AIDS RESEARCH AND HUMAN RETROVIRUSES
Volume 27, Number 8, 2011

DOI: 10.1089/aid.2010.0223

Estonia at the Threshold of the Fourth Decade of the AIDS Era in Europe

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Abstract

This article describes the trends of HIV/AIDS and related conditions in Estonia during the past decade (2000–2009), with special focus on the potential for epidemic transition. Key transmission determinants and major risk groups are examined and problems and barriers to fighting HIV/AIDS with possible applications in prevention and control are described. Estonian routine data sources and published literature were reviewed, supplemented with information from personal communication with physicians and public health specialists. For comparative European data, international HIV/AIDS and drug addiction surveillance documents, administrative data, and published literature were reviewed. In Eastern Europe (including Estonia) the predominant HIV transmission mode is injection drug use (IDU), closely followed by heterosexual transmission, an increasing risk factor for new cases. Although the contribution of cases acquired by sexual contact with high-risk partners such as IDUs is not known, characteristics of the sexual networks of IDUs may be important in determining the evolution of the HIV/AIDS epidemics in the region. In Estonia, despite major gaps in available data, the HIV/AIDS epidemic is still presumably confined to IDUs (and probably, to their sexual partners). In Eastern Europe, young women in IDU–non-IDU partnerships engaging in unprotected sex potentially serve as a bridge to the general population, yet knowledge of and research into the population characteristics and potential magnitude of bridging are limited. In Estonia, as in other Eastern European countries, HIV prevention and harm reduction initiatives should be tailored not only to the predominantly male HIV-positive IDU population, but also to their noninfected non-IDU female sexual partners.

Introduction

At the threshold of the fourth decade of the AIDS era it has been noted that "HIV infection remains of major public health importance all over Europe."[1] Although the characteristics of national epidemics differ remarkably, distinctive HIV transmission patterns and trends are apparent within the three areas (East, West, and Center) of the WHO European region.[1] The epidemic in Estonia is typical of the East European region, reaching a peak in 2001, and remaining concentrated among injecting drug users (IDUs) (Table 1).[1,2] In recent years, awareness of sexual HIV transmission from IDUs to the general population has increased. However, behavioral and epidemiological data on bridge populations from recent epidemics in Eastern Europe and interventions targeting these risk groups are generally missing.[3,4]

In this review we describe the trends of HIV/AIDS and related conditions in Estonia during the past decade (2000–2009), with special focus on potential epidemic transition and generalization. We examine the key transmission determinants and major risk groups, and describe the problems and barriers to fighting HIV/AIDS with possible applications in prevention and control.

Materials and Methods

Demographic and socioeconomic situation

Estonia, a relatively new democracy, regained its independence in 1992 and joined the European Union (EU) in 2004. In 2009 the mean annual population of Estonia was 1,340,271, with women accounting for 54% and men for 46% and more than two-thirds of the inhabitants living in towns. The proportion of nonethnic Estonians was about 31%, of whom 82% were Russian. These population characteristics have remained unchanged during the past decade although the population is shrinking (by 2.3% from 2000 to 2009) and

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Table 1. Key HIV/AIDS Epidemic Characteristics in Selected Eastern European Countries in 2008

	Estonia	*Russian Federation*	*Ukraine*	*Latvia*	*Belarus*	*Lithuania*
HIV incident cases per 100,000 population[1]	40.6	38.1[7]	34.1	15.8	9.1	2.8
AIDS incident cases per 100,000 population[1]	4.6	4.6[7]	2.2	4.4	3.6	1.6
HIV tests per 1000 population[1]	55.5	149.7[7,8]	49.6	34.8	45.3	48.2
Proportion of new HIV cases, by transmission mode (%)[1]						
Injecting drug use	Not available	62.7[7]	44.8	27.9	22.2	44.2
Heterosexual contact	Not available	35.1[7]	50.3	45.5	74.4	27.4
Estimated adult (15–49) prevalence (%)[5]	1.3	1.1	1.6	0.8	0.2	0.1
Proportion of new HIV cases attributable to IDU, cumulative (%)[1]	51.0	79.8[7]	61.3	60.3	55.0	73.4
Proportion of young (15–29) people among new HIV cases, cumulative (%)	79.1[6]	72.3[7]	Not available	60.0[a,9]	69.4[10]	45.0[11]

[a]*Dated 31.07.2009 (2008 data not available).*

aging.[12] In 2008, life expectancy at birth was 79.2 years for women and 68.6 years for men.[13]

The rapid economic growth of the recent past was reversed in 2008 when GDP per capita (chain-linked volume, reference year 2000) decreased by 5.0%.[12] Whereas unemployment declined from 2000 to 2007 (when it fell from 13.6% to 4.4%), it rose to 13.8% in 2009, exceeding that of 2000. Men, youth, and workers in construction and manufacturing, were hit hardest.[13]

Healthcare is provided by a social-insurance-based system that covered over 95% of the Estonian population in 2009.[12,14]

HIV policy

State-financed, national programs for HIV/AIDS prevention in Estonia were launched in 1992. These programs, together with the Global Fund program for Estonia, are coordinated by the Ministry of Social Affairs. Estonia's capacity to manage its response to HIV and AIDS has developed extensively over the past decade, particularly through funding and support provided by the project "Scaling up the response to HIV in Estonia" from the Global Fund to fight HIV/AIDS, Tuberculosis, and Malaria (Global Fund 2003–2007). Currently a National HIV/AIDS Prevention Strategy for 2006–2015 is being implemented.[15,16] The National Institute for Health Development (NIHD) coordinates HIV/AIDS prevention under the Ministry of Social Affairs in executive partnership with the Ministries of Internal Affairs, Education, Justice, and Defense.

