viral transmission linked to the shared use of injecting equipment, and this may be particularly the case in the East, where the current potential for advancing sexual transmission appears greatest [41]. The majority of PWID in surveys across the region report inconsistent condom use with their regular partners, the majority of whom are noninjectors for male PWID.

Migration as an Intersecting Factor in HIV Vulnerability

European HIV case reports indicate the potential significance of migration. Among MSM in the West, 5.8% of diagnoses in 2010 were among men who originated from elsewhere in the West and 2.8% (281) were among men from Central Europe or the East. Among diagnoses in the West associated with injecting drug use, 4.3% originated from elsewhere in the West and 20% (181) in Central Europe or the East. Among cases associated with heterosexual exposure in the West, over one-third were among people who originated from a country with a generalized HIV epidemic. Evidence internationally indicates that local and international migration can have important effects on the dynamics of HIV transmission, both among vulnerable groups and in relation to heterosexual exposure [15, 42, 43].

There is a pattern among MSM to migrate into the cities, and from cities in the East toward the metropolises of Western Europe. An effect of homophobia in the region is generating mobility among MSM who tend to move or travel to urban centers, considered more gay-friendly and less stigmatizing [30, 44, 45]. The surveys we reviewed suggested that a significant minority of MSM are migrants, with up to 15% in many sites [30, 46–48]. Studies of MSM in some cities show higher prevalence of HIV among migrant MSM [49].

In the last 20 years, there are increasing numbers of migrant women working in the European sex industries. In the West, the majority of SWs are migrant women, most of whom are East European and African. Being a migrant emerges in some studies of SWs as a risk factor for HIV, but in others, there is no such association, most likely reflecting the HIV prevalence within country of origin [2, 15, 17, 50]. A systematic review examining the effect of migration on the risk of HIV among migrant SWs found that overall HIV prevalence was highest among migrants from Africa. Where there was no injecting drug use, HIV prevalence was lower among international migrants from Africa working in high-income countries compared to internal African migrants working within other African countries. The risk of HIV among migrant SWs is likely mediated by local contexts such as the availability of services to migrants, immigration policies, and local organization of the sex industry [51].

Taken together, there is a need to better monitor migrant status in HIV surveillance as well as to increase the accessibility of HIV-prevention responses to migrant PWID, SWs, and MSM, including through the translation of existing materials and messaging via the Internet and travel companies, including those servicing the gay tourist market [12, 17, 52].

Environmental Factors Shaping HIV Risk

While the epidemiological studies we reviewed rarely explicitly embraced exploration of social determinants, our synthesis of data on HIV risk factors nonetheless points to the potential role of environmental-level factors in HIV transmission (chapter 3). Our discussion of HIV-prevention responses (chapter 4) also highlighted that the development and impact of interventions can be shaped by social and structural contexts.

Our review points to regional differences, suggesting that levels of risk behavior among key populations tend to be highest in the East. While the frequency of reported needle or syringe sharing is highly variable across Europe, there are instances of especially high levels of sharing in the East and Central Asia. Among SWs, the systematic review showed that condom use with clients was consistently higher in the West than in the East or Central Europe. Among MSM, the highest rates of condom use during anal sex emanate from studies in the West, with rates around 15% higher than those reported in the East. Reports of UAI are also higher in the East than in the West or Central Europe. Most PWID across the region report inconsistent condom use with their regular partners, with a substantial minority reporting inconsistent condom use with their casual partners.

Among PWID, our review of multivariate studies pointed to unemployment, gender, and aspects of the legal environment as potentially important. Regarding gender, women who inject drugs tend to be younger than their male counterparts, engage in higher rates of needle and syringe sharing, and are more likely to share their sex partners' injecting equipment and engage in riskier sexual practices [36, 53–59]. Regarding the legal environment, ever having been arrested and ever having spent time in prison emerged as risk factors for HIV. Rates of arrest were high among PWID surveyed, especially in the East. Qualitative studies in the region link police arrest, as well as the fear or experience of police violence with reduced capacity for risk reduction [60–62]. There is a need to systematically document the prevalence and contexts of policing practices, including extrajudicial practices, which may violate the human rights of PWID as well as potentially impact their HIV risk reduction capacity. These data also suggest that there is an urgent need to maximize the coverage and intensity of HIV-prevention interventions in prison settings. These findings are corroborated by studies internationally [60, 61, 63–67].

Among SWs, violence emerges as an important contextual determinant of HIV risk, linking to HIV both directly and indirectly. Reported levels of sexual and physical violence among SWs were high and appeared most common among minority groups (transvestites, Roma) and in the East [12, 52, 68–70]. Evidence also points to aggressive policing practices, especially in the East, exacerbating the potential for HIV risk by women having to work longer hours to make up time after arrest, having unprotected sex for more money to make up lost income, and not carrying condoms as they may be used as evidence of sex work [63, 71, 72]. Explicitly linked to policing is legislation regulating sex work, which is a key structural determinant of violence and HIV risk. The practice of criminalizing activities related to sex work can reduce opportunities for communication between SWs and often result in the concentration of sex work into tolerance zones [73, 74]. While the evidence shows a decriminalized approach results in a safer working environment and improved health, these benefits can be limited by other policies such as those related to migration and may exclude some of the more vulnerable populations [75, 76]. The evidence suggests that where sex work is unregulated and accompanied by police corruption, as it is in the East, it results in the most risky environments [72, 77]. Legislation may also influence community attitudes toward SWs with criminalization of sex work, reinforcing negative attitudes and violence toward SWs; it also hinders the implementation of targeted services as reflected in the fewer number of targeted services for SWs in Russia [78, 79]. Repressive policies will reduce SWs access to HIV services, particularly, as is often reported in the East, when HIV testing is enforced following detention by police.

In our ecological analysis, the strongest and most consistent association we found was a linear relationship between an increased number of people imprisoned per 100,000 population and increased HIV prevalence among PWID and FSWs ("HIV-Prevention Responses among People Who Inject Drugs" and "HIV Prevention Responses among SWs" sections in chapter 4). Prison, an effect of criminalization of drug use and sex work, can constitute a risk environment for the acquisition of HIV.

Among MSM, the reviewed evidence suggests that social stigma in relation to male homosexuality emerges as a key factor influencing men's capacity for risk reduction efforts. Feeling stigmatized also constrains the potential impacts of HIV surveillance and prevention efforts, disabling HIV-prevention help-seeking efforts as well as encouraging underreporting of same-sex activity as risk factors in HIV surveillance efforts. Institutionalized social stigma experienced by MSM can be viewed as a form of "structural violence" mediating HIV risk indirectly as well as directly.

Toward a Social Epidemiology of HIV Vulnerability

Our review identified a number of cross-cutting environmental factors as key domains of future social epidemiological research investigating HIV risk and vulnerability in the region including (a) criminalization of key populations, drug use, and sexual practices; (b) the experience of social stigma and discrimination; (c) migration; (d) gender inequalities; and (e) material inequalities. This is not an exhaustive list and does not discount the potential importance of multiple other structural factors. Future epidemiological and intervention studies of HIV among key populations at high risk need to better systematically delineate how micro- and macroenvironmental factors combine to increase or reduce HIV risk.

Social determinants are often nonlinear and indirect in their effects, and this presents considerable challenges to delineating causative relationships. Researching the delineation of causal pathways to HIV transmission demands a shift from binary epidemiologic models of simple cause and effect to multilevel models, which emphasize HIV as an outcome of multiple contributing factors interacting together. HIV is best envisioned as an outcome of a complex system of interactions occurring within and between individuals and their environments, with the challenge being to better capture the dynamism of these reciprocal relations.

Our review identified important structural indicators relating to criminalization, low income, and gender inequality. But how these factors may directly or indirectly mediate pathways of risk towards HIV transmission is often unclear as well as dependent on the situation. Poverty, for example, does not have a straightforward relationship to HIV [80–82]. Our ecological analysis, for example, illustrated how those settings with higher gross national income (GNI) per capita tended to have higher-HIV prevalence among MSM. Similarly, gender inequality is reproduced nonlinearly through situation specific interactions occurring simultaneously at the structural level (for example, via laws or policy), at the level of the community or household (for example, through social norms, values, and networks), and through individual and interpersonal actions (for example, through risk negotiation and behavior). A risk factor for HIV such as physical violence, for instance, may act as a proximal indicator of structurally determined social marginalization indirectly mediated through a combination of gender and material inequalities [83, 84]. There is a need for an iterative and mixed-methods research approach, in which qualitative evidence helps to map risk environment pathways, which are further elaborated through multilevel epidemiology, leading to empirically-informed models of social and structural HIV prevention.

Strengthening HIV Surveillance

Our review noted the need for a systematic assessment of the robustness of methods used to monitor HIV prevalence and risk in key populations over time. We also noted the need to expand or introduce repeated studies to measures these, as well as indicators of HIV incidence, in some countries. HIV surveillance studies were found to be better established among PWID than among SWs and MSM, with very little data available among migrants and male SWs. Establishing mechanisms for repeated measures of HIV prevalence and risk is especially important, as is the development of a centralized portal for the synthesis of such data to enable cross-region comparisons.

Moreover, HIV surveillance systems provide unrealized opportunities to collate data on indicators of HIV-prevention intervention coverage, as outlined in third generation surveillance guidelines [85]. Data on the coverage of combination interventions are especially important. Where feasible, surveillance systems should also be geared toward monitoring indicators of how the social and structural context mediate HIV, for instance, by estimating the prevalence of violence among SWs and MSM and of police contact among PWID.

A key challenge in collecting data to inform interventions is the political context in which sex work, drug use, and MSM takes place. In contexts where, for example, sex work is heavily regulated or MSM is stigmatized, conducting HIV related surveillance studies among people with few rights or representation may create ethical or safety challenges. Proposals for HIV related surveillance studies need to be conducted with full consultation with affected populations and with appropriate rights protections in place [86]. There are some useful lessons in good surveillance practice in Europe, including, for instance, the European Men Who Have Sex with Men Internet Survey, the sentinel surveillance of HIV and risk among PWID in Italy, Spain, and the United Kingdom; and sentinel surveillance among SWs in Central Asia [50, 87–90].

Our review of surveillance data shows higher rates of HIV testing in the East, especially in Russia. This may result from mandatory testing of migrants and the practice of "opt-out" rather than "opt in" testing policies at various clinic and health service settings [91, 92]. Evidence reviewed tends to show the protective effect of HIV testing in reducing HIV risk among PWID, and SWs, and UAI among MSM [35]. The uptake of HIV testing needs to be increased while simultaneously increasing access to treatment and reducing the stigma associated with HIV positivity and the removal of structural barriers to employment and discrimination for those diagnosed.

Strengthening HIV Prevention

People Who Inject Drugs

Among PWID, we noted the well-established scientific evidence in support of needle and syringe exchange programs (NSPs), opioid substitution therapy (OST), and antiretroviral therapy (ART) as methods of reducing HIV risk and preventing HIV transmission [93]. The combination of NSP, OST, and ART are to be reinforced as cornerstone interventions of HIV-prevention policy in Europe, and it is essential that they are sufficiently scaled-up. Estimates of NSP, OST, and ART coverage among PWID vary throughout the region, but coverage is generally lowest in the East, where HIV prevalence is higher.

Evidence, including in Europe [94], indicates that core HIV-prevention interventions targeting PWID have enhanced impact when they are delivered in combination [94, 95]. Stand-alone interventions may have limited impact on reducing HIV incidence even with good coverage [94, 96]. The enhanced HIV-prevention effects of combining OST with NSP and ART have particular resonance for countries—for instance, Russia and Ukraine—experiencing large HIV outbreaks among PWID. The effectiveness of HIV-prevention policies depends on the combined effects of multiple integrated interventions and bringing these to scale [96].

Findings from our modeling analysis show that high but achievable coverage levels of NSP can result in large decreases (>30%) in HIV incidence and prevalence in settings with high HIV prevalence among PWID. Required coverage levels are much lower when interventions are combined or in lower prevalence settings. The analysis also highlights the importance of combination interventions for reducing HIV incidence and prevalence to low levels in high-prevalence settings, with no single intervention (or only at high coverage in the lower prevalence setting of Dushanbe) being able to reduce HIV incidence to less than 1% or prevalence to less than 10% in 20 years. Modeling shows that when core interventions are delivered in combination, coverage targets become more feasible, although they still remain considerable, with about 60% coverage of all three core interventions being required in Tallinn and St. Petersburg over 20 years and about 30% coverage in Dushanbe, to reduce HIV prevalence to less than 10%.

Intervention availability and coverage is shaped by the policy and social environment, and as we have noted, how law enforcement, policing practices, and national commitments to HIV prevention can limit HIV-prevention coverage potential. We have also noted, for instance, how in Russia—a setting of a major

HIV epidemic—the legal and social environment has constrained, even prohibited, the development of proven-to-be-effective HIV-prevention intervention, such as OST. Structural interventions bringing about policy, legal, or social change are required to enable sufficient HIV-prevention scale-up, and this is arguably most urgent in the East. The package of combination HIV-prevention interventions promoted by the World Health Organization (WHO) and other international agencies as core to national HIV prevention programming (which includes NSPs, OST, and ART) underemphasizes the potential role of social and structural intervention approaches. International evidence points to the potential HIV prevention impact of interventions fostering social and structural changes [97, 98]. For example, social network interventions encouraging PWID to promote risk reduction among their injection and drug using networks are associated with reduction in the risk behavior of participating PWID as well as their network members [99–103]. The secondary distribution of sterile injecting equipment through peer networks of PWID is a practical yet underformalized example of how to diffuse HIV prevention through geometric progression in social networks [104–106]. The introduction of supervised injecting centers in six countries in Europe, as well as internationally, has been prompted by the need to create safer injecting environments, especially given elevated HIV risks linked to injecting in public, which in turn are linked to homelessness [96, 107–109]. Such interventions have attracted PWID at greater HIV risk, reduced syringe sharing, and facilitated access to withdrawal management, drug treatment, and other HIV-prevention interventions [107, 108, 110–121].

Moreover, combination HIV-prevention approaches should consider including interventions fostering policy reform as well as legal change. The WHO notes that "the alignment of drug control measures with public health goals [is] a priority" [122]. While lacking in rigorous evaluation, interventions targeting changes in the criminal justice environment include (a) the development of police HIV-prevention training and partnerships; (b) the development of alternatives to prison programs, including coerced or mandated entry to drug treatment via community penalties and court orders; (c) the provision of sterile injecting equipment in prisons, which meta-analyses link to positive rather than adverse risk reduction effects; (d) the provision of OST in prisons, which is linked to improved drug treatment outcomes including post-release; and (e) the enactment of interventions enabling legal aid and legal rights literacy to protect against rights violations, though the HIV-prevention impact of these interventions remains unknown.

Interventions that bring about change in the legal environment seek to minimize the iatrogenic health effects of the criminalization of drug users and the prohibition of HIV-prevention interventions. Ecological evidence indicates elevated odds of HIV and HIV risk among injecting drug users (IDUs) in settings without legal access to HIV-prevention interventions such as OST and NSP, compared to settings with access [123–125]. The relaxation of legal restrictions to the provision of sterile needles and syringes increases their availability and accessibility, reducing levels of risk behavior, as well as potentially reducing levels of police harassment among IDUs [63, 84, 123, 126–130]. If HIV risks are in part associated with the criminalization of drug use per se, as increasingly evidenced internationally [131–134], then decriminalizing drug use is also a strategy to reduce such harm [111, 133].

Sex Workers

International evidence has shown the importance of targeted interventions for SWs as well data from our ecological analysis linking a reduction in HIV with increasing numbers of services that address not only HIV/STI but broader social and health problems ("HIV Prevention Responses among SWs" section in chapter 4). HIV-prevention frameworks for SWs need to recognize that an individual may not identify themselves as a sex worker sufficiently to engage consciously in behavior change to minimize sex-work–related harms. Many interventions targeting SWs exclude those who do not self identity as such [44, 135]. The focus of services in the East, for instance, has been among SWs who inject drugs rather than targeting the health and welfare needs of SWs more broadly [136]. Evidence internationally indicates that interventions that specifically target SWs show greater promise in reducing sexual risk, including the risk of sexual violence, when compared against drug-related harm reduction interventions targeting SWs who use drugs [137]. The vertical structure of health systems, especially in the East, compounds the problem of targeting HIV prevention to all those potentially in need, as there is often little linkage between drug treatment and sexual health services. It is fundamental that HIV-prevention interventions specifically target SWs, including those not involved in drug use and who may not define themselves as connected to the sex industry. It is also important that drug and sexual health services are sufficiently integrated to maximize their coverage potential.

Indicators of coverage by SW services across the region was limited. Data on HIV testing suggested that over one-third of SWs across the region had been tested for HIV, but this may reflect testing following arrest or detainment or as a result of mandatory testing through regulation (as it is done in Greece) rather than voluntary testing. The European Centre for Disease Control highlighted the limited scope of behavioral surveillance among SWs in European Union (EU) countries usually collected through one-time surveys rather than ongoing or repeated surveillance at a national level [86]. There was also little consistency in the type of indicators collected, making comparisons difficult to draw. The routine collation of reported HIV or STI testing at SW service centers would facilitate an estimate of the effective coverage of services in relation to HIV prevention, taking into account the need for consultation and protection of privacy as discussed above. Routinely monitoring condom use with clients and nonpaying partners would also give an insight into sexual risk behaviors, as the high prevalence of gonorrhea underscores the persistent sexual vulnerability of SWs.

The reviewed literature emphasizes the heterogeneous nature of sex-worker populations in Europe. This again emphasizes the need to tailor intervention approaches accordingly. The rapidly changing sex-worker scene in Europe accentuates the need for flexible and innovative approaches to health service provision, especially in relation to the diversification of indoor sex work and the increased involvement of migrant women in sex work. With the growing number of indoor SWs across the region, there is a need for interventions to reach off-street SWs. Projects in the United Kingdom have attempted to address this by conducting outreach on line: contacting women via websites and circulating frequent emails about services. The increase in migrant women means that one of the main priorities for short-term intervention is provision of translation, especially in Western Europe experiencing migration from the East as well as South America and Sub-Saharan Africa.

There have been increased calls for applying a pragmatic "harm reduction" approach to sex work as more commonly applied in relation to drug use [138, 139]. A harm reduction framework for sex work seeks to envisage how a variety of harms related to sex work might be relevant, directly or indirectly, to HIV prevention. Our review identified violence as a primary concern. Community-level interventions, such as the Ugly Mugs scheme, implemented successfully throughout most of Western Europe should be introduced to projects in the East and Central Europe. Violence experienced by SWs in family, social, and work relationships is contextualized by broader social and structural violence feeding social stigma and discrimination [97, 140, 141]. Indirect pathways that mediate the risk of violence include low self-esteem and the inability to negotiate safer practices for fear of further violence; increasing drug use to manage the stress of violence; or forced relocation of sex work to less familiar or safe areas [84, 142–144].

The significance of violence in the everyday lives of SWs emphasizes the need for envisaging HIV prevention inside a social and structural intervention approach to reducing sex work risks, of which HIV is one. HIV-prevention interventions should be nested inside change strategies that simultaneously address the social welfare of SWs and their social determinants of health, including disparities in employment opportunity, income, and access to welfare services [138, 139, 145]. Key targets for health interventions targeting SWs, in addition to HIV risk reduction, include reducing violence and unwanted pregnancies and improving mental and emotional health [146]. For example, sexual health interventions throughout the region need to focus not only on sexual safety negotiations with clients of SWs but also on promoting contraceptive use among the nonpaying sex partners of SWs to prevent unplanned pregnancies and unprotected sex.

The evidence reviewed indicates that the criminalization of sex work can disable rather than enable capacities for health protection [74, 139, 142, 147]. There is potential HIV-prevention impact linked to the decriminalization of sex work, including indirectly through the potential reduction in violence and protection of SWs' mental health [148–150]. A long-term strategy of public health may include the decriminalization of sex work across the region. In the short- and medium-term, emphasis should be given to community-level interventions, such as the development of managed street-based sex-work zones, which have shown positive effects in reducing incidences of violence and providing a safer place to work. Managed street zones need the consent of local communities and need to clearly assign responsibilities to authorities to manage the zone [151].

Men Who Have Sex with Men

An important finding of the review is that access to mainstream sexual health provision for MSM can be impeded by staff hostility borne out of the dual stigma of homosexuality and HIV, and patient fears concerning breaches of confidentiality [152–154]. Such concerns appear more acute in the East. For instance, social stigma appears to act as a deterrent to timely HIV testing and levels of HIV testing are lower in Central Europe and the East.

Evidence suggests that HIV testing can increase condom use for anal intercourse [155, 156], but for HIV-negative men testing is a more effective HIV-prevention strategy when accompanied by effective counseling on risk reduction [40]. Effective counseling is rare in contexts where specialized services are rarely available, as is the case for example in Russia [153, 157]. Dedicated MSM-only test facilities are needed in countries where most physicians are inclined to be hostile toward MSM. For full impact, it is essential that links are made with other prevention services appropriate to the needs of MSM, particularly in the East where many MSM appear poorly informed of the HIV risks linked to certain practices [158]. Paying for tests and other medical care is a major barrier to uptake and should be discontinued.

While HIV prevention among MSM has traditionally focused on consistent condom use, factors such as availability, cost, and "condom fatigue" have been considered as reasons why men participate in UAI [159–162]. To address these factors, condoms should be made freely available in all gay venues and known meeting places and required as a condition of local authority licensing. Additionally, strategies other than a reliance on 100% condom use are needed such as encouraging slower rates of partner change, fewer partners, and especially the avoidance of multiple concurrent partnerships. Concurrency is a key risk factor in the spread of HIV because people are more inclined to use condoms in casual relationships [20, 163], but the establishment and maintenance of trust in a relationship encourages unprotected intimacy and then sets up barriers to honesty about any infidelity [164, 165]. Other strategies should involve encouraging the practices of sex acts other than anal sex [160].

In the West, social stigma appears to be a less prominent factor shaping access to help and risk reduction; HIV testing is more common, knowledge of the risks posed by UAI is higher, and condoms are widely available [166, 167]. However, many MSM continue to have unprotected sex frequently with casual partners. In a context of the widespread availability of highly active antiretroviral therapy (HAART), there may also be a misplaced reliance on negative HIV results when selecting sex partners [168, 169]. Only HIV-positive people can definitely "know their status." The population groups in which HIV incidence is high are those in which unprotected sex and casual sex are more easily socially accepted, and the persistent focus of prevention strategies on "technical solutions" (condoms, testing, HAART) may do little to shift such social norms, rendering a reliance on HIV testing for prevention dangerously misleading. Interventions need to question how strategies of serosorting are applied in practice, for they may promote a false sense of security. Counseling along with HIV testing is necessary to address any misconceptions regarding the safety of relying on recent HIV-negative test results as a rationale for unprotected sex.

Complacency about infection and treatment availability complicates prevention messages in the West. There is some evidence that good adherence to HAART can reduce viral load to undetectable levels and that HAART therefore acts as HIV prevention [170, 171]. This has led to much debate about "negotiated safety strategy" as an HIV-prevention strategy. In this strategy, sexual partners agree to dispense of condoms within their relationship while at the same time negotiate sexual agreement outside the regular relationship. However, some residual risk resulting from infidelity or lapses in the agreed condom use in sex outside the partnership still exists, resulting in some infections. Moreover, in gay communities where open relationships and casual sex with multiple partners is the norm, promotion of treatment as a prevention method can be unhelpful, leading to increased UAI [163, 172]. And perhaps, it may also be linked to the increase in HIV incidence seen among MSM in Western Europe.

Furthermore, patients with undetectable viral load may have detectable virus in semen and therefore may be infectious [173–175]. Many of the studies providing the evidence of effectiveness of treatment as prevention are based not on observed data but on mathematical models, which are highly sensitive to their parameters and underlying assumptions. The remaining studies are ecological studies that overall give mixed results and are unable to demonstrate causality [170–172, 176]. A retrospective cohort study of treatment as prevention [177] found that 5% of the partners of people living with HIV (PLHIV) on treatment seroconverted, as compared with 3% of controls (difference nonsignificant). A false sense of security, interacting with much higher risks from acute infections (pre-seroconversion), may result in elevation of risks. An assumption that treatment is protective is particularly problematic in the case of MSM, given that the per-act probability of transmission is so much higher for anal sex [178] than for vaginal sex [179], and that partner numbers are typically higher. The promotion of HIV treatment as prevention as a strategy for HIV prevention in Europe therefore needs to be approached with some caution.

One difficulty with the targeting of HIV prevention in parts of the European region is that it tends to be based on "Western" models of experience, and these tend historically to be based on interventions targeting homosexually-identified men. Such approaches may tend to overinclude men who perform mainly or only the receptive role, since those who tend to take the insertive role may be more likely to identify themselves as heterosexual [180]. It is fundamentally important to recognize the heterogeneous nature of populations of MSM and to tailor interventions accordingly in different parts, and local settings, of Europe.

Our review notes a varied environment in relation to the criminalization and social regulation of homosexuality throughout Europe. Legal changes to decriminalize homosexuality in the parts of the region where such laws remain (Turkmenistan, Uzbekistan) need to be made. It is important that discrimination on the grounds of sexual orientation should be afforded the same legal punishment and redress in the East as in the West [181]. Shifts in Western Europe toward recognizing the social inclusion of MSM—for instance, through the legalization of civil partnerships between men—are important social interventions in that they contribute to an enabling context for health and citizenship, including potentially for HIV prevention. Community-level interventions may facilitate some of the social changes required to enable the wider social acceptance of homosexuality, including the day-to-day practices of health, welfare, and regulatory institutions and especially the practices of police and health care professionals. Aside from HIV-prevention capacity, our review notes that HIV surveillance systems are much more likely to correctly attribute transmission of HIV between MSM, and thus better allocate treatments, in settings where homosexuality is less socially stigmatized.

A Shift toward Social-Structural Intervention Approaches

Social and structural interventions seek social or structural change not only at the level of the individual but also at the level of the society or community. We emphasize the need for HIV-prevention programs to embrace social and structural interventions that attempt to bring about a contextual change in the environments that mediate HIV risk, with the objectives of removing barriers to HIV prevention and enabling social conditions that protect against HIV vulnerability. Structural approaches emphasize the potential HIV prevention effects of multisectoral nonhealth interventions including stigma-reduction interventions; decriminalizing drug use, sex work, and MSM; microfinance and access to employment interventions [97, 182–184]; poverty alleviation interventions [185, 186]; community mobilization and civil participation interventions [97, 144, 186]; access to housing and welfare interventions; and access to education interventions [187].

There are a number of intervention approaches that show both theoretical, and some evidence-based promise. These include HIV prevention-focused interventions that attempt to (a) create safer physical environments (for instance, safer injecting facilities, safer brothel policies, managed sex-work zones, reduction in stigma toward MSM); (b) defuse changes in risk-related norms, values, and practices at the level of the peer group and social network (e.g., "indigenous-leader" community mobilization interventions); (c) effect legal change and/or moderate risk related to legislative and policing practices (e.g., through police partnerships, developing legal and human rights literacy, offering legal aid, and advocating for legal or policy reform); and (d) institute non-HIV and nonhealth focused multisectoral initiatives that can theoretically have an indirect HIV prevention effect. However, evidence assessing social and structural HIV prevention among key populations at high risk remains embryonic, and creating this evidence is a key challenge for the future.

References

1. European Centre for Disease Prevention and Control. Implementing the Dublin Declaration on Partnership to Fight HIV/AIDS in Europe and Central Asia. 2010 progress report. 2010, ECDC: Stockholm.
2. Belza, M. J. Prevalence of HIV, HTLV-I and HTLV-II among female sex workers in Spain, 2000–2001. *European Journal of Epidemiology*, 2004. 19(3): p. 279–82.
3. Cwikel, J. G., et al. Sexually transmissible infections among illegal female sex workers in Israel. *Sexual Health*, 2006. 3(4): p. 301–03.
4. Folch, C., et al. Prevalence of human immunodeficiency virus, Chlamydia trachomatis, and Neisseria gonorrhoeae and risk factors for sexually transmitted infections among immigrant female sex workers in Catalonia, Spain. *Sexually Transmitted Diseases*, 2008. 35(2): p. 178–83.
5. Gutierrez, M., et al. Prevalence of HIV-1 non-B subtypes, syphilis, HTLV, and hepatitis B and C viruses among immigrant sex workers in Madrid, Spain. *Journal of Medical Virology*, 2004. 74(4): p. 521–27.
6. Linhart, Y., et al. Sexually transmitted infections among brothel-based sex workers in Tel-Aviv area, Israel: high prevalence of pharyngeal gonorrhea. *International Journal of STD & AIDS*, 2008. 19(10): p. 656–69.
7. Nigro, L., et al. Prevalence of HIV and other sexually transmitted diseases among Colombian and Dominican female sex workers living in Catania, eastern Sicily. *Journal of Immigrant and Minority Health*, 2006. 8(4): p. 319–23.
8. Papadogeorgaki, H., et al. Prevalence of sexually transmitted infections in female sex workers in Athens, Greece—2005. *European Journal of Dermatology*, 2006. 16(6): p. 662–65.
9. Platt, L., et al. Risk of sexually transmitted infections and violence among indoor-working sex workers in London: the effect of migration from Eastern Europe. *Sexually Transmitted Infections*, 2011. 87(5): p. 377–84.
10. Vall-Mayans, M., et al. Sexually transmitted Chlamydia trachomatis, Neisseria gonorrhoeae, and HIV-1 infections in two at-risk populations in Barcelona: female street prostitutes and STI clinic attendees. *International Journal of Infectious Diseases*, 2007. 11(2): p. 115–22.
11. EuroHIV. HIV/AIDS Surveillance in Europe. Mid-year report 2006. HIV/AIDS Surveillance in Europe, EuroHIV, Editor. 2007, Institut de Veille Sanitaire: Saint-Maurice.
12. Nielsen, S., et al. STI rates and risk factors among female sex workers attending STI testing sites in Germany, in International Society for Sexually Transmitted Disease Research. 2011: Quebec.
13. Todd, C. S., et al. Prevalence and correlates of human immunodeficiency virus infection among female sex workers in Tashkent, Uzbekistan. *Sexually Transmitted Diseases*, 2006. 33(8): p. 496–501.
14. Todd, C. S., et al. Prevalence and factors associated with human immunodeficiency virus infection among sex workers in Samarkand, Uzbekistan. *Sexually Transmitted Diseases*, 2009. 36(2): p. 70–72.
15. van Veen, M. G., et al. HIV and Sexual risk behavior among commercial sex workers in the Netherlands. *Archives of Sexual Behavior*, 2010. 39(3): p. 714–23.

