

What expedites the AIDS epidemics in Central and Eastern Europe?

An empirical analysis of biological, institutional and social determinates

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Abstract:

The HIV/AIDS epidemic spreads rapidly in Central and Eastern Europe. In order to prevent further transmissions, policy-makers need to understand the determinates of HIV/AIDS facilitating these epidemics. Much attention has been paid to epidemiological aspects like injecting drug use and unsafe sexual intercourse. However, other important determinates like social stigmatisation and concomitant diseases have been neglected. This paper analyses the impact of social and institutional factors – in addition to biological ones – on the spread of HIV/AIDS in 28 Central and Eastern European countries between 1996 and 2006. Our results show that HIV prevalence rises with tuberculosis prevalence. We also find a positive correlation between the spread of HIV and social factors like marginalisation of subpopulations with high-risk behaviour.

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1. Introduction

More than 25 years after the first cases of AIDS were reported in Los Angeles, the virus has been spread all over the world, but unevenly. Although Sub-Saharan Africa remains the epicentre of the global HIV/AIDS crisis, the fastest reported rate of increase in HIV infection has been documented in several countries in Central and Eastern Europe during the recent years. Nowadays, the estimated number of new infections amounts to approximately 150,000 people. This is an increase of 70 percent within two years.

The majority of the academic literature on AIDS has acknowledged that the economic and social collapse of the former socialist societies facilitates the rapid spread of HIV among injecting drug users and sex workers - two significant transmission ways. Because these epidemiological transmission patterns have been identified as the main reasons for the wide spread of HIV in Central and Eastern Europe, policy interventions focusing exclusively on preventive measures like condom distribution and needle exchange programmes have been recommended by the literature on AIDS. Yet, against the background of ongoing HIV epidemics, anti-HIV programmes concentrating on epidemiological aspects of HIV seem to be insufficient. Similar to medical cases, treatment of sickness will be ineffective if a doctor does not entirely consider all symptoms of a person's illness and thus, gives a false diagnosis. Likewise currently recommended policies addressing the HIV/AIDS epidemics in Central and Eastern European countries fail because of a "false diagnosis": Little attention is paid to further important reasons like a disintegration of social infrastructure and deteriorated health systems that have also contributed to the HIV/AIDS epidemics. An exception is Stillwaggon (2006) whose work indicates that poverty and infectious diseases contribute

to the spread of HIV/AIDS in the former Soviet countries. By contrast, our work confirms the observation that social and biological factors have facilitated HIV/AIDS epidemics in Central and Eastern Europe. We concentrate on social marginalisation and tuberculosis as two potential drivers.

In particular, we test two recent observations: First, a lacking social integration of children and adolescents, particularly of Roma people, leads to social marginalisation making an effective HIV/AIDS education extremely difficult. We examine if these social factors also contribute to the rapid spread of HIV in Central and Eastern Europe. Second, the less developed health care sector and poor living conditions, i.e. malnutrition and difficult social conditions in the aftermath of the COMECON collapse, seem to facilitate the HIV transmission. Thus, high tuberculosis prevalence in East European countries has the potential to drive HIV transmission.

We find a positive relationship between the spread of HIV/AIDS and social factors like stigmatization and marginalisation of subpopulations with high-risk behaviour. Our results also show that the HIV prevalence rises with higher tuberculosis prevalence.

The paper proceeds as follows. Section 2 starts with basic information about the level and distribution of HIV in Central and Eastern Europe. Afterwards, determinates of HIV/AIDS are described in Section 3. Following a short presentation of epidemiological aspects, biological and social determinants like social marginalisation and the coincidence of HIV and tuberculosis, are outlined. In Section 4, we present the empirical analysis using data from the EUROHIV, UNAIDS, WHO, and WDI databases for 28 Central and Eastern European countries. The final section concludes.