HIV testing

HIV testing in Estonia was introduced in 1987 and is currently conducted by 31 screening laboratories located in larger healthcare institutions.[17,18] Comprehensive laboratory quality assurance systems and a national reference institution (the State Reference Laboratory of HIV Diagnostics) are in place. Testing is voluntary, performed only with the informed consent of the subject, except for blood and organ donors, for whom testing is obligatory.[17] HIV testing is recommended and routinely performed for pregnant women, prisoners, and people diagnosed with sexually transmitted infections (STIs) or tuberculosis. Free voluntary counseling and HIV-testing services are provided in the eight largest towns.[19] Anonymous testing was available until the beginning of 2009, but since then, patients have had to reveal their identity to get positive preliminary test results verified. The number of tests performed (excluding unlinked anonymous and blood donor tests) has consistently increased during the past decade, from 40 459 (i.e., 29.6 per 1000 inhabitants) in 2000 to 78 735 (i.e., 58.7 tests per 1000) in 2009.[20,21]

Free, voluntary testing to the population groups who are at the most risk is available in voluntary counseling and testing (VCT) clinics and via prevention and harm reduction services (HRS), e.g., by offering VCT at syringe exchange facilities. Rapid HIV testing is currently available at VCT clinics in Tallinn, the capital of Estonia. On a nonroutine basis HIV rapid testing is also offered in syringe exchange centers in Tallinn and during public health promotion events all over the country.[22]

HIV surveillance

Surveillance for infectious diseases, including HIV/AIDS and STIs in Estonia, is passive and based on mandatory universal healthcare provider case reporting to the National Infectious Diseases Information System, operated by the Estonian Health Board (EHB) under the Ministry of Social Affairs. Tuberculosis (TB) cases are registered in the National Tuberculosis Registry in NIHD. In addition to the passive surveillance system, serial cross-sectional studies on HIV and related risk-behavior prevalence among current IDUs have been conducted in two cities. Limited information on female commercial sex workers (CSWs) and men having sex with men (MSMs) is also available from studies conducted by the NIHD and the Department of Public Health, University of Tartu.[23,24]

Drug use monitoring

Since 2001, data on illicit drug use have been collected and analyzed by the Estonian Drug Monitoring Centre (EDMC), the national information and competence center in cooperation with the European Drug Addiction Monitoring Centre for Drugs and Drug Addiction (EMCDDA). Data on illicit drug use prevalence and related social and medical problems (including drug-related treatment) are reported to EMCDDA and used to direct national policy on drug use prevention and control.

Drug treatment data are systematically collected in a national registry, the Estonian Drug Treatment Database, which has been operated by the NIHD since 2008.[15]

HIV treatment

Highly active antiretroviral treatment (HAART) is available free of charge to all patients in need, including those without health insurance. According to local policy HAART is initiated at CD4 T cell count $<350/mm^3$. HIV treatment is provided by the government healthcare system through infectious disease departments in five major hospitals. Antiretroviral treatment (ART) is primarily given on an outpatient basis. Patients are required to visit the clinic once a month to receive their monthly drug supply.

HIV mother-to-child transmission control

HIV testing is recommended for all women visiting a doctor for pregnancy diagnosis and registration (which is a common practice in Estonia) irrespective of whether they are planning to give birth or have an abortion. Antenatal care and mother-to-child transmission (MCTC) prevention treatment are available free of charge for all women, regardless of their insurance status, and provided by collaboration between obstetricians and infectious disease specialists. Milk powder for replacement feeding is provided free of charge to all newborns of HIV-infected mothers until the age of 12 months.[25]

Methods

We reviewed the published literature and the following Estonian data sources: (1) Statistics Estonia population indicators and composition database,[12] (2) Ministry of Social Affairs healthcare statistics database,[26] (3) Estonian Health Board database on nationwide passive surveillance of infectious diseases and HIV diagnostics,[6] and (4) National Institute for Health Development database on HIV/AIDS and Drug Addiction research and strategy.[15]

We also obtained data from personal communications with physicians, public health specialists, and officials in the abovementioned institutions.