16. Uuskula, A., et al. A study on HIV and hepatitis C virus among commercial sex workers in Tallinn. *Sexually Transmitted Infections*, 2008. 84(3): p. 189–91.
17. Platt, L., et al. Risk of sexually transmitted infections and violence among indoor-working female sex workers in London: the effect of migration from Eastern Europe. *Sexually Transmitted Infections*, 2011. 87(5): p. 377–84.
18. Folch, C., et al. Social characteristics, risk behaviors and differences in the prevalence of HIV/sexually transmitted infections between Spanish and in migrant female sex workers in Catalonia, Spain. [Spanish]. *Medicina Clinica*, 2009. 132(10): p. 385–88.
19. Leobon, A., et al. A relative profile of HIV-negative users of French websites for men seeking men and predictors of their regular risk taking: a comparison with HIV-positive users. *AIDS Care*, 2011. 23(1): p. 25–34.
20. Balthasar, H., et al. Intentional risk reduction practices of men in Switzerland who have anal intercourse with casual male partners. *Journal of Acquired Immune Deficiency Syndromes*, 2010. 54(5): p. 542–47 10.1097/QAI.0b013e3181e19a6b.
21. International HIV/AIDS Alliance, Behavioral monitoring and HIV infection prevalence among female sex workers as a component of second generation surveillance. 2009, International HIV/AIDS Alliance: Kiev.
22. Platt, L., et al. Effects of sex work on the prevalence of syphilis among injection drug users in 3 Russian cities. *American Journal of Public Health*, 2007. 97(3): p. 478–85.
23. Rhodes, T., et al. Prevalence of HIV, hepatitis C and syphilis among injecting drug users in Russia: multi-city study. *Addiction*, 2006. 101(2): p. 252–66.
24. Dershem, L., et al. Characteristics, high-risk behaviors and knowledge of STI/HIV/AIDS, and STI/HIV prevalence of facility-based female sex workers in Batumi, Georgia: 2004–2006. Report on two behavioral surveillance surveys with a biomarker component for the SHIP Project. USAID Cooperative Agreement No. 114–A-00–02–00095–00. 2007: [Tbilisi], Georgia, *Save the Children*, 2007 Sep.
25. Stvilia, K., et al. Prevalence of hepatitis C, HIV, and risk behaviors for blood-borne infections: a population-based survey of the adult population of T'bilisi, Republic of Georgia. *Journal of Urban Health*, 2006. 83(2): p. 289–98.
26. Busza, J. R., et al. Street-based adolescents at high risk of HIV in Ukraine. *Journal of Epidemiology and Community Health*, 2010.
27. Cusick, L., A. Martin, and T. May, Vulnerability and involvement and in drug use and sex work. 2003, Home Office: London.
28. Kral, A. H., et al. Sexual transmission of HIV-1 among injection drug users in San Francisco, USA: risk-factor analysis. *The Lancet*, 2001. 357: p. 1397–401.
29. Wood, E., et al. Elevated rates of antiretroviral treatment discontinuation among HIV-infected injection drug users: implications for drug policy and public health. *International Journal of Drug Policy*, 2004. 15: p. 133–38.
30. Baral, S., et al. Male sex workers in Moscow, Russia: a pilot study of demographics, substance use patterns, and prevalence of HIV-1 and sexually transmitted infections. *AIDS Care*, 2010. 22(1): p. 112–18.
31. Belza, M. J., Risk of HIV infection among male sex workers in Spain. *Sexually Transmitted Infections*, 2005. 81(1): p. 85–88.
32. Bruckova, M., et al. HIV infection among commercial sex workers and injecting drug users in the Czech Republic. *American Journal of Tropical Medicine and Hygiene*, 2006. 75(5): p. 1017–20.

33. Leuridan, E., et al. Male sex workers in Antwerp, Belgium: a descriptive study. *International Journal of STD and AIDS*, 2005. 16(11): p. 744–48.
34. Sethi, G., et al. HIV, sexually transmitted infections, and risk behaviors in male sex workers in London over a 10 year period. *Sexually Transmitted Infections*, 2006. 82(5): p. 359–63.
35. Platt, L., et al. Impact of gender and sex work on sexual and injecting risk behaviors and their association with HIV positivity among injecting drug users in an HIV epidemic in Togliatti City, the Russian Federation. *Sexually Transmitted Diseases*, 2005. 32(10): p. 605–12.
36. Vioque, J., et al. Prospective cohort study of female sex workers and the risk of HIV infection in Alicante, Spain (1986–96). *Sexually Transmitted Infections*, 1998. 74: p. 284–88.
37. Lum, P. J., C. Sears, and J. Guydish, Injection risk behavior among women syringe exchangers in San Francisco. *Substance Use & Misuse*, 2005. 40(11): p. 1681–96.
38. Riehman, K. S., et al. Sexual relationships, secondary syringe exchange, and gender differences in HIV risk among drug injectors. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 2004. 81(2): p. 249–59.
39. *Save The Children*, T.-C.f.I.a.C.o.R.H., Infectious Diseases, AIDS and Clinical Immunology Research Center, Characteristics, high-risk behaviors and knowledge of STI/HIV/AIDS, and prevalence of HIV, syphilis and hepatitis among MSM in Tbilisi, Georgia: 2007. 2008, PATH, USAID.
40. Kasianczuk, M. G., et al. Risk factors associated with condom use among men who have sex with men in Ukraine. *Journal of LGBT Health Research*, 2009. 5(1–2): p. 51–62.
41. Strathdee, S. A., and S. G. Sherman, The role of sexual transmission of HIV infection among injection and non-injection drug users. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 2003. 80 (Supplement 3): p. S7–14.
42. Ryan, K. A., et al. Characteristics associated with prevalent HIV infection among a cohort of sex workers in Cameroon. *Sexually Transmitted Infections*, 1998. 74(2): p. 131–35.
43. van den Hoek, A., et al. High prevalence of syphilis and other sexually transmitted diseases among sex workers in China: potential for fast spread of HIV. *AIDS*, 2001. 15(6): p. 753–79.
44. Aral, S. O., et al. Commercial sex work, drug use, and sexually transmitted infections in St. Petersburg, Russia. *Social Science & Medicine*, 2005. 60(10): p. 2181–90.
45. Sokolowski, S., et al. Knowledge, attitudes and sexual behavior with regards to HIV/STIs among MSM in 4 EU countries. 2007, Bordernet. European Union.
46. Adam, P. C. G., I. Teva, and J. B. F. de Wit, Balancing risk and pleasure: sexual self-control as a moderator of the influence of sexual desires on sexual risk-taking in men who have sex with men. *Sexually Transmitted Infections*, 2008. 84(6): p. 463–67.
47. Hurtado Navarro, I., et al. Differences between women and men in serial HIV prevalence and incidence trends. *European Journal of Epidemiology*, 2008. 23(6): p. 435–40.
48. Schwappach, D. L. B., and P. Bruggmann, An integrated model of care to counter high incidence of HIV and sexually transmitted diseases in men who have sex with men–initial analysis of service utilizers in Zurich. *BMC Public Health*, 2008. 8.

49. Prasad, L. R., et al. Changing epidemiology of HIV anonymous testing in Switzerland for 1996–2006. *Swiss Medical Weekly,* 2009. 139(17–18): p. 256–63.

50. Folch, C., et al. Working group REDAN, Prevalence of HIV, HCV and other sexually transmitted infections and associated risk behaviors among Spanish and immigrant IDU in Catalonia, Spain, in International Harm Reduction Conference, April 25–29, 2010: Liverpool, United Kingdom.

51. Platt, L., et al. Systematic review examining differences in HIV, sexually transmitted infections and health-related risk behaviors between migrant and indigenous sex workers, Draft.

52. TAMPEP and L. Brussa, Sex work in Europe: a mapping of the prostitution scene in 25 countries, in Sex work, migration and health, TAMPEP. International, Editor. 2009, TAMPEP International: Amsterdam.

53. Miller, C. L., et al. Females experiencing sexual and drug vulnerabilities are at elevated risk for HIV risk infection among youth who use injection drugs. *Journal of Acquired Immune Deficiency Syndromes,* 2002. 30: p. 335–41.

54. Montgomery, S. B., et al. Gender differences in HIV risk behaviors among young injectors and their social network members. *American Journal of Drug and Alcohol Abuse,* 2002. 28(3): p. 453–75.

55. Muga, R., et al. Syphilis in injecting drug users: clues for high-risk sexual behavior in female IDUs. *International Journal of STD & AIDS,* 1997. 8: p. 225–28.

56. Spittal, P. M., and M. T. Schechter, Injection drug use and despair through the lens of gender. *Canadian Medical Association Journal,* 2001. 164: p. 295–305.

57. Tortu, S., et al. Women's drug injection practices in East Harlem: an event analysis in a high-risk community. *AIDS and Behavior,* 2003. 7: p. 317–28.

58. Tyndall, M. W., et al. Risky sexual behaviors among injection drugs users with high HIV prevalence: implications for STD control. *Sexually Transmitted Infections,* 2002. 78 (Supplement 1): p. S170–5.

59. Weber, A. E., et al. HIV risk profile and prostitution among female street youths. *Journal of Urban Health: Bulletin of the New York Academy of Medicine,* 2002. 79(4): p. 525–33.

60. Booth, R., et al. Police brutality is independently associated with sharing injection equipment among injection drug users in Odessa, Ukraine, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.

61. Sarang, A., et al. Policing drug users in Russia: risk, fear, and structural violence. *Substance Use & Misuse,* 2010. 45(6): p. 813–64.

62. Strathdee, S. A., et al. HIV and risk environment for injecting drug users: the past, present, and future. *The Lancet*, 2010. 376(9737): p. 268–84.

63. Rhodes, T., A. Sarang, and M. Simic, Police violence and 'fear-based policy' as barriers to HIV prevention: qualitative case studies in Russia and Serbia, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.

64. Rhodes, T., et al. Trust, disruption and responsibility in accounts of injecting equipment sharing and hepatitis C risk. *Health, Risk & Society,* 2008. 10(3): p. 221–40.

65. Rhodes, T., et al. Situational factors influencing drug injecting, risk reduction and syringe exchange in Togliatti City, the Russian Federation: a qualitative study of micro-risk environment. *Social Science & Medicine,* 2003. 57(1): p. 39–54.

66. Dolan, K., et al. HIV in prison in low-income and middle-income countries. *The Lancet Infectious Diseases*, 2007. 7(1): p. 32–41.
67. Jürgens, R., A. Ball, and A. Verster, Interventions to reduce HIV transmission related to injecting drug use in prison. *The Lancet Infectious Diseases*, 2009. 9(1): p. 57–66.
68. Matteelli, A., et al. Chlamydia trachomatis genital infection in migrant female sex workers in Italy. *International Journal of STD & AIDS*, 2003. 14(9): p. 591–95.
69. Stachowiak, J. A. Health risks and power among female sex workers in Moscow, In *SIECUS Report*, 2005. 33(2): 18–25.
70. Ilić, D., S. Šipetić, and V. Bjegović, Risk of HIV infection among indoor and street sex workers and their use of health services in Belgrade, Serbia. *Srpski arhiv za celokupno lekarstvo*, 2010. (3–4): p. 219–24.
71. Simic, M., and T. Rhodes, Violence, dignity and HIV vulnerability: street sex work in Serbia. *Sociology of Health & Illness*, 2009. 31(1): p. 1–16.
72. Crago, A. L., Arrest the violence. Human Rights abuses against sex workers in Central and Eastern Europe and Central Asia. 2009, Sex Workers' Rights Advocacy Network in Central and Eastern Europe and Central Asia.
73. Shannon, K., et al. Mapping violence and policing as an environmental-structural barrier to health service and syringe availability among substance-using women in street-level sex work. *International Journal of Drug Policy*, 2008. 19(2): p. 140–47.
74. Boynton, P., and L. Cusick, Sex workers to pay the price. *BMJ*, 2006. 332(7535): p. 190–91.
75. Boyle, F. M., et al. Psychological distress among female sex workers. *Australian and New Zealand Journal of Public Health*, 1997. 21(6): p. 643–46.
76. Romans, S. E., et al. The mental and physical health of female sex workers: a comparative study. *Australian and New Zealand Journal of Psychiatry*, 2001. 35(1): p. 75–80.
77. International Harm Reduction Development Program, Women, Harm Reduction, and HIV, in Assessment in Action. 2009, Open Society Institute.
78. Campbell, R., and M. Storr, Challenging the Kerb Crawler rehabilitation programme. *Feminist Review*, 2001. 67: p. 94–108.
79. Kinnell, H., Violence and sex work in Britain. 2008, Cullompton: Willan Publishing. p. 290.
80. Chin, J., The AIDS pandemic: the collision of epidemiology with political correctness. 2007, Oxford: Radcliffe Publishing.
81. Parkhurst, J. O., Understanding the correlations between wealth, poverty and Human Immunodeficiency Virus infection in African countries. *Bulletin of the World Health Organization*, 2010. 88(7): p. 519–26.
82. Shelton, J. D., M. M. Cassell, and J. Adetunji, Is poverty or wealth at the root of HIV? *The Lancet*, 2005. 366(9491): p. 1057–58.
83. Bourgois, P., B. Prince, and A. Moss, The everyday violence of hepatitis C among young women who inject drugs in San Francisco. *Human Organization*, 2004. 63(3): p. 253–64.
84. Rhodes, T., et al. Police violence and sexual risk among female and transvestite sex workers in Serbia: qualitative study. *BMJ*, 2008. 337(7669).
85. Camara, B., et al. Guidelines for upgrading of HIV/AIDS/STI surveillance in the Caribbean, in The third generation surveillance of HIV/AIDS/STI linking HIV, AIDS and STI case-reporting behavioral and care surveillance, 2002: Caribbean Epidemiology Centre, WHO, and PANO.

86. European Centre for Disease Prevention and Control (ECDC), Mapping of HIV/STI behavioral surveillance in Europe, in ECDC TECHNICAL REPORT. 2009: Stockholm.
87. Public Health England, Shooting up: infections among injecting drug users in the United Kingdom 2010. An update, November 2011, in Shooting up: infections among injecting drug users in the United Kingdom. 2011.
88. Camoni, L., et al. Continued high prevalence of HIV, HBV and HCV among injecting and noninjecting drug users in Italy. *Annali Dell'Istituto Superiore di Sanita*, 2010. 46(1): p. 59–65.
89. Ongoeva, D., HIV-infection epidemiological analysis among sex workers in Central Asia. 2010: Oblast AIDS Centre, the Kyrgyz Republic.
90. Schmidt, A. J., et al. *EMIS Community Report 1*. 2010.
91. Mounier-Jack, S., S. Nielsen, and R. J. Coker, HIV testing strategies across European countries. *HIV Medicine*, 2008. 9: p. 13–19.
92. Samet, J. H., Russia and human immunodeficiency virus—beyond crime and punishment. *Addiction*, 2011. 106(11): p. 1883–85.
93. World Health Organization (WHO), Policy guidelines for collaborative TB and HIV services for injecting and other drug users: an integrated approach, in Evidence for action technical papers. 2008.
94. Van Den Berg, C., et al. Full participation in harm reduction programmes is associated with decreased risk for human immunodeficiency virus and hepatitis C virus: evidence from the Amsterdam Cohort Studies among drug users. *Addiction*, 2007. 102(9): p. 1454–62.
95. Roux, P., et al. The impact of methadone or buprenorphine treatment and ongoing injection on highly active antiretroviral therapy (HAART) adherence: evidence from the MANIF2000 cohort study. *Addiction*, 2008. 103(11): p. 1828–36.
96. Degenhardt L., et al. Prevention of HIV infection for people who inject drugs: why individual, structural, and combination approaches are needed. *The Lancet*, 2010. 376: p. 285–301.
97. Gupta, G. R., et al. Structural approaches to HIV prevention. *The Lancet*, 2008. 372(9640): p. 764–75.
98. Blankenship, K., et al. Structural interventions: concepts, challenges and opportunities for research. *Journal of Urban Health*, 2006. 83(1): p. 59–72.
99. Booth, R. E., et al. Interventions with injection drug users in Ukraine. *Addiction*, 2009. 104(11): p. 1864–73.
100. Latkin, C. A., W. Hua, and V. L. Forman, The relationship between social network characteristics and exchanging sex for drugs or money among drug users in Baltimore, MD, USA. *International Journal of STD & AIDS*, 2003. 14: p. 770–75.
101. Latkin, C. A., et al. The efficacy of a network intervention to reduce HIV risk behaviors among drug users and risk partners in Chiang Mai, Thailand and Philadelphia, USA. *Social Science & Medicine*, 2009. 68(4): p. 740–48.
102. Hammett, et al. Patterns of HIV prevalence and HIV risk behaviors among injection drug users prior to and 24 months following implementation of cross-border HIV prevention interventions in northern Vietnam and southern China. 2006. 18. New York, NY, ETATS-UNIS: Guilford, p. 19.
103. Medley, A., et al. Effectiveness of peer education interventions for HIV prevention in developing countries: a systematic review and meta-analysis. *AIDS Education and Prevention*, 2009. 21(3): p. 181–206.

104. Irwin, K., et al. Secondary syringe exchange as a model for HIV prevention programs in the Russian Federation. *Substance Use & Misuse*, 2006. 41(6–7): p. 979–99.

105. Bryant, J., and M. Hopwood, Secondary exchange of sterile injecting equipment in a high distribution environment: a mixed method analysis in south east Sydney, Australia. *International Journal of Drug Policy*, 2009. 20(4): p. 324–28.

106. Des Jarlais, D. C., et al. Doing harm reduction better: syringe exchange in the United States. *Addiction*, 2009. 104(9): p. 1441–46.

107. Kerr, T., et al. The role of safer injection facilities in the response to HIV/AIDS among injection drug users. *Current HIV/AIDS Reports*, 2007. 4(4): p. 158–64.

108. Hedrich, D., European report on drug consumption rooms. 2004, European Monitoring Centre for Drugs and Drug Addiction (EMCDDA).

109. Hedrich, D., T. Kerr, and F. Dubois-Arber, Drug consumption facilities in Europe and beyond, in Harm reduction: evidence, impacts and challenges, T. Rhodes, Hedrich, D., Editor. 2010, Publications Office of the European Union: Luxembourg.

110. MISC Evaluation Committee, Final report of the evaluation of the Sydney Medically Supervised Injecting Centre. 2003.

111. Room, R., The ambiguity of harm reduction–goal or means, and what constitutes harm?, in Harm reduction: evidence, impacts and challenges, T. Rhodes, Hedrich, D., Editor. 2010, Publications Office of the European Union: Luxembourg. p. 108.

112. Wood, E., et al. Do supervised injecting facilities attract higher-risk injection drug users? *American Journal of Preventive Medicine*, 2005. 29(2): p. 126–30.

113. Wood, E., et al. Service uptake and characteristics of injection drug users utilizing North America's first medically supervised safer injecting facility. *American Journal of Public Health*, 2006. 96(5): p. 770–73.

114. Benninghoff, F., R. Geense, and F. Dubois-Arber, Resultats de l'étude 'La clientèle des structures à bas seuil d'accessibilité en Suisse'. 2001, Institut universitaire de médecine sociale et préventitive: Lausanne.

115. Benninghoff, F., et al. Evaluation de Quai 9 'Espace d'acceuil et d'injection' à Genéve: période 12/2001–12/2000. 2003, Institut universitaire de médecine sociale et préventive: Lausanne.

116. Benninghoff, F., and F. Dubois-Arber, Résultats de l'étude de la clientèle du Cactus BIEL/BIENNE 2001. 2002, Institut universitaire de médecine sociale et préventive.: Lausanne.

117. Solai, S., et al. Evaluation de L'espace D'accueil et D'injection" QUAI 9" à Genève Deuxième phase 2003. 2003, Institut Universitaire de Médecine Sociale et Préventive: Lausanne.

118. Bravo, M. J., et al. Use of supervised injection facilities and injection risk behaviors among young drug injectors. *Addiction*, 2009. 104(4): p. 614–19.

119. Poschadel, S., R. Höger, and J. Schnitzler, Schreckenberger, Evaluation der Arbeit der Drogenknsomräume in der Bundesrepublik Deutschland: Endbericht imAuftrag des Bundesminiteriums für Gesundheit, Das Bundesminiteriums für Gesundheit und Soziale Sicherung (Schriftenriehe Bd 149). 2003, Nomos-Verlags-Gelleschaft: Baden-Baden.

120. Kimber, J., et al. Process and predictors of drug treatment referral and referral uptake at the Sydney Medically Supervised Injecting Centre. *Drug and Alcohol Review*, 2008. 27(6): p. 602–12.

121. Wood, E., et al. Rate of detoxification service use and its impact among a cohort of supervised injecting facility users. *Addiction*, 2007. 102(6): p. 916–19.

122. Ball, A. L., HIV, injecting drug use and harm reduction: a public health response. *Addiction*, 2007. 102(5): p. 684–90.

123. Friedman, S. R., et al. Relationships of deterrence and law enforcement to drug-related harms among drug injectors in US metropolitan areas. *AIDS*, 2006. 20(1): p. 93–99.

124. Hurley, S. F., D. J. Jolley, and J. M. Kaldor, Effectiveness of needle-exchange programmes for prevention of HIV infection. *The Lancet*, 1997. 349(9068): p. 1797–800.

125. Wiessing, L., et al. Associations between availability and coverage of HIV-prevention measures and subsequent incidence of diagnosed HIV infection among injection drug users. *American Journal of Public Health*, 2009. 99(6): p. 1049–52.

126. Cooper, H., et al. The impact of a police drug crackdown on drug injectors' ability to practice harm reduction: a qualitative study. *Social Science & Medicine*, 2005. 61(3): p. 673–84.

127. Pollini, R. A., et al. Syringe possession arrests are associated with receptive syringe sharing in two Mexico–US border cities. *Addiction*, 2008. 103(1): p. 101–8.

128. Rhodes, T., et al. Injecting equipment sharing among injecting drug users in Togliatti City, the Russian Federation: maximizing the protective effects of syringe distribution. *Journal of Acquired Immune Deficiency Syndromes*, 2004. 35(3): p. 293–300.

129. Skala, P., Criminalization of drug users in Ukraine as a factor hindering the scale-up of access to HIV/AIDS prevention and treatment programmes, in XVIII International AIDS Conference, July 18–23, 2010: Vienna, Austria.

130. Wolfe, D., M. P. Carrieri, and D. Shepard, Treatment and care for injecting drug users with HIV infection: a review of barriers and ways forward. *The Lancet*, 2010. 376(9738): p. 355–66.

131. Reuter, P., Ten years after the United Nations General Assembly Special Session (UNGASS): assessing drug problems, policies and reform proposals. *Addiction*, 2009. 104(4): p. 510–17.

132. Degenhardt, L., et al. Toward a global view of alcohol, tobacco, cannabis, and cocaine use: findings from the WHO World Mental Health Surveys. *PLoS Med*, 2008. 5(7): p. e141.

133. Wood, E., et al. Vienna Declaration: a call for evidence-based drug policies. *The Lancet*, 2010. 376(9738): p. 310–12.

134. Wood, E., et al. The war on drugs: a devastating public-policy disaster. *The Lancet*, 2009. 373(9668): p. 989–90.

135. Aral, S. O., et al. The social organization of commercial sex work in Moscow, Russia. *Sexually Transmitted Diseases*, 2003. 30(1): p. 39–45.

136. Central and Eastern European Harm Reduction Network, Sex work, HIV/AIDS, and human rights in Central and Eastern Europe and Central Asia. A report from the Central and Eastern European Harm Reduction Network. 2005: Vilnius, Lithuania, CEEHRN, 2005 Jul. 119.

137. Surratt, H. L., and J. A. Inciardi, An effective HIV risk-reduction protocol for drug-using female sex workers. *Journal of Prevention & Intervention in the Community*, 2010. 38(2): p. 118–31.

138. Cusick, L., Widening the harm reduction agenda: from drug use to sex work. *International Journal of Drug Policy*, 2006. 17(1): p. 3–11.

139. Rekart, M. L., Sex-work harm reduction. *The Lancet*, 2005. 366: p. 2123–34.

140. Campbell, J. C., Health consequences of intimate partner violence. *The Lancet*, 2002. 359(9314): p. 1331–36.

141. Dunkle, K. L., et al. Gender-based violence, relationship power, and risk of HIV infection in women attending antenatal clinics in South Africa. *The Lancet*, 2004. 363(9419): p. 1415–21.

142. Shannon, K., et al. Prevalence and structural correlates of gender-based violence among a prospective cohort of female sex workers. *BMJ*, 2009. 339: p. b2939.

143. Shannon, K., et al. Structural and environmental barriers to condom use negotiation with clients among female sex workers: implications for HIV-prevention strategies and policy. *American Journal of Public Health*, 2009. 99(4): p. 659–65.

144. Watts, C., and C. Zimmerman, Violence against women: global scope and magnitude. *The Lancet*, 2002. 359(6): p. 1232–37.

145. Goodyear, M. D., and L. Cusick, Protection of sex workers. *BMJ*, 2007. 334(7584): p. 52–53.

146. UNAIDS Advisory Group on HIV and Sex Work, The report of the UNAIDS Advisory Group on HIV and Sex Work. 2011, UNAIDS.

147. Sexton, S., Over the parapet: a short study into the needs and aspirations of sex workers in Edinburgh, SCOT-PEP, Editor. 2009: Edinburgh.

148. Boyle, F. M., et al. Psychological distress among female sex workers. *Australian and New Zealand Journal of Public Health*, 1997. 21(6): p. 643–46.

149. Romans, S. E., et al. The mental and physical health of female sex workers: a comparative study. *Australian and New Zealand Journal of Psychiatry*, 2001. 35: p. 75–80.

150. Seib, C., J. Fischer, and J. M. Najman, The health of female sex workers from three industry sectors in Queensland, Australia. *Social Science and Medicine*, 2009. 68(3): p. 473–78.

151. Oberzaucher, N., HIV and sexually transmitted infection prevention among sex workers in Eastern Europe and Central Asia. UNAIDS Best Practice Collection; UNAIDS/06.10E. 2006, Geneva, Switzerland: Joint United Nations Programme on HIV/AIDS [UNAIDS], 2006 May. p. 63.

152. Costenbader, E., et al. Secrecy and risk among MSM in Tbilisi, Georgia. *AIDS Care*, 2009. 21: p. 591–97.

153. Peryshkina, A., et al. Men who have sex with men (MSM), physicians, and non-government organizations (NGOs): finding agreement on the HIV risk environment and service provision for MSM in Russia, in International AIDS Conference, July 18–23, 2010: Vienna, Austria.

154. Rainbow Project, Through Our Eyes—Experiences of Lesbian, Gay and Bisexual People in the Workplace. 2011.

155. Csepe, P., et al. HIV risk behavior among gay and bisexual men in Budapest, Hungary. *International Journal of STD & AIDS*, 2002. 13(3): p. 192–200.

156. Štulhofer, A., et al. HIV-related sexual risk taking among HIV-negative men who have sex with men in Zagreb, Croatia. *AIDS and Behavior*, 2008. 12(3): p. 505–12.

157. Kizub, D., et al. Advocating for HIV and STI prevention services and strengthening the advocacy capacity of groups representing men who have sex with men in the Russian Federation: study of the needs of men who have sex with men with respect to HIV and STI prevention and medical care in Russia. 2009, AIDS Infoshare: Moscow.
158. Reynolds, L., et al. HIV among men who have sex with men in Central and Eastern Europe: a review of 30 countries. WHO, Editor. 2011, World Health Organization.
159. Bourne, A. D., et al. Relative safety II: risk and UAI among gay men with diagnosed HIV. 2009. Sigma Research: London.
160. Kippax, S., et al. Sexual negotiation in the AIDS era: negotiated safety revisited. *AIDS,* 1997. 11(2): p. 191–97.
161. Parsons, J. T., et al. Sexual harm reduction practices of HIV-seropositive gay and bisexual men: serosorting, strategic positioning, and withdrawal before ejaculation. *AIDS*, 2005. 19: p. S13–25.
162. van Kesteren, N. M. C., H., J. Hospers, and G. Kok, Sexual risk behavior among HIV-positive men who have sex with men: a literature review. *Patient Education and Counselling,* 2007. 65(1): p. 5–20.
163. Folch C, et al. Factors associated with unprotected sexual intercourse with steady male, casual male, and female partners among men who have sex with men in Barcelona, Spain. 2006. 18. New York, NY, ETATS-UNIS: Guilford, p. 16.
164. Choi, K. H., E. S. Hudes, and W. T. Steward, Social discrimination, concurrent sexual partnerships, and HIV risk among men who have sex with men in Shanghai, China. *AIDS and Behavior,* 2008. 12(4 Suppl.): p. S71–7.
165. Morris, M., and M. Kretzschmar, Concurrent partnerships and the spread of HIV. *AIDS*, 1997. 11(5): p. 641–48.
166. European Men Who Have Sex With Men Internet Survey (EMIS). http://www.emis-project.eu.
167. UNAIDS, An introduction to indicators: UNAIDS monitoring and evaluation fundamentals. 2010.
168. Mirandola, M., et al. HIV biobehavioral survey among men who have sex with men in Barcelona, Bratislava, Bucharest, Ljubljana, Prague and Verona, 2008–2009. (Special Issue: HIV/AIDS and other sexually transmitted infections [STI] in men who have sex with men [MSM]—trends and behavioral surveillance.) *Eurosurveillance*, 2009. 14(48): p. 19427.
169. Williamson, L. M., et al. HIV testing trends among gay men in Scotland, United Kingdom (1996–2005): implications for HIV testing policies and prevention. *Sexually Transmitted Infections*, 2009. 85(7): p. 550–54.
170. Granich, R. M., et al. Universal voluntary HIV testing with immediate antiretroviral therapy as a strategy for elimination of HIV transmission: a mathematical model. *The Lancet*, 2009. 373(9657): p. 48–57.
171. Montaner, J. S. G., et al. Association of highly active antiretroviral therapy coverage, population viral load, and yearly new HIV diagnoses in British Columbia, Canada: a population-based study. *The Lancet*, 2010. 376(9740): p. 532–39.
172. Vanable, P. A., et al. Impact of combination therapies on HIV risk perceptions and sexual risk among HIV-positive and HIV-negative gay and bisexual men. *Health Psychology*, 2000. 19(2): p. 134–45.

173. Cohen, M., The HIV 'test and treat' movement: the details really matter, and now, in BHIVA Autumn Conference, October 7–8, 2010: London.

174. Cohen, M. S., HIV treatment as prevention: to be or not to be? *Journal of Acquired Immune Deficiency Syndromes*, 2010. 55(2): p. 137–38. 10.1097/QAI.0b013e3181f0cbf3.

175. Cohen, M. S., HIV treatment as prevention: in the real world the details matter. *Journal of Acquired Immune Deficiency Syndromes*, 2011. 56(3): p. e101–02. 10.1097/QAI.0b013e3182041968.

176. Montaner, J. S. G., et al. The case for expanding access to highly active antiretroviral therapy to curb the growth of the HIV epidemic. *The Lancet*, 2006. 368(9534): p. 531–36.

177. Wang, L., et al. HIV transmission risk among serodiscordant couples: a retrospective study of former plasma donors in Henan, China. *Journal of Acquired Immune Deficiency Syndromes*, 2010. 55(2): p. 232–38. 10.1097/QAI.0b013e3181e9b6b7.

178. Jin, F., et al. UAI, risk reduction behaviors, and subsequent HIV infection in a cohort of homosexual men. *AIDS*, 2009. 23(2): p. 243–52. 10.1097/QAD.0b013e32831fb51a.

179. Boily, M. -C., et al. Heterosexual risk of HIV-1 infection per sexual act: systematic review and meta-analysis of observational studies. *The Lancet Infectious Diseases*, 2009. 9(2): p. 118–29.