2. The HIV/AIDS epidemics in Central and Eastern Europe

There is a wide diversity in the epidemiology of HIV in Europe. In the Centre, reported HIV infections have been at a low and stable level since 1996 as illustrated in Figure 1. In 2006, 1,805 new HIV cases were diagnosed representing 9.4 new infections per million inhabitants (EuroHIV (2006, p. 19)). By contrast, HIV has rapidly spread in the states of the former Soviet Union until the year 2001. The number of newly infected people rose from 27.5 in 1996 to 209.4 per million inhabitants in 2006, representing a 660% increase within 10 years (EuroHIV (2006, pp. 18-19)). Following a peak in new HIV infections in 2001 and a decline of reported HIV infections to 174.3 per million inhabitants in 2003, the number of diagnosed HIV cases has steadily increased in the recent years.

[Insert Figure 1 about here]

Recent trends in Eastern Europe primarily mirror the development of the HIV/AIDS epidemics in the Russian Federation and Estonia, which are most affected by HIV/AIDS. The largest geographical extent of HIV/AIDS can be found in the Russian Federation, having one of the most rapidly growing epidemics worldwide with an explosive increase since 1996. The number of citizens living with HIV has steadily risen from 17.4 in 1996 to 1,197.5 per million inhabitants in 2001 according to EuroHIV. Although a decline in new HIV cases is reported, the HIV/AIDS epidemic continues to spread, but less rapidly than in the late 1990s. Similar tendencies for HIV/AIDS

have been observed in Estonia, reporting the highest rate of new HIV infections per million inhabitants in Europe since 2000 (EuroHIV, 2006).

In contrast to the decelerated growth of the epidemics in the Russian Federation and in Estonia, the number of new HIV cases has steadily increased in other countries of the former Soviet Union like the Ukraine and most of the Central Asian countries, except for Belarus facing a stabilised HIV/AIDS epidemic. In Uzbekistan, now having the largest HIV/AIDS epidemic within Central Asia, the quantity of new HIV infections rose between 2003 and 2006 from 69 to 83 per million inhabitants (EuroHIV (2006, table 1)). A similar pattern is evident in the smaller epidemic of the Republic of Moldova where the reported HIV infections have more than doubled within the last three years, thereby reaching 160 cases per million inhabitants in 2006 (EuroHIV, 2007...).

The risen annual number of newly reported HIV cases in several Central Asian countries and, hence, the growth of these epidemics, are considerably smaller than those in other countries like the Ukraine. Like Estonia and the Russian Federation, the Ukraine is most affected by HIV/AIDS, but its HIV/AIDS epidemic continues to grow quickly. As HIV infections have more than doubled since 2001, reaching 283 cases per million inhabitants in 2006, the Ukraine is experiencing the highest cumulative amount of HIV infections among the European countries (UNAIDS and WHO (2007, p. 2)).

In sum, Central and Eastern European countries have reported stable HIV/AIDS epidemics since 1996 whereas the epidemiology of HIV is quite diverse in the countries of the former Soviet Union. In Estonia, for example, HIV incidence continues to grow in contrast to the other Baltic states, Latvia and Lithuania, reporting declines in newly

diagnosed HIV cases. An uneven spread of HIV is also evident in Belarus, documenting a stabilised number of new HIV infections, and in its neighbouring countries, the Russian Federation and the Ukraine which are heavily affected by HIV/AIDS. In order to reason these epidemiological observations, we proceed by discussing the determinates of HIV/AIDS.

3. Determinates of HIV/AIDS

In the majority of the academic literature on HIV/AIDS, epidemiological trends of an epidemic are attributed to transmission paths getting infected with HIV/AIDS. Intravenous drug injection, mother-to-child transmission during breast feeding, blood donations and hetero- or homosexual contact are generally identified as the main risk factors. Therefore, changes in an epidemic's pattern are reasoned by shifts in its transmission. However, experiences from the past indicate that each HIV/AIDS epidemic is embedded in its economic and social environment. The political collapse of the former Soviet Union, resulting in a decline of socioeconomic conditions which was correlated with a rise in unemployment and poverty, seems to be accompanied by an increase in HIV infections in several countries. In the region of today's Russian Federation, for example, HIV prevalence was low, numbering 0.2 newly diagnosed HIV cases per million inhabitants in 1987 whereas it is now home of the largest HIV/AIDS epidemic in Europe (WHO Regional Office for Europe, 2007a). Against this background, the subsequent discussion does not only include epidemiological, but also social and biological drivers of HIV/AIDS.