For European comparative data we reviewed international HIV/AIDS and drug addiction surveillance documents, administrative data, and the published literature. Relevant publications were sought through computerized searches in MEDLINE via PubMed and ISI Web of Knowledge (Web of Science) from 2000 to 2010 using free text and the following medical subject headings (MeSH) from the MeSH descriptor list: HIV; disease outbreaks; preventive health services (subcategories diagnostic services, needle exchange programs); antiretroviral therapy, highly active; molecular epidemiology; substance abuse, intravenous; Europe (including subcategories Europe, Eastern, Baltic States, Estonia and Russia, Ukraine, Belarus). We also searched the World Health Organization (WHO), Joint United Nations Programme on HIV and AIDS (UNAIDS), and European Centre for Disease Prevention and Control (ECDC) websites for relevant documents and reports. Comparative data from selected countries in the region (Russia, Ukraine, Belarus, Latvia, and Lithuania) were also obtained through personal communication with country medical representatives and suggested web-based national statistics databases, general and HIV/AIDS related. Our international searches were limited to English and Russian.

The current review focuses on the decade from 2000 to 2009 (local data included 2009, for other countries the most recent available data were for 2008).

Results

HIV infection incidence and prevalence

HIV was first detected in Estonia in 1988. For the following 12 years the incidence remained low (with the rate reaching 9 per million by 1999), with half of the cases identified among homosexual or bisexual men and the rest presumably acquired heterosexually.[27] A significant change occurred in the summer of 2000, when the number of new cases, predominantly among IDUs, was noted to increase rapidly. An HIV epidemic in Estonia was officially recognized in 2001.

Although HIV incidence has gradually decreased since the peak in 2001, by 2008 Estonia still had by far the highest HIV incidence in Europe (407/million; 545 cases).[6,12] In 2009 a further 411 new HIV cases (307/million) were registered (Fig. 1).[6,12]

The number of people living with HIV (PLHIV) reached 6909 by the end of 2008,[17] placing Estonia second among the three Eastern European and Central Asian countries with an estimated HIV prevalence exceeding 1% of the adult population (Ukraine 1.6%, Estonia 1.3%, and Russia 1.1%).[5] By the end of 2009, a total of 7320 HIV cases had been reported and 7035 people were living with HIV in Estonia.[6,12,17]

HIV distribution regional differences

The Estonian HIV epidemic has a distinctive geographic distribution—the two regions most affected, i.e., contributing the majority of new HIV cases, are Ida-Viru county, in the easternmost part of the country on the Russian border, where

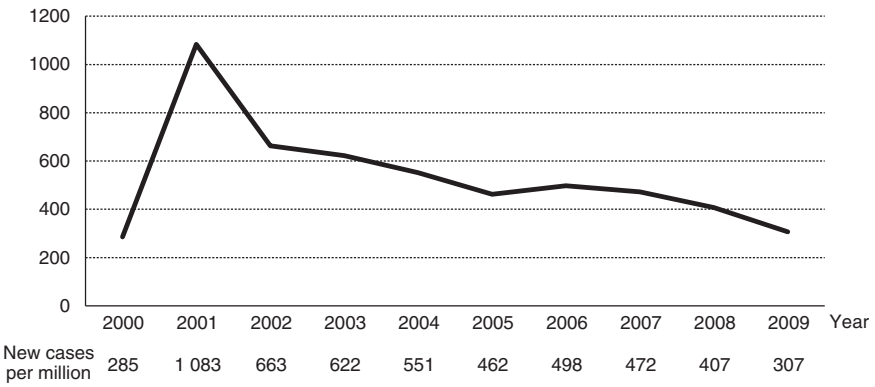

FIG. 1. New HIV cases registered in Estonia 2000–2009.[6,12]

the Estonian epidemic erupted in the chief city Narva in 2001, and Tallinn, the capital city.[28] In 2009, these two regions still accounted for 82% of all new HIV cases. Although absolute numbers in Ida-Viru and Tallinn in 2009 were similar (189 and 150, respectively), the rate of new HIV cases was by far the highest in Ida-Viru with 1114 per million inhabitants, compared to 376 in Tallinn and 307 in Estonia overall.[12,28]

HIV-infected population characteristics

Over two-thirds (68%) of new HIV cases in Estonia during the past decade have been diagnosed among men.[6] Although the absolute number of newly HIV infected women has not changed substantially (e.g., 267 in 2002 and 230 in 2008), the proportion of women has been growing steadily—from 20% in 2000 to 59% in 2009.[6]

The first HIV-infected pregnant woman in Estonia was diagnosed in 1993. During the past decade, 778 HIV-positive pregnant women have been registered, increasing from 13 in 2000 to 131 in 2007 (data not available for 2008 and 2009).[29] In 2007 an estimated 0.5% of pregnant women (including pregnancies ending with delivery and abortion) were HIV infected.[30] From 2000 to 2007 467 HIV-infected women gave birth to a child in Estonia. In 2007 the MTCT rate was 2.2%.[29] A total of 36 MTCT cases of HIV have been recorded in Estonia, three of them in 2009. Overall, MTCT has accounted for 0.5% of all newly diagnosed HIV cases in Estonia and for 0.7% in 2009.[25]

Most new HIV cases in Estonia have been diagnosed in people under 30. Yet the mean age of newly diagnosed cases is increasing. In 2001, the year in which the epidemic was officially recognized, 92% of new cases occurred among people under 30, but in 2009 the corresponding proportion was 56%.[28]

Population groups most at risk for HIV

The population groups most at risk for HIV are listed in Table 2.