180. Goodreau, S. M., et al. Role versatility among men who have sex with men in urban Peru. *Journal of Sex Research*, 2007. 44(3): p. 233–39.

181. UNAIDS, AIDS and men who have sex with men, in UNAIDS Best Practice Collection 2000, UNAIDS.

182. Aidala, A., et al. Housing status and HIV risk behaviors: implications for prevention and policy. *AIDS and Behavior*, 2005. 9(3): p. 251–65.

183. Basu, I., et al. HIV prevention among sex workers in India. *Journal of Acquired Immune Deficiency Syndromes*, 2004. 36(3): p. 845–52.

184. Swendeman, D., et al. Empowering sex workers in India to reduce vulnerability to HIV and sexually transmitted diseases. *Social Science & Medicine*, 2009. 69(8): p. 1157–66.

185. Dworkin, S. L., and K. Blankenship, Microfinance and HIV/AIDS prevention: assessing its promise and limitations. *AIDS and Behavior*, 2009. 13(3): p. 462–69.

186. Pronyk, P. M., et al. Effect of a structural intervention for the prevention of intimate-partner violence and HIV in rural South Africa: a cluster randomised trial. *The Lancet*, 2006. 368(9551): p. 1973–83.

187. Hargreaves, J. R., et al. Systematic review exploring time trends in the association between educational attainment and risk of HIV infection in Sub-Saharan Africa. *AIDS*, 2008. 22(3): p. 403–14. 10.1097/QAD.0b013e3282f2aac3.

APPENDIX A

Systematic Review of Detailed Search Strategy

People Who Inject Drugs

1. **Human immunodeficiency virus (HIV)**
   Keywords:
   HIV *OR* (human immunodeficiency virus) *OR* (acquired immunodeficiency syndrome) *OR* (acquired immune deficiency syndrome)
   OR
   Subject headings:
   exp HIV/ *OR* exp HIV infections/
2. **Epidemiological terms**
   a. Prevalence and incidence
   b. Keywords:
   c. Prevalen* OR incidence
      OR
      Subject headings:
      Prevalence/ *OR* Incidence/
   d. Risk factors for acquiring HIV infection
      Keywords:
   e. risk* *OR* correlat* *OR* determinant* *OR* vulnerab* *OR* regression *OR* risk *OR* (enhanc* adj3 transmission) *OR* multivariate *OR* (route* adj3 transmission) *OR* (factor* adj3 transmission) *OR* (social norm*) *OR* network *OR* socio-demographic *OR* socio-economic *OR* lifestyle *OR* epidemiol*
      OR
      Subject headings:
      exp Risk/ *OR* Factor Analysis, Statistical/ *OR* exp Regression analysis/ *OR* exp Risk Factors/ *OR* exp Risk-Taking *OR* exp Epidemiology

3. **Countries**

   All countries in the European region as defined by the World Health Organization (WHO):

   Albania, Andorra, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kazakhstan, the Kyrgyz Republic, Latvia, Liechtenstein, Lithuania, Luxembourg, the former Yugoslav Republic of Macedonia, Malta, Moldova, Monaco, Montenegro, the Netherlands, Norway, Poland, Portugal, Romania, the Russian Federation, San Marino, Serbia, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkey, Turkmenistan, Ukraine, United Kingdom, and Uzbekistan.

   a. Europe

      Basic grouping, derived from Medline subject schema:

      Keyword search string (to include adjectives as well as nouns for countries):

      Europe* *OR* Albania* *OR* Andorra* *OR* Armenia* *OR* Austria* *OR* Azerbaijan* *OR* Bel#rus *OR* Byel#rus* *OR* Belgium *OR* Belgian *OR* Bosnia* *OR* Herzegovin* *OR* Bulgaria* *OR* Croatia* *OR* Cypr* *OR* Czech* *OR* Denmark *OR* Danish *OR* Estonia* *OR* Finland *OR* Finnish *OR* France *OR* French *OR* Georgia* *OR* German* *OR* Greece *OR* Greek *OR* Hungary *OR* Hungarian *OR* Iceland* *OR* Ireland *OR* Irish *OR* Israel* *OR* Italy *OR* Italian *OR* Kosovo *OR* Latvia* *OR* Lithuania* *OR* Luxembourg* *OR* Malta *OR* Maltese *OR* Monaco *OR* Montenegr* *OR* Netherland* *OR* Dutch *OR* Norway *OR* Norwegian *OR* Poland *OR* Polish *OR* Portugal *OR* Portuguese *OR* Moldova* *OR* Romania* *OR* Russia* *OR* USSR *OR* CIS *OR* Marino *OR* Serbia* *OR* the Slovak Republic* *OR* Slovenia* *OR* Spain *OR* Spanish *OR* Sweden *OR* Swedish *OR* Switzerland *OR* Swiss *OR* Macedonia* *OR* Transdniestria* *OR* Trans-Dniester* *OR* Transnistria* *OR* Turkey *OR* Turkish *OR* Ukrain* *OR* United Kingdom *OR* Britain *OR* British *OR* English *OR* England *OR* Scotland *OR* Scottish *OR* Wales *OR* Welsh *OR* Baltic* *OR* Balkan* *OR* Kosov* *OR* Dagestan* *OR* Chech?n* *OR* Ingush*

      Subject heading search string:

      Exp Europe/

   b. Central Asia

      Keyword search string (to include adjectives as well as nouns for countries):

      Kazakh* *OR* Kyrg?#z* *OR* Kirg?#z *OR* Tajik* *OR* Turkmen* *OR* Uzbek*

      Subject heading search string:

      exp Asia, Central/

4. **Risk group**

   Keywords:

   IDU* *OR* inject* *OR* intravenous *OR* heroin *OR* addict* *OR* opiate* *OR* narco* *OR* psychotropic* *OR* psychoactive* *OR* (drug depend#n*) *OR*

(recreation* adj3 drug*) *OR* (harm reduction) *OR* syringe* *OR* methadone *OR* opioid* *OR* syringe* *OR* (needle* adj3 shar*) *OR* (illegal* adj3 drug*)
Subject headings:
exp Substance Abuse, Intravenous/ *OR* exp Needle Sharing/ *OR* exp Heroin Dependence/

Sex Workers

1. **HIV**
   Keywords:
   HIV *OR* (human immunodeficiency virus) *OR* (acquired immunodeficiency syndrome) *OR* (acquired immune deficiency syndrome)
   OR
   Chlamydia Trachomatis *OR* Chlamydia *OR* C Trachomatis *OR* Treponema Pallidum *OR* T Pallidum *OR* syphilis *OR* Neisseria gonorrhea *OR* N gonorrhea *OR* Gonorrhea *OR* Trichomonas vaginalis *OR* T vaginalis *OR* trichmoniasis
   Subject headings:
   exp HIV/ *OR* exp HIV infections/ Sexually Transmitted Diseases/ or Gonorrhea/or Risk Factors/or Chlamydia Infections/
2. **Epidemiological terms**
   a. Prevalence and incidence
      Keywords:
      Prevalence* *OR* incidence
      OR
      Subject headings:
      Prevalence/ *OR* Incidence/
   b. Risk factors for acquiring HIV infection
      Keywords:
      risk* *OR* correlat* *OR* determinant* *OR* vulnerab* *OR* regression *OR* risk *OR* (enhanc* adj3 transmission) *OR* multivariate *OR* (route* adj3 transmission) *OR* (factor* adj3 transmission) *OR* (social norm*) *OR* network *OR* socio-demographic *OR* socio-economic *OR* lifestyle *OR* epidemiol*
      OR
      Subject headings:
      exp Risk/*OR* Factor Analysis, Statistical/ *OR* exp Regression analysis/*OR* exp Risk Factors/*OR* exp Risk-Taking *OR* exp Epidemiology
3. **Countries**
   All countries in the European region as defined by WHO:
   Albania, Andorra, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kazakhstan, the Kyrgyz Republic, Latvia, Lithuania, Luxembourg, the former Yugoslav Republic of Macedonia, Malta, Moldova, Monaco, Montenegro, the Netherlands, Norway, Poland, Portugal, Romania, the Russian

Federation, San Marino, Serbia, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkey, Turkmenistan, Ukraine, United Kingdom of Great Britain and Northern Ireland, and Uzbekistan.

a. Europe
   Keyword search string (to include adjectives as well as nouns for countries):
   Europe* *OR* Albania* *OR* Andorra* *OR* Armenia* *OR* Austria* *OR* Azerbaijan* *OR* Bel#rus *OR* Byel#rus* *OR* Belgium *OR* Belgian *OR* Bosnia* *OR* Herzegovin* *OR* Bulgaria* *OR* Croatia* *OR* Cypr* *OR* Czech* *OR* Denmark *OR* Danish *OR* Estonia* *OR* Finland *OR* Finnish *OR* France *OR* French *OR* Georgia* *OR* German* *OR* Greece *OR* Greek *OR* Hungary *OR* Hungarian *OR* Iceland* *OR* Ireland *OR* Irish *OR* Israel* *OR* Italy *OR* Italian *OR* Kosovo *OR* Latvia* *OR* Lithuania* *OR* Luxembourg* *OR* Malta *OR* Maltese *OR* Monaco *OR* Montenegr* *OR* Netherland* *OR* Dutch *OR* Norway *OR* Norwegian *OR* Poland *OR* Polish *OR* Portugal *OR* Portuguese *OR* Moldova* *OR* Romania* *OR* Russia* *OR* USSR *OR* CIS *OR* Marino *OR* Serbia* *OR* the Slovak Republic* *OR* Slovenia* *OR* Spain *OR* Spanish *OR* Sweden *OR* Swedish *OR* Switzerland *OR* Swiss *OR* Macedonia* *OR* Transdniestria* *OR* Trans-Dniester* *OR* Transnistria* *OR* Turkey *OR* Turkish *OR* Ukrain* *OR* United Kingdom *OR* Britain *OR* British *OR* English *OR* England *OR* Scotland *OR* Scottish *OR* Wales *OR* Welsh *OR* Baltic* *OR* Balkan* *OR* Kosov* *OR* Dagestan* *OR* Chech?n* *OR* Ingush*
   Subject heading search string:
   exp Europe/
b. Central Asia
   Keyword search string (to include adjectives as well as nouns for countries):
   Kazakh* *OR* Kyrg?#z* *OR* Kirg?#z *OR* Tajik* *OR* Turkmen* *OR* Uzbek*
   Subject heading search string:
   exp Asia, Central/

4. **Risk group**
   Keywords:
   (sex work*) *OR* prostitut* *OR* (entertainment worker*) *OR* (exchang* adj3 sex) *OR* (sell* adj3 sex) *OR* (sold* adj3 sex) *OR* (sex adj3 money) *OR* (transaction* adj3 sex) *OR* (commerc adj3 sex) *OR* (surviv* adj3 sex) *OR* (sex adj3 drug*) *OR* (sex trade) *OR* (sex industry) *OR* (sex* servic*) *OR* brothel* *OR* (red-light) *OR* solicit* *OR* (bar girl*) *OR* hostess* *OR* escort* *OR* masseu*
   Subject headings:
   exp Prostitution/

Men Who Have Sex with Men

1. **HIV**
   Keywords:
   HIV *OR* (human immunodeficiency virus) *OR* (acquired immunodeficiency syndrome) *OR* (acquired immune deficiency syndrome)

OR
Subject headings:
exp HIV/ *OR* exp HIV infections/

2. **Epidemiological terms**
   a. Prevalence and incidence
      Keywords:
      Prevalen* *OR* incidence
      OR
      Subject headings:
      Prevalence/ *OR* Incidence/
   b. Risk factors for acquiring HIV infection
      Keywords:
      risk* *OR* correlat* *OR* determinant* *OR* vulnerab* *OR* regression *OR* risk *OR* (enhanc* adj3 transmission) *OR* multivariate *OR* (route* adj3 transmission) *OR* (factor* adj3 transmission) *OR* (social norm*) *OR* network *OR* socio-demographic *OR* socio-economic *OR* lifestyle *OR* epidemiol*
      OR
      Subject headings:
      exp Risk/ *OR* Factor Analysis, Statistical/ *OR* exp Regression analysis/ *OR* exp Risk Factors/ *OR* exp Risk-Taking *OR* exp Epidemiology
3. **Countries**
   All countries in the Europe region as defined by WHO:
   Albania, Andorra, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kazakhstan, the Kyrgyz Republic, Latvia, Lithuania, Luxembourg, Malta, Monaco, Montenegro, the Netherlands, Norway, Poland, Portugal, Moldova, Romania, the Russian Federation, San Marino, Serbia, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Tajikistan, the former Yugoslav Republic of Macedonia, Turkey, Turkmenistan, Ukraine, United Kingdom of Great Britain and Northern Ireland, and Uzbekistan.
   a. Europe
      Keyword search string (to include adjectives as well as nouns for countries):
      Europe* *OR* Albania* *OR* Andorra* *OR* Armenia* *OR* Austria* *OR* Azerbaijan* *OR* Bel#rus *OR* Byel#rus* *OR* Belgium *OR* Belgian *OR* Bosnia* *OR* Herzegovin* *OR* Bulgaria* *OR* Croatia* *OR* Cypr* *OR* Czech* *OR* Denmark *OR* Danish *OR* Estonia* *OR* Finland *OR* Finnish *OR* France *OR* French *OR* Georgia* *OR* German* *OR* Greece *OR* Greek *OR* Hungary *OR* Hungarian *OR* Iceland* *OR* Ireland *OR* Irish *OR* Israel* *OR* Italy *OR* Italian *OR* Kosovo *OR* Latvia* *OR* Lithuania* *OR* Luxembourg* *OR* Malta *OR* Maltese *OR* Monaco *OR* Montenegr* *OR* Netherland* *OR* Dutch *OR* Norway *OR* Norwegian *OR* Poland *OR* Polish *OR* Portugal *OR* Portuguese *OR* Moldova* *OR* Romania* *OR* Russia* *OR* USSR *OR* CIS *OR* Marino *OR* Serbia* *OR* the Slovak Republic* *OR* Slovenia* *OR* Spain *OR* Spanish

OR Sweden *OR* Swedish *OR* Switzerland *OR* Swiss *OR* Macedonia* *OR* Transdniestria* *OR* Trans-Dniester* *OR* Transnistria* *OR* Turkey *OR* Turkish *OR* Ukrain* *OR* United Kingdom *OR* Britain *OR* British *OR* English *OR* England *OR* Scotland *OR* Scottish *OR* Wales *OR* Welsh *OR* Baltic* *OR* Balkan* *OR* Kosov* *OR* Dagestan* *OR* Chech?n* *OR* Ingush*
Subject heading search string:
Exp Europe/

b. Central Asia
Keyword search string (to include adjectives as well as nouns for countries):
Kazakh* *OR* Kyrg?#z* *OR* Kirg?#z *OR* Tajik* *OR* Turkmen* *OR* Uzbek*
Subject heading search string:
exp Asia, Central/

4. **Risk group**
Keywords:
Homosexual* *OR* gay* *OR* bisexual* *OR* (men who have sex with men) *OR* (male adj3 prostitut*) *OR* (male adj3 (sex worker)) *OR* (transgender*) *OR* (transsexual*) *OR* transvestit* *OR* LGBT *OR* (sexual minorit*)
Subject headings:
exp Homosexuality, Male/ *OR* exp Homosexuality/

Gray Literature

Internet Sites Searched for Gray Literature—General

http://www.aids2006.org/
http://www.aids2008.org/
http://www.aids2010.org/
http://www.ihra.net/
http://www.euro.who.int/en/home
http://www.unaids.org
http://ecdc.europa.eu/en/Pages/home.aspx
http://www.soros.org/
http://www.usaid.gov/km/
http://www.eurohiv.org/
http://www.fhi.org/en/HIVAIDS/pub/index.htm
http://www.harm-reduction.org
http://www.afew.org
http://www.dfid.gov.uk/Media-Room/Publications/?t=HA
http://www.epinorth.org/eway/default.aspx?pid=230&trg=4148&MainArea_5260=5328:0:&4148=5326:2:0
http://www.episouth.org/relevant_links_docs.html
http://europa.eu.int
http://www.szu.cz

http://www.iph.fgov.be/reitox/
http://www.sst.dk/
http://www.stakes.fi/
http://www.ift.de/
http://www.dimdi.de/
http://www.gbe-bund.de/
http://www.asl.bergamo.it
http://www.hrb.ie
http://www.inef.ie
http://www.hrb.ie/ndc
http://www.fhinst.se/

Internet Sites Searched for Gray Literature—PWID Specific

http://www.emcdda.europa.eu/
http://eusk.tai.ee/?lang=en
http://www.europad.org/europeanpartnerlinks.asp
http://www.univie.ac.at
http://www.beldrug.org
http://www.kaapeli.fi/nad/
http://www.terveysportti.fi/pls/kotisivut
http://www.drogues.gouv.fr
http://www.bisdro.uni-bremen.de/
http://www.indro-online.de
http://www.dgsuchtmedizin.de
http://business.hol.gr/~umhri/
http://www.sitd.org
http://www.relis.lu/
http://www.trimbos.nl/
http://www.frw.uva.nl/cedro/Welcome.html
http://www.ivo.nl/
http://www.aiar.nl
http://www.rusinfo.no
http://www.med.uio.no/ipsy/skr/
http://www.rusmiddeletaten.oslo.kommune.no
http://www.ipdt.pt/
http://www.addiction.ie
http://www.seea.net/about-seea
http://www.mir.es/pnd/index.htm
http://www.fad.es/
http://www.idea-prevencion.com/
http://www.ieanet.com
http://www.socidrogalcohol.org
http://www.can.se
http://www.sfa-ispa.ch

http://www.isf.unizh.ch
http://www.abbeycarefoundation.com
http://www.sdf.org.uk
http://www.dundee.ac.uk
http://www.drugscope.org.uk
http://www.lau.org.uk
http://www.addiction-ssa.org
http://www.gla.ac.uk/Inter/DrugMisuse/
http://www.iop.kcl.ac.uk
http://www.smmgp.co.uk
http://www.staplefordcentre.co.uk
http://www.qed.org.uk
http://www.itacaeurope.org
http://www.erit.org/
http://www.q4q.nl/methwork/
http://www.elisad.org
http://www.pompidou.coe.int/
http://www.ecdp.net
http://www.ac-company.org
http://www.irefrea.org

Internet Sites Searched for Gray Literature—Sex Worker Specific

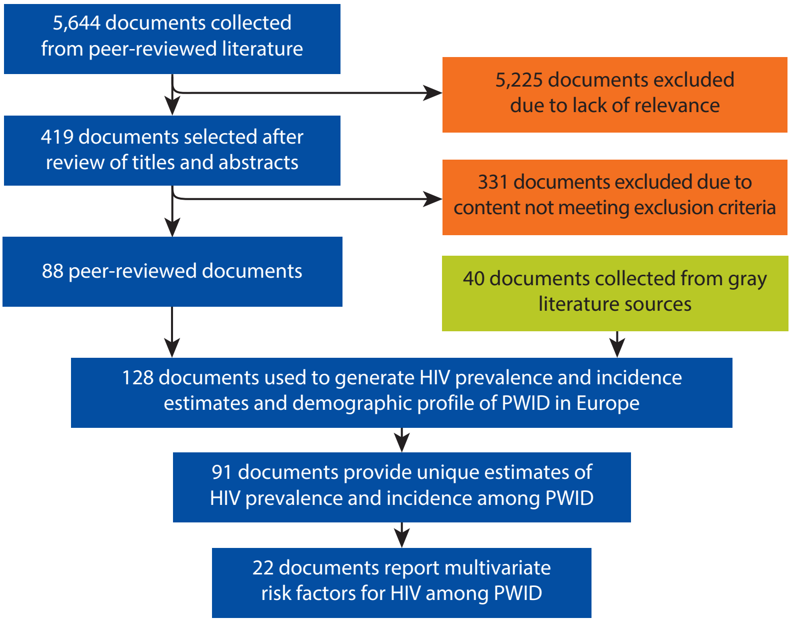
http://tampep.eu/
http://www.nswp.org/
http://www.uknswp.org/

Internet Sites Searched for Gray Literature—Specific to Men Who Have Sex with Men

http://www.gnpplus.net
http://www.aidsinfoonline.org
http://www.pridelife.co.uk
http://www.emis-project.eu
http://www.ilga-europe.org
http://www.non-discrimination.net
http://www.rki.de/EN/Home/homepage__node.html

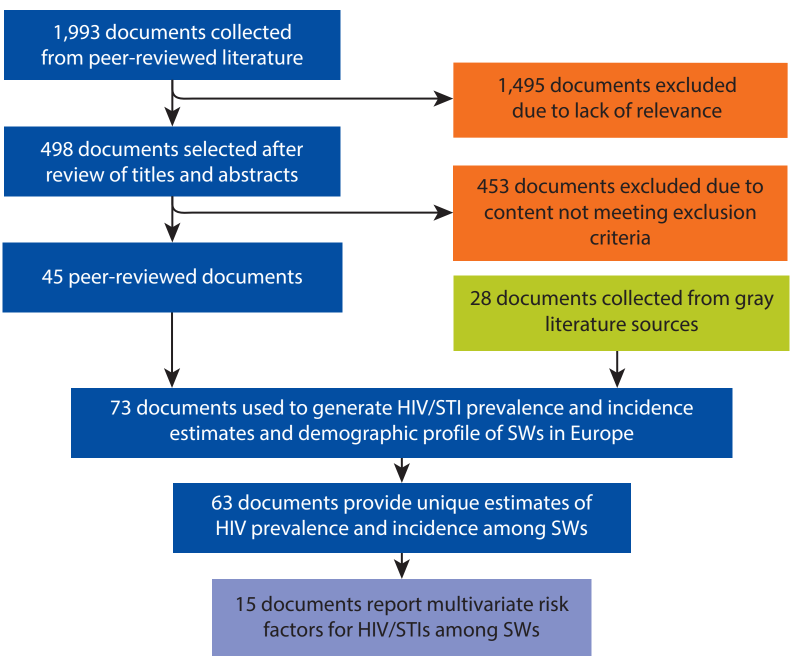
Study Selection Flowcharts

Figure A.1 Flowchart of Study Selection of PWID



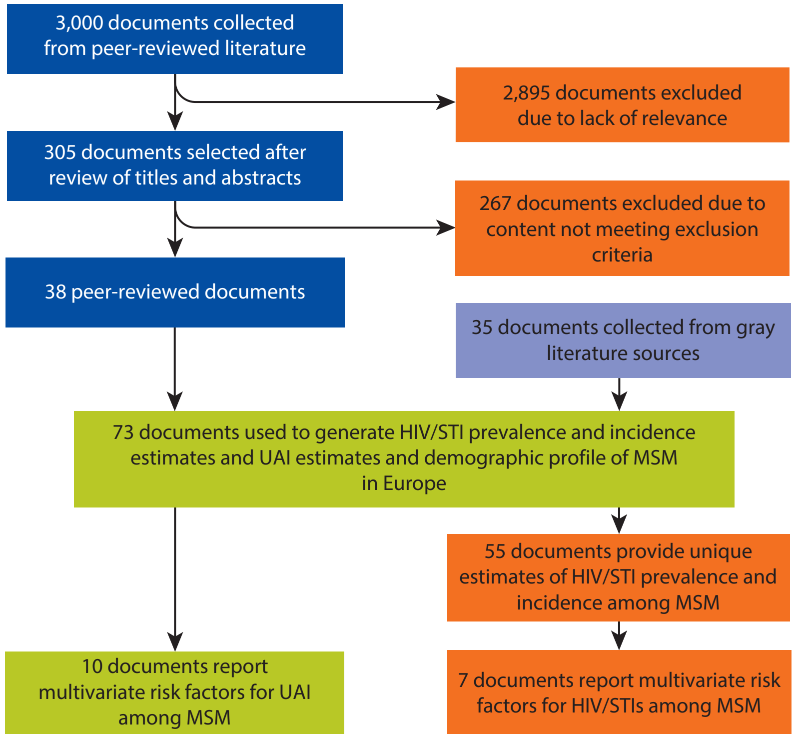
Note: HIV = human immunodeficiency virus; PWID = people who inject drugs.

Figure A.2 Flowchart of Study Selection of SWs



Note: HIV = human immunodeficiency virus; STI = sexually transmitted infection; SW = sex worker.

Figure A.3 Flowchart of Study Selection of MSM



Note: HIV = human immunodeficiency virus; MSM = men who have sex with men; STI = sexually transmitted infection; UAI = unprotected anal intercourse.

Box A.1 Key Indicators of an Enabling Environment for PWID

Meaningful Engagement of Stakeholders

1. The meaningful involvement of PWID in policies affecting their health and welfare and in related HIV prevention programming is accepted as an important indicator of 'health policy' formation [1, 2]. While assessing "meaningful involvement" is complex, we adopt a simple indicator: the presence of a national organization of drug users.

Coordinated National Strategy to HIV Prevention and Drug Use

2. Explicit and supportive reference to "harm reduction" in national policy documents can mark a commitment to evidence-based interventions as part of HIV prevention responses targeting PWID. International agencies advocate institutional and national-level endorsement of harm reduction as a feature of national strategy [3, 4]. We adopt evidence of explicit supportive reference to harm reduction in national strategy as an indicator of enabling policy environment.
3. Monitoring and evaluating the state of the epidemic and response is an important element of building evidence-based responses [5, 6]. Targeted seroprevalence and behavioral

box continues next page

Box A.1 Key Indicators of an Enabling Environment for PWID *(continued)*

surveillance is recommended in concentrated HIV epidemics [7]. We adopt as an indicator of enabling policy evidence of at least one HIV seroprevalence and one behavioral study among PWID since 2000.

Implementation of Public Health-Oriented Approaches to Reducing Harm

4. Drug control policies that seek to distinguish drug users from drug traders and traffickers, and which deemphasizes the criminalization of drug users, can give priority to public health-oriented approaches to reducing drug-related harm. We adopt the application of administrative rather than criminal penalties for drug use and possession of quantities for personal use as an indicator of an enabling policy environment.
5. We adopt the legal availability of OST and needle and syringe exchange programs (NSPs) in a country as an indicator of enabling policy environment. These are core components of the recommended nine combination HIV prevention interventions for PWID [3]. Many countries have adopted at least some recommended measures, but often the components missing are OST and NSPs. The effectiveness of both in improving the health of PWID is well established [8–10], especially for OST [11–17]. OST also facilitates access to and augments the effects of other interventions, such ART [10, 18].
6. The availability of OST and NSPs in prison can show a country's willingness to address the needs of even the most marginalized of its citizens, as well as demonstrating noteworthy scale of the programs. Because of existing laws concerning drug use and possession, PWID in many countries account for disproportionately high rates of incarceration [19]. Prisons may act as a risk environment for HIV transmission linked to drug injecting. International guidelines [20] recommend continuity of services between prison and communities and some countries have developed successful partnerships between penal systems and HIV services, including in the European region [21].

Note: NSPs = needle and syringe exchange programs; OST = opioid substitution therapy; PWID = people who inject drugs.

Table A.1 Behavioral and Intervention Coverage Parameter Estimates Used in the Model Fits

Parameter	*Tallinn*	*St. Petersburg*	*Dushanbe*
Average duration inject in years	16	30	8
Infection rate per month in latent phase of HIV	0.014	0.011	0.011
Seed HIV prevalence in 1996	1.5%	4%	2%
Baseline intervention coverage assumptions			
NSP	Assumed to scale-up from nothing in 2003 to 40% reduction in HIV incidence in 2008. Effect on intermediate years proportional to syringes distributed.	0%	Assumed to scale-up from nothing in 1999 to about 20% reduction in HIV risk by 2010 because achieved half NSP coverage of Tallinn.
OST	0%	0%	0%
ART	0%	0%	0%

Note: ART = antiretroviral therapy; NSPs = needle and syringe exchange programs; OST = opioid substitution therapy.

Table A.2 HIV Natural History and Intervention Efficacy Parameters for Model Fits

Model parameter	*Value used*	*Data source*
HIV "biological" model parameters		
Infection rate per month in latent phase of HIV	Varied to fit model	See table A.1 for values used in model fit
Cofactor increase in HIV transmission probability during:		
• Initial period of high viremia (Γ)	26	[22]
• Pre-AIDS period of high viremia (Λ)	7	[22]
Duration of initial period of high viremia in years (1/δ)	0.25	[22]
Duration of pre-AIDS period of high viremia in years (1/λ)	0.75	[22]
Duration of latent period in years (1/η)	9.4	[23]
Duration of AIDS in years (1/Δ)	1	[23]
Duration of HIV epidemic in years	12	Start of HIV epidemic set to 1996
Seed HIV prevalence at start of epidemic	Varied to fit model	Estimated through fitting model to HIV prevalence data (see table A.1)
Model intervention effectiveness parameters		
Relative HIV infection rate while on ART compared to latent phase transmission probability (Φ)	0.20	No data for PWID–Estimated from recent trials [24, 25] adjusted for low adherence levels among PWID [26–32]
Average survival time with HAART in years	15	PWID have lower survival on ART than non-PWID [33]
Relative infection rate if susceptible IDU is currently on		
• OST (Ψ1)	0.5	Unpublished meta-analysis [34]
• High-coverage NSP as in Tallinn in 2008/09 (Ψ2)	0.6	See text and [35]
• OST+NSP coverage (Ψ3)	Product of above	Similar to recent study considering efficacy of OST and NSP for HCV [36]

Note: AIDS = acquired immune deficiency syndrome; ART = antiretroviral therapy; HAART = highly active antiretroviral therapy; HCV = hepatitis C virus; IDU = injecting drug user; NSPs = needle and syringe exchange programs; OST = opioid substitution therapy.

References

1. Reference Group to the United Nations on HIV and Injecting Drug Use. *Consensus Statement of the Reference Group to the United Nations on HIV and Injecting Drug Use*. 2010.
2. Jürgens, R. *"Nothing About Us Without Us" — Greater, Meaningful Involvement of People Who Use Illegal Drugs: A Public Health, Ethical, and Human Rights Imperative*. International edition. Toronto: Canadian HIV/AIDS Legal Network, International HIV/AIDS Alliance, Open Society Institute; 2008.
3. World Health Organization. *WHO, UNODC, UNAIDS Technical Guide for Countries to Set Targets for Universal Access to HIV Prevention, Treatment and Care for Injecting Drug Users*. World Health Organization, Regional Office for Europe; 2009.
4. European Union. EU Drugs Strategy (2005–2012). In: *Secretariat* G, editor. 2004.
5. UNAIDS. *Practical Guidelines for Intensifying HIV Prevention: Towards Universal Access*. Joint United Nations Programme on HIV/AIDS (UNAIDS); 2007.
6. European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). *Statistical Bulletin 2011*. 2011. Available from: http://www.emcdda.europa.eu/stats11.