3.1. Epidemiological aspects

In order to classify the epidemiological trends of HIV/AIDS in Central and Eastern Europe, we use the pattern of transmission of HIV and the HIV prevalence expressing the cumulative number of HIV infections. According to the wide spread of HIV, the extent of an epidemic can be subdivided into two different stages (USAID (2002, p. 7)). In nascent epidemics, the HIV prevalence is less than five percent in all known subpopulations practising high-risk behaviour, i.e. injecting drug users, sex workers etc. whereas in concentrated epidemics the HIV prevalence is higher than five percent in one or more subpopulations.

A. Nascent HIV/AIDS epidemics

HIV/AIDS epidemics in early stages can be found in most of the Central and Eastern European countries (Sonntag, 2005). These epidemics have in common that HIV is primarily concentrated among subpopulations with high-risk behaviour and thus, the epidemics have not started to spread into the general population.

Unsafe heterosexual intercourse among high-risk population groups remains the primary mode of transmission of HIV in Central Europe in 2006 whereas it has become the main driver of HIV in Belarus for the first time (EuroHIV (2006, p. 11)). Prior to 2005, the majority of HIV cases in Belarus (59.8 percent) were diagnosed among injecting drug users, particularly in the Gomel region neighbouring the Russian Federation and the Ukraine which are both highly affected by HIV/AIDS (Ministry of Health Belarus (2008, p. 11)). As a result of an increasing proportion of sexually HIV-infected people between 2002 and 2006, especially among sexual partners of injecting drug users, 66.8 percent of newly diagnosed HIV infections were caused by unsafe

sexual intercourse in 2006 (Ministry of Health Belarus (2008, p. 12), WHO (2005a, p. 1)).

By contrast, in other Central Asian countries and in each of the Caucasian and the Baltic republics, the main path of infection is the use of non-sterile instruments for intravenous drug injection (UNAIDS and WHO (2007, pp. 7-9)). In countries like Kyrgyzstan and Uzbekistan which are located on a major drug trafficking route from Afghanistan to the Russian Federation, HIV/AIDS is highly concentrated among injecting drug users. In Uzbekistan, for example, the number of HIV-infected injecting drug users has more than doubled between 2002 and 2006, finally reaching 1,454 cases (EuroHIV (2007, p. 19)). As a consequence, 75 percent of all HIV cases are caused by unsafe injecting drug use (WHO (2005b, p. 1)). In contrast to several Central Asian countries reporting a rising annual number of HIV-infected injecting drug users, a decline in new HIV diagnoses caused by an exchange of non-sterile needles and syringes has been found in Latvia since the peak in 2001 (EuroHIV (2007, table 1)). A reduced HIV incidence among Latvian injecting drug users can be observed due to Latvia's epidemic having reached a level of saturation.

B. Concentrated HIV/AIDS epidemics

When an epidemic has reached a concentrated stage, its pattern changes. HIV starts to spread not only between people having a risky shift, but also into other parts of the population. Consequently, heterosexual activity increasingly becomes the main method of transmission. A similar change in pattern is evident in some Eastern European countries like the Ukraine and the Russian Federation, facing nearly 90 percent of all new HIV infections in 2006 (UNAIDS and WHO (2007, p. 2)).

Following a rapid increase in newly diagnosed HIV cases in the Russian Federation until the peak of new infections in 2001, the number of HIV infections among Russian injecting drug users has been declining in the recent years (Ministry of Health and Social Development of the Russian Federation (2008, pp. 16-17)). By contrast, the number and the proportion of sexually infected people has steadily increased over the last five years, now representing 32 percent (WHO (2005c, p. 1), Ministry of Health and Social Development of the Russian Federation (2008, p. 15)). Like the Russian Federation, the Ukraine is facing a concentrated HIV/AIDS epidemic among injecting drug users (WHO (2005d, p. 1)). However, the change in pattern of transmission of HIV is more rapid than in the Russian Federation as depicted in Figure 2.