Injecting drug users. A study using capture-recapture methodology estimated the prevalence of IDU among the adult population in Estonia to be 2.4%. According to estimations in 2004 there were about 14,000 IDUs in Estonia, of whom 70% lived in the capital area and 20% in Ida-Viru county (the easternmost part of the country).[31]

Local studies have revealed a high prevalence of HIV (40–90%),[33–36] and incidence of HIV (>20/100 person years at risk) in the IDU population.[41] Comparing HIV prevalence in IDU groups with different duration of injecting history in 2004 and 2007, almost no change was detected among "old" injectors (from 56% to 58%), whereas a remarkable decrease from 50% to 33% occurred among "new" injectors (e.g., those who had been injecting drugs for 0–3 years). Although HIV prevalence was very high in both years, this trend reflects the decline of HIV spread among IDUs.[41–43]

Disparities in HIV prevalence and risk behavior have been noted among IDUs in Estonia according to the main drug used. In studies of current IDUs those reporting using fentanyl and 3-methylfentanyl ("China White" or "White Persian") have repeatedly had higher odds for HIV seropositivity.[44] For example, a study in Tallinn revealed 62% HIV prevalence among fentanyl injectors, compared to 27% among those

TABLE 2. CHARACTERISTICS OF OVERALL AND HIV HIGH-RISK POPULATIONS IN ESTONIA

	Total population	*IDU*	*MSM*	*CSW*
Population size	1.34 million[12]	14,000[31]	18,000[21,32]	1500[25]
HIV adult (15–49) prevalence	1.3%[1]	40–90%[33–35]	2.5%[25]	7.6%[25]
Mean age	Not applicable	26.5[36]	27.2[24]	29.5[37]
Gender (proportion of men)	46.1%[12]	84%[36]	Not applicable	Not available
Ethnic Estonians	68.7%[12]	15.2%[36]	69.5%[24]	13.2%[23]
IDU prevalence	2.4%[31]	Not applicable	6.3%[38]	6.6%[37]
≥2 sexual partners	During last 12 months: 9.1%[39]	During last 12 months: 44.9[36]	During last 6 months: 65%[24]	During last 7 days: 79%, commercial partners/ 26%, noncommercial partners[23]
Unprotected intercourse	During last 12 months: 68.4% women/63.9% men[40]	During last 12 months: 66.9% main partner/ 40.6% casual partner[36]	During last 12 months: 79.4% main partner/ 57.7% casual partner[24]	During last 4 weeks: 52% commercial partner/ 62.5% noncommercial partner (main and casual)[23]

IDU, intravenous drug users; MSM, men who have sex with men; CSW, commercial sex workers.

taking amphetamines.[44] Injection of fentanyl was associated with higher risk injection practices such as injecting in the street with a previously used needle/syringe, sharing a needle/syringe with someone known to have HIV, and overdose.[44]

While exploring risk behavior (both injecting and sexual) according to knowledge of HIV serostatus, HIV-positive IDUs aware of their serostatus appeared to be involved in higher risk behaviors (measured as odds of receptive sharing of used injecting equipment and water with peers, sharing with a sexual partner or a known HIV-positive person, and having an IDU as a sexual partner), compared with those not aware of their serostatus and those who knew they were seronegative.[45]

IDUs tend to be young (mean age around 25) and sexually active, with almost half having reported multiple sexual partners within a year in several studies.[36,45,46] In a cross-sectional survey among current IDUs in Tallinn in 2007 (84% of whom were men), 44.9% of the 347 respondents reported having had two or more partners during the preceding year. Of those sexually active during the preceding 6 months, two or more main partners were reported by 11.7% and two or more casual partners by 40.1% within the past 6 months and 2% of respondents had received money, drugs, or other commodities for sex at some time.[36] Only 33.1% of the IDUs reported always using a condom with their main partner and 59.4% with a casual partner.[36] While a survey among 159 IDUs attending two syringe exchange programs in Tallinn in 2004 revealed similar proportions of respondents having multiple sexual partners and using condoms, 16.6% reported having received money for sex (72% of females, 6% of males), and 34% (all male respondents) having paid for sex.[33] Across the studies, the majority of IDUs report having noninjecting sexual partners, e.g., 77.4% of IDUs in the 2004 study.[35,42]

Men who have sex with men. In the 1990s, prior to the IDU-related HIV epidemic outbreak, sexual transmission (predominantly male-to-male) of HIV prevailed and, of the total 96 new HIV cases registered by the end of 1999, only 4% were attributable to IDU.[25,47]