7. UNAIDS/WHO. *Guidelines for Second Generation HIV Surveillance: The Next Decade*. Geneva, Switzerland: UNAIDS/WHO Working Group on Global HIV/AIDS and STI Surveillance; 2000.
8. Tilson, H., et al. *Preventing HIV Infection among Injecting Drug Users in High-Risk Countries: An Assessment of the Evidence*. Washington, DC: Institute of Medicine; 2007.
9. Kimber, J., et al. Harm Reduction among Injecting Drug Users – Evidence of Effectiveness. In: *Harm Reduction: Evidence, Impacts and Challenges*. EMCDDA Scientific Monograph Series. Luxembourg: Publications Office of the European Union; 2010, p. 462.
10. Degenhardt, L. M. B., et al. Prevention of HIV Infection for People Who Inject Drugs: Why Individual, Structural, and Combination Approaches Are Needed. *Lancet* 2010. 376: 285–301.
11. Williams, A. B., et al. Methadone Maintenance Treatment and HIV Type 1 Seroconversion among Injecting Drug Users. *AIDS Care: Psychological and Socio-Medical Aspects of AIDS/HIV* 1992. 4: 35–41.
12. Metzger, D. S. Human Immunodeficiency Virus Seroconversion among Intravenous Drug Users In- and Out-of-Treatment: An 18-Month Prospective Follow-Up. *Journal of Acquired Immune Deficiency Syndrome* 1993. 6: 1049–56.
13. Moss, A. R., et al. HIV Seroconversion in Intravenous Drug Users in San Francisco, 1985–1990. *AIDS* 1994. 8: 223–32.
14. Hartel, D. M., and Schoenbaum, E. E. Methadone Treatment Protects against HIV Infection: Two Decades of Experience in the Bronx, New York City. *Public Health Reports (Washington, DC: 1974)* 1998. 113 (Suppl 1): 107–15.
15. Serpelloni, G., et al. Methadone Treatment as a Determinant of HIV Risk Reduction among Injecting Drug Users: A Nested Case-Control Study. *AIDS Care: Psychological and Socio-medical Aspects of AIDS/HIV* 1994. 6: 215–20.
16. Novick, D. M., et al. *Absence of Antibody to Human Immunodeficiency Virus in Long-Term, Socially Rehabilitated Methadone Maintenance Patients*. Chicago, IL: American Medical Association, 1990.
17. Rhoades, H. M., et al. Retention, HIV Risk, and Illicit Drug Use During Treatment: Methadone Dose and Visit Frequency. *American Journal of Public Health* 1998. 88: 34–9.
18. Van Den Berg, C., et al. Full Participation in Harm Reduction Programmes is Associated with Decreased Risk for Human Immunodeficiency Virus and Hepatitis C Virus: Evidence from the Amsterdam Cohort Studies among Drug Users. *Addiction* 2007. 102: 1454–62.
19. Dolan, K., et al. HIV in Prison in Low-Income and Middle-Income Countries. *The Lancet Infectious Diseases* 2007. 7: 32–41.
20. World Health Organization, UNOoDaCU, Joint United Nations Programme on HIV/AIDS (UNAIDS). *Interventions to Address HIV in Prisons: HIV Care, Treatment and Support* 2007.
21. Larisa, P., Drug Users, HIV-positive Prisoners. Examples of adequate influence over changes in national policy on harm reduction programs in Moldovan prisons. XVIII International AIDS Conference. Vienna, Austria, 2010.
22. Hollingsworth, T. D., R. M. Anderson, and C. Fraser. HIV-1 Transmission, by Stage of Infection. *Journal of Infectious Diseases* 2008. 198 (5): 687–93.

23. Prins, M., et al. Pre-AIDS Mortality from Natural Causes Associated with HIV Disease Progression: Evidence from the European Seroconverter Study among Injecting Drug Users. *AIDS* 1997. 11 (14): 1747–56.
24. Cohen, M. S., et al. Prevention of HIV-1 Infection with Early Antiretroviral Therapy. *New England Journal of Medicine* 2011. 365 (6): 493–505.
25. Donnell, D. et al. Heterosexual HIV-1 Transmission after Initiation of Antiretroviral Therapy: A Prospective Cohort Analysis. *The Lancet* 2010. 375 (9731): 2092–98.
26. Malta, M., et al. Adherence to Antiretroviral Therapy among HIV-Infected Drug Users: A Meta-Analysis. *AIDS and Behavior* 2010. 14 (4): 731–47.
27. Wood, E., et al. Adherence and Plasma HIV RNA Responses to Highly Active Antiretroviral Therapy among HIV-1 Infected Injection Drug Users. *Canadian Medical Association Journal* 2003. 169 (7): 656–61.
28. Nolan, S., et al. Adherence and Plasma HIV RNA Response to Antiretroviral Therapy among HIV-Seropositive Injection Drug Users in a Canadian Setting. *AIDS Care* 2011. 23 (8): 980–87.
29. Bangsberg, D. R., et al. Adherence to Protease Inhibitors, HIV-1 Viral Load, and Development of Drug Resistance in An Indigent Population. *AIDS* 2000. 14 (4): 357–66.
30. Petersen, M. L., et al. Pillbox Organizers Are Associated with Improved Adherence to HIV Antiretroviral Therapy and Viral Suppression: A Marginal Structural Model Analysis. *Clinical Infectious Diseases* 2007. 45 (7): 908–15.
31. Gross, R., et al. Effect of Adherence to Newly Initiated Antiretroviral Therapy on Plasma Viral Load. *AIDS* 2001. 15 (16): 2109–17.
32. Braithwaite, R. S., et al. Adherence, Virological and Immunological Outcomes for HIV-Infected Veterans Starting Combination Antiretroviral Therapies. *AIDS* 2007. 21 (12): 1579–89.
33. Carrico, A. W. Substance Use and HIV Disease Progression in the HAART Era: Implications for the Primary Prevention of HIV. *Life Sciences* 2011. 88 (21–22): 940–47.
34. MacArthur, G. J., et al. Evidence for the Effectiveness of Opiate Substitution Treatment in Relation to HIV Transmission in People Who Inject Drugs: A Systematic Review and Meta-Analysis. *BMJ* 2012. 345: e5945.
35. Uuskula, A., et al. Expanded Syringe Exchange Programs and Reduced HIV Infection among New Injection Drug Users in Tallinn, Estonia. *BMC Public Health* 2011. 11: 517.
36. Turner, K., et al. The Impact of Needle and Syringe Provision and Opiate Substitution Therapy on the Incidence of Hepatitis C Virus in Injecting Drug Users: Pooling of United Kingdom Evidence. Addiction (web published ahead of print), 2011.

APPENDIX B

Data Tables and Statistics

Table B.1 Annual Number of Diagnostic Tests for HIV Undertaken in the WHO European Region

Country	*Year*	*Number of HIV tests*	*Proportion of total (%)*	*Proportion of total for subregion (%)*	*Tests per 1,000 people*
Western Europe					
Andorra	2010	2,678	0	0	32
Austria	2008	751,749	2	7	90
Belgium	2010	651,095	1	6	61
Denmark	2006	154,332	0	1	28
Finland	2010	185,114	0	2	35
France	2010	4,977,463	10	47	80
Germany	2004	2,277,000	5	21	28
Greece	2009	2,083	0	0	0
Iceland	2010	7,318	0	0	23
Ireland	2009	184,980	0	2	42
Israel	2010	286,368	1	3	41
Italy	—	—	—	—	—
Liechtenstein	—	—	—	—	—
Luxembourg	2008	13,366	0	0	28
Malta	2007	11,957	0	0	29
Monaco	—	—	—	—	—
Netherlands	—	—	—	—	—
Norway	2006	188,550	0	2	40
Portugal	2005	917,117	2	9	86
San Marino	2010	5,090	0	0	164
Spain	—	—	—	—	—
Sweden	—	—	—	—	—
Switzerland	—	—	—	—	—
United Kingdom	—	—	—	—	—
	Subtotal	10,616,260			33
Central Europe					
Albania	2006	3,098	0	0	1
Bosnia and Herzegovina	2010	20,793	0	1	6

table continues next page

Table B.1 Annual Number of Diagnostic Tests for HIV Undertaken in the WHO European Region *(continued)*

Country	*Year*	*Number of HIV tests*	*Proportion of total (%)*	*Proportion of total for subregion (%)*	*Tests per 1,000 people*
Bulgaria	2010	150,000	0	4	20
Croatia	2008	38,996	0	1	9
Cyprus	2008	42,294	0	1	49
Czech Republic	2010	353,507	1	10	34
Hungary	2010	89,137	0	3	9
Macedonia, FYR	2007	10,574	0	0	5
Montenegro	2008	4,229	0	0	7
Poland	2010	187,600	0	6	5
Romania	2010	291,915	1	9	14
Serbia	2010	51,727	0	2	5
Slovak Republic	2010	109,261	0	3	20
Slovenia	2008	31,183	0	1	15
Turkey	2007	1,998,163	4	59	27
	Subtotal	3,382,477			17
Eastern Europe					
Armenia	2010	60,731	0	0	20
Azerbaijan	2010	353,772	1	1	41
Belarus	2010	638,190	1	2	66
Estonia	2010	78,054	0	0	58
Georgia	2010	25,370	0	0	6
Kazakhstan	2009	2.297,588	5	7	148
Kyrgyz Republic	2007	227,879	0	1	42
Latvia	2010	58,826	0	0	26
Lithuania	2010	178,554	0	1	54
Moldova	2006	216,566	0	1	60
Russian Federation	2010	25.209,546	53	75	178
Tajikistan	2010	280,281	1	1	41
Turkmenistan	2007	211,789	0	1	42
Ukraine	2008	2.280,442	5	7	50
Uzbekistan	2010	1.506,724	3	4	55
	Subtotal	33.624,312			119
	Total	47.623,049			57

Sources: ECDC/WHO European Office HIV Report 2011 and Russian AIDS Centre Report 2011.
Note: — = not available; HIV = human immunodeficiency virus; WHO = World Health Organization.

Table B.2 Annual Number of HIV Case Reports in Europe: 2006–10 and Cumulative Total

	Year, number of reports, and proportion of total						*Five-year period, 2006–10*		*Since start of reporting*	
Sub-region	*2006*	*2007*	*2008*	*2009*	*2010*	*2010 diagnoses per million*	*Cumulative total and proportion of total*	*Annual average*	*Cumulative total and proportion of total*	*Per million*
West	26,374	27,520	28,235	27,441	25,659	70	135,229	27,046	379,353	1,042
	30%	28%	25%	24%	22%		25%		30%	
Central Europe	1,870	2,039	2,247	2,464	2,478	13	11,098	2,220	33,308	172
	2%	2%	2%	2%	2%		2%		3%	
East	60,941	69,565	81,948	86,836	87,564	309	386,854	77,371	867,457	3,057
	68%	70%	73%	74%	76%		73%		68%	
All (100%)	89,185	99,124	112,430	116,741	115,701	138	533,181	106,636	1,280,118	1,521

Sources: ECDC/WHO European Office HIV Report 2011 and Russian AIDS Centre Report 2011.
Note: Data for the most recent years may be revised because of delays in case reporting. HIV = human immunodeficiency virus.

Table B.3 HIV Case Reports in Europe by Country and Main Exposure Categories

	Cumulative cases associated with MSM		*Cumulative cases associated with IDU*		*Cumulative cases associated with heterosexual exposure*			*All cases: cumulative total*	
Country	*Total*	*Proportion of cases associated with MSM of the main exposure categories (%)*	*Total*	*Proportion of cases associated with IDU exposure of the main exposure categories (%)*	*Total*	*Proportion of cases associated with heterosexual exposure of the main exposure categories (%)*	*Cumulative number of cases: MSM, IDU or heterosexual exposure only*	*Total*	*Case per million people*
Western Europe									
Andorra	17	37	13	28	16	35	46	57	679
Austria	—	—	—	—	—	—	—	—	—
Belgium	5,175	34	797	5	9,210	61	15,182	23,406	2,210
Denmark	2,350	43	485	9	2,604	48	5,439	5,872	1,076
Finland	891	38	360	15	1,112	47	2,363	2,778	524
France	10,227	34	1,254	4	18,867	62	30,348	43,199	696
Germany	17,905	57	3,045	10	10,540	33	31,490	40,144	488
Greece	4,918	65	347	5	2,355	31	7,620	10,531	946
Iceland	104	44	36	15	94	40	234	257	816
Ireland	1,391	28	1,247	25	2,307	47	4,945	5,599	1,262
Israel	1,403	24	913	16	3,513	60	5,829	6,579	933
Italy	3,988	33	1,096	9	6,927	58	12,011	14,438	404
Liechtenstein	—	—	—	—	—	—	—	—	—

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Table B.3 HIV Case Reports in Europe by Country and Main Exposure Categories *(continued)*

	Cumulative cases associated with MSM		*Cumulative cases associated with IDU*		*Cumulative cases associated with heterosexual exposure*			*All cases: cumulative total*	
Country	*Total*	*Proportion of cases associated with MSM of the main exposure categories (%)*	*Total*	*Proportion of cases associated with IDU exposure of the main exposure categories (%)*	*Total*	*Proportion of cases associated with heterosexual exposure of the main exposure categories (%)*	*Cumulative number of cases: MSM, IDU or heterosexual exposure only*	*Total*	*Case per million people*
Luxembourg	377	42	124	14	404	45	905	1,013	2,106
Malta	23	21	6	5	81	74	110	132	324
Monaco	—	—	—	—	—	—	—	—	—
Netherlands	10,217	61	713	4	5,849	35	16,779	18,599	1,125
Norway	1,450	33	575	13	2,387	54	4,412	4,626	970
Portugal	3,398	13	10,221	38	13,376	50	26,995	27,840	2,607
San Marino	17	39	11	25	16	36	44	68	2,194
Spain	6,696	43	2,011	13	6,809	44	15,516	17,183	594
Sweden	3,197	38	1,142	14	4,098	49	8,437	9,427	1,024
Switzerland	4,653	31	3,654	25	6,480	44	14,787	32,214	4,272
United Kingdom	50,610	47	5,436	5	51,906	48	107,952	115,391	1,885
Central Europe									
Albania	38	10	1	0	328	89	367	415	132
Bosnia and Herzegovina	33	22	21	14	95	64	149	170	45
Bulgaria	146	12	292	24	795	64	1,233	1,272	168
Croatia	452	56	58	7	292	36	802	862	195
Cyprus	228	35	9	1	409	63	646	681	790
Czech Republic	907	64	72	5	448	31	1,427	1,522	147
Hungary	1,061	76	22	2	322	23	1,405	1,953	195
Macedonia, FYR	12	38	2	6	18	56	32	37	18
Montenegro	47	47	3	3	51	50	101	119	191
Poland	1,049	13	5,844	74	960	12	7,853	14,393	378
Romania	121	7	23	1	1,555	92	1,699	4,764	223
Serbia	638	29	938	43	590	27	2,166	2,593	264
Slovak Republic	226	70	10	3	86	27	322	357	66
Slovenia	302	76	13	3	85	21	400	487	242
Turkey	218	9	83	4	2,053	87	2,354	3,683	50
Eastern Europe									
Armenia	16	2	386	43	497	55	899	971	316
Azerbaijan	22	1	1,681	71	662	28	2,365	2,723	312
Belarus	61	1	5,421	50	5,425	50	10,907	11,204	1,158

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Table B.3 HIV Case Reports in Europe by Country and Main Exposure Categories *(continued)*

	Cumulative cases associated with MSM		*Cumulative cases associated with IDU*		*Cumulative cases associated with heterosexual exposure*			*All cases: cumulative total*	
Country	*Total*	*Proportion of cases associated with MSM of the main exposure categories (%)*	*Total*	*Proportion of cases associated with IDU exposure of the main exposure categories (%)*	*Total*	*Proportion of cases associated with heterosexual exposure of the main exposure categories (%)*	*Cumulative number of cases: MSM, IDU or heterosexual exposure only*	*Total*	*Case per million people*
Estonia	93	2	3,670	87	449	11	4,212	7,692	5,736
Georgia	83	3	1,537	59	970	37	2,590	2,691	625
Kazakhstan	82	1	10,271	72	3,998	28	14,351	15,754	1,015
Kyrgyz Republic	2	0	2,163	71	864	29	3,029	3,287	607
Latvia	222	5	2,775	68	1,104	27	4,101	4,888	2,164
Lithuania	106	7	1,251	78	246	15	1,603	1,734	522
Moldova	36	1	2,580	42	3,480	57	6,096	6,356	1,750
Russian Federation	2,643	1	237,586	77	67,627	22	307,856	630,222	4,457
Tajikistan	0	0	1,490	68	691	32	2,181	2,768	405
Turkmenistan	0		0		0		0	2	0
Ukraine	406	0	87,771	60	59,185	40	147,362	153,108	3,329
Uzbekistan	29	0	11,410	71	4,730	29	16,169	24,057	885

Sources: ECDC/WHO European Office HIV Report 2011 and Russian AIDS Centre Report 2011.
Note: HIV = human immunodeficiency virus; IDU = injecting drug user; MSM = men who have sex with men; — = not available.

Table B.4 Annual Number of HIV Case Reports in Europe: 2006–10 and Cumulative Total by Gender

		Year, number of reports, and proportion of total					
Subregion	*Subgroup*	*2006*	*2007*	*2008*	*2009*	*2010*	*Cumulative total and proportion of total*
Western Europe	Male	17,762	19,135	19,866	19,645	18,776	264,105
	Female	8,571	8,339	8,330	7,744	6,861	110,560
	Female (%)	*33*	*30*	*30*	*28*	*27*	30
	All[a]	26,374	27,520	28,235	27,441	25,659	379,353
Central Europe	Male	1,338	1,470	1,662	1,878	1,885	22,776
	Female	484	471	486	493	454	8,353
	Female (%)	*27*	*24*	*23*	*21*	*19*	27
	All[a]	1,870	2,039	2,247	2,464	2,478	33,308
Eastern Europe[b]	Male	35,864	41,049	68,863	50,839	51,625	559,342
	Female	25,073	28,252	12,594	35,997	35,736	305,862
	Female (%)	*41*	*41*	*15*	*41*	*41*	35
	All[a]	60,941	69,565	81,948	86,836	87,564	867,457

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Table B.4 Annual Number of HIV Case Reports in Europe: 2006–10 and Cumulative Total by Gender *(continued)*

Subregion	*Subgroup*	*Year, number of reports, and proportion of total* 2006	2007	2008	2009	2010	*Cumulative total and proportion of total*
All	Male	54,964	61,654	90,391	72,362	72,286	846,223
	Female	34,128	37,062	21,410	44,234	43,051	424,775
	Female (%)	*38*	*38*	*19*	*38*	*37*	33
	All[a]	89,185	99,124	112,430	116,741	115,701	1,280,118

Sources: ECDC/WHO European Office HIV Report 2011; and Russian AIDS Centre Report 2011.
Note: Data for the most recent years may be revised because of delays in case reporting. The proportion of cases of females was reported in the text and a figure, and this was used to divide the total number of cases into males and females for individual years (proportion female 2006: 43.5%; 2007: 43%; 2008: 42%; 2009: 41.5%; 2010: 41%). HIV = human immunodeficiency virus.
a. Includes those where gender not reported.
b. For the Russian Federation data yearly number by gender was not given.

Table B.5 Annual Number of HIV Case Reports in Europe: 2006–10 and Cumulative Total by Age

Subregion	*Subgroup*	*Year, number of reports, and proportion of total* 2006	2007	2008	2009	2010	*Cumulative total and proportion of total*
Western Europe	<15	277	265	246	217	210	5,679
		1%	*1%*	*1%*	*1%*	*1%*	1%
	15–19	406	468	475	457	468	7,351
		2%	*2%*	*2%*	*2%*	*2%*	2%
	20–29	6,052	6,240	6,271	5,887	5,805	102,938
		23%	*23%*	*22%*	*21%*	*23%*	27%
	30–39	9,124	9,264	9,125	8,446	8,544	134,893
		35%	*34%*	*32%*	*31%*	*33%*	36%
	40–49	5,657	6,052	6,500	6,263	6,451	71,600
		21%	*22%*	*23%*	*23%*	*25%*	19%
	50+	3,130	3,400	3,676	3,790	3,900	40,630
		12%	*12%*	*13%*	*14%*	*15%*	11%
	Unknown	1,728	1,831	1,942	2,381	281	16,262
		7%	*7%*	*7%*	*9%*	*1%*	4%
	All[a]	26,374	27,520	28,235	27,441	25,659	379,353
	<15	49	38	34	26	28	2,641
		3%	*2%*	*2%*	*1%*	*1%*	8%
	15–19	66	82	70	74	50	1,549
		4%	*4%*	*3%*	*3%*	*2%*	5%
	20–29	651	701	727	792	834	11,360
		35%	*34%*	*32%*	*32%*	*34%*	34%
Central Europe	30–39	602	590	723	856	824	8,746
		32%	*29%*	*32%*	*35%*	*33%*	26%
	40–49	268	267	339	384	385	3,790
		14%	*13%*	*15%*	*16%*	*16%*	11%
	50+	142	203	220	256	260	2,223
		8%	*10%*	*10%*	*10%*	*10%*	7%
	Unknown	92	158	134	76	97	2,999
		5%	*8%*	*6%*	*3%*	*4%*	9%

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Table B.5 Annual Number of HIV Case Reports in Europe: 2006–10 and Cumulative Total by Age *(continued)*

Subregion	*Subgroup*	*Year, number of reports, and proportion of total* 2006	2007	2008	2009	2010	*Cumulative total and proportion of total*
	All[a]	1,870	2,039	2,247	2,464	2,478	33,308
	<15	763	980	1,585	1,916	2,145	10,563
		1%	*1%*	*2%*	*2%*	*2%*	1%
Eastern Europe[b]	15–19	3,098	2,754	2,588	2,259	1,776	74,741
		5%	*4%*	*3%*	*3%*	*2%*	9%
	20–29	23,551	27,209	36,828	36,784	33,906	369,477
		39%	*39%*	*45%*	*42%*	*39%*	43%
	30–39	18,629	23,097	28,799	32,554	34,787	219,989
		31%	*33%*	*35%*	*37%*	*40%*	25%
	40–49	5,881	7,218	8,691	9,864	11,071	65,213
		10%	*10%*	*11%*	*11%*	*13%*	8%
	50+	1,919	2,409	2,946	3,436	3,873	20,935
		3%	*3%*	*4%*	*4%*	*4%*	2%
	Unknown	7,100	5,899	512	22	6	106,539
		12%	*8%*	*1%*	*0%*	*0%*	12%
	All[a]	60,941	69,565	81,948	86,836	87,564	867,457
	<15	1,089	1,283	1,865	2,159	2,383	18,883
		1%	*1%*	*2%*	*2%*	*2%*	1%
	15–19	3,570	3,304	3,133	2,790	2,294	83,641
Eastern Europe[b]		*4%*	*3%*	*3%*	*2%*	*2%*	7%
	20–29	30,254	34,150	43,826	43,463	40,545	483,775
		34%	*34%*	*39%*	*37%*	*35%*	38%
Total	30–39	28,355	32,951	38,647	41,856	44,155	363,628
		32%	*33%*	*34%*	*36%*	*38%*	28%
	40–49	11,806	13,537	15,530	16,511	17,907	140,603
		13%	*14%*	*14%*	*14%*	*15%*	11%
	50+	5,191	6,012	6,842	7,482	8,033	63,788
		6%	*6%*	*6%*	*6%*	*7%*	5%
	Unknown	8,920	7,888	2,588	2,479	384	125,800
		10%	*8%*	*2%*	*2%*	*0%*	10%
	All[a]	89,185	99,124	112,430	116,741	115,701	1,280,118

Sources: ECDC/WHO European Office HIV Report 2011; and Russian AIDS Centre Report 2011.
Note: Data for the most recent years may be revised because of delays in case reporting. The annual proportion by age group was reported in a figure, and this was used to divide total number of cases into age groups for the individual years. HIV = human immunodeficiency virus.
a. Includes those where age not reported.
b. The Russian Federation data yearly number by age was not reported.

Table B.6 Annual Average HIV Case Reports in Europe: 2006–10 by Country and Exposure

	Cases associated with MSM		*Cases associated with injecting drug use*		*Cases associated with heterosexual exposure*		*Cases associated with mother-to-child transmission*		*Exposure not known or other[a]*			*All cases*	
Country	*Total*	*Cases per million people*	*Total*	*Cases per million people*	*Total*	*Cases per million people*	*Total*	*Cases per million people*	*Total*	*Cases per million people*	*Proportion of total*	*Total*	*Cases per million people*
Western Europe													
Andorra	2	19	0	0	1	10	0	—	0	5	14%	3	33
Belgium	343	32	16	2	415	39	9	1	320	30	29%	1,102	104
Denmark	119	22	13	2	125	23	3	1	9	2	3%	269	49
Finland	54	10	10	2	84	16	1	0	32	6	18%	180	34
France	1,328	21	135	2	2,130	34	29	0	1,659	27	31%	5,281	85
Germany	1,572	19	128	2	695	8	19	0	410	5	15%	2,824	34
Greece	249	22	10	1	112	10	2	0	173	16	32%	546	49
Iceland	2	7	3	10	6	20	0	0	3	10	21%	15	46
Ireland	108	24	39	9	162	36	6	1	60	13	16%	375	84
Israel	123	17	42	6	191	27	11	2	15	2	4%	382	54
Italy	650	18	151	4	1,096	31	7	0	351	10	16%	2,255	63
Luxembourg	20	41	3	6	23	47	0	0	2	4	4%	47	98
Malta	3	8	1	2	13	32	0	0	3	8	16%	20	50
Netherlands	714	43	8	0	327	20	7	0	61	4	5%	1,117	68
Norway	86	18	11	2	163	34	5	1	7	2	3%	273	57
Portugal	287	27	282	26	976	91	9	1	41	4	3%	1,595	149
San Marino	0	0	0	0	0	6	0	0	2	77	92%	3	84
Spain	1,079	37	233	8	974	34	8	0	274	9	11%	2,568	89
Sweden	110	12	33	4	207	22	10	1	60	7	14%	420	46
Switzerland	261	35	36	5	281	37	4	1	134	18	19%	715	95
United Kingdom	2,659	43	169	3	3,697	60	106	2	425	7	6%	7,057	115
TOTAL	9,768	27	1,323	4	11,676	32	237	0	4,043	11		27,046	74

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Table B.6 Annual Average HIV Case Reports in Europe: 2006–10 by Country and Exposure *(continued)*

	Cases associated with MSM		*Cases associated with injecting drug use*		*Cases associated with heterosexual exposure*		*Cases associated with mother-to-child transmission*		*Exposure not known or other[a]*			*All cases*	
Country	*Total*	*Cases per million people*	*Total*	*Cases per million people*	*Total*	*Cases per million people*	*Total*	*Cases per million people*	*Total*	*Cases per million people*	*Proportion of total*	*Total*	*Cases per million people*
Central Europe													
Albania	4	1	0	0	36	12	2	1	3	1	7%	47	15
Bosnia and Herzegovina	3	1	0	0	4	1	0	0	0	0	0%	7	2
Bulgaria	22	3	52	7	59	8	1	0	0	0	0%	135	18
Croatia	44	10	1	0	12	3	0	0	1	0	2%	59	13
Cyprus	13	16	1	1	23	26	0	0	3	3	7%	39	46
Czech Republic	92	9	7	1	36	3	0	0	5	0	4%	139	13
Hungary	81	8	1	0	18	2	1	0	33	3	25%	133	13
Macedonia, FYR	2	1	0	0	2	1	0	0	0	0	8%	5	2
Montenegro	7	11	0	0	3	5	0	0	1	1	7%	11	18
Poland	71	2	70	2	72	2	3	0	657	17	75%	874	23
Romania	15	1	2	0	101	5	7	0	57	3	31%	182	9
Serbia	63	6	9	1	27	3	1	0	15	2	13%	114	12
Slovak Republic	26	5	2	0	8	2	0	0	5	1	12%	40	7
Slovenia	29	14	0	0	4	2	0	0	7	3	16%	40	20
Turkey	18	0	2	0	226	3	4	0	144	2	37%	394	5
Total	489	3	147	1	632	3	20	0	931	5	—	2,220	11
Eastern Europe													
Armenia	2	1	37	12	72	24	3	1	7	2	6%	121	39
Azerbaijan	3	0	263	30	90	10	5	1	44	5	11%	405	46
Belarus	7	1	234	24	678	70	20	2	11	1	1%	949	98

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Table B.6 Annual Average HIV Case Reports in Europe: 2006–10 by Country and Exposure *(continued)*

	Cases associated with MSM		*Cases associated with injecting drug use*		*Cases associated with heterosexual exposure*		*Cases associated with mother-to-child transmission*		*Exposure not known or other*[a]			*All cases*	
Country	*Total*	*Cases per million people*	*Total*	*Cases per million people*	*Total*	*Cases per million people*	*Total*	*Cases per million people*	*Total*	*Cases per million people*	*Proportion of total*	*Total*	*Cases per million people*
Estonia	0	0	98	73	18	13	4	3	406	303	77%	526	392
Georgia	11	3	194	45	142	33	10	2	3	1	1%	360	84
Kazakhstan	13	1	1,202	77	615	40	27	2	169	11	8%	2,026	131
Kyrgyz Republic	0	0	305	56	139	26	14	3	34	6	7%	492	91
Latvia	17	8	102	45	128	57	5	2	59	26	19%	311	138
Lithuania	7	2	77	23	26	8	0	0	16	5	13%	127	38
Moldova	4	1	143	39	527	145	11	3	25	7	3%	710	196
Russian Federation	260	2	13,910	98	8,128	57	430	3	29,844	211	57%	52,572	372
Tajikistan	0	0	231	34	128	19	7	1	87	13	19%	452	66
Turkmenistan	0	0	0	0	0	0	0	0	0	0	—	0	0
Ukraine	66	1	7,056	153	7,385	161	189	4	365	8	2%	15,061	327
Uzbekistan	0	0	1,459	54	744	27	68	3	986	36	30%	3,257	120
Total	391	1	25,310	89	18,820	66	793	0	32,057	116	—	77,371	273

Sources: ECDC/WHO European Office HIV Report 2011 and Russian AIDS Centre Report 2011.
Note: HIV = human immunodeficiency virus; MSM = men who have sex with men; — = not available.
a. Between 2006 and 2010 there were 740 with other transmission risk, that is, either hemophiliac/transfusion recipient or nosocomial infection.