[Insert Figure 2 about here]

Figure 2 reveals that the number and the proportion of injecting drug users among newly registered HIV infections has already been reduced since the late 1990s in the Ukraine (Ministry of Health and Social Development of the Ukraine (2008, pp. 15-16)). This decline was accompanied by an explosively increasing heterosexual transmission of HIV, numbering 35 percent in 2006 (UNAIDS and WHO (2007, p. 6)).

3.2. Biological and social aspects

The socioeconomic decline, including the deterioration of the public health systems during the 1990s, has also resulted in the resurgence of other infectious diseases, most notably tuberculosis. A weak medical infrastructure resulting from an outdated and underfinanced health system has prevented the implementation of new diagnostic methods, like sputum smear microscopy, which are essential for an effective detection

of tuberculosis (WHO Regional Office for Europe (2007b, pp. 7, 10, 35-36)). Since most of the tuberculosis specialists educated in the former Soviet Union prefer radiology to microscopy, tuberculosis case detection rates are low in Central and Eastern Europe – mainly in the Ukraine, in the Russian Federation and in Central Asian countries facing strong economic relationships with the Russian Federation (WHO Regional Office for Europe (2007b, p. 4)).

The resurgent wide spread of tuberculosis is additionally fostered by an inadequate treatment of tuberculosis patients in many countries resulting in low rates of treatment success (74 percent) as in the African region (WHO Office for Europe, 2007c). Problems arise if the centralised and vertical tuberculosis programmes established under the Soviet system have to be integrated with general health services provided by the private sector (WHO Office for Europe (2007b, p. 7)). While tuberculosis patients were predominantly treated in hospitals during the Soviet era, the DOTS strategy to control tuberculosis, acknowledged by the WHO, is characterised by a directly observed treatment (DOT) of patients outside the hospital. Since privately provided health care services are poorly coordinated with state tuberculosis services, therapies are often interrupted by patients, particularly by marginalised and socially underprivileged people like injecting drug users and Roma. As a result, drug-resistant strains of tuberculosis requiring more expensive treatment occur (WHO Regional Office for Europe (2007b, pp. 8-9)). Moreover, a high incidence of drug-resistant tuberculosis strains has the potential to extend the tuberculosis crisis, especially in countries with high treatment defaults like Bulgaria, Romania, the Russian Federation

and its neighbouring Central Asian countries (WHO Regional Office for Europe (2007b, pp. 5, 9)).

Following these epidemiological tendencies, the HIV/AIDS crisis in Central and Eastern Europe does not appear as an isolated concern caused by injecting drug use and unsafe heterosexual intercourse. It is embedded into a large and increasing tuberculosis crisis. In 2006, 306,880 cases were reported in the 12 former Soviet countries; half of them in the Russian Federation, the only European state out of the 22 countries in the world with a high burden of tuberculosis (WHO, 2008).

The epidemiological co-incidence of HIV and tuberculosis is worrying because both diseases are often referred to as a deadly duo: each of them speeds up the progression of the other. HIV is the most potent single factor to cause a break-out of active tuberculosis when latent tuberculosis infections have not been treated (WHO (2003, p. 11)). Thus, it has the potential to foster the transmission of tuberculosis and, hence, the risk of people to become infected rises (Corbett et al. (2003, p. 1016)). In 2006, one third of the patients who were HIV-positive were co-infected with tuberculosis, which was the leading cause of deaths among them (WHO Regional Office Europe, 2007d). All in all, the underinvestment and the lack of coordination in health systems combined with a steeply increasing tuberculosis epidemic are likely to expedite the HIV/AIDS epidemics in Central and Eastern Europe. It follows

Hypothesis: HIV prevalence rises with tuberculosis prevalence.