Data on the number of men who have sex with men (MSM) in Estonia are limited. According to the UNAIDS guidance value on MSM population size (2–5% of the adult male population), the mean estimate for Estonia in 2009 would have been 18,000 persons.[17]

Among the HIV/AIDS VCT center clients (where about one-third of all new HIV cases are detected) 5.1% of all male visitors in 2005 defined themselves as homosexual or bisexual and 7.2% of those diagnosed with HIV.[2]

A small scale cross-sectional study in 2008 with 79 MSM participants documented a 2.5% HIV prevalence among respondents.[38]

In 2007 a web-based survey conducted among gay Internet site visitors found that 67% of 361 respondents considered themselves homosexual; others were bisexual. The mean age of MSM was 30.5 years, most (75%) were Estonians, and almost 20% were Russian; 40% had a university degree and 27% were high school graduates. During the preceding 6 months respondents reported having, on average, 4.3 male partners; 20% also reported having had a female partner. Always using a condom during anal intercourse was reported by 25% with a regular partner and by 54% with a casual partner. With a regular female partner, a condom was always used by 20%, and with a casual partner by 48% of the men; 71.2% of respondents had been tested for HIV, almost half of them within the last year.[48]

Commercial sex workers. In 2001 the estimated number of CSWs in Estonia was between 3000 and 5000.[49] In 2009, representatives from two nongovernmental organizations (NGOs) providing HIV testing and counseling services to CSWs (Lifeline and AIDS Information and Support Centre, Tallinn) estimated 1500 or more CSWs originating from Estonia, with 1000 currently working in Estonia (mostly in Tallinn, the capital).[50]

In 2005, a study among 227 Tallinn CSWs with a mean age of 29.5 years found that 80.6% were Russian and 13.2% were Estonian; 70% had at least secondary education.[23] The mean duration of sex work was 8.3 years (range 0–30) and the mean number of partners during the preceding 7 days was 11 (range 0–100).[23,42] Only 46% of respondents reported always using a condom. In another study among Tallinn CSWs, almost 75% of respondents had had two or more clients and about 25% had had two or more sexual partners not paying for sex during the preceding week. The same study revealed that during the preceding month almost half the CSWs had had unprotected sexual intercourse with a client and almost two-thirds reported not always using a condom with a partner not paying for sex.[23] Of CSWs 12% admitted current (during the past 4 weeks) use of noninjected drugs and 6.6% injected drugs.[37] Although 65.5% of respondents had been ever tested for HIV and 94.0% of them claimed to be HIV negative, a 7.6% HIV prevalence was detected among CSWs with 81.4% of those actually infected not aware of their serostatus.[37]

Recent (2009) formative research in NGOs providing services to CSWs indicated that the population of CSWs is becoming older and the number of minors providing sex services has decreased.[50]

AIDS

The first AIDS case in Estonia was diagnosed in 1992, 4 years after the first case of HIV infection.[6] Since 2000, the number of reported AIDS cases has increased in 10 and decreased in 17 of the European Union /European Economic Area (EU/EEA) countries.[1] During the past decade the largest increase was reported by Estonia, from three cases in 2000 (2 per million) to 61 (46 per million) in 2008.[1,51] In 2009 in Estonia 38 new AIDS cases (28 per million) were registered.[6,12] Altogether in Estonia by the end of 2009, a total of 290 individuals had been diagnosed with AIDS.[6]

While in the whole EU/EEA area the most common AIDS-indicative diseases in 2008 were pneumocystis pneumonia (22%), wasting syndrome due to HIV (9%), and tuberculosis (TB) (9%), in the East of the WHO European Region, TB (as in non-EU/EEA countries) ranked first (32%), followed by wasting syndrome due to HIV and extrapulmonary TB.[1] In Estonia, TB cases among people living with HIV (PLHIV) have also increased, making TB the main AIDS-defining disease in 49% of new AIDS cases registered in 2007 (data not yet available for 2008 or 2009).[52]

The first AIDS death in Estonia was reported in 1996, and the cumulative number of deaths attributable primarily to AIDS according to national mortality statistics reached 263 by

the end of 2009.[12] So far the highest annual number of AIDS deaths (51) was registered in 2009.[12]

HIV molecular epidemiology

The first time the Estonian HIV-1 virus subtype distribution was evaluated in 1999 it demonstrated a predominance of subtype B (80% of cases) and to a lesser extent a prevalence of other subtypes similar to those detected in Western Europe.[27] After the explosion of the IDU-related epidemic in 2000 two studies somewhat surprisingly reported that the recombinant form CRF06_cpx, previously detected in some West-African countries, was the most common subtype in Estonia. This is in contrast to the predominance of subtype A1 as found in neighboring countries such as Latvia, Russia, and Ukraine.[53–55] Phylogenetic analysis of these viruses revealed a monophyletic origin of approximately 80%, suggesting a single infection source. Around 20% of the viruses in Estonia were probably locally unique recombinant forms between subtype A1 and CRF06_cpx.[53,54] Recent pol region analysis showed that the subtype structure of the Estonian HIV epidemic remained unchanged up to 2008.[56–58]