Table B.7 Characteristics of HIV Prevalence Studies among PWID across Europe

Country Name		Seroprevalence studies			Best Estimates of seroprevalence studies[a]						Behavioral studies[b]		
		Number of studies[c]		Repeated	Area covered	Sites[c]	Recruitment strategy	n	Year	Reference	Undertaken/Repeated		
Western Europe	Austria	1	Y	—	National	41	Drug treatment and LT	417	2009	[14]	N		—
	Belgium	1	Y	—	City	1	Drug treatment and LT	329	2009		Y	Y	—
	Denmark	1	Y	—	National	5	Overdose death post mortem	188	2009	[14]	N		—
	Finland	1	Y	Methods inconsistent	National	4	Needle exchanges	1,560	2009	[14]	Y	Y	—
	France	3	Y	Methods inconsistent	City	5	Community and LT	342	2009	[14]	Y	Y	—
	Germany	2	Y	Last data 2007	National		Overdose death post mortem	1,394	2009	[14]	N		—
	Greece	3	Y	—	National	19	Drug treatment, HIV test centers, and LT	741	2009	[14]	Y	Y	—
	Iceland	—		—	—	—	—	—	—	—	N		—
	Ireland	2	N	—	City	1	Drug treatment	64	2003	[14]	Y	Y	—
	Israel	1	N	—	National	1	Note review of addiction treatment	743	2003/05	[15]	N		—
	Italy	4	Y	—	National	522	Drug treatment centers	63,989	2009	[14]	N		—
	Luxembourg	1	N	—	National	13	Drug treatment, HIV test centers, prisons, antenatal care, and LT	202	2005	[14]	Y	Y	—
	Malta	1	N	—	National	1	Drug treatment centers	175	2006	[14]	N		—
	Netherlands	—	Y	Cohort study (n<50)	—	—	—	—	—	—	Y	Y	—
	Norway	2	Y	—	National	14	Drug treatment centers	3,905	2009	[14]	N		—
	Portugal	3	Y	—	National		Drug treatment centers	2,381	2009	[14]	N		—
	Spain	8	Y	Last data 2007	National		Drug treatment centers	8,643	2007	[14]	Y	Y	—

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Table B.7 Characteristics of HIV Prevalence Studies among PWID across Europe *(continued)*

Country Name	Seroprevalence studies: Number of studies[c]			Repeated	Best Estimates of seroprevalence studies[a]: Area covered	Sites[c]	Recruitment strategy	n	Year	Reference	Behavioral studies[b]: Undertaken/Repeated		
	Sweden	5	Y	Prison sample	—	2	Prisons, HIV testing	259	2009	[34]	N		—
	Switzerland	2	Y	No recent data found	City	5	HIV testing	1,063	1996/2006	[123]	Y	Y	—
	United Kingdom	9	Y	—	National[a]	4	Drug treatment, HIV testing, NSP, and LT	5,590	2009	[14]	Y	Y	—
Central Europe	Albania	2	Y	—	City	1	Community	200	2008	[124]	Y	Y	2005 and 2008 only
	Bosnia and Herzegovina	2	Y	—	City[a]	3	Community	780	2009	[26]	Y	Y	2007 and 2009 only
	Bulgaria	3	Y	—	National	8	Community and brothels	1,421	2008	[125]	Y	Y	Since 2004 annual
	Croatia	7	Y	Methods inconsistent	City	3	Drug treatment, HIV test centers and LT	399	2007	[14]	Y	N	—
	Cyprus	2	Y	—	National		Drug treatment	89	2009	[14]	N		
	Czech Republic	3	Y	—	National	—	Drug treatment, HIV test centers, prisons and LT	1,363	2009	[14]	Y	Y	Details not clear
	Hungary	6	Y	—	National	18	Drug treatment, needle exchanges	590	2009	[14]	Y	N	Multiple surveys at different time points
	Macedonia, FYR	1	Y	—	National	6	Community	597	2007	[18]	Y	Y	—
	Montenegro	1	Y	First study in 2008 due to be repeated every 2 or 3 years	—	—	Community—RDS	317	2008	[40]	Y	Y	—
	Poland	2	Y	—	National	—	Public health laboratories	1,713	2009	[14]	Y	N	Under consideration
	Romania	2	Y	Methods inconsistent	City	1	Community—RDS	449	2009	[126]	Y	Y	Repeated 2010
	Serbia	2	Y	First study in 2008 due to be repeated 2010	City[a]	3	Community	960	2010	[24]	Y	Y	Will be repeated every 2–3 years
	Slovak Republic	1	Y	—	City	1	Drug treatment centers	97	2009	[14]	N		

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Table B.7 Characteristics of HIV Prevalence Studies among PWID across Europe *(continued)*

Country Name		*Seroprevalence studies*			*Best Estimates of seroprevalence studies*[a]						*Behavioral studies*[b]		
		Number of studies[c]	*Repeated*		*Area covered*	*Sites*[c]	*Recruitment strategy*	*n*	*Year*	*Reference*	*Undertaken/Repeated*		
	Slovenia	3	Y	—	National	18	Drug treatment centers	266	2009	[14]	Y	Y	
	Turkey	2	N	—	National	3	Community	68	2006–07	[16]	Y	N	
	Armenia	1	Y	—	—	—	—	—	2007	[127]	Y	Y	
Central Europe	Azerbaijan	2	Y	Methods inconsistent	City	7	Community	1,000	2007–08	[36]	Y	Y	Methods inconsistent
	Belarus	2	Y	—	National	16	—	1,770	2008	[25]	Y	Y	Methods and frequency inconsistent
Eastern Europe	Estonia	7	N	—	City[a]	2	Community—RDS	350	2007		Y	Y	
	Georgia	9	Y	—	City	6	Community	1,289	2008–09	[23]	Y	Y	
	Kazakhstan	1	Y	—	National	22	Community	4,860	2009	[20]	Y	Y	
	Kyrgyz Republic	1	Y	—	National	5	Community—RDS	900	2009	[20]	Y	Y	
	Latvia	3	Y	—	National	—	Drug treatment and HIV testing	987	2003	[14]	Y	Y	
	Lithuania	8	Y	Methods and sites inconsistent	National	—	Drug treatment, needle exchange and HIV testing	1,112	2003	[14]	Y	Y	
	Moldova	2	Y	—	City[a]	2	Community	663	2009	[45]	Y	Y	Method has varied over time
	Russian Federation	16	Y	Methods and sites inconsistent	City[a]	5	—	1,799	2008/9	[66]	Y	Y	Consistency over time not clear
	Tajikistan	2	Y		—	8	Community—RDS	1,657	2009	[20]	Y	Y	
	Turkmenistan	—			—	—	—	—	—	—			
	Ukraine	8	Y		National	28	Community	6,459	2009	[22]	Y	Y	
	Uzbekistan	2	Y		National	14	Community	3,743	2007	[19]	Y	Y	

Note: HIV = human immunodeficiency virus; LT = low threshold; N = no; n = sample size; NSP = Needle Syringe Program; RDS = respondent-driven sampling; Y = Yes; — = not available.

a. Estimates from single studies with the exception of the following countries where a weighted estimate was calculated from multiple studies (n): Bosnia and Herzegovina (2), Estonia (2), Moldova (2), the Russian Federation (2), and United Kingdom (3).

b. Behavioral studies not necessarily linked into biological data—this column documents only whether they have been undertaken among people who inject drugs.

c. Number of studies identified during the period 2005–11.

Table B.8 Characteristics of HIV Prevalence Studies among FSWs across Europe

Country name		Seroprevalence studies			Best estimates of seroprevalence studies[a]						Behavioral studies[b]	
		Number of studies[c]		*Repeated*	*Area covered*	*Sites*[c]	*Recruitment strategy*	*n*	*Year*	*Reference*	*Undertaken*	
Western Europe	Austria	4	N		National	—	STI Clinics	1,184	2002	[128]	N	
	Belgium	1	N		City	1	—	1,016	2008	[10]	Y	Y
	Denmark					—	—		—	—	N	
	Finland					—	—		—	—	N	
	France	1			City	1	—	46	2008	[10]	N	
	Germany	2	N		National	—	STI Clinics	3,880	2010–11	[77]	N	
	Greece	1	N		City	1	STI Clinics	299	2005	[129]	N	
	Iceland				—	—	—	—	—	—	N	
	Ireland				—	—	—	—	—	—	N	
	Israel	2	N		City	1	Work	300	—	[130]	Y	N
	Italy	4	Y	Methods inconsistent	City	1	HIV Clinics	229	1992–07	[86]	Y	Y
	Luxembourg				—	—	—	—	—	—	Y	Y
	Malta				—	—	—	—	—	—	N	
	Netherlands	2	N		National[a]	1	Clinics and Work	1,417	2002–05	[80, 128]	Y	Y
	Norway	1	N		City	1	Clinics and Work	746	2008	[10]	N	
	Portugal	1	N		City	1	Work (street)	96	2000–01	[10, 84]	N	
	Spain	4	N		City[a]	4	STI Clinics	4,485	2000–01	[82, 83]	Y	Y
	Sweden	1	N	n<50	Region	1	Prison	45	2006–07	[10]	N	
	Switzerland				—	—	—	—	—	—	Y	Y
Central Europe	United Kingdom	5	N		City	1	STI clinics and Work	268	2008–09	[82, 83, 85]	Y	Y
	Albania	1	N		City	1	RDS	90	2008	[44]	Y	N
	Bosnia and Herzegovina	1	N		City	—	—	42	2007	[125]	Y	N

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Table B.8 Characteristics of HIV Prevalence Studies among FSWs across Europe *(continued)*

Country name		*Seroprevalence studies* — *Number of studies*[c]	*Repeated*		*Best estimates of seroprevalence studies*[a] — *Area covered*	*Sites*[c]	*Recruitment strategy*	*n*	*Year*	*Reference*	*Behavioral studies*[b] — *Undertaken*		
	Bulgaria	3	Y		National	8	—	799	2008	[17]	Y	Y	
	Croatia	1	N		City	7	NGO	43	2003–05	[131]	Y	N	
	Czech Republic	2	N		City	7	—	585	1999–00	[132]	Y	N	
	Hungary	1	N		—	—	Screening	500	2006	[10]	N		
	Macedonia, FYR	3	Y	n<70	National[a]	—	—	118	2006, 2007	[18]	Y	N	
	Montenegro		N				—		—		N		
	Poland	2	Y		City	13	Work/Clinics	650	2002–05	[128]	Y	N	
	Romania	1			City	1	Work (street)	204	2006	[10]	Y	N	
	Serbia	1	Y	2 years	City	1	—	250	2010	[133]	Y	Y	2 years
	Slovak Republic				—	—	—		—		N		
	Slovenia				—	—	—		—		N		
	Turkey	1	N		City	3	Work	252	2006–07	[16]	Y	N	
Eastern Europe	Armenia	3	Y	Infrequent	National	3	Work/HIV and STI Clinics	250	2005	[128]	Y	N	
	Azerbaijan	2	Y	2 years	City	2	Work	300	2007–08	[134]	Y	Y	2 years
	Belarus	3	Y	Methods unclear	City[a]	7	—	937	2004–09	[25, 135]	Y	N	
	Estonia	1	N		City	1	Work	257	2005–06	[136]	Y	Y	
	Georgia	4	Y	2 years so far	City	1	Work	160	2009	[137]	Y	Y	
	Kazakhstan	6	Y		National	2	Work/STI Clinics	1,960	2005	[128]	Y	Y	
	Kyrgyz Republic	4	Y		City	2	STI Clinics	352	2006	[91]	Y	Y	

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Table B.8 Characteristics of HIV Prevalence Studies among FSWs across Europe *(continued)*

		Seroprevalence studies			*Best estimates of seroprevalence studies*[a]						*Behavioral studies*[b]		
Country name		*Number of studies*[c]		*Repeated*	*Area covered*	*Sites*[c]	*Recruitment strategy*	*n*	*Year*	*Reference*	*Undertaken*		
Eastern Europe	Latvia	2	Y	2 years so far	City	1	Work	93	2004	[128]	N		
	Lithuania	2	Y		City	1	Work	101	2005	[128]	Y	Y	
	Moldova	4	Y		City	1	RDS	300	2009	[45]	Y	Y	
	Russian Federation	17	Y	Methods and sites inconsistent	National[a]	48	—	4,209	2000–09	[32, 66, 78, 79, 128, 138]	Y	Y	
	Tajikistan	4	Y		Region	5	STI Clinics	1,800	2008	[32, 66, 78, 79, 91, 128, 138]	Y	Y	
	Turkmenistan					—	—		—		N		
	Ukraine	3	Y	2 years so far	City[a]	16	Work	2,278	2008	[22, 139]	Y	Y	2 years
	Uzbekistan	3	Y		City[a]	Multiple	—	2,000	2005–07	[140]	Y	Y	2 years

Note: FSW = female sex worker; HIV = human immunodeficiency virus; N = No; n = sample size; NGO = nongovernmental organization; RDS = respondent-driven sampling; STI = sexually transmitted infection; SW = sex worker; Y = Yes; — = not available.

a. Estimates from single studies with the exception of the following countries where a weighted estimate was taken from multiple studies in Belarus (2), Montenegro (2), the Netherlands (2), Spain (2), the Russian Federation (7), Ukraine (2), and Uzbekistan (unclear—possibly 3 between 2005–07).

b. Behavioral studies not necessarily linked into biological data; this column documents only whether they have been undertaken among SWs.

c. Number of studies identified during the period 2005–11.

Table B.9 Characteristics of HIV Prevalence Studies among Male and Transgender SWs across Europe

Country name		*Number of studies*[c]	*Area covered*	*Sites*[a]	*Recruitment strategy*	*n*	*Year*	*Behavioral data*	*Reference*
Western Europe	Belgium	1	City	1	Outreach	120	1999–2004	Yes	[141]
	Italy	2	City	1	Clinics	752	1992–2007	Yes	[86]
	Netherlands	1	City	2	Clinics/Work	70	2002–05	Yes	[142]
	Spain	1	National	19	Clinics	1,935	2000–07	Yes	[143]
	United Kingdom	2	City	1	STI clinics	636	1999–2003	Yes	[120]
Eastern Europe	Russian Federation	1	City	1	Work	50	2005–06	Yes	[119]

Note: HIV = human immunodeficiency virus; n = sample size; STI = sexually transmitted infection; SWs = sex workers.
a. Number of studies identified during the period 2005–11.

Table B.10 Characteristics of HIV Prevalence Studies among MSM across Europe

		Seroprevalence studies			*Best estimates of seroprevalence studies*[a]						*Behavioral studies*[b]		
Country Name		*Number of studies*[c]	*Repeated*		*Area covered*	*Sites*[c]	*Recruitment strategy*	*n*	*Year*	*Reference*	*Undertaken/Repeated*		
Western Europe	Austria				—	—	—	—	—	—	N		
	Belgium	3	N		City	2	Community	649	2009–10	[98]	Y	Y	
	Denmark				—	—	—	—	—	—	Y	Y	
	Finland				—	—	—	—	—	—	Y	N	
	France	2	N		City	1	Community	886	2009	[105]	Y	Y	
	Germany				—	—	—	—	—	—	Y	Y	
	Greece				—	—	—	—	—	—	Y	Y	NGO service provider data
	Iceland				—	—	—	—	—	—	N		
	Ireland				—	—	—	—	—	—	Y	Y	
	Israel				—	—	—	—	—	—	Y	N	
	Italy	2	N		City	1	Community—TLS	342	2008–09	[102]	Y	N	
	Luxembourg				—	—	—	—	—	—	N		
	Malta				—	—	—	—	—	—	N		
	Netherlands	4	N		National	—	STI clinics	3,483	2004		Y	Y	
	Norway				—	—	—	—	—	—	Y	Y	
	Portugal	1	N		City	1	STI clinics	468	2002	[128]	N		
	Spain	5	Y	Regional	National	19	STI clinics	4,165	2003	[128]	Y	Y	
	Sweden				—	—	—	—	—	—	Y	Y	
	Switzerland	3		Unclear if still ongoing	National	—	HIV testing	1,091	2004	[128]	Y	Y	
	United Kingdom	11	Y		City	5	Community—TLS	3,501	2009	[96]	Y	Y	
Central Europe	Albania	2	Y	2 surveys, 3 years	City	1	Community—RDS	198	2008	[103]	Y	Y	
	Bosnia and Herzegovina	1	N		—	—	—	224	2007	[125]	Y	N	

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Table B.10 Characteristics of HIV Prevalence Studies among MSM across Europe *(continued)*

		Seroprevalence studies			*Best estimates of seroprevalence studies*[a]						*Behavioral studies*[b]		
Country Name		*Number of studies*[c]		*Repeated*	*Area covered*	*Sites*[c]	*Recruitment strategy*	*n*	*Year*	*Reference*	*Undertaken/Repeated*		
	Bulgaria	1	Y		National	3	HIV testing	452	2008	[17]	Y	Y	
	Croatia	3	N	Unclear	City	1	Community—RDS	360	2006	[99]	Y	N	
	Cyprus				—	—	—	—	—	—	N		
	Czech Republic	2	Y		City	1	Community—TLS	390	2008–09	[102]	Y	N	
	Hungary	2	Y	2 surveys, 2 years	—	—	—	388	2009	[144]	Y	N	Unclear
	Macedonia, FYR	1	Y	Unclear	National	—	Community	37	2007	[18]	Y	Y	
	Montenegro				—	—	—	—	—	—	N		
	Poland	1	N		National	8	Community	404	2004	[101]	Y	N	
	Romania	1	N		City	1	Community—TLS	389	2008–09	[102]	Y	N	
	Serbia	2	Y	First in 2008	City	2	Community	—	2008	[24]	Y	Y	First in 2008
	Slovak Republic	1	N		City	1	Community—TLS	345	2008–09	[102]	Y	N	
	Slovenia	2	Y		City	1	Community—TLS	387	2008–09	[102]	Y	Y	
	Turkey	1	N		National	—	Community	166	2006–07	[16]	Y	N	
	Armenia	1	N		—	—	—	—	2007	[127]	Y	Y	Last data in 2007, small sample sizes
Eastern Europe	Azerbaijan	1	N		City	1	Community	100	2007–08	[36]	Y	N	
	Belarus	2	Y		National	7	—	480	2009	[25]	Y	Y	
	Estonia	1	N		City	1	Community and health services	79	2008	[35]	Y	Y	
	Georgia	1	Y	2 surveys, 2 years apart	City	1	Community—RDS	136	2007	[104]	Y	Y	Last data for 2007
	Kazakhstan	2	Y		—	—	Sentinel surveillance	880	2009	[97]	Y	Y	
	Kyrgyz Republic	1	Y		—	—	Community—RDS	84	2008	[106]	Y	Y	

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Table B.10 Characteristics of HIV Prevalence Studies among MSM across Europe *(continued)*

	Seroprevalence studies			*Best estimates of seroprevalence studies*[a]						*Behavioral studies*[b]		
Country Name	*Number of studies*[c]	*Repeated*		*Area covered*	*Sites*[c]	*Recruitment strategy*	*n*	*Year*	*Reference*	*Undertaken/Repeated*		
Latvia				—	—	—	—	—	—	Y	N	
Lithuania	1	Y	2 surveys (2008 and 2009)	—	—	—	—	2009	[145]	Y	Y	
Moldova	1	Y		City	1	—	—	2009	[45]	Y	Y	
Russian Federation	5	Y	Methods inconsistent	City	5	Community	1,179	2006	[79] [66]	Y	Y	Methods and sites inconsistent
Tajikistan				—	—	—	—	—	—	Y	N	
Turkmenistan				—	—	—	—	—	—	N		
Ukraine	1	Y	Methods inconsistent	National	13	Community	—	2009	[22]	Y	Y	
Uzbekistan	1	Y		National	4	—	—	2009	[94]	Y	Y	

Note: HIV = human immunodeficiency virus; MSM = men who have sex with men; N = No; n = sample size; NGO = nongovernmental organization; RDS = respondent-driven sampling; STIs = sexually transmitted infections; TLS = time location sampling; Y = Yes; — = not available.
a. Estimates from single studies with the exception of the following countries where a weighted estimate was calculated from multiple studies in the Russian Federation (2).
b. Behavioral studies not necessarily linked to biological data—this column documents only whether they have been undertaken among MSM.
c. Number of studies identified during the period 2005–11.

Table B.11 Countries with Population Size Estimates of PWID, SWs, and MSM

		PWID estimate			*MSM estimate*			*SW estimate*		
Country		*Year*	*n*	*Reference*	*Year*	*n*	*Reference*	*Year*	*n*	*Reference*
Western Europe	Austria	2000	17,500	[146]	—	—	—	2000	29,060	[147]
	Belgium	1997	25,800	[146]	—	—	—	2000	16,972	[147]
	Denmark	2006	12,754	[14]	—	—	—	2000	6,370	[147]
	Finland	2002	15,650	[146]	—	—	—	2000	5,625	[147]
	France	1999	122,000	[146]	—	—	—	2000	35,421	[147]
	Germany	2005	94,250	[14]	—	—	—	2000	387,719	[147]
	Greece	2009	10,658	[14]	—	—	—	2000	12,446	[147]
	Iceland	—	—	—	—	—	—	No	—	—
	Ireland	1996	6,289	[146]	—	—	—	No	—	—
	Israel	—	—	—	—	—	—	No	—	—
	Italy	1996	326,000	[146]	—	—	—	2000	64,468	[147]
	Luxembourg	2007	1,482	[14]	—	—	—	2000	2,828	[147]
	Malta	—	—	—	—	—	—	No	—	—
	Netherlands	2008	2,390	[14]	—	—	—	2000	23,979	[147]
	Norway	2008	10,238	[14]	—	—	—	2000	3,974	[147]
	Portugal	2005	16,425	[14]	—	—	—	2007	9,695	[90]
	Spain	1998	83,972	[146]	—	—	—	2000	61,868	[147]
	Sweden	2007	29,513	[14]	—	—	—	2000	2,976	[147]
	Switzerland	1997	31,653	[146]	—	—	—	No	—	—
	United Kingdom	2004–07	147,900	[14]	—	5% men "not entirely heterosexual"	[148]	2000	83,043	[147]

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Table B.11 Countries with Population Size Estimates of PWID, SWs, and MSM *(continued)*

		PWID estimate			*MSM estimate*			*SW estimate*		
Country		*Year*	*n*	*Reference*	*Year*	*n*	*Reference*	*Year*	*n*	*Reference*
Central Europe	Albania	Yes, year not known	4,000	GF R5 Proposal midpoint [149]	—	—	—	2004	7,217	[147]
	Bosnia and Herzegovina	2009	7,500	[150]	—	—	—	2004	6,665	[147, 149]
	Bulgaria	2005	20,250	[146]	—	—	—	2004	12,962	[147]
	Croatia	2009	3,145	[14]	—	—	—	2004	7,480	[147]
	Cyprus	2009	481	[14]	—	—	—	—		[147]
	Czech Republic	2009	35,300	[14]	—	—	—	2004	13,842	[147]
	Hungary	2008–09	5,699	[14]	—	—	—	2004	18,018	[147]
	Macedonia, FYR	2007	17,500	[151]	—	—	—	2004	6,120	[147]
	Montenegro	Yes, year not known	1,980	—	—	—	—	2004	1,284	[147]
	Poland	—	—	—	—	—	—	2004	45,968	[147]
	Romania	2009	17,767	[14]	—	—	—	2004	32,065	[147]
	Serbia	Yes, year not known	18,000	[133]	2006	3,745–10,691 according to the multiplier method and between 4,476–5,996 using capture-recapture. 2.4% of men had AI with a man in past 12 months	[152]	2004	14,994	[147]
	Slovak Republic	2006	18,841	[14]	—	—	—	2004	7,642	[147]
	Slovenia	2001	7,320	[146]	1999–2001	3.3% some homosexual experience; 1% AI	—	2004	6,323	[147]
	Turkey	—	—	—	—		—	2004	29,000	[153]

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Table B.11 Countries with Population Size Estimates of PWID, SWs, and MSM *(continued)*

		PWID estimate			*MSM estimate*			*SW estimate*		
Country		*Year*	*n*	*Reference*	*Year*	*n*	*Reference*	*Year*	*n*	*Reference*
Eastern Europe	Armenia	2000	2,000	[146]		17,000–65,000	[154]	2004	11,770	[147]
	Azerbaijan	2006	300,000	[146]	No	—	—	2004	43,723	[147, 149]
	Belarus	2005	6,308	[146]	No	—	—	2004	20,605	[147, 149]
	Estonia	2004	13,886	[14]	No	—	—	2004	3,202	[147]
	Georgia	2004	127,833	[146]	No	—	—	2004	16,135	[147]
	Kazakhstan	2006	124,400	[92]		1.9% of men aged >15 have ever had sex with a man	[155]	2004	32,080	[147, 149]
	Kyrgyz Republic	2006	25,000	[146]		2% of sexually active men	[156]	2004	5,466	[147, 149]
	Latvia	—	3,429	Imputed using [14]	No	—	—	2004	7,545	[147]
	Lithuania	2006	5,123	[146]	No	—	—	2004	4,951	[147]
	Moldova	2001	3,810	[146]		2% of men reporting AI	[157]	2005	5,000	[149]
	Russian Federation	2007	1,825,000	[146]	No	—	—	2004	263,480	[147]
	Tajikistan	2006	25,000	[158]	No	—	—	2004	5,988	[147]
	Turkmenistan	—			No	—	—	2004	2,487	[147]
	Ukraine	2006	375,000	[146]	No	—	—	2004	79,180	[147]
	Uzbekistan	2006	80,000	[146]	No	—	—	2004	25,671	[147]

Note: AI = anal intercourse; GF = Global Fund Project Monitoring Report; MSM = men who have sex with men; n = sample size; PWID = people who inject drugs; R = round; SW = sex worker; — = not available.

APPENDIX C

Systematic Review and Summary Tables

Table C.1 Summary of Studies Included in Systematic Review and Range of HIV Prevalence Estimates among PWID in Western European Countries

Country	*City*	*Population sample*	*Survey year*	*Survey design*	*No. of studies*	*HIV prevalence range (%)*	*"Best" prevalence estimate (%)*	*References*
Austria	National	IDUs	2008	Diagnostic testing	1	1	1	[175]
Belgium	Antwerp	IDUs	2008	Diagnostic testing	1	6.4	6.4	[175]
Denmark	National	IDUs	2006	Prevalence study using unlinked, anonymous testing	1	2.1	2.1	[175]
Finland	National	IDUs	2009	Accessibility	1	0.7	0.7	[98]
France	Lille, Strasbourg, Paris, Bordeaux, Marseille	Ever or current injectors or snorters, IDUs	2002–06	Cross-sectional, prevalence study using unlinked anonymous testing	3	8–22	8	[17, 24, 175]
Germany	National	Drug users including ever IDUs	1998–2007	Cross-sectional, diagnostic testing	2	3.4–18	3.4	[99, 175]
Greece	National	IDUs	2004–09	Diagnostic testing, Inpatient detox facility	3	0–0.7	0.7	[100, 175]
Ireland	Dublin	Opiate users, IDUs	2001–03	Cross-sectional	2	11–12.5	12.5	[101, 175]
Israel	National	Ever IDUs	2003–05	Hospital data	1	1.9	1.9	[56]
Italy	National	Drug users (76–89 IDUs)	2002–08	Cross-sectional, diagnostic testing, outpatient records review	4	6.5–14.4	11.7	[22, 23, 61, 175]
Luxembourg	National	IDUs	2005	Prevalence study	1	2.5	2.5	[65]
Malta	National	IDUs	2006	Diagnostic testing	1	0	0	[175]
Norway	14 sites	IDUs	2008	Prevalence study	2	0.6–2.8	2.8	[175]
Portugal	National	IDUs	2008	Diagnostic testing	3	9.2–18.4	9.2	[175]
Spain	National	Ever injected, current heroin users, VCT users	1999/2006	Cross-sectional	8	6.5–58.1	34.5	[64, 102, 104–106, 175–178]
Sweden	Stockholm, Gothenburg, Stockholm county	IDUs	2007–09	Diagnostic testing, prevalence study	5	0–9.3	9.3	[175, 179]
Switzerland	National	Entering heroin assisted therapy for first time, Ever IDUs	2000–06	Cross-sectional	2	2.0–12.6	2.0	[108, 180]
United Kingdom	National	Ever and current IDUs	2001–10	Diagnostic testing, prevalence study, sentinel survey, prospective cohort	9	0.5–4.2	1.1	[57, 110, 113, 175, 181]

Note: HIV = human immunodeficiency virus; IDU = injecting drug user; PWID = people who inject drugs; VCT = voluntary counseling and testing.

Table C.2 Summary of Studies Included in Systematic Review and Range of HIV Prevalence Estimates among PWID in Central European Countries

Country	*City*	*Population sample*	*Survey year*	*Survey design*	*No. of studies*	*HIV prevalence range (%)*	*"Best" prevalence estimate (%)*	*References*
Albania	Tirana	IDUs	2005/08	Cross-sectional	2	0	0	[141, 142]
Bosnia and Herzegovina	Zenica, Luka, Sarajevo	IDUs	2007/09	Descriptive	2	0.3–0.6	0.4	[143, 182]
Bulgaria	Sofia and National	IDUs	2003/08	Cross-sectional, diagnostic testing	3	0.5–6.8	6.8	[49, 145, 175]
Croatia	National	IDUs	2001/08	Convenience, prevalence study, diagnostic testing	7	0–1.5	0	[54, 146–148, 175]
Cyprus	National	IDUs	2008	Diagnostic testing, prevalence study	2	0	0	[175]
Czech Republic	Cheb, Usti nad Labem, Ostrava and Prague	IDUs	1999/2008	Cross-sectional, diagnostic testing	3	0.07–0.2	0.07	[97, 175]
Hungary	National	IDUs	1999/2008	Cross-sectional, prevalence study	6	0–0.8	0	[55, 75, 79, 92, 175, 183]
Macedonia, FYR	National	IDUs	2007	Convenience	1	0	0	[151]
Montenegro	Unclear	IDUs	2008	RDS	1	0.4	0.4	[152]
Poland	National	IDUs	2005–08	Diagnostic testing, prevalence survey	2	2.4–29.6	9.2	[175]
Romania	Bucharest	IDUs	2007–09	RDS, Diagnostic testing	2	1–1.6	1	[175, 184]
Serbia	Belgrade, Podgorica, Novi Sad, and Nis	IDUs	2005–08	Cross-sectional	2	0–3.5	2.0	[42, 154, 185]
Slovak Republic	Bratislava	IDUs	2008	Diagnostic testing	1	1	1	[175]
Slovenia	National	IDUs	2005–09	UAI survey of service users, prevalence study, diagnostic testing	3	0	0	[155, 175]
Turkey	Gaziantep, Ankara, Istanbul, and Izmir	IDUs	2006–08	Diagnostic testing, convenience sampling	2	0–1.5	1.5	[156, 175]

Note: HIV = human immunodeficiency virus; IDU = injecting drug user; PWID = people who inject drugs; RDS = respondent-driven sampling; UAI = unprotected anal intercourse.

Table C.3 Summary of Studies Included in Systematic Review and Range of HIV Prevalence Estimates among PWID in Eastern European and Central Asian Countries

Country	*City*	*Population sample*	*Survey year*	*Survey design*	*No. of studies*	*HIV prevalence range (%)*	*"Best" prevalence estimate (%)*	*References*
Armenia	Unclear	IDUs	2007	Unclear	1	6.8	6.8	[115]
Azerbaijan	National	IDUs	2003–08	Accessibility, street, snowball	2	1.3–33.0	10.3	[11, 116]
Belarus	National	IDUs	2004–09	Descriptive, UAI sentinel testing survey	2	1.0–33.0	10.7	[117, 186]
Estonia	Tallinn, Kohtla-Jarve	IDUs	2002–09	Cross-sectional	7	26.7 (amphetamine only users)–90	53.5	[47, 48, 70, 119–121, 187]
Georgia	National	Ever and current IDUs	1997–2009	Cross-sectional	9	0.5–11.7	2.1	[7–10, 13, 188, 189]
Kazakhstan	National	IDUs	2009	Snowball	1	2.90	2.9	[190]
Kyrgyz Republic	National	IDUs	2009	RDS	1	14.3	14.3	[15]
Latvia	Riga	IDUs	2003–08	RDS, diagnostic testing, prevalence study	3	6.6–22.6	6.6	[48, 124, 175]
Lithuania	Vilnius, Alytus	IDUs, drug users including IDUs	2003–09	RDS, diagnostic testing, prevalence study	8	0.6–9.8	2.4	[48, 92, 175, 191]
Moldova	Chisinau, Balti	IDUs	2009	RDS	2	16–39	28.6	[125]
Russian Federation	National	Ever and current IDUs	1999–2009	Cross-sectional	16	8.6–61.1	28.9	[18, 27, 44, 85, 90, 93, 126, 127, 130, 132, 164, 192–197]
Tajikistan	National	IDUs	2004–09	Cross-sectional, RDS	2	12.1–17.3	17.3	[15, 41, 163]
Ukraine	National	IDUs	1999–2009	Cross-sectional	8	3–80	22.9	[18, 25, 26, 69, 135–137, 198, 199]
Uzbekistan	Tashkent and National	IDUs	2003–09	Cross-sectional	2	11.0–29.8	13	[15, 95, 138, 200]

Note: HIV = human immunodeficiency virus; IDU = injecting drug user; PWID = people who inject drugs; RDS = respondent-driven sampling; UAI = unprotected anal intercourse.

