

# Epidemiology of HIV Infection and AIDS in Croatia – An Overview

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## ABSTRACT

*This article presents an overview of HIV/AIDS epidemiology and surveillance in Croatia 20 years after the first documented case of AIDS in the country. Here we describe strategies employed for HIV/AIDS surveillance in Croatia as well as preliminary results of HIV seroprevalence among most-at-risk populations (MARPs) research conducted by the Infectious Diseases Epidemiology Service at the Croatian National Institute of Public Health (CNIPH). Croatia has a low incidence and prevalence of HIV and AIDS. At the end of 2005, there were 553 documented cases of HIV infection, 239 of which progressed to AIDS. In Croatia, AIDS is being registered within MARPs only and dominantly among men who have sex with men (MSM). AIDS patients and HIV infected persons are found in all parts of the country. Crude prevalence of HIV among MARPs was found to be 0.9%. It is necessary to continue with current prevention and control measures in the country, and to create a culture of awareness and precaution, a strategy that has proven effective in reducing risk of HIV infection.*

**Key words:** HIV, AIDS, epidemiology, Croatia, MARP, surveillance

## Introduction

HIV infection and AIDS were first described during the mid 1980s among the men who have sex with men (MSM) population. While initially confined to this group, HIV spread in highly industrialized countries with the speed and scale of an epidemic<sup>1,2</sup>.

Preliminary epidemiologic research demonstrated that HIV is sexually transmitted, and that increased sexual contact increases likelihood of infection. Pockets of infection were also soon found within the hemophilic and intravenous drug using (IDU) populations.

When HIV first emerged, no adequate treatments existed and infection invariably culminated in severe immunodeficiency – AIDS. A full half of AIDS patients diagnosed at the beginning of the epidemic had died within the following 7–10 years, and 15 years after the appearance of AIDS, practically 90% of AIDS patients had died. Incidence of HIV increased exponentially, with over 500 infected individuals per million in highly developed countries. Low and middle income countries, where heterosexual transmission was dominant, experienced a higher proportion of infected women. The disease was also transmitted from mother to child and subsequently, the

number of infected children and AIDS cases among children increased. The rapid spread and devastating consequences of HIV have made the virus one of the greatest public health problems of the twenty-first century<sup>1–3</sup>.

Outbreak control measures have been directed towards interrupting viral transmission routes. Health education, and in particular, education among high risk groups, has played a crucial role in this effort. By the mid 1990s, the beneficial effects of education on virus transmission were already apparent<sup>1–3</sup>.

In developed countries, the nosocomial route of transmission has almost completely been eliminated, due to the introduction of careful monitoring of blood and blood products and voluntary blood donorship programs<sup>4,5</sup>.

In many areas of the world, the incidence of HIV infection has begun to decline. Western industrialized countries have seen a decrease in incidence among the MSM population in the 1990s. Prevalence has also decreased in some African countries, such as Uganda, in which prevention and outbreak control measures specific to local cultural and medical demands have been intro-

duced. Incidence among sex workers in Thailand and Cambodia and among IDUs in Brazil and Spain has also declined in the past few years<sup>1–6</sup>.

Other regions of the world, including Eastern Europe, initially employed less effective measures of HIV prevention. Many of these efforts were based on extensive testing of the population, even before therapy was available. In focusing on testing, governments and public health agencies of those countries largely ignored educational approaches and harm reduction programs. Upon introduction into these societies, HIV infection was explosive, particularly among IDU populations<sup>4,5</sup>.

Today, there are 40 million people estimated to be living with the HIV infection. Nearly 5 million people have acquired the virus in the year 2005<sup>5</sup>. The introduction of highly active anti-retroviral therapy (HAART) has significantly reduced case fatality and decreased incidence of AIDS. Conversely, the prevalence of HIV infection has increased. Though the rate of new HIV infections has slowed in many highly industrialized countries, the number of people living with HIV is still rising in almost all regions of the world.

The first AIDS cases in Croatia were documented in 1985. By that time, major routes of transmission and most-at-risk populations (MARPs) had been well-described by epidemiologists, due in part to intensive world-wide monitoring of the spread of HIV. The first National AIDS Health Protection Programme (NAHPP) in Croatia was established in 1983, before the first AIDS case appeared in Croatia. The NAHPP was based upon three major strategies: health education, prevention of transmission of the virus via blood and blood products, and risk reduction among IDUs. The epidemiology of HIV in Croatia, 20 years after the first AIDS case was seen in the country, is described below.