Drug resistance mutations of HIV were investigated in Estonian treatment naive populations in 2005–2006 and 2008.[56–58] These studies indicated that CRF06_cpx and its recombinant forms with subtypes A1 possess several naturally occurring polymorphisms in the protease region (K14R, M36I, H69K, and L89M), also characteristic to other non-B subtype epidemics. So far there is no evidence that these polymorphisms have directly impacted the effectiveness of first line antiretroviral therapy. Primary drug resistance mutations were not found in samples from HIV patients collected during 2005–2006.[58] Yet a rapid increase to a 5.5% prevalence of these mutations was detected in samples collected from newly diagnosed HIV patients in 2008—in eight samples drug resistance mutations to the three most widely used antiretroviral drug classes (PI, NNRTI, and NRTI) were detected and three strains possessed mutations determining resistance to at least two antiretroviral classes.[58] These results are slightly above the threshold considered critical for implementation of pretreatment drug resistance testing according to the "Guidelines for the Use of Antiretroviral Agents in HIV-1-Infected Adults and Adolescents."[59] A third integrase region genotyping study has detected several drug resistance-associated polymorphisms (V72I, L74I, V201I, and T206S), but no primary drug resistance mutations against integrase inhibitors.[57]

Response to the HIV/AIDS epidemic in Estonia

Harm reduction services to IDUs. The main interventions provided in harm reduction services (HRS) are opioid substitution treatment (OST) and needle and syringe exchange programs. In Estonia, HRS are provided by nonprofit organizations, mainly funded by the state according to the operating plan of the national HIV/AIDS strategy.

Needle and syringe exchange programmes (NSP) were initiated in 1997 in Estonia. In 2009, nine organizations were providing syringe exchange and counseling services through 36 centers and 179,226 visits by 10,698 visitors (3393 first-time visitors of them) were registered. Altogether in 2009, 2,277,509 syringes with needles plus an additional 413,319 needles were distributed.[60] According to the analysis based on NSP clients, 73% of IDUs were reached by NSP during the preceding month and 40–46% of IDUs attend NSP regularly.[45]

Methadone detoxification has been available in Estonia since 1998, but opioid substitution maintenance treatment with methadone was officially introduced in 2001.[61,62] Because HIV/AIDS and illicit drug use in Estonia are interrelated, methadone treatment is state financed according to the national HIV/AIDS strategy. At the end of 2009 there were five institutions (seven centers) for substitution treatment with 966 patients treated during 2009 and 660 on methadone maintenance at year end.[63] In detention institutions OST is still very limited—during 2009 12 IDUs received OST with methadone, yet there were approximately 430 opioid-dependent detainees in Estonia at the end of 2009.[64,65]

In parallel to the state-funded methadone program, methadone treatment is also provided by one hospital in Tallinn (financed by the local government), and buprenorphine has been available since 2003, but is not widely used.[63,66]

HIV related services to CSWs. HIV testing and counseling services to CSWs have been provided in Tallinn since 1994. Currently (in 2008) two centers offer consultations on STIs, HIV, safe sex, and other related topics. These centers distribute condoms, lubricants, and information materials from the centers and during outreach activities.[67] One of the centers also focuses on integrating women involved in prostitution in the labor market.[67] In 2008 the centers were visited over 2000 times, with 250 new clients tested for STIs and over 50,000 condoms distributed.[30] In Jõhvi (in Ida-Viru county) an HRS center for IDUs also provided services to women having sex for drugs or money to buy drugs.[30]

HIV-related services to MSM. The Gay and Lesbian Information Centre (GLIC) in Tallinn, the only institution in Estonia providing MSM with information about homosexuality, sexual health (including STIs and HIV), and related counseling services, was established in 2004. In 2008 during services provided on site (totaling 1203 visits) and through outreach programs in six gay-oriented clubs/bars/saunas altogether 132,000 condoms were distributed to MSM.[30] Due to low attendance and budget constraints the center was closed in February 2009, but outreach programs continued. No special HIV testing and treatment services are available to MSM but VCT services to the general population can be utilized.[30]

HIV treatment

According to a model-based estimate by Lai *et al*. there were about 11,000 people living with HIV (PLHIV) in Estonia in both 2008 and 2009.[17] The same analysis suggested that in Estonia the number of HIV-infected individuals who would need antiretroviral treatment (ART) could have been as high as 3000 in 2008.[17] During the past 10 years the number of patients on HAART has increased from 27 in 2000 to 1006 in 2008 and was 1387 at the end of 2009.[30,68] However, only 5–12% of HIV-infected IDUs have reported currently receiving ART.[42]

To avoid vertical transmission of HIV, prophylactic treatment is available to all HIV-infected pregnant women during both pregnancy and delivery, and to their newborns. In the three largest outpatient infectious disease departments in

Estonia (one in Tallinn and two in Ida-Viru county) special case-management teams of nurses and social workers provide support to HIV-positive pregnant women.