Table C.4 Demographic and Drug Use Characteristics of Study Respondents in Western Europe

Country	*Male*	*Age (midpoints)*	*Duration of injecting*	*Frequency injected*	*Main drug injected*	*% Shared needle/ syringe*	*References*
Finland	—	—	—	—	—	28 d: 32%	[98]
France	71%–75%	Mean 34–36	Average age at first injection 20.4–21.2	—	(injected or snorted); 30% crack/freebase; 27% cocaine; 20% heroin; 12% ecstasy	13%	[17, 24, 53]
Germany	—	Median 31	72% ≥5 years	4 m: median f 8 times, m 23 times	95% heroin	—	[99]
Ireland	60%	Median 26	—	—	—	—	[101]
Israel	85%	Mean 33.8	0.7 among IDUs	—	Among whole sample: heroin (with or without methadone)	—	—
Italy	84%–86%	Mean 29–35 years	Median 14.5 years	—	49%–92% heroin	—	[22, 23, 61]
Luxembourg	—	—	—	—	100% Lifetime heroin; 84.2% speedball	6 m: 37% borrowed paraphernalia, 37% lent paraphernalia	[65]
Netherlands	61%	Median age at entry: 30	Median since first injection 7.2	6 m: 82% > weekly	6 m: 52% speedball	—	[63]
Spain	66%–81%	Mean 25.7–30.2 years	mean 7.6–11.6 years	6 m: 45% daily	67% heroin; 78%–80% cocaine; 68% speedball	6 m: 18%, 12 m: 19%; ever 25%–66%	[20, 64, 102, 103, 105, 106, 177, 178, 201–205]
Sweden	67%	Median 42.5 years	median 19 years	—	—	61.9%	[62]
Switzerland	75%–82%	Mean 33.7, median 36 years	mean 11.6 years, median 15 years	6 m: median # injections in past week: 7	—	6 m: 9%; 30 d: 5%	[108, 180]
United Kingdom	69%–76%	Mean 27.4–31 years	7 years	Median: 2.5 times daily, 80% daily	71% opiates, 53% cocaine/crack in past 12 m; 92% heroin	28 d: 21%–31%	[57, 111, 113]

Note: d = days; f = frequency; IDU = injecting drug user; m = months; — = not available.

Table C.5 Demographic and Drug Use Characteristics of Study Respondents in Central Europe

Country	*Male*	*Age (midpoints)*	*Duration of injecting*	*Frequency injected*	*Main drug injected*	*% Shared needle/ syringe*	*References*
Albania	Majority (over 90%)	Mean 25.4; 35%–48% <25	81%–91% = <5 years; 20% <12m	More than once per day 20%	90% heroin; 51% diazepam	Last time injected: 18%; 30 d: 54%	[141, 142]
Bosnia and Herzegovina	88%–96%	Mean 29–30 years	Mean age at first injection: 21 years	54% inject 2–3 times daily	97% heroin	30 d: 21%–31%	[143, 144]
Bulgaria	79%	Mean 25.9 years	—	—	—	Last time injected: 14%	[49]
Croatia	83%	Median 26–30 years	Median 5–10 years	—	—	12 m: 30%–48%	[54]
Czech Republic	70%	60% 18–22 years	—	—	48% heroin; 42% methamphetamine	—	[97]
Hungary	69%–77%	Mean 22.6–27.9 years; 60% ≤ 30	Mean 6.8; 39.2% ≤ 5	Daily heroin 32%; daily amphetamine 9%	52%–79% heroin; 28%–51% amphetamine	30 d: 22%–33%; (unclear period, includes syringe, cooker, filter, rinsewater) 62%–68%	[55, 75, 76, 79, 92]
Macedonia, FYR	83%	Mean 26.8 years	11% aged <15 years at first injection	15%–37% daily	92% heroin; methadone 50%; 49% benzodiazepines	30 d: 34%	[151]
Montenegro	89%	23% ≤ 25, 29% ≥ 31	—	—	—	—	[152]
Romania	78%	Mean 28 years	Mean age at first injection 20 years		30 d: 97% heroin	Last injection: 15% did not use sterile equipment	[184]
Serbia (and Montenegro)	78%–93%	20%–41% <25 years	27%–58% <5 years	39%–53% daily	94%–96% heroin	30 d: 15%–30%	[42, 154]
Turkey	—	Mean 30.3 years	—	—	51.5% heroin	30 d: 67%	[156]

Note: d = days; m = months; — = not available.

Table C.6 Demographic and Drug Use Characteristics of Study Respondents in Eastern Europe and Central Asia

Country	*Male*	*Age (midpoints)*	*Duration of injecting*	*Frequency injected*	*Main drug injected*	*% Shared needle/ syringe*	*References*
Armenia						At last injection: 5%	[115]
Azerbaijan	95%	Mean 27–31.6 years	Mean 9	21%–46% daily	66%–93% heroin, 36% homemade opiates	56%–68%	[11, 116]
Belarus	75%–77%	35% 25–29 years; 32% 30–39 years; mean 24 years	42% >7; mean 4–5	57%–59% daily	79%–86% heroin	6 m: 30%–32%	[18, 117]
Estonia	53%–88%	Mean 23–26 years; 40%–62% ≤20 years	Mean 7.9	Daily 61%	Fentanyl 61%–74%; 90% mak; 59%–83% heroin, 31%–45% amphetamines	28 d: 18%–32%	[47, 48, 70, 71, 96, 119, 121, 187]
Georgia	92%–100%	Mean 27.5–40.5 years	Mean 5–15.6; median 7	—	59%–97% heroin; 78% Buprenorphine; 30 d: 34% only heroin; 18% only buprenorphine; 9% only ephedrine, 36% multiple drugs	Ever: 85%, at last injection 6%–63%	[7–10, 13]
Kazakhstan	83%	Median 31 years	Mean 6.7	—	92% heroin	—	[15]
Kyrgyz Republic	82%	Median 37 years	Mean 8.6	—	98% heroin	—	[15]
Latvia	70%	Mean 29.9	Mean 9.7	Daily 27%	45% heroin; 44% amphetamine	28 d: 31%	[48]
Lithuania	76–82%	Mean 30	Mean 10.4	76%–91%	58% hanka	28 d: 2–98%	[48, 92]
Moldova	78%–87%	14%–20% <25 years	—	—	—	Last injection: 1%–2%	[125]
Russian Federation	57%–83%	Mean 20.7–29 years; median 29 years	48% ≤ 5 years; mean 5.5–9.6; median 8	15%–92% daily	66%–100% heroin, 20% methamphetamine	30 d: 8%–79%	[18, 27, 44, 52, 85, 93, 126, 127, 132, 164, 174, 192–194, 196, 197]
Tajikistan	85%–90%	Median 34 years	Mean 4.6–11.6 years	39.1% daily	98%–99% heroin	Last injection: 37%, 6 m 65%	[15, 41]
Ukraine	74%–83%	Mean 24–32.7, years; median 31 years	Mean 5–13	50%–91% daily	30 d: 79%–94% hanka; 73–78% opiates, 12–35% stimulants, 36–56% opiate/sedative mix	30 d: 13%–22%; 6 m 47%–52%. Used prefilled syringe in 30 d: 55%	[18, 25, 26, 86, 134, 136, 137, 206]
Uzbekistan	87%–95%	Mean 28.7–34 years	Mean 5.3	—	91% heroin	59%	[95, 140]

Note: d = days; m = months; — = not available.

Table C.7 Sexual and Sociostructural Characteristics of Study Respondents in Western Europe

Country	*Inconsistent condom use*	*Sex work*	*HIV tested*	*HCV infection (%)*	*Income/employment*	*Prison/arrest*	*References*
Finland	—	—	12 m: 63% tested and know result	—	—	—	[98]
France	—	—	Ever tested: 95%	—	17.5%–33% employed; 65% on benefits	Ever: 61%	[17, 24, 53]
Germany	—	—	—	82%	—	—	[99]
Ireland	—	—	Ever tested: 86%	66%	—	—	[101]
Israel	—	—	—	35.7%	—	—	[56]
Italy	—	—	—	71.2%–72%	79% employed (Male: 81%; female 72%)	Ever committed a crime: 57%	[22, 23, 61]
Luxembourg	—	—	—	—	—	At least once in past 10 years: 70%	[65]
Spain	13%–60%	11.5%–17.9%	Ever tested: 82%	83.4%–93.5%	Regular income 4.8%–32.3%	Ever arrested: 11%–64% In past 12 months; 0.5%–9.1%; Ever for >1 month 43.1%	[20, 64, 102, 103, 105, 106, 177, 178, 201–205]
Sweden	40%	—	12 m: 75%	HIV—PWID: 88%	—	—	[62]
Switzerland	28%–72%	Females: 20%	95.80%	78.3%	—	—	[108, 180]
United Kingdom	—	—	Ever 54%	44% (PWID aged <30, or injecting = <6 years)	—	Ever: 66%–75%	[57, 111, 113]

Note: HCV = hepatitis C virus; HIV = human immunodeficiency virus; m = months; PWID = people who inject drugs; — = not available.

Table C.8 Sexual and Sociostructural Characteristics of Study Respondents in Central Europe

Country	*Inconsistent condom use*	*Sex work*	*HIV tested*	*HCV infection*	*Income/ employment*	*% Prison*	*References*
Albania	Last casual sex partner: 64%; 12 m: 86%	4.30%	Ever: 30%	—	—	—	[141, 142]
Bosnia and Herzegovina	Last time had sex: 58%–73%	—	Ever: 46%–77%, of which 36%–44% in past 12 m	—	—	Ever: 2%–55%	[143, 144]
Bulgaria	Last sexual intercourse: 62%	Sold sex for money or drugs in past 6 m: 8.4%	12 m: 48% tested and know result	73.9%	30.7% employed	Ever: 18%	[49]
Croatia	—	—	Ever: 83%–93%	—	—	—	[54]
Czech Republic	—	0.20%	—	—	—	—	[97]
Hungary	30 d: 89.3%	—	Ever: 56%–59%	37%	20.4%–46.2% work at least part time	—	[55, 75, 76, 79, 92]
Macedonia, FYR	30 d: 56%	30 d: 14%	12 m: 44%	—	—	—	[151]
Montenegro	—	—	—	—	—	—	[152]
Romania	30 d: 76%	Ever exchanged sex for money, drugs; or other goods: 13% (male 12%; female 14%)	12 m: 19% tested and know result	—	—	Ever: 40%	[184]
Serbia (and Montenegro)	Last time had sex: 71%	Ever: 5%–10%	12 m: 22% tested and know result	63%	—	Ever: 43%–50%	[42, 154]
Turkey	56%	—	—	—	—	—	[156]

Note: d = days; f = frequency; HCV = hepatitis C virus; HIV = human immunodeficiency virus; m = months; — = not available.

Table C.9 Sexual and Sociostructural Characteristics of Study Respondents in Eastern Europe and Central Asia

Country	*% Inconsistent condom use*	*% Sex work*	*% HIV tested*	*HCV infection*	*Income/ employment*	*% Prison*	*References*
Armenia	At last sexual intercourse: 44%		12 m: 23% tested and know result				[115]
Azerbaijan	87%–98%		12 m: 4.9% tested and know result				[11, 116]
Belarus	6 m: 20% (casual)–58% (regular)	Female 3%; male 1%					[18, 117]
Estonia	12 m: 60%,	2%–17%	Ever: 49%–87%; 12 m: 57%	96%	14%–57.3% some regular income	Ever in prison: 58%–66%; new injectors (= <3 years) 32%–40%; Ever arrested: 49%–66%	[47, 48, 70, 71, 96, 119, 121, 187]
Georgia	33%–74%; UAI at last sex with regular partners: 79%; casual partners: 52%; paid partners 22%	28% paid for sex with median of 3 people	Ever: 11%–33% tested and know result	58.2%–70.4%	40% regular income	6%–21%	[7–10, 13]
Kazakhstan	24%	Female: 15%; male: 14%	56%				[15]
Kyrgyz Republic	40%	Female: 4%; male: 4%	40%				[15]
Latvia	52%	3%	Ever: 72%, 12 m 44%			Ever: 45%	[48]

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Table C.9 Sexual and Sociostructural Characteristics of Study Respondents in Eastern Europe and Central Asia *(continued)*

Country	*% Inconsistent condom use*	*% Sex work*	*% HIV tested*	*HCV infection*	*Income/ employment*	*% Prison*	*References*
Lithuania	89%–93%	5%	Ever: 95%, 12 m 73%			71%	[48, 92]
Moldova	50%–67%		32%–47%				[125]
Russian Federation	12%–87%; 6 m; all partners: 59%; casual partners: 34%	6%; females: 24%–32%; males: <1%–5%	Ever: 56%–81%	63.4%–96%	13%–49.4% regular income	Ever in prison: 6%–46% (female 19%; male: 55%); Ever arrested: 26.5%–76%; arrested in past 12 m 60.4%–67.2%	[18, 27, 44, 52, 85, 93, 126, 127, 132, 164, 174, 192–194, 196, 197]
Tajikistan	55%–100%	21%; female: 31%; male 13%,	15%–36%	61.3%	20% employed	44.5% ever arrested	[15, 41]
Ukraine	30 d: 38%–55%; 6 m: regular 83%; casual: 27%	3.4%–11%; female: 3%–7%; male <1%	12 m: 26%–61%	73%	44%–69% employed	Ever arrested: 58%–72%	[18, 25, 26, 86, 134, 136, 137, 206]
Uzbekistan	44%	Female: 36%; male: 18%	13%				[95, 140]

Note: HCV = hepatitis C virus; HIV = human immunodeficiency virus; m = months; UAI = unprotected anal intercourse.

Table C.10 Summary of Multivariate Studies for HIV Risk Factors among PWID in Western Europe Derived from Systematic Review

Study, year	*Location*	*Sample*	*Individual-level risk factors*	*Environmental-level risk factors*
Stark et al. 2005 [99]	Germany, Berlin	166 prisoners (117 females, 57 males) reporting having ever injected	Injecting drugs during a previous incarceration[a]; HCV+	Adjusted for syringe sharing, duration of injecting career, year injecting started
Camoni et al. 2009 [61]	Italy, national	1,330 people who use drugs, of whom 1,009 (75.9%) ever injected and were randomly sampled at public drug treatment centers	Injecting[a]	Age[a]; area; unemployed; years of education
Quaglio et al. 2006 [22]	Italy, Northern	Opiate-dependent drug users on OST for at least 6 months, of whom 89% reported injecting as their principal route of administration	Duration of injecting career	Recruitment site; Age; Gender; Education; Employment[a]; Living status; Marital status
Van den Berg et al. 2006 [63] Outcome is HIV seroconversion	Netherlands, Amsterdam	710 PWID (ever) who were HIV negative at entry to cohort study	Duration of injecting career; HIV status of steady partner; level of harm reduction accessed	—
Barrio et al. 2006 [102]	Spain, Madrid, Barcelona, and Seville	621 heroin-injecting users recruited from street (same sample as below)	Ever injected with a used syringe; first drug injected at least weekly; ever sniffed with tubes; ever been pierced; backloaded in past year	Gender; ever in prison; city of residence
De La Fuente et al. 2006 [103]	Spain, Madrid, Barcelona, and Seville	628 heroin-injecting users recruited from street (same sample as above)	Adjusted for gender, employment, education, prison, and injecting and sexual behavior risks	Stratified by duration of injecting career: ≤5 years: city of residence (AOR ref.: Barcelona; Madrid AOR 1.3, 95% CI 0.5–3.5; Seville AOR 0.7, 95% CI 0.7, 0.1–4.3); >5 years: city of residence (AOR ref.: Barcelona; Madrid AOR 3.1, 95% CI 1.5–6.2; Seville AOR 1.5, 95% CI 0.5–4.8)
Hurtado et al. 2008 [105]	Spain, Valencia	5,948 PWID attending VCT and self-identifying	model adjusted for age	Gender Tested in more recent calendar year Interaction: gender x calendar year

Note: AOR = adjusted odds ratio; CI = confidence interval; HCV = hepatitis C virus; HCV+ = HCV-positive; HIV = human immunodeficiency virus; OST = opioid substitution therapy; PWID = people who inject drugs; ref = reference; VCT = voluntary counseling and testing; — = not available.

a. Adjusted for age, education, ethnicity, and employment status.

Table C.11 Summary of Multivariate Studies for HIV Risk Factors among PWID in Eastern Europe and Central Asia Derived from Systematic Review

Study, year	*Location*	*Sample*	*Individual-level risk factors*	*Environmental-level risk factors*
Platt et al. 2006 [161]	Estonia, Tallinn	350 PWID who injected in past 4 weeks recruited by RDS	Primary injection of opioid or amphetamine in past 4 weeks; duration of injecting career; shared needle in past 4 weeks; shared equipment in past 4 weeks; injected with a used needle from a sex partner in past 4 weeks; number of sexual partners in past year	Age; gender; main source of income in past 4 weeks; ethnicity; ever registered in drug treatment; ever been in prison; ever attended needle exchange
Abel-Ollo et al. 2009 [70]	Estonia, Tallinn and Kohtla-Järve	450 PWID (350 from Tallinn and 100 from Kohtla-Järve) who injected in past 4 weeks recruited by RDS. For analysis the participants were categorized as HIV–, HIV+ aware of their status, and HIV+ unaware of their status, according to self-reported status at the time of testing. The data from Tallinn are also analyzed above.	Analysis of risk factors for HIV among participants aware of their status (ref HIV– participants): sharing used needles/syringes in past 4 weeks;[a] unprotected sex in past 4 weeks; sharing water; PWID as sex partner in past year; sharing injection equipment with sexual partner in past year; having 2 or more sex partners in past year; unprotected intercourse in past year; ever sharing needles with HIV+ person	
Uusküla et al. 2010 [121]	Estonia, Tallinn	350 PWID, aged 18+, who injected in past 2 months recruited by RDS	Earlier age of initiation to injecting; primary injection of opioid or amphetamine; receptive sharing in past 6 months	Ever attended syringe exchange; main source of income other than work; unemployment at habitat level; residential change at habitat level
Platt et al. 2005 [90]	Russian Federation, Togliatti	268 male PWID who injected in past 4 weeks recruited in 2001 by outreach workers	Duration of injection; injected with used paraphernalia in past 4 weeks[a]; injected with used needle in past 4 weeks; ever injected homemade drugs; injected with used needle from someone known to be HIV+; injected with used needle from someone known to be HCV+[a]; unprotected anal or vaginal sex with a regular partner in past 4 weeks; unprotected anal or vaginal sex with a casual partner in past 4 weeks[a]; ever had an STI	Ever been in prison; ever been in drug treatment; ever been arrested

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Table C.11 Summary of Multivariate Studies for HIV Risk Factors among PWID in Eastern Europe and Central Asia Derived from Systematic Review *(continued)*

Study, year	*Location*	*Sample*	*Individual-level risk factors*	*Environmental-level risk factors*
—	Russian Federation, Togliatti	89 female non-sex worker PWID who injected in past 4 weeks, recruited in 2001 by outreach workers	Duration of injection; injected with used paraphernalia in past 4 weeks; injected with used needle in past 4 weeks; ever injected homemade drugs; injected with used needle from someone known to be HIV+; injected with used needle from someone known to be HCV+; unprotected anal or vaginal sex with a regular partner in past 4 weeks; ever had an STI	Ever been in prison; ever been in drug treatment; ever been arrested
—	Russian Federation, Togliatti	66 female sex worker PWID who injected in past 4 weeks, recruited in 2001 by outreach workers	Duration of injection; injected with used paraphernalia in past 4 weeks; injected with used needle in past 4 weeks; ever injected homemade drugs; injected with used needle from someone known to be HIV+; injected with used needle from someone known to be HCV+; unprotected anal or vaginal sex with a regular partner in past 4 weeks; ever had an STI	ever been in prison; ever been in drug treatment; ever been arrested
Platt et al. 2008 [162]	Russian Federation, Togliatti	230 PWID (134 in 2001 from the study above, and 96 from 2004) who reported injecting for 3 years or less and injected in past 4 weeks, recruited by outreach workers in 2001 and through RDS in 2004	Duration of injecting career; frequency of injection; ever injected homemade drugs; injected with used needles in past 4 weeks; used a previously used filter; frontloading in past 4 weeks; injected with a prefilled syringe; frequency of reusing the same needle; ever exchanged sex for money, drugs or goods; history of STIs	Year of study; gender; age; district of residence; education; main source of income in past 4 weeks; history of prison; police arrest in past year; ever in drug treatment; main source of needles in past 4 weeks; ever been tested for HIV
Kozlov et al. 2006 [85] Outcome is HIV incidence at 12-month follow-up to enrollment	Russian Federation, St. Petersburg	520 seronegative PWID enrolled in cohort study who injected at least 3 times/week in past month or reused another's injecting equipment at least 3 times in past 3 months	Frequency of injecting psychostimulants; number of sex partners in past 6 months; selling sex for money or goods in past 6 months	
Niccolai et al. 2010 [164]	Russian Federation, St. Petersburg	387 ever injectors who were enrolled through RDS	Unsafe injection in past 30 days; has STI	Unemployed

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Table C.11 Summary of Multivariate Studies for HIV Risk Factors among PWID in Eastern Europe and Central Asia Derived from Systematic Review *(continued)*

Study, year	*Location*	*Sample*	*Individual-level risk factors*	*Environmental-level risk factors*
Rhodes et al. 2006 [93]	Russian Federation, Moscow	455 PWID who injected in past 4 weeks, recruited by outreach workers	Duration of injecting career; last day injected, number of times injected; frequency of injection; main drug injected in past 4 weeks; injected with used needle in past 4 weeks; shared paraphernalia in past 4 weeks; ever injected with used needles; number of sex partners in past year; history of STI	Gender; age; education; main source of income in past 4 weeks; ever been in prison; ever registered as a drug user
	Russian Federation, Volgograd	517 PWID who injected in past 4 weeks, recruited by outreach workers	Duration of injecting career; frequency of injection; ever injected homemade drugs; injected with used needle in past 4 weeks; shared paraphernalia in past 3 weeks; ever injected with used needles; injected with needle previously used by sex partner in past 12 months; number of sex partners in past year; history of STI	Gender; age; education; main source of income in past 4 weeks; ever registered as a drug user
	Russian Federation, Barnaul	501 PWID who injected in past 4 weeks, recruited by outreach workers	Duration of injecting career; last day injected, number of times injected; frequency of injection; main drug injected in past 4 weeks; ever injected homemade drugs; injected with used needle in past 4 weeks; shared paraphernalia in past 4 weeks; filled syringe from working syringe in past 4 weeks; ever injected with used needles; number of sex partners in past year; history of STI	Gender; age; education; main source of income in past 4 weeks; ever been in prison; ever registered as a drug user
Beyrer et al. 2009 [41]	Tajikistan, Dushanbe	419 PWID, aged 17+ who injected in past month, recruited through snowball technique	Daily injection in past 6 months	Ethnicity model adjusted for gender
Stachowiak et al. 2006 [163]	Tajikistan, Dushanbe	207 ethnic Tajik PWID (subsample of above), aged 17+, recruited through snowball technique	Injecting at least daily for past 6 months; less than 3 years since initiation of injection; injects "alone"; injected with used needle in past 6 months	Reports narcotics "very easy" to obtain; ever experienced drug treatment
Booth et al. 2006 [134]	Ukraine, Kiev, Odessa, Makeevka/Donetsk	778 PWID aged 18+, who injected in past 30 days and were unaware of their HIV status, recruited through outreach workers	Injected sedative/opiate mix in past 30 days; daily injection in past 30 days; sex in past 30 days; sex with HIV+ or unknown status partner in past 30 days	Age; gender; city of origin

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Table C.11 Summary of Multivariate Studies for HIV Risk Factors among PWID in Eastern Europe and Central Asia Derived from Systematic Review *(continued)*

Study, year	*Location*	*Sample*	*Individual-level risk factors*	*Environmental-level risk factors*
Dumchev et al. 2009 [25]	Ukraine, Vinnitsya	268 PWID aged 18+, who reported at least 3 injections in past 30 days and have lived in Vinnitsya for past year, recruited through snowball sampling	Shared needles with HIV+ person in past year; injected opiates daily	HIV knowledge score
Taran et al. 2011[26]	Ukraine, 16 cities	3,487 PWID, aged 16+, who injected in past 30 days and were recruited through RDS	Type of drug injected in past month; duration of injecting career; injecting frequency in past month; used alcohol with drugs in past month; shared needle at last injection; frequency of sharing paraphernalia in past month; sexual contact in past year	Gender; marital status; occupation; education
Sanchez et al. 2006 [138]	Uzbekistan, Tashkent	701 self-identified PWID aged 18+ available for 2 weeks after enrolment by outreach workers	Age at first drug use; first illicit drug of use; duration of injecting career; current heroin use; injecting frequency; poppy-straw use; group drug use; sharing needles; own syringe; blood transfusion; STI history; Hepatitis history; TB history; STI symptoms; sell sex for drugs; condom use; number of sexual partners in past month	Age; gender; nationality; marital status; employment status; education status; needle exchange program; AIDS knowledge; protection for AIDS; donated blood for money

Note: AIDS = acquired immune deficiency syndrome; HCV = hepatitis C virus; HCV+ = HCV-positive; HIV = human immunodeficiency virus; HIV+ = HIV-positive; HIV– = HIV-negative; PWID = people who inject drugs; RDS = respondent-driven sampling; STI = sexually transmitted infection; TB = tuberculosis; — = not available.
a. Adjusted for age, education, ethnicity, and employment status.

Table C.12 Summary of HIV Prevalence among Samples of SWs in Western Europe

Country	*Area*	*Population sampled*	*Injecting drug use*	*Migrants*	*Survey year*	*HIV prevalence*	*Category*	*n*	*References*
Austria	Vienna	FSWs recruited from STI clinics	—	—	2002	1%	Low	1,184	[107]
		Registered FSWs	—	—	—	0%	—	642	—
		Illegal FSWs	—	—	—	4%	Medium	246	—
		Unregistered FSWs working in bars	—	—	—	0%	—	296	—
Belgium	Antwerp	SWs	—	—	2008	0%	Low	1,016	[64]
France	Paris	Chinese SWs	—	100%	2008	0%	Low	46	[64]
Germany	National (multisite)	FSWs recruited through STI clinics VCT sites, and private clinics	—	—	2002	0.30%	Low	290	[107]
	National (multisite)	FSWs recruited through STI clinics VCT sites, and private clinics	5% (n = 518)	63% (n = 1,425)	2010–11	0.20%	Low	3,880	[69]
Greece	Athens	FSWs applying for official license to work as SWs, recruited at STI clinics (migrants and non-migrants)	0 Drug use	19.7% Migrants (Ukraine, Georgia, Russian Federation, Bulgaria, Romania, Albania)	2005	0%	Low	299	[20]
	Bologna	Street migrant FSWs attending STI clinics	—	76% Eastern Europe	1995–99	1.60%	Low	558	[100]
Italy	Rome	Female migrant SWs attending an HIV testing site	8.9% cocaine users	—	1992–2007	5%	High	229	[91]
	Sicily	Migrant street-based SWs, recruited via outreach workers	0 reported using illegal substances	64.4% Colombian 35.6% Dominican	2001–02	0%	Low	118	[67]
Italy	Palermo	Migrant SWs, recruited from the street	—	—	2008	8%	High	123	[71]
Netherlands	Rotterdam, The Hague	FSWs recruited from work settings	0	75% migrants	2002–05	1.50%	Low	399	[19]

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Table C.12 Summary of HIV Prevalence among Samples of SWs in Western Europe *(continued)*

Country	*Area*	*Population sampled*	*Injecting drug use*	*Migrants*	*Survey year*	*HIV prevalence*	*Category*	*n*	*References*
		Female drug users	52%	65% migrants		13.6%	High	88	—
		All FSWs	16%	76% migrants		5.7%	High	557	—
	National (multi-site)	FSWs	—	—	2005	0.50%	Low	1,018	[107]
Norway	Oslo	STI clinics for SWs (includes MSWs)	—	—	2008	1%	Low	746	[64]
Portugal	Lisbon	FSWs recruited from street including migrants and IDUs	50%–60% cocaine/heroin	51% migrants	2000–01	13.50%	High	96	[108]
Spain	Madrid	Immigrant FSWs, transsexuals (60), and MSW (3) recruited from work settings	—	75% Sub-Saharan Africa; 18% Central and South America; 6% EE	1998–2003	5.2%	High	762	[65]
		Female African SWs	—	—	—	4.5%	Medium	574	—
		Ecuador (MSW = 62)	—	100% Ecuador	—	11%	High	128	—
	Madrid, Alicante, Bilbao, Pamplona, Oviedo, Gijon	FSWs (largely migrants)	0.6%	83.3% migrants (83% from LA; 8% EE; 5% SSA; 2% no information)	2000–01	0.7%	Low	3,149	[27]
		Injecting drug users	—	—	—	15.8%	High	19	[92]
	Barcelona	Female street-based SWs	—	95% migrants (31% LA; 25% SSA; 24% EE)	2002–03	1%	Low	301	[21]
		Female migrant SWs recruited at work	1.0%	100% migrants (Eastern Europe, Africa, Latin America)	2003–04	0.8%	Low	357	[28]
Sweden	Stockholm region	Recruited in prison	—	—	2006–07	2.2%	Medium	45	[64]
Israel	2 sites	FSWs who had entered Israel illegally and were working without permits	—	100% EE/FSU	—	0%	Low	43	[9]

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Table C.12 Summary of HIV Prevalence among Samples of SWs in Western Europe *(continued)*

Country	*Area*	*Population sampled*	*Injecting drug use*	*Migrants*	*Survey year*	*HIV prevalence*	*Category*	*n*	*References*
	Tel Aviv	Female brothel workers (except for 12 street workers)	—	89.6% migrants from FSU	—	0.3%	Low	300	[66]
United Kingdom	London	Recruitment at specialist sex work clinics	11%	33% migrants	1986–93 and 1997–2000	0%	Low	130	[108]
	London (East)	Female street workers	92% heroin/crack		2004	4.10%	Medium	24	[83]
		Female street workers, drug users (crack, heroin) recruited via outreach workers	96% (crack, heroin, cocaine)	28% (Somali, European, West Indian)	2006–07	24%	Very high	25	[6]
	London	FSWs and migrant SWs from Eastern Europe, recruitment at specialist sex work clinics	4.4% IDU	60.8% EE/FSU migrants	2008–09	1.10%	Low	268	[109]
	Scotland	FSWs recruited from VCT sites, STI clinics, hospitals	—	—	2002	0%	Low	103	[107]

Note: EE = Eastern Europe; FSU = former Soviet Union; FSW = female sex worker; HIV = human immunodeficiency virus; IDU = injecting drug user; LA = Latin America; MSW = male sex worker; n = sample size; SSA = Sub-Saharan Africa; STIs = sexually transmitted infections; SW = sex worker; VCT = voluntary counseling and testing; — = not available.