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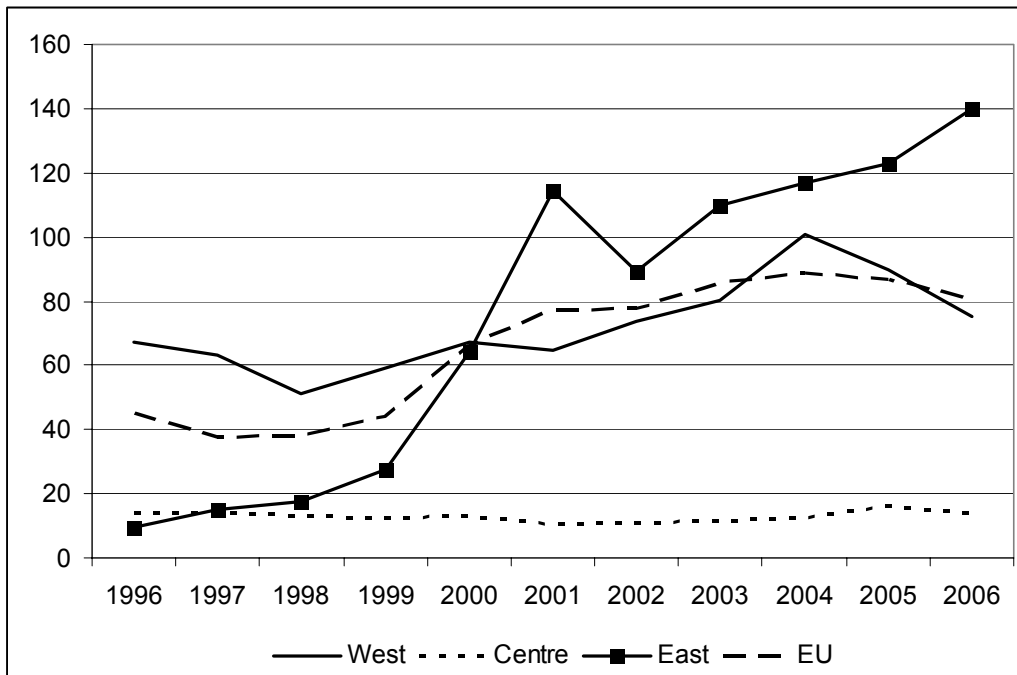


Figure 1. Incidence rate of diagnosed HIV/AIDS per million population in West, Centre and Eastern Europe and the EU, 1996-2006

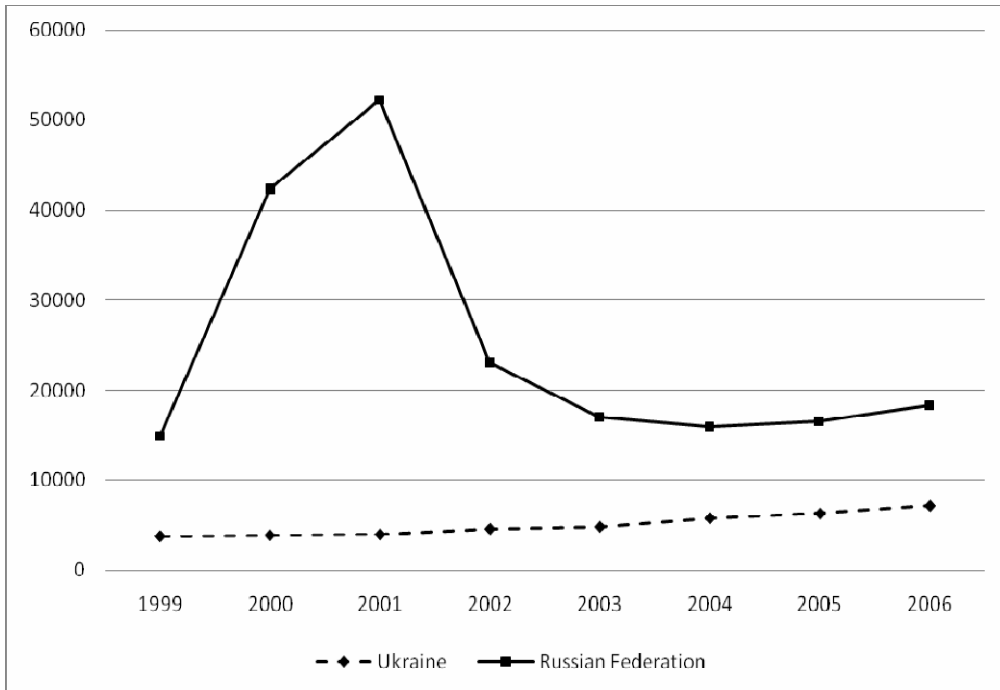


Figure 2. HIV infections among IDU in the Russian Federation and Ukraine, 1999-2006