HIV/AIDS and tuberculosis

In 2008, Estonia ranked fourth in the EU/EEA region with an overall TB notification rate of 33.1 TB cases per 100,000 population and had the highest HIV prevalence among TB cases (9.9% amounting to 444 cumulative cases).[69] The proportion of PLHIV among all TB patients in Estonia has increased from 0.25% in 2000 to 9.5% in 2009.[25,30] Multidrug-resistant TB (MDR-TB) prevalence in Estonia is high (16.4% of newly diagnosed cases in 2009), as among HIV-TB coinfection cases (12.1% in 2009).[70] According to the ECDC 2008 TB surveillance report, 90.1% of TB patients in Estonia were aware of their HIV status.[69]

TB related healthcare services are free of charge for all patients (as are HIV-related services), financed by the Estonian Health Insurance Fund and state budget through the National Tuberculosis Control Programme, operated by NIHD. Directly observed treatment short courses (DOTS) were implemented in 2000 and the coverage is 100%. There are five separate TB hospital departments in Estonia and one central hospital in each county (15) responsible for TB treatment and prophylactic activities (contact tracing) in the region.[25] No special services are provided to people with TB-HIV coinfection—all cases are comanaged by infectious disease and tuberculosis doctors.

Discussion

In 2008 in the Eastern geographic and epidemiological area of the WHO European Region the predominant HIV transmission mode was IDU (45% of cases), closely followed by heterosexual transmission (44% of cases), with a clear increase in the relative proportion of new cases attributable to heterosexual transmission (Table 1).[1]

Although it is not known to what extent the increasing number of new heterosexually acquired cases in the region is related to sexual contact with high-risk partners such as IDUs, characteristics of IDU sexual networks may be important determinants in the evolution of the HIV/AIDS epidemics.[1,71,72] A high prevalence of HIV among IDUs and high sexual risk behavior among both IDUs and the general population can create a bridge for expansion of the epidemic via those who have unprotected sexual contacts with HIV-positive IDUs.[3,35,72–74] Studies in several Eastern European countries have described IDUs as sexually active with a variety of primary, casual, and commercial sex partners, both injecting and noninjecting.[41,73,75,76] Although IDUs may be engaged in providing sex for money or drugs, the noninjecting primary sexual partners of IDUs appear to be particularly vulnerable to HIV infection due to higher frequency of unprotected vaginal and anal sex in these relationships, compared with other types of partnerships.[36,73]

IDUs and their primary partners may constitute a sexual network not closely connected to the general population. In a study conducted in Estonia in 2007, recruiting IDUs and their main noninjecting sexual partners, 20% of the non-IDU primary sexual partners of IDUs reported having had casual partner(s) during the preceding 6 months, and, importantly, 57% of their casual partners were also IDUs.[77] Although a potential HIV transmission bridge to the general population through the female non-IDU partners of IDUs does exist in Estonia, a detailed regional (county and town level) gender analysis of reported HIV cases during 2000–2009 in Estonia does not suggest generalization of the epidemic.[6,12] Although there are important gaps in data available from Estonia (i.e., data on HIV transmission mode are not routinely collected) it is possible that the HIV/AIDS epidemic is still confined to IDUs (and probably to their sexual partners).

During the past decade most of the new HIV cases reported from the region have been men; however, this disparity is decreasing. In some countries such as Estonia, Latvia, and Lithuania the increasing relative proportion of women among newly diagnosed HIV cases is a function of a significant decrease of new cases reported among men while the numbers of female cases has been relatively stable.[6,9,78] On the contrary, in countries such as Ukraine and Belarus the growing proportion of women is a reflection of an actual increase of new cases among women.[10,79]

According to the Reference Group to the United Nations on HIV and IDU 2007 report, Estonia had a dramatically higher rate of HIV prevalence among IDUs at 72.1%, compared to 41.8% in Ukraine, 37.2% in the Russian Federation, 8.2% in Latvia, 2.4% in Lithuania, and 1.5% in Belarus.[80] "In many areas in industrialized countries it has been possible to keep the HIV prevalence low indefinitely, literally preventing HIV epidemics among IDUs"[81,82] or even "'reverse' large-scale HIV epidemics among IDUs (i.e., to greatly reduce both HIV incidence and prevalence) with large-scale prevention efforts applied over long time-periods."[81,83] Whether the interventions used in developed countries will have the same degree of effectiveness in transitional countries needs to be determined. Analyses conducted among a subset of "new" injectors among IDUs in Tallinn, Estonia demonstrated a decreasing HIV prevalence and estimated lower HIV incidence among "new" injectors, referring to the effectiveness of large-scale SEPs in a country such as Estonia.[42,43,84]