Table C.13 Summary of HIV Prevalence among Samples of SWs in Central Europe

Country	*Area*	*Population sampled*	*Injecting drug use*	*Migrants*	*Survey year*	*HIV prevalence*	*Category*	*n*	*References*
Albania	Tirana	FSWs working on the street and in bars	—	—	2008	1.10%	Low	90	[110]
Bosnia and Herzegovina	—	FSWs	—	—	2007	0%	Low	42	[111]
Bulgaria	8 cities	MSWs (16%) and FSWs recruited from street, brothels	—	—	2005	1%	Low	874	[112]
			—	—	2008	0.63%	Low	799	[113]
Croatia	Brod, Dubrovnik, Osijek, Rijeka, Slavonski, Split, Zadar, and Zagreb	SWs recruited through NGOs	—	—	2003–05	2.3%	Medium	43	[114]
Czech Republic	Cheb, Usti nad Labem, Ostrava	FSWs	10%	40% (non-Czech)	1999–2000	0.7%	Low	585	[115]
	Prague and two regions	FSWs recruited from street	—	—	—	0.1%	Low	797	[107]
Macedonia, FYR	National	FSWs	—	—	2005	0%	Low	48	[116]
					2006	1.9%		51	
					2007	0%		67	
Hungary	—	SWs screened at bus pilot programs	—	—	2006	0%	Low	500	[64]
Montenegro	—	Female and Male SWs (MSWs = 14)	—	—	2007	0.76%	Low	133	[117]
Poland	13 cities	SWs recruited from clinics and community	2%		2002–05	0%–2%	Low	650	[107]

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Table C.13 Summary of HIV Prevalence among Samples of SWs in Central Europe *(continued)*

Country	*Area*	*Population sampled*	*Injecting drug use*	*Migrants*	*Survey year*	*HIV prevalence*	*Category*	*n*	*References*
	National (multisites)	SWs recruited from VCT sites, STI clinics, and hospitals	—	—	2005	0%	Low	250	[107]
Romania	Bucharest	Street SWs	—	—	2006	1%	Low	204	[64]
Serbia	Belgrade	Female (62%), Male (22%), Transsexuals (16%)	27%		2010	0.8%	Low	250	[118]
Serbia (Kosovo)	Ferizaj, Urosevac, Prizren	Street and indoor SWs, mostly migrants (Albania, Bulgaria, Moldova, Ukraine)	1.3% IDU in last 12 months	34% Bulgaria, 28% Albania, 16% Moldova, and 9% Ukraine	2006	0%	Low	157	[119]
Turkey	Ankara, Istanbul, Izmir	Unregistered FSWs		26%	2006–07	0.8%	Low	252	[120]

Note: FSW = female sex worker; HIV = human immunodeficiency virus; IDU = injecting drug user; LA = Latin America; MSWs = male sex workers; n = sample size; NGOs = nongovernment organizations; SSA = Sub-Saharan Africa; STIs = sexually transmitted infections; SW = sex worker; VCT = voluntary counseling and testing; — = not available.

Table C.14 Summary of HIV Prevalence among Samples of SWs in Eastern Europe

Country	*Area*	*Population sampled*	*Injecting drug use*	*Migrants*	*Survey year*	*HIV prevalence*	*Category*	*n*	*References*
Armenia	National	FSWs recruited through VCT sites and STI clinics	1.20%	—	2000	1.2%	Low	168	[107]
		FSWs recruited from street and VCT sites	0.40%	—	2005	0.4%	Low	250	[107]
	Gegharkunik, Lori, Yerevan, Shirak, Syunik	Female sex worker	—	—	2007	0.4%	Low	—	[121, 122]
Azerbaijan	Baku, Gandja, Sumgait	SWs	—	—	2007–08	2.5% (all cases in Baku)	Medium	300	[123]
		Street-based and indoor SWs	<1% used drugs in last month	4% migrants from Russian Federation	2003	8.50%	High	200	[124]
Belarus	Brest, Gomel, Grodno, Minsk, Mogilev, Vitebsk	FSWs recruited from the street and STI clinics	—	—	2004	0%, 0.98±0.5	Low	208	[107]
	7 areas	—	—	—	2004, 2006, 2009	0%	Low	481	[125]
	Minsk	FSW	15.50%	—	2009	6.40%	High	453	[125]
Estonia	Talinn	FSWs recruited via chain referral	6.60%	0%	2005–06	7.6%	High	227	[36]
Georgia	Tblisi	SWs recruited through TLS	1.3%	20%	2002	0%	—	153	[35]
			5.6%	22%	2004	1.3%	—	158	—
			1.8%	13%	2006	0.6%	—	160	—
			—	—	2009	1.9%	Low	160	[78]
Georgia	Batumi	SWs recruited through TLS	1.7%	18%	2004	0%	—	120	[35]
			5.8%	13%	2006	0.1%	—	114	
			—	—	2009	0.8%	Low	120	[78]
Latvia	Riga	FSWs	—	—	2002	16%	High	92	[107]
	Riga and regions	—	53% IDU	—	2004	18%	High	93	[107]

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Table C.14 Summary of HIV Prevalence among Samples of SWs in Eastern Europe *(continued)*

Country	*Area*	*Population sampled*	*Injecting drug use*	*Migrants*	*Survey year*	*HIV prevalence*	*Category*	*n*	*References*
Lithuania	Vilnius	FSWs recruited from street	—	—	2005	0%	Low	101	[107]
	—	FSWs recruited at Lithuanian AIDS Center	—	—	2007	0%	Low	67	[126]
Moldova	Chisinau	—	11.2% IDUs	1.3% from Moldova, rest from Russian Federation	2001	4.60%	Medium	151	[124]
		SWs recruited through harm reduction programs	—	—	2004	8.50%	High	151	[127]
		—	—	—	2007	2.90%	Medium	242	
		SWs recruited through RDS	—	—	2009	6.10%	High	300	
	Moscow	Street-based FSW	4.80%	75%	2002	14.1%	High	147	[124]
Russian Federation	St Petersburg	Street-based FSW IDUs	97.20%	11%	2003	48.1%	Very high	109	
	Ekaterinburg	Street/apartment based FSWs	27.30%	43.50%	2003	14.8%	High	151	
	Moscow	IDU SWs recruited from community settings	100%	82%	2003	13.3% (4/30)	High	34	[82]
	Volgograd	—	100%	20.60%	2003	2.9% (1/34)	Medium	36	
	Barnaul	—	100%	20.70%	2003	6.1% (2/33)	High	34	
	Togliatti	IDU SWs recruited from community settings	100%	13%	2001	62.1%	Very high	66	[13]
Russian Federation	Togliatti		100%		2005	57.8%	Very high	38	
	Moscow	SWs recruited from the street			2000	15%	High	170	[107]

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Table C.14 Summary of HIV Prevalence among Samples of SWs in Eastern Europe *(continued)*

Country	*Area*	*Population sampled*	*Injecting drug use*	*Migrants*	*Survey year*	*HIV prevalence*	*Category*	*n*	*References*
	Nizhny Novgorod	CSWs			2006	5.80%	High	200	[81]
	Krasnoyarsk	CSWs			2007	8%	High	200	
	Tomsk	CSWs			2007	2%	Medium	200	
	Chelyabinsk	CSWs			2007	6%	Medium	200	[128]
	Irkutsk	CSWs			2008	20%	Very high	201	
	Moscow	SWs recruited at STI clinics			2009	4.50%	Medium	750	
	15 Russian cities	CSWs	30%		2009	4.50%	Medium	1,777	
Ukraine	Donetsk, Kharkiv, Lutsk, Nikolaev, Odessa, Poltava, Simferopol.	FSWs recruited from street			2002	20%	Very high	646	[107]
	23 cities	FSWs recruited from community			2008–09	13.20%	High	3,284	[129]
Ukraine	16 cities	FSWs recruited from community settings	24% ever used drugs; 15% IDU in last 30 days	39% internal migrants	2009	12.90%	High	2,278	[130]
Kazakhstan		SWs recruited from community settings; sold sex in last 6 months	9.80%	—	2006	2.50%	Medium	—	[88]
			18.20%	—	2007	2.20%	Medium	—	—
			12.30%	—	2008	1.40%	Low	—	—
			11.10%	—	2008	1.30%	Low	2,249	—
	National	FSWs recruited from STI clinics	—	—	—	0.10%	Low	3,903	[107]
	19 cities	FSWs recruited from the street/STI clinics	12%	—	2005	2.10%	Medium	1,960	[107]

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Table C.14 Summary of HIV Prevalence among Samples of SWs in Eastern Europe *(continued)*

Country	*Area*	*Population sampled*	*Injecting drug use*	*Migrants*	*Survey year*	*HIV prevalence*	*Category*	*n*	*References*
Kyrgyz Republic	Bishkek, Osh	FSWs in past 6 months	4.8%	—	2006	1.4%	Low	352	[88]
			2.3%	—	2007	1.3%	Low	—	—
			0.5%	—	2008	1.9%	Low	—	—
			0.4%	—	2008	1.6%	Low	—	—
Tajikistan	5 regions	FSWs	0.3%	—	2006	3.7%	Medium	1,200	—
			1.50%	—	2007	1.6%	Low	—	—
			1.70%	—	2008	2.8%	Medium	—	—
			1.50%	—	2008	2.7%	Medium	—	—
Uzbekistan	Samarkand	FSWs and MSWs	5%	—	2004–05	6.20%	High	372	[85]
	Tashkent	FSWs	9%	—	2003–04	10% (45/448)	High	448	[84]
		FSWs IDU	100%	—	—	58.50%	Very high	41	—
		FSWs non-IDU	0%	—	—	5.20%	High	407	—
	Multisites	FSWs	—	—	2005–07	4.70%	Medium	2,000	[89]

Note: AIDS = acquired immune deficiency syndrome; CSWs = commercial sex workers; FSWs = female sex workers; IDU = injecting drug user; MSW = male sex worker; n = sample size; RDS = respondent-driven sampling; STIs = sexually transmitted infections; SWs = sex workers; TLS = time location sampling; VCT = voluntary counseling and testing; — = not available.

Table C.15 Summary of HIV Prevalence among Samples of Male and Transgender SWs

Country	*City*	*Population sample*	*Migrant*	*IDU*	*Survey year*	*HIV Prevalence*	*Category*	*n*	*References*
Belgium	Antwerp	MSWs recruited through outreach	72% (Eastern Europe, Middle East, North America, South Africa, Western Europe)	5%	1999–2004	10.80%	High	120	[95]
Czech Republic	Cheb, Ostrava, Prague, Usti nad Labem	MSW	7% (Bulgaria, Russian Federation, Ukraine)	38%	1999–2003	0.9%	Low	1,480	[115]
		—	—	—	—	—	—	—	[107]
Italy	Rome	MSWs/Transgender	80%–96% (mostly South America)	8.9% cocaine	1992–2007	23%	Very high	752	[91]
	Brescia	Transgender	100% (South America)	—	2002–04	27%	Very high	85	[90]
Netherlands	Rotterdam, The Hague	Transgender	96% (mostly South America)	—	2002–05	18.80%	High	70	[19]
Russian Federation	Moscow	MSW	84% internal migrants	8%	2005–06	16%	High	50	[55]
Spain	19 cities	MSW and transgender	67% migrants (mostly South America)	3.30%	2000–02	12%	High	418	[92]
Spain	19 cities	MSW and transgender	70%	2%	2000–07	9.9%	High	1,935	[131]
United Kingdom	London	MSWs recruited at STI clinics	62.8% (SA, SSA, WE, EE, Australia)	26.70%	1994–2003	8.90%	High	636	[86]
		—	—	—	2003	9.3%	High	257	[107]

Note: EE = Eastern Europe; HIV = human immunodeficiency virus; IDU = injecting drug user; LA = Latin America; MSM = men who have sex with men; MSWs = male sex workers; *n* = sample size; SA = South America; SSA = Sub-Saharan Africa; STI = sexually transmitted infection; SW = sex worker; WE = Western Europe; — = not available.

Table C.16 Prevalence of HIV and Syphilis among Samples of Male and Transgender SWs

Country	*City*	*Population*	*HIV*	*Syphilis*	*n*	*Year*	*Reference*
Italy	Brescia	Transgender	27%	14%	86	2002–04	[90]
United Kingdom	London	MSW	9%	21%	746	1994–2003	[86]
Belgium	Antwerp	MSW	10.8%	12.5%	120	1999–2004	[95]
Spain	Madrid	Transgender	22.6%	30.6%	62	1998–2003	[65]

Note: HIV = human immunodeficiency virus; MSW = male sex worker; *n* = sample size; SW = sex worker.

Table C.17 Prevalence of HIV and Syphilis among Samples of FSWs

Country	*City*	*Population*	*HIV*	*Syphilis*	*n*	*Year*	*Reference*
Albania	Tirana	FSW	1.1%	6%	90	2011	[110]
Bulgaria	8 cities	FSW	1%	10%	799	2005	[113]
Serbia	Belgrade	FSWs, MSW, Transgender	1%	4%	250	2010	[118]
Kyrgyz Republic	Bishkek, Osh	FSWs	1.4%	34.9%	352	2006	[132]
Azerbaijan	Baku, Gandja, Sumgait	FSWs	3%	9%	200	2001	[124]
Moldova	Kishinev	FSWs including IDUs	5%	12%	148	2001	
Russian Federation	Moscow	FSWs including IDUs	14%	26%	147	2001	
	Ekaterinburg	FSWs including IDUs	15%	22%	151	2001	
	Barnaul, Moscow, Volgograd	FSWs including IDUs	7%	16%	98	2003	[14]
Italy	Bologna	FSWs including migrants	2%	12%	558	1995–99	[100]
Greece	Athens	FSWs including migrants	0%	18%	299	2005	[20]
United Kingdom	London	FSW including migrants	1%	2%	268	2007–08	[109]
Spain	Madrid	FSW including migrants	0%	3%	66	1998–2003	[65]
Ukraine	15 cities	FSW including IDUs	12.9%	4.4%	2,278	2009	[130]
Georgia	Tblisi, Batumi	FSWs including IDUs	0.4%	34.1%	985	2002–06	[133]
Turkey	Ankara, Istanbul, Izmir	FSWs (unregistered)	0.8%	7.5%	252	2006–07	[120]

Note: FSW = female sex worker; HIV = human immunodeficiency virus; IDU = injecting drug user; MSW = male sex worker; *n* = sample size.

Table C.18 Prevalence of Chlamydia and Gonorrhea among Samples of FSWs

Country	*City*	*Population*	*Chlamydia*	*Gonorrhea*	*n*	*Year*	*Reference*
Israel	Tel Aviv	FSWs (indoor)	6%	5%	300		[66]
Turkey	Gazaniantep	FSWs (registered)	5%	—	92	1997–98	[134]
Turkey	Ankara, Istanbul, Izmir	FSWs (unregistered)	1.2%	2.8%	252	2006–07	[120]
United Kingdom	London	FSWs incl. migrants	4%	2%	233	2008–09	[109]
Belgium	Ghent	FSWs incl. migrants	7%	—	950	1998–2003	[93]
Italy	Bologna	Migrant FSWs	6%	1%	558	1995–99	[100]
	Brescia	Migrant FSWs	14%	—	101	1998–2000	[29]
Spain	Barcelona	FSWs (street)	5%	4%	301	2002–03	[21]
Serbia (Kosovo)	Ferizaj, Prizren, Urosevac	Migrant FSWs (street/indoor)	45%	—	153	2006	[119]
Georgia	Tblisi	FSWs (street)	23%	18%	160	2002–06	[133]
	Batumi	FSWs (indoor)	22%	12%	160	2004–06	[133]

Note: FSWs = female sex workers; *n* = sample size; — = not available.

Table C.19 Demographic Characteristics, Harms Associated with Sex Work, and HIV Testing among Samples of Male and Transgender SWs

Country	*City*	*n*	*Year*	*Recruitment location*	*Population*	*Age*	*Condom use with clients*	*Condom use with nonpaying partners*	*Testing for HIV*	*Violence*	*Ref.*
Netherlands	Rotterdam, The Hague	70	2002–05	Drug relief center and community settings	Transgender	Median = 30 years (26–37)	Inconsistent = 26%	Inconsistent = 81% (steady partners); 50% (casual partners)	82% ever tested	—	[19]
Spain	National	418	2002	22 HIV/STI counseling and testing clinics	MSW, Transgender (18%)	Mean = 29.2 years; SD = 7.3 years	—	—	100%	—	[92]
		1,935	2000–07	19 HIV/STI counseling and testing clinics	MSW, Transgender	Mean = 29.7; SD = 7.8 years	—	—	—	—	[131]
United Kingdom	London	636	1994–2003	Targeted sexual health clinics		Mean = 25.4 years (15–59)	96% reported consistent condom use for anal sex with last 4 clients	19% (10/52) unprotected vaginal sex; 37% of MSW (128/319) did use condoms for anal sex with regular male partner	—	—	[86]
Belgium	Antwerp	120	1999–2004	Street, red light district	MSW (all transvestite or transsexual)	Median = 26.5 years (12–58)	—	79.1% always used condoms for anal intercourse	—	—	[95]

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Table C.19 Demographic Characteristics, Harms Associated with Sex Work, and HIV Testing among Samples of Male and Transgender SWs *(continued)*

Country	*City*	*n*	*Year*	*Recruitment location*	*Population*	*Age*	*Condom use with clients*	*Condom use with nonpaying partners*	*Testing for HIV*	*Violence*	*Ref.*
Czech Republic	Cheb, Usti nad Labem, Ostrava, Prague	1,480		Community settings and via specialist project	MSW	Mean = 22.9 years (18–54)	—	—	—	—	[115]
Russian Federation	Moscow	50	2005–06	Community settings via RDS, outreach workers	MSW	36% aged between 17–20 years	—	—	—	28% ever experienced violence from clients	[55]
Italy	Brescia	85	2002–04	STI clinics	Transgender	mean = 27.8 years	79% regular condom use	—	—	—	[90]
	Rome	65	1992–2007	HIV clinics	MSWs	—	69% regular condom use with clients	—	—	—	[91]
		602	—	—	Transgender	—	76% regular condom use with clients	—	—	—	—

Note: HIV = human immunodeficiency virus; MSWs = male sex workers; *n* = sample size; RDS = respondent-driven sampling; ref. = reference; SD = standard deviation; STI = sexually transmitted infection; SW = sex worker; — = not available.

Table C.20 Demographic Characteristics, Harms Associated with Sex Work, and HIV Testing among Samples of FSWs in Europe

Country	*City*	*Year*	*Recruitment location*	*Location of sex work*	*Age*	*Drug use*
Greece	Athens	2005	STI/HIV clinics	Brothels	39.7 years	0%
Israel	Tel Aviv, 2 sites	—	Community settings	Brothels	22–27 years	—
Italy	Brescia, Catania, Milan	1999–2003	Work settings and STI clinics	89%–100% street	23–38 years	No IDU reported
Spain	National	2000–05	STI clinics, SW services, work	31.4%–100% street	28–38 years	<1% IDUs
Netherlands	Rotterdam, The Hague	2002–05	Drug relief center and community settings	24% Street	30 years	No IDU reported
United Kingdom	London	2000–09	Clinics and work settings	70% indoors	26–27 years	4%–11% ever IDU
Bosnia and Herzegovina	—	2007	Cross-sectional biobehavioral survey	HIV clinics	—	—
Bulgaria	8 cities	2008	Cross-sectional biobehavioral survey	—	—	—
Croatia	Split and Zagreb	2006–08	Community recruitment	46%–49% street	—	9.2%–55% IDUs
Czech Republic	Cheb, Ostrava, Usti nad Labem	1999–2000	Community settings	—	24.8 years	10% ever IDUs

Migrants	*Condom use with clients*	*Condom use with non paying partners*	*Violence*	*HIV testing*	*Ref.*	*No. studies*
19.7% Migrants (Albania, Bulgaria, Georgia, Romania, Russian Federation, Ukraine)	—	—	—	Mandatory ever: 15 days in order to obtain permit	[20]	1
Mostly migrants from FSU	<5% reporting inconsistent condom use with clients	—	—	—	[66]	2
91%–100% migrants	12–16% reported not using a condom with clients	84% reported not using condoms with stable partner	—	—	[7, 29, 67]	3
83%–100% migrants	<5% reporting not using a condom with clients; 90% reporting non-condom use with nonpaying partners	—	—	—	[21, 27–28]	3
75% migrants (Africa, SE, LA)	inconsistent = 11%	inconsistent = 89% (steady partners); 65% casual partners	—	82% ever tested	[19]	1
33%–60% migrants	<1% did not use condom last time had vaginal sex with client or partner	69.3% did not use condoms last time they had vaginal sex with a nonpaying partner	30.2% experience violence from clients in the last 12 months	37% tested for HIV in past 12 months	[108–109]	2
—	—	—	—	28.8% ever HIV tested; 13.6% tested in the past 12 months	[111]	1
—	—	—	—	58.3% report having a test and knowing the result	[113]	1
—	<5% reporting no condom at last commercial sex	—	30%–52% report physical abuse from client in last year	78.5%–91% ever tested for HIV	[54]	1
40% migrants	—	—	—	—	[115]	1

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Table C.20 Demographic Characteristics, Harms Associated with Sex Work, and HIV Testing among Samples of FSWs in Europe *(continued)*

Country	*City*	*Year*	*Recruitment location*	*Location of sex work*	*Age*	*Drug use*
Kosovo	Ferizaj/ Urosevac/ Prizren	2006	Clinic recruitment	Street and indoor SWs	28 years	1.3% IDUs in past 12 months
Romania	Bucharest, Constanta, Timisoar	2008	Community settings via key informants	Street	Range 15–24 years	22.2% ever injected
Serbia	Belgrade	2006–10	Community recruitment	Street and indoor	—	12.8%–27% IDUs
Turkey	Gaziantep, Izimir, and Manisa	1997–2006	Clinic recruitment	—	21–74 years	2% ever used illegal drugs
	Ankara, Istanbul, and Izmir	2006–07	Peer recruitment	—	—	—
Armenia	Yerevan	2007–08	Community settings	100% Street	33.7 years	no illegal drugs; 96.7% reported alcohol
Azerbaijan	Baku	2003	Community settings	50%	64.5% aged 20–30 years	<1% used drugs in past month
Estonia	Tallinn	2005–06	Community settings via RDS, TLS	—	29.5 years	6.6% IDUs
Georgia	Batum, Tblisis	2002–09	Community setting	100%	21–32 years	6% IDU
Lithuania	Vilnius	2008	Women's Health site at Lithuanian AIDS Center	—	27.5 years	—

Migrants	*Condom use with clients*	*Condom use with non paying partners*	*Violence*	*HIV testing*	*Ref.*	*No. studies*
34% Bulgaria; 28% Albania; 16% Moldova; and 9% Ukraine	38% never used condoms with clients in past 30 days	45% reported never using condoms with nonpaying partners in last 12 months.	16% forced to have sex against their will in past 12 months	40% ever tested for HIV	[119]	3
—	35% reported inconsistent condom use with clients in past 12 months	52–60% report not using condom with regular partner	46% forced to have sex in the last 12 months	52% ever tested for HIV	[135]	1
42.5%–55.1% Roma	<11% reporting not using condom at last commercial sex	—	—	—	[118, 136]	2
—	38% did not always use a condom with clients	—	—	—	[16, 134]	3
—	29% did not use a condom with last client	—	—	—	[120]	1
—	32.5% inconsistent condom use in past 7 days for vaginal sex	—	30% ever forced to have sex	—	[137]	1
4% migrants from Russian Federation	78% did not use condoms with clients	86% did not use condoms with regular partners	—	13% tested for HIV past 12 months	[124]	1
—	25% did not always use condoms for vaginal and anal sex with clients	—	—	65.5% had ever been tested for HIV	[36]	1
10%–20%	10% inconsistent condom use with clients	90% inconsistent with nonpaying partners; 19% did not use condom for last sex	17.7%, 29%, 26.9% experience physical/sex violence during past year (Tblisi); 13% physical violence (Batumi)	52% ever tested for HIV (Tblisi)	[78]	6
—	8% did not use a condom with last client			53.4% had been tested for HIV in past 12 months and knew result	[126]	1

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Table C.20 Demographic Characteristics, Harms Associated with Sex Work, and HIV Testing among Samples of FSWs in Europe *(continued)*

Country	*City*	*Year*	*Recruitment location*	*Location of sex work*	*Age*	*Drug use*
Moldova	Kishinev	2003–10	Community recruitment, RDS	100%	23–25 years	11.2% IDUs
Russian Federation	Chelyabinsk, Ekaterinburg, Irkutsk, Moscow, Samara, Saratov	2001–03	Community recruitment, RDS	Mostly street	20–25 years	4.8%–14% ever injecting
Ukraine	National	2003–09	Community via NGOs	Mostly street	23.1 years	71% ever IDU; 59% regular
		2009	TLS	43.4% street	26 years	24% ever used drugs; 15% IDU in last 30 days
Uzbekistan	Samarkand and Tashkent	2003–05	Community settings via NGOs	2.3%–47.5% street	25–27 years	5.30%
Kyrgyz Republic	Bishkek and Osh	2006–09	Community settings	—	25–26 years	0.4%–5.0% IDUs
Kazakhstan	Multisites	2006–09	Community settings	—	25–27 years	7.1%–9.8% IDUs
Tajikistan	Multisites	2006–09	Community settings	—	26–31 years	4.0%–6.3% IDUs

Migrants	*Condom use with clients*	*Condom use with non paying partners*	*Violence*	*HIV testing*	*Ref.*	*No. studies*
99% migrants from Russian Federation	17% did not use condom with last client		53.4% experience violence or have been threatened by client	13.9% tested for HIV over last 12 months	[124, 127]	2
7%–100% internal migrants	0%–32.4% did not use a condom with last client	—	19.7%–76% reporting some kind of sexual or physical violence from a client in the last year	37.8%–57% ever tested for HIV	[52, 124, 138]	5
—	12%–44% did not use a condom for last sexual contact	—	—	59% tested for HIV in past 12 months and know results	[129, 139]	2
39% internal migrants	10% did not use condom for last sexual act with client	42% did not use condom for last sexual act with permanent partner	—	56% tested for HIV in past 12 months and know results	[130]	—
—	—	—	—	83.9% ever tested for HIV	[85, 140]	2
—	<20% reporting noncondom use with clients for last sex act; 20%–50% reporting non-condom use with regular partner	—	—	42.5%–55.7% tested in past 12 months voluntarily	[88]	4
—	<20% reporting noncondom use with clients for last sex act; 20%–50% reporting noncondom use with regular partner	—	—	61.2%–76.4% tested in past 12 months voluntarily	[88]	4
—	<30% reporting noncondom use with clients for last sex act	—	—	26.7%–55.0% tested in past 12 months	[88]	4

Note: FSWs = female sex workers; FSU = former Soviet Union; HIV = human immunodeficiency virus; IDUs = injecting drug users; LA = Latin America; NGOs = non government organizations; RDS = respondent-driven sampling; Ref. = reference; SE = standard error; STIs = sexually transmitted infections; SW = sex worker; TLS = time location sampling; — = not available.

Table C.21 Summary of HIV Incidence and Prevalence Estimates among MSM in Western Europe

Country	*City*	*# studies*	*Study year*	*Recruitment location*	*Population sample*	*HIV Prevalence range*	*"Best" HIV prevalence*	*HIV Incidence*	*Reference*
Belgium	National	3	2002–10	Anonymous testing sites; gay venues	MSM	1.90%–6.06%	6.06%	—	[57, 86, 87]
France	National	2	2004–09	VCT sites; gay venues	MSM	2.0%–17.70%	17.70%	—	[57, 60]
Italy	Rome, Verona	2	2000–09	HIV testing center; community settings	MSM	11.80%	11.80%	IR 4.97/100 PY	[21, 31]
Netherlands	National	4	1999–2004	HIV testing center; community settings	MSM, Dutch speaker	2.80%–4.20%	4.20%	IR 1.2–3.8/100 PY	[10–12, 88]
Portugal	Lisbon	1	2002	STI clinics	MSM	6.40%	6.40%	—	[57]
Spain	National	5	2003–09	Gay venues; mail to members of a LGBT association; VCT clinics	MSM	1.60%–19.80%	5.50%	—	[5, 7, 21, 57, 61]
Switzerland	National	3	1996–2006	Anonymous VCT	MSM	1.60%–3.40%	1.60%	—	[8, 9, 57]
United Kingdom	National	11	1999–2007	Gay venues; online; sexual health clinics	MSM, Central and Eastern European MSM	3.10%–13.70%	9.10%	—	[14, 16, 57, 65, 66, 83, 89–93]

Note: HIV = human immunodeficiency virus; IR = incidence rate; LGBT = lesbian, gay, bisexual, transgender; MSM = men who have sex with men; PY = person-year; STIs = sexually transmitted infections; VCT = voluntary counseling and testing; — = not available.

Table C.22 Summary of HIV Incidence and Prevalence Estimates among MSM in Central Europe

Country	*City*	*# studies*	*Study year*	*Recruitment location*	*Population sample*	*HIV Prevalence*	*"Best" HIV prevalence*	*HIV Incidence*	*Reference*
Albania	Tirana	2	2005–08	Community	MSM	0.80%–1.80%	1.80%	—	[23, 94]
Bosnia and Herzegovina	Unclear	1	2007	Unclear	MSM	0.70%	0.70%	—	[33]
Bulgaria	National	1	2008	Gay venues	MSM	3.32%	3.32%	—	[34]
Croatia	National	3	2006	Community; gay venues	MSM, HIV– men	3.30%–4.60%	4.5%	—	[35–37]
Czech Republic	Prague	2	2004–09	Community; gay venues	MSM	0.5%–2.60%	2.60%	—	[21, 57]
Hungary	Budapest	2	2007–09	Community	MSM	2.60%–10.40%	10.40%	—	[22, 38]
Macedonia, FYR	National	1	2007	Community	MSM	0%	0.00%	—	[39]
Poland	National	1	2004	Community	MSM	4.70%	4.70%	—	[40]
Romania	Bucharest	1	2008–09	Gay venues	MSM	4.60%	4.60%	—	[21]
Serbia	Belgrade, Novi Sad, Pristina	2	2006–10	Community	MSM	0%–4.25%	4.25%	—	[41, 42]
Slovak Republic	Bratislava	1	2008–09	Gay venues	MSM	6.10%	6.10%	—	[21]
Slovenia	Ljubljana	2	2008–09	Gay venues	MSM	0.90%–5.10%	5.10%	—	[21, 43]
Turkey	Ankara, Istanbul, Izmir	1	2006–07	Community	MSM	1.8%	1.80%	—	[18]

Note: HIV = human immunodeficiency virus; MSM = men who have sex with men; — = not available.