## The HIV/AIDS Surveillance System

The control and prevention of HIV/AIDS in Croatia is regulated by the Act on the Protection of the Population from Infectious Diseases and its Regulations as well as by the National AIDS Health Protection Programme in the Republic of Croatia<sup>6</sup>. The Infectious Diseases Epidemiology Service at the Croatian National Institute of Public Health (CNIPH) monitors the status of infectious diseases in the country using an epidemiology information system based on report of individual cases. Individual cases of infectious disease are reported to CNIPH by health care providers at the time of diagnosis or death and are subsequently entered into a national registry.

This system of individual case reporting has been applied to HIV. In the instance of HIV, physicians are required to report new and confirmed cases. An AIDS case is reported if an HIV positive person develops an »AIDS related disease« as defined by the World Health Organization<sup>7</sup>. The death of an HIV/AIDS patient must also be reported.

Additional data on the individual, including information about testing, confirmation of infection, most likely transmission route, comorbidities, and cause of death, if applicable, are collected. All data are entered into the Croatian National HIV/AIDS Registry maintained by the Infectious Diseases Epidemiology Service at the CNIPH. According to an agreement with the University Hospital for Infectious Diseases »Dr. Fran Mihaljević« where most Croatian HIV patients are diagnosed, reports are sent directly to the Infectious Diseases Epidemiology Service at the CNIPH.

Data from the Croatian National HIV/AIDS Registry contribute to a world-wide HIV/AIDS information systems and to two reporting networks of individual HIV/AIDS patients registration maintained by the WHO (European HIV infection data set (EHIDS) and European non aggregate AIDS data set (ENAADS))<sup>5</sup>.

All laboratories that conduct HIV testing are required to report annually on the cumulative number of individuals tested, as well as on source of tested blood, (voluntary blood donors, hospital patients and most-at-risk-groups) to CNIPH. From the total number of the tested persons, the laboratories report the number of positive HIV tests<sup>8–10</sup>.

Additional preliminary surveillance data have been obtained through programs sponsored by the Global Fund to Fight AIDS, Tuberculosis and Malaria and coordinated by the Croatian Ministry of Health and Social Welfare. In particular, the Infectious Diseases Epidemiology Service at the CNIPH has implemented Global Fund Subproject HIV-5, entitled »Improving the Surveillance of HIV infection and AIDS«<sup>11</sup>, and Subproject HIV-2, entitled »Improving accessibility to Voluntary Counseling and Testing Service for HIV/AIDS«, both of which have contributed to surveillance efforts of CNIPH.

Programme HIV-5, sought to recruit and test individuals in Croatia at higher risk for contracting HIV. The study population was defined as adults (age 18 or older) who provided consent to participate and who fit into a high-risk category. High risk categories were defined as:

- Men who have sex with men (MSM)
- Sex workers (SW) and their clients
- Injecting drug users (IDU)
- Heterosexual male working abroad (predominantly sailors)
- Persons with a history of sexually transmitted diseases (STD)

Participants were mobilized in cooperation with non-governmental organizations in Rijeka, Split, Zagreb, Osijek, Slavonski Brod, Zadar and Dubrovnik. Clients were screened at the CNIPH (Microbiology Service), and those with a positive ELISA result were sent for confirmatory testing (Western blot) at the Reference Center for HIV/AIDS at the University Hospital for Infectious Diseases »Dr. Fran Mihaljević«.

In the first two years (Dec 1, 2003 – Nov 30, 2005), 843 persons were interviewed and tested for HIV. The re-

sults obtained through the HIV-2 and HIV-5 programmes are presented later in the text.

In 2005, the HIV Department of the Infectious Diseases Epidemiology Service at the CNIPH started collecting United Nations Global Assembly Special Session (UNGASS) indicators in order to improve monitoring and evaluation of the National HIV/AIDS Prevention Programme<sup>13,14</sup>. Through this initiative, data are collected on all activities related to the control and prevention of HIV infection in the country. All data from individual HIV patients are kept highly confidential in accordance with standard ethical principles.

## Epidemiology of HIV and AIDS in Croatia

Using the previously described systems, the HIV/AIDS situation has been monitored in Croatia since 1985, when the first AIDS cases were documented here. Between 1985 and 2005, there were 553 documented cases of HIV infection, 239 of which progressed to AIDS. During the same period of time, of the 553 diagnosed HIV 127 patients died (Figure 1).

The most of the infected patients acquired the infection abroad. The fraction of HIV-infected individuals who have acquired the infection abroad versus domestically varies by risk group. Almost all HIV-infected heterosexual men in Croatia, for example, have acquired the HIV infection outside the country working as migrant workers, mostly sailors<