Within the East geographic and epidemiological area of the WHO European Region, IDU coverage with HRS and ART differs considerably. According to the 2010 systematic review by Mathers *et al.* in Lithuania 68%, in Ukraine 39%, and in Estonia 30% of IDUs accessed NSPs in a year, the corresponding proportion in Russia and Belarus was 7% and data from Latvia were not available.[85] According to international targets for HIV/AIDS prevention, treatment, and care for IDUs, medium level NSP coverage would correspond to 20–60% of IDUs regularly reached by NSPs.[86] At the same time the amount of sterile injecting equipment (number of needles and syringes) distributed per IDU in a year in East European countries ranged from 151 in Estonia to 4 in Russia.[85] OST (mainly with methadone, but also buprenorphine in most countries) was available in all Eastern European countries except Russia.[85] The proportion of IDUs on OST ranged from 10 per 100 in Lithuania to less than 1 per 100 in Belarus, and 7 in Estonia[85]—all in the low OST-coverage international category.[86] Also ART coverage among IDUs remains low over the entire region—ranging from 16 per 100 HIV-positive IDUs in Lithuania to less than one in Russia (Belarus with four and Ukraine and Estonia with two in the middle).[85,86]

While looking at other population groups at risk for HIV, in 2008 in the WHO European Region almost one-fifth (19%) of HIV infections were diagnosed among MSM; in the East cluster the corresponding number was only 0.5% according to

official statistics.[2] Yet serosurveys in different countries in the region have detected a much higher HIV prevalence among MSM—1–9% in the Russian Federation and 10–23% in Ukraine.[2,87] It is difficult in Eastern Europe to accurately determine the different HIV transmission groups (e.g., homosexual vs. heterosexual) for various reasons.[88] First, not all countries collect this information. Second, nondisclosure of sexual orientation remains common in Eastern Europe.[88] A recent survey carried out among lesbian, gay, bisexual, and transgender communities in five Central and Eastern European countries showed that only 2–55% of people would feel comfortable revealing their sexual orientation, gender identity, or same-sex practices to a healthcare provider.[89]

Data on HIV prevalence among CSWs also differ to a great extent within the Eastern European region and even within the countries. Compared to the Estonian 7.6% HIV prevalence among CSWs,[25] in Ukraine it ranges from 13.6% to 31.0%[2] and in Russia a wide range from 2% to 62% has been observed in different regions.[87] Despite the limited size of the officially reported CSW population, compared to IDUs, the combination of IDU and CSW should not be forgotten.

Public health implications

The ability to control HIV requires an effective and comprehensive public health surveillance capacity. The explosive character of the HIV epidemic in Eastern Europe demands the presence of a sensitive and flexible system of surveillance, capable of monitoring the ways in which the virus is transmitted and the factors that facilitate it, and offering the possibility of predicting new routes of transmission, new vulnerable population groups, and new areas of HIV spread.[90] Overcoming barriers to HIV surveillance (including lack of appreciation of the value of high-quality surveillance data and weak societal commitment) and developing comprehensive surveillance systems are of great urgency, especially in Eastern Europe.[90] The current passive STI surveillance system should be enhanced and regular audits of quality of care for people living with HIV/AIDS and STI patients should be implemented.[91–93]

Being confronted with the HIV/AIDS epidemic driven by injection drug use, one of the main challenges and focus of the Estonian HIV/AIDS strategy will remain coverage of IDUs by treatment and harm reduction services. However, to enhance coverage and adherence, different services could be offered as an integrated package of care by the same providers.

In Estonia, as in other countries in the East geographic and epidemiological area of the WHO European Region, HIV prevention and harm reduction initiatives and services should be focused not only on the predominantly male HIV-positive IDU population, but also on their noninfected non-IDU female sexual partners as the potential HIV bridge to the general population. Although studies in the region (Russia) have shown that young women in IDU–non-IDU partnerships having unprotected sex potentially serve as the bridge,[3,4] local epidemiologic research to study the population characteristics and potential magnitude of bridging should be conducted and precisely targeted HIV prevention interventions designed.

Acknowledgments

This research was supported by the New York State International Training and Research Program (Grant 2D43TW000233), NIH–Fogarty International Center and National Institute on Drug Abuse; Norwegian Financial Mechanism/EEA (Grant EE0016); the Basic Financing and the Target Financing of Estonian Ministry of Education and Research (Grants SF0180060s09 and SF0182726s06); Center of Excellence of Translational Research of Neuroimmunology (project SFOS WP1-NeuroAIDS); Estonian Science Foundation (Grants GARMB 8004 and GARMB 8415); the European Union through the European Regional Development Fund and the European Social Fund; and the Archimedes Foundation. We also gratefully acknowledge the help of Ilze Puckure from Latvia, Agne Simkunaite from Lithuania, and Vladimir Eremin from Belarus, who directed us to country HIV/AIDS statistical databases; and Jevgenia Epštein, Valentina Ustina, Taavi Lai, Merilin Mäesalu, Aljona Kurbatova, Kristi Rüütel, Katri Abel-Ollo, Ave Talu, Aire Trummal, Margit Kuus, and Piret Viiklepp from Estonia, who provided us with unpublished Estonian data and explanatory information.

Author Disclosure Statement

No competing financial interests exist.

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