Table 1. HIV/AIDS incidences per million population in Central and Eastern European countries (1996-2006)

Country	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Albania	1.6	1.6	1.9	1.6	4.2	9.6	11.4	8.2	10.6	12.4	15
Armenia	8.5	10.3	2.9	11.1	8.5	8.5	11.9	10.2	19	30	37.5
Azerbaijan	0.9	1.3	3.5	5.4	6.6	14.1	11.6	13.2	13.1	29	26
Belarus	31.4	19.2	17.8	40.7	51.7	57.6	92.6	74.1	86.6	91.4	103.3
Bosnia and Her- zegovina	3.8	2	6.8	5.7	1.8	3.5	2.2	4.5	5	4.5	5.3
Bulgaria	4	2.9	1.8	2.8	5.4	4.3	4.8	7.7	9	13.1	13.8
Croatia	4.1	7.4	10.5	13.7	11.2	8.2	13.5	11.8	14.8	17.8	18.9
Cyprus	72.9	60.3	41.6	47.6	51	32.9	25.1	36.1	33.4	57.7	43.9
Czech Republic	6.6	7.9	3.8	6.6	6.9	5.7	5.7	6.8	8.7	9.9	10.3
Estonia	9.6	4.9	7	6.4	160.1	493.2	301.3	622.9	573.5	491.5	525.4
Georgia	2.3	4.8	5.1	7.7	17.9	19.7	26.7	28.2	51.8	70.4	87.7
Hungary	9.3	9.1	10.9	9.9	7.5	10.3	10.5	9	10.1	13.1	8.2
Kazakhstan	0.1	0.5	0.6	0.3	0.6	1.1	22.6	50.6	48.4	66.6	126.6

Kyrgyzstan	0.4	0.4	1.3	2.3	3.3	30.1	33.5	27.9	33.9	37.2	50.3
Latvia	14.9	12.1	71	105.9	200.4	349.5	249.1	200.9	167.8	159	155.6
Lithuania	4.5	8.6	15.9	18.4	18.9	21.7	109.4	32.2	42.3	35.3	37.2
Moldova	3.4	39.3	38.7	18.1	15.3	27.1	25	70.9	97.6	139.9	171.9
Montenegro	4.7	24.9	3.1	10.9	21.8	4.7	7.9	14.1	4.7	15.8	8.5
Poland	16.7	16.8	18.9	16.5	18.5	17.2	16.6	18.1	18.9	18.1	18.5
Romania	61.7	62.6	64.5	45	35.6	35.9	27.2	27.3	27.1	23.1	18.1
Russia	10.8	30	27.7	135.5	405.2	603.6	333.4	257	242.3	255	281
Serbia	8.6	6.4	9	5	6.4	6.2	16	15.4	15.2	14.9	14.2
Slovakia	0.7	2.4	2.6	0.8	4.4	2.4	2.4	2.8	3.2	4.5	5.7
Slovenia	9	5	13.5	11.5	10	10.6	12.6	10.1	17.7	22.8	18.8
Tajikistan	0	0.2	0.2	0	1.1	6.2	4.9	6.6	30.5	29.8	30.8
Macedonia	3.5	0	6	5	5.4	3.5	4.4	0.5	3.4	11.6	11.2
Ukraine	54.3	92.3	73.8	59.5	63.4	72.5	98.4	208.4	270.2	323.4	386.9
Uzbekistan	0	0.4	0.2	1.1	6.3	13.1	20.2	41.7	77.4	82.7	81.7