Table C.23 Summary of HIV Incidence and Prevalence Estimates among MSM in Eastern Europe

Country	*City*	*# studies*	*Study year*	*Recruitment location*	*Population sample*	*HIV Prevalence*	*"Best" HIV prevalence*	*HIV Incidence*	*Reference*
Armenia	Unclear	1	2007	Unclear	MSM	2%	2%	—	[44]
Azerbaijan	Baku	1	2007–08	Community settings	MSM	1%	1%	—	[45]
Belarus	National	2	2006–09	Sentinel surveillance	MSM	0.17%–2.10%	0.17%	—	[95, 96]
Estonia	Tallinn	1	2008	Health and community services	MSM	2.50%	2.50%	—	[48]
Georgia	Tbilisi	1	2007	RDS	MSM	3.70%	3.70%	—	[49]
Kazakhstan	Unclear	2	2007–09	Community, sentinel surveillance	MSM	0.20%–0.30%	0.20%	—	[59, 97]
Kyrgyz Republic	Unclear	1	2007–08	Community settings	MSM	1.2%	1.20%	—	[59]
Lithuania	Unclear	1	2009	Unclear	MSM	2.7%	2.70%	—	[51]
Moldova	Chisinau	1	2007	Unclear	MSM	4.80%	4.80%	—	[52]
Russian Federation	7 cities	5	2003–09	Community settings	MSM	0%–18%	6.39%	—	[20, 22, 54, 58, 98, 99]
Ukraine	National	1	2009	Community settings	MSM	1.50%–21.70%	8.60%	—	[55]
Uzbekistan	National	1	2009	Unclear	MSM	6.80%	6.80%	—	[56]

Note: HIV = human immunodeficiency virus; MSM = men who have sex with men; RDS = respondent-driven sampling; — = not available.

Table C.24 Demographic Characteristics of Study Respondents in Western Europe

Country	*Age*	*Country of origin*	*Education*	*Income/ employment*	*HIV test previous*	*STI incidence/ prevalence*	*Violence*	*References*
Belgium	Mean 31.3 years	—	—	—	Ever 88%; 12 m: 52.2%	—	—	[87]
France	Median 38 years	Metropolitan France 83%; elsewhere 17%; visible minority 7.6%	High school/University: 64%–65%	—	Ever 86.2%	Self-report 12 m: 8.8%–20.4%	—	[60, 84]
Israel	Mean 26–27 years	90.7% Israeli born	High school/University: 53%–65%	Above average income 54%	Ever: 64%	—	—	[17, 85]
Italy	Median 35 years	—	—	—	12 m: 53% tested and know result	—	—	[21, 31]
Netherlands	Median 28–39 years; mean 36 years	Netherlands 87.2%–93.2%	Low-level: 9–21%; medium: 33%–40%; high: 38%–58%	—	Ever: 63.4%	Gonorrhea 5.7–6/100 PY; Syphilis 1.4–5.4 /100 PY	—	[10–12, 88]
Norway	—	—	—	—	Ever: 74.7%; 12 m: 56% tested and know result	—	—	[100]
Spain	Median 31–38 years; mean 41 years	Spanish 9%–79.7%; Latin American 11.5%–77%; Eastern European 4%–5%; Western European 2%; North African 2%	High school or less: 47%–52%; university: 48%–54%	Employed: 61%–69%; self-employed: 12%–14%; student: 10%–20%	Ever: 63%–86.8%; 12 m: 46%–56% tested and know result	12 m: Syphilis 2%–5%; Gonorrhea 5%; chlamydia 3%; Herpes 2%; Public lice 8%; genital warts 2%	12 m: 10.7%–11% victim of aggression or verbal assaults	[5–7, 21, 61, 81]
Switzerland	Mean 33 years	Switzerland 73.6%–77%; other European 15.7%–16.7%	—	—	—	—	—	[8, 9, 82]
United Kingdom	Median 27–39 years; mean 35 years	White 85%–96.7%	No qualification 12%–19%, secondary 17%–23%, further/ vocational 36%, university 47%–54%	Employed 77%–84%, student 5%–8%, unemployed 8%–18%	Ever: 59%–90.1%; 12 m: 34%–50.8%	Any 12 m 36%–45.7%, gonorrhea 9%–27%, chlamydia 10%–19%, warts 8%–9%, syphilis 1%–7%, pubic lice 6%–11%, herpes 3%–4%		[14–16, 65, 66, 83, 91, 101–103]

Note: HIV = human immunodeficiency virus; m = months; PY = person-year.; STIs = sexually transmitted infections; — = not available.

Table C.25 Demographic Characteristics of Study Respondents in Central Europe

Country	*Age*	*Country of origin*	*Education*	*Income/employment*	*HIV test previous*	*STI incidence/prevalence*	*References*
Albania	44% <25 years	—	26.1% did not attend school	—	—	Syphilis 2.6%; HCV 3.5%	[23]
Bulgaria	—	—		—	12 m: 42% tested and know results	—	[34]
Croatia	Median 27 years	—	57%–61% secondary; 36%–39% university	—	Ever 48%–57%	Syphilis 13.2%; gonorrhea 13.1%; chlamydia 9%	[26, 35]
Czech Republic	Mean 28 years	—	University 27%	—	12 m testing and received result 42%	—	[21]
Hungary	—	Non-Hungarians excluded	Mean 28%–29%; 44% high school; 40% university/ vocational; 15.3 years in education	72%–88% employed: 61% "white collar," 16% "blue collar"	—	All 4.3%	[22]
Macedonia, FYR	—	—	—	—	12 m: 56% tested and know results	—	[39]
Romania	Median 25 years	—	—	—	12 m: 43.2% tested and know result	—	[21]
Serbia		—	—	—	12 m: 31% tested and know results	—	[41]
Slovak Republic	Median 28 years	—	—	—	12 m: 32% tested and know results	—	[21]
Slovenia	Median 30 years	—	—	—	12 m: 38% tested and know results	—	[21]
Turkey	Median 26 years	93% Turkish	5% Just literate; 11% primary; 11% secondary; 58% higher; 14% still studying	—	—	Prevalence HBV 3.6%; syphilis 10.8%; gonorrhea 3%; chlamydia 1.8%	[18]

Note: HBV = hepatitis B virus; HCV = hepatitis C virus; HIV = human immunodeficiency virus; m = months; STIs = sexually transmitted infections; — = not available.

Table C.26 Demographic Characteristics of Study Respondents in Eastern Europe and Central Asia

Country	*Age*	*Country of origin*	*Education*	*Income/employment*	*HIV test previous*	*STI incidence/ prevalence*	*Violence*	*References*
Azerbaijan	—	—	—	—	—	Syphilis 8%; HCV 14%		[45]
Estonia	Median 30 years	Estonia 71%, Russian Federation 21%	<secondary 13%; secondary 18%; vocational 18%; post-secondary 51%	≤7,500 EEK pa 34%; 7,500 EEK+ 66%	Ever: 67%	—	—	[19]
Georgia	Median 27 years	Georgia 83.4%; Armenia 3.6%; Russian Federation 3.6%	57% secondary; 56% post-secondary	—	Ever: 41% tested and knows results	Syphilis 31.4%; HCV 15.7%	Ever experienced violence because of sexual orientation 21%: physical 14%; verbal 12%; sexual 7%	[25]
Kazakhstan	Median 27 years	Kazakhstan 26.4%; Russian Federation 63.6%	Elementary 7%; secondary 54%; higher 39%	Median income US$324; no income 8%; no certain occupation 4%	12 m: 40% tested and knows the results	Syphilis 4.1%, HCV 4.2%; 12 m suspected: 8.3%	—	[59, 76]
Kyrgyz Republic	Median 24 years	Kyrgyz Republic 43.8%; Russian Federation 63.6%	Elementary 5%, secondary 40%; higher 56%	Median income US$114; no income 13%; no certain occupation 18%	12 m: 24%–52% tested and knows results	Prevalence syphilis 10.7%; HCV 1.2%; 12 m: suspected 13.7%	—	[59, 76]
Lithuania	—	—	—	—	12 m: 41% tested and knows result	—	—	[51]

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Table C.26 Demographic Characteristics of Study Respondents in Eastern Europe and Central Asia *(continued)*

Country	*Age*	*Country of origin*	*Education*	*Income/employment*	*HIV test previous*	*STI incidence/ prevalence*	*Violence*	*References*
Russian Federation	Mean 28 years	Russian Federation 62%	Middle school 34%; high school 24%; mean 15.3 years in education	72% permanently employed; 18%–40% currently studying	—	10.5% syphilis; 12%, HPV 8%, HSV-2 4%, HCV 8%	Male SW sample: ever violence from clients 28%	[20, 22]
Tajikistan		Tajikistan 65.9%; Uzbekistan 26.8%; Russian Federation 7%	—	—	12 m: 2.8% tested and knows results	12 m suspected: 4.2%	—	[76]
Ukraine	Median 27 years	—	Completed secondary school or higher 92%	—	12 m: tested and knows results 43%; 6 m: 35%	—	—	[24, 55]

Note: EEK = Estonian Kroon; HCV = hepatitis C virus; HIV = human immunodeficiency virus; HPV = human papilloma virus; HSV-2 = herpes simplex virus 2; m = months; STIs = sexually transmitted infections; SW = sex worker; — = not available.

Table C.27 Sexual and Drug Use Characteristics of MSM in Western Europe

Country	*UAI*	*Condom use at last AI*	*Other risk (reduction) practices*	*Partner types and numbers*	*Alcohol/drugs*	*Sex work*	*References*
Belgium	—	c 72.1%, r 38.1%	—	—	12 m: alcohol 46.4%; poppers 36.3%; ecstasy 14.7%; cocaine 13.1%; Viagra 12.2%; GHB/GBL 9.7%; cannabis 8.5%; speed 6.4%; methamphetamine 1.4%	—	[87]
France	c (HIV discordant or unknown) 23.5%	—	12 m: Barebacked 30.5%; esoteric sexual practice 41.8%	12 m: mean 18.1; median 6; 9.5% 1 partner; 77.9% 2–50, 12.6% 50+	—	12 m: sold sex 8.1%	[60, 84]
Israel	6 m: 23%	—	12% sex with males and females	—	6 m: 53% none, of those who use, alcohol 47%; marijuana 28%; poppers 27%; Viagra 11%; ecstasy 9%; 33% used 2 or more drugs	Paid for sex 11%	[17, 85]
Italy	6 m: anal sex c 45.9%, r 59.8%; oral sex c 91.9%, r 94.2%	45.6%	—	6 m: c median 6, r 1	6 m: before/during sex: alcohol 54.2%; poppers 21.6%; ecstasy 3%; Viagra 8.6%; marijuana 13.4%; cocaine 8.3%; amphetamine 1.9%	—	[21, 31]
Netherlands	6 m: anal sex c 15.1%, oral sex r 26.1%; c and r 11.6%	—	—	6 m: 8	—	—	[10–12, 88]
Norway	6 m: c 24%	—	—	—	—	—	[100]

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Table C.27 Sexual and Drug Use Characteristics of MSM in Western Europe *(continued)*

Country	*UAI*	*Condom use at last AI*	*Other risk (reduction) practices*	*Partner types and numbers*	*Alcohol/drugs*	*Sex work*	*References*
Spain	12 m: c 23%–31%, r 55%; c <30 years 41%, 30+ 34%; r <30 years 69%, 30+ 60%	33%–57%;	—	6 m: median 6; 12 m: 10+ 64%; 12 m: 9.8% female partner	12 m: before/during sex: none 36%; alcohol 64%; marijuana 26%; cocaine 19%; amphetamine 5%; poppers 41%; Viagra 13%; ketamine 5%; methamphetamine 3%. # drugs used: none 44%; 1–3 46%; 4%–6 8%, 7+ 2%	12 m: 4.1% charged for sex; Valencia study recruited from SW apartments	[5–7, 21, 61, 81]
Switzerland	Ever 98%; c 45.7%; 12 m: 32.6% (HIV+ 52.4%, HIV– 31%)	—	24%–73.8% used such practice intentionally; 50% practiced sorting; 33% strategic positioning; 62% withdrawal before ejaculation; 53% used 1 of the 3 practices; 38%: used 2; and 9% used all 3.	12 m: anal sex: none 32.8%; 1 20.4%; 2–3 23.4%; 4–10 15.4%; 10+ 8%; 24 m: 0–1 7.9%; 2–5 42.4%; 6+ 46.4%	—	—	[8, 9, 82]
United Kingdom	24 m: any receptive: 55%–83%; >1 partner 26%–60%, >5 partners 6%–27%; r 38–59%; c 25%–55%; any insertive: 61%–76%; >1 partner 30%–65%; >5 partners 13%–27%; 12 m: 0–1 partner 86%; 2+ 14%; c 10%; UAI with partners of unknown or discordant status: 26%	—	—	12 m: female partner 12.2%; 12 m: 10+ partners 10.7%–11.3%; 13+ 24.8%; 30+ 16.7%	12 m: any 59.9%; poppers 44%; marijuana 32%; ecstasy 34%; cocaine 22%; ketamine 13%; amphetamine 9.4%; GHB 5.4%; methamphetamine 4.7%; LSD 3.5%; crack 2.1%; heroin 1%	Paid for sex with a man 15% (London based); 9.8% (elsewhere)	[14–16, 65, 66, 83, 91, 101–103]

Note: AI = anal intercourse; c = casual partner; HIV = human immunodeficiency virus; HIV+ = HIV-positive; HIV– = HIV-negative; GBL = gamma-Butyrolactone; GHB = gamma hydroxybutyric acid; LSD = lysergic acid diethylamide; m = months; MSM = men who have sex with men; r = regular partner; SW = sex worker; UAI = unprotected anal intercourse; — = not available.

Table C.28 Sexual and Drug Use Characteristics of MSM in Central Europe

Country	*UAI*	*Condom use at last AI*	*Partner types and numbers*	*Alcohol/drugs*	*Sex work*	*References*
Albania	6 m: commercial 42%; noncommercial 56%	6 m: commercial: 77%; noncommercial 60%	Female partners: ever 50%; of whom 84% in 6 m, and 71% having had 1–3 female partners. Male partners: 6 m: >50% insertive MSM have 4+ partners; 34.2% have 5+ noncommercial partners	42% daily alcohol; 65% have ever tried drugs; 59% inject, heroin most popular	6 m: 74% AI with commercial partner.	[23]
Bulgaria	—	c 70.4%	—	—	—	[34]
Croatia	12 m: 1+ c 46%–60%	c 58%, r 37–44%; (29% never had a c)	Female partner: ever 52%–53%; current 7%. Male partners: 6 m: median 3; 12 m: none 23.4%; 1 20.5%; 2–3 17.5%; 4–7 5%; 8+ 5.6%	12 m: drugs before sex 33%; alcohol before sex 51%	Ever sold sex 5%	[26, 35]
Czech Republic	6 m: c 64%; r 74%	30%	6 m: median 4	6 m: before/during sex: alcohol 85%; poppers 38%, ecstasy 11%, Viagra 13%, marijuana 24%, cocaine 5%, amphetamine 9%	—	[21]
Hungary	3 m: 72%: c 28%, r 57.6%: with multiple partners 24.6%	All 49.6%; c 74%, r 35.3%,	Female: ever 96.8%, 12 m: 96.2%. Male median 4.9	—	12 m: 5.1% paid for sex	[22]
Macedonia, FYR	—	Last AI: 57%	—	—	—	[39]
Romania	6 m: c 48%, r 57%	42.7%	6 m: median 3	6 m: before/during sex: alcohol 62%; poppers 21%; ecstasy 8%; Viagra 5%; marijuana 12%; cocaine 6%; amphetamine 3%	—	[21]

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Table C.28 Sexual and Drug Use Characteristics of MSM in Central Europe *(continued)*

Country	*UAI*	*Condom use at last AI*	*Partner types and numbers*	*Alcohol/drugs*	*Sex work*	*References*
Serbia	—	67%	—	—	—	[41]
Slovak Republic	6 m: AI: c 58%, r 80%	31%	6 m: median 3	6 m: before/during sex: alcohol 84%; poppers 34%; ecstasy 8%; Viagra 9%; marijuana 13%; cocaine 5%; amphetamine 4%	—	[21]
Slovenia	6 m: AI: c 41%, r 63%.	I43%	6 m: median 3	6 m: before/during sex: alcohol 70%; poppers 50%; ecstasy 11%; Viagra 10%; marijuana 19%; cocaine 10%; amphetamine 10%	—	[21]
Turkey	—	Ever: always 30%; almost always 7%; sometimes 12%; never 4%; do not know/no answer 46%	Female partner: ever 36%; male partner: 0 8%; all sex in past 6 m: ins. 1 8.4%; ins. >1 7.2%; rec. 1 6%; rec. >1 10.2%; rec. and ins. 8.4%; rec. and ins. >1 28.9%	—	44% sold sex, both ins. and rec. with >1 partner 37%; rec. only 16%; ins. only 16%	[18]

Note: AI = anal intercourse; c = casual partner; ins. = insertive; MSM = men who have sex with men; m = months; r = regular partner; rec. = receptive; UAI = unprotected anal intercourse; — = not available.

Table C.29 Sexual and Drug Use Characteristics of MSM in Eastern Europe and Central Asia

Country	*UAI*	*Condom use at last AI*	*Partner types and numbers*	*Alcohol/drugs*	*Sex work*	*Ref.*
Estonia	12 m: 49%	56%		30 d: none 6%; 1 or less/week 49%; more than 1/week 42%; every day 4%; illicit drug use: none 57%; not regular 37%; frequent/regular 7%		[19]
Georgia	12 m: all 65%, commercial partners (male and female) 72%	All 62%, male commercial partner 38%	Female partners: 12 m: c 47%; Commercial: 18%. Male partners: 1–5 69.3%; 6–10 15%; 11+ 15.7%	Daily alcohol 5%; any drugs 39%; marijuana 89%; Subutex 22%; injected 24%; none with a used needle	12 m: sold to a man 21%	[25]
Kazakhstan		All 57.1%; c 79%, r 52%; commercial partner 78%	3 m: 0 1%; 1 18%; 2+ 81%; 12 m: mean: all 10.3; male 9.4; female 0.9	Ever injected 2.1%; mean age at first injection 15.9 years; of injectors, injected daily in past 6 m: 25%		[59, 76]
Kyrgyz Republic	—	All 47.8%; c 54%, r 58%; commercial partner 100%	3 m: 0 1%, 1 17%; 2+ 82%; 12 m: mean: all 10.2; male 7.9; female 2.5	Ever injected 1.0%; mean age at first injection, 23 years: of injectors, injected daily in past 6 m: none	—	[59, 76]
Lithuania	—	47%	—	—	—	[51]
Russian Federation	3 m: any UAI 53%; c 16%, r 45%; multiple partners 16%	44.2%	12 m: 24% male and female partners	30 d: alcohol 92%–96% (male mean 6.6 days, median 5 days; 41% were drunk); poppers 21%; marijuana/hash 15%; amphetamines 4%; injecting <1%–8%	12 m: 16% paid for sex	[20, 22]
Tajikistan	12 m: c 70.3%, r: 97.2%; commercial 96.4%	24.9%	12 m: mean (median) all 74.7(26), male 69 (23), female 6.6 (1)	Ever injected 4.5%; mean age at first injection 17.2 years; of injectors, injected daily in past 6 m: 23.1%	—	[76]
Ukraine	—	r 55%, c 82%, commercial partners 80%.	Female partners 6 m: 29%; 6 m: median: 4	30 d: alcohol 86%; daily alcohol 8%;1–2 times weekly 43%; current drug use 5%; IDU 1%	6 m: 21% paid for sex	[24, 55]

Note: AI = anal intercourse; c = casual partner; d = days; IDU = injecting drug user; m = months; MSM = men who have sex with men; r = regular partner; Ref. = reference; UAI = unprotected anal intercourse; — = not available.

Table C.30 Summary of Multivariate Studies for HIV Incidence Risk Factors among MSM in Europe

Study, year	*Location*	*Sample*	*Individual-level risk factors*	*Environmental-level risk factors*
Van der Bij et al. 2005 [11]	Netherlands, Amsterdam	603 HIV– men in cohort ≤30 years until age 35 (ACS, see below)	UAI with casual partner	Education[a]
Dukers et al. 2007 [12]	Netherlands, Amsterdam	3,733 HIV– men in cohort recruited from STI clinics	STI coinfection; history of HIV testing	Age Nationality
	Netherlands, Amsterdam	1,498 HIV– men in cohort recruited from community (ACS, see above)	STI coinfection	Age Nationality[a]
	Netherlands, Rotterdam	265 HIV– men in cohort recruited from community	STI coinfection	Age Nationality

Note: ACS = Amsterdam Cohort Studies; HIV = human immunodeficiency virus; MSM = men who have sex with men; STIs = sexually transmitted infections; UAI = unprotected anal intercourse.
a. Adjusted for age, education, ethnicity, and employment status.

Table C.31 Summary of Multivariate Studies for HIV Prevalence Risk Factors among MSM in Europe

Study, year	*Location*	*Sample*	*Individual-level risk factors*	*Environmental-level risk factors*
Prasad et al. 2009 [9]	Switzerland, 5 cities	10,103 men attending anonymous HIV testing; knowledge of HIV infected partner[a]; condom use with occasional partner[a]; history of STIs[a]	Number of partners in past two years[a]	Age[a] Nationality[a] Year of testing
Dodds et al. 2007 [66]	United Kingdom, London	1,436 men recruited at gay venues	Attended GUM in past year[a]; STI in past year[a]; UAI with >1 partner in past year[a]; UAI with casual partners in past year[a]; UAI with partners of unknown or discordant status in past year[a]	Employment[a] Education[a]
Dodds et al. 2007 [66]	United Kingdom, Brighton	373 men recruited at gay venues	Attended GUM in past year[a]; STI in past year[a]; UAI with >1 partner in past year[a]; UAI with casual partners in past year[a]; UAI with partners of unknown or discordant status in past year	Employment[a] Education
Dodds et al. 2007 [66]	United Kingdom, Manchester	348 men recruited at gay venues	Attended GUM in past year[a]; STI in past year; UAI with >1 partner in past year; UAI with casual partners in past year; UAI with partners of unknown or discordant status in past year	Employment Education
Macdonald et al. 2008 [15]	United Kingdom, London, Brighton, Manchester	232: 75 cases, 157 controls recruited from sexual health clinics	Ancillary sexual behaviors[a]; STIs[a]; Substance use[a];	Venues used to meet men[a]
Williamson et al. 2007 [65]	United Kingdom, Glasgow, Edinburgh	1,350 men recruited at gay venues	Number of sex partners in past year; Number of anal sex partners in past year[a]; UAI with >1 sex partner in past year; STI in past year[a]	Age[a] Recruitment location Survey venue Area of residence

Note: GUM = genitourinary medicine clinic; HIV = human immunodeficiency virus; MSM = men who have sex with men; STI = sexually transmitted infection; UAI = unprotected anal intercourse.
a. Adjusted for age, education, ethnicity, and employment status.

Table C.32 Summary of Multivariate Studies for STI Incidence Risk Factors among MSM in Europe

Study, year	*Location*	*Sample*	*Individual-level risk factors*	*Environmental-level risk factors*
Van der Bij et al. 2005 [11]	Netherlands, Amsterdam	603 HIV– men in cohort ≤30 years until age 35 (ACS)	Sells sex	Calendar time

Note: ACS = Amsterdam Cohort Studies; HIV = human immunodeficiency virus; MSM = men who have sex with men; STI = sexually transmitted infections.

Table C.33 Summary of Multivariate Studies for UAI Risk Factors among MSM in Europe

Study, year	*Location*	*Sample*	*Individual-level risk factors*	*Environmental-level risk factors*
Folch et al. 2006 [81]	Spain, Barcelona	354 men reporting steady male partners, recruited at gay venues	UAI with steady male partners: • HIV status of couple • Attitudes about HIV prevention given availability of ART	Living arrangements
		543 men reporting casual male partners, recruited at gay venues	UAI with casual male partners: • HIV status (self-report) • Drug use before/during sex • Index reflecting acceptance of gay men's orientation • Attitudes about HIV prevention given availability of ART	Victim of aggression or verbal assaults Recruitment site Circle of friends
Folch et al. 2009 [6]	Spain, Catalonia	850 men recruited at gay venues	UAI with casual male partners: • Number of male sex partners • Number of drugs used • HIV status (self-report)	Country of origin Internalized homophobia Met casual partners online
Balthasar et al. 2010 [82]	Switzerland, nationwide	1,689 men recruited online and through gay media	No or inconsistent condom use in past year: • Number of partners in past year • Stable relationship in past year • HIV status (self-report) • Visited risk reduction HIV prevention site • HIV status × number of partners (interaction)	Age Internet partner-seeking
Štulhofer et al. 2008 [26]	Croatia, Zagreb	216 men recruited through snowball techniques	Condom use at last AI with casual partner: • HIV knowledge • HIV risk self-assessment • Number of partners in past 5 years • Ever tested for HIV • Sex with a woman • Sold sex • In a stable relationship • Used drugs before sex • Used alcohol before sex	Age Frequency of cruising Education Internet partner-seeking

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Table C.33 Summary of Multivariate Studies for UAI Risk Factors among MSM in Europe *(continued)*

Study, year	*Location*	*Sample*	*Individual-level risk factors*	*Environmental-level risk factors*
Amirkhanian et al. 2009 [22]	Russian Federation, St. Petersburg and Budapest, Hungary	38 men in St. Petersburg and 118 men in Hungary recruited through RDS	Any UAI • Safer sex intentions • Condom and safer sex attitudes	
			UAI with casual partner • Safer sex intentions • Safer sex self-efficacy	Education
			UAI with multiple partners • Safer sex intentions • Safer sex self-efficacy	
Mor et al. 2008 [17]	Israel, nationwide	2,873 men recruited through gay-oriented websites	UAI and substance use: • Casual contacts in past 6 months • Sells sex • Steady and casual partners • Dislikes condoms • Negotiation skills • HIV knowledge • Age at first sexual intercourse • Number of sexual encounters	Lives in Tel Aviv Education Living situation, model adjusted for age
Mor et al. 2011 [85]	Israel, nationwide Outcome "sex risk behavior" defined as performing insertive or receptive UAI during the past 6 months with at least one of the following cases: (a) not knowing his own HIV status; (b) not knowing his steady partner's HIV status; (c) UAI with an HIV+ steady partner; (d) UAI with a casual partner; (e) participant who performed UAI with their HIV– steady partner, while concurrently having UAI with the casual partner.	896 men recruited through gay-orientated websites reporting sex with casual partners	Sex risk behavior among MSM with casual partners: • Number of partners • Receptive oral with ejaculation • Substance use before/during sex • Insufficient negotiation skills • Negative attitude to condoms • Risk-taker personality	Education Meeting sexual partners in venues that encourage sexual activity
		907 men recruited through gay-oriented websites reporting sex with steady partners	Sex risk behavior among MSM with steady partners: • Number of partners • Insufficient negotiation skills • Negative attitude to condoms • Risk-taker personality • Length of relationships	Being at high risk of HIV, model adjusted for age
Kasianczuk et al. 2009 [24]	Ukraine, 10 cities	1,764 men recruited through snowball methods	Condom use at last AI: • Insertive/receptive role in past 6 months • Partner's type in past 6 months • Alcohol/drugs	Age

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Table C.33 Summary of Multivariate Studies for UAI Risk Factors among MSM in Europe *(continued)*

Study, year	*Location*	*Sample*	*Individual-level risk factors*	*Environmental-level risk factors*
			• Knows where to test for HIV • Ever had an HIV test • Perceived risk of HIV	
Léobon et al. 2011 [84]	France, nationwide	11,768 HIV– men recruited through gay-oriented general interest and specialized websites	12 m regular unprotected sex with casual partners: • Sensation seeking • number of casual partners • Barebacked with a couple • Oral contact with sperm • Esoteric activity • Traded sex • Used drugs • Used alcohol • Had an STI	Recruitment website Education Live in Paris Venues used to find sexual partners
		2,130 HIV– men recruited through gay-oriented general interest and specialized websites	12 m regular unprotected sex with casual partners: • Sensation seeking • Number of casual partners • Sex with a casual partner while couples • Barebacked with a couple • Oral contact with sperm • Esoteric activity • Traded sex • Used drugs • Used alcohol • Had an STI	Recruitment website Age Education Live in Paris Venues used to find sexual partners
Evans et al. 2011 [83]	United Kingdom, nationwide	691 Central and Eastern European migrant men recruited through gay-oriented websites	UAI with casual partners in past year: • Self-reported HIV status • Ever injected drugs • Recreational drug use in past year • Been paid for sex in United Kingdom	Age Employment Education Country of origin Completed questionnaire in native language Time in United Kingdom Lives in London Recruitment website

Note: AI = anal intercourse; ART = antiretroviral therapy; HIV = human immunodeficiency virus; HIV+ = HIV-positive; HIV– = HIV-negative; m = months; MSM = men who have sex with men; RDS = respondent-driven sampling; STI = sexually transmitted infection; UAI = unprotected anal intercourse.

Environmental Benefits Statement

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HIV Epidemics in the European Region provides a systematic review of the evidence on HIV vulnerability and response in all 53 countries of the World Health Organization's (WHO's) European Region, stretching from Iceland to the borders of China. The report focuses on key populations most at risk of HIV infection: people who inject drugs, sex workers, and men who have sex with men. It confirms that these populations are disproportionately affected by the growing HIV epidemic in Europe.

Twenty-five percent of HIV diagnoses in Europe are associated with injecting drug use, with much higher proportions in Eastern Europe (33 percent) than in Western Europe (5 percent) and Central Europe (7 percent). Sex between men accounted for 10 percent of all HIV diagnoses, with higher rates reported in Western Europe (36 percent), followed by Central Europe (22 percent) and Eastern Europe (0.5 percent). HIV remains relatively low among female sex workers who do not inject drugs (less than 1 percent), but higher among those who inject drugs (more than 10 percent) and among male and transgender sex workers.

The analysis highlights the pivotal role of social and structural factors in shaping HIV epidemics and prevention responses. Poverty, marginalization, and stigma contribute to the HIV epidemic in Europe and Central Asia. Economic volatility and recession risks are increasing vulnerability to HIV and infections. Barriers to successful HIV responses include the criminalization of sex work, of sex between men, and of drug use; social stigmatization; violence; and rights violations.

HIV prevention requires social and environmental changes. The report calls for policy makers and HIV program implementers to target the right policies and programs to maximize the health and social impacts of Europe's HIV responses and get higher returns on HIV-related investments. *HIV Epidemics in the European Region: Vulnerability and Response* is a product of a collaboration of the World Bank; the London School of Hygiene and Tropical Medicine, with its Centre for Research on Drugs and Health Behaviour; the WHO Regional Office for Europe; and UNAIDS.

ISBN 978-1-4648-0388-8
SKU 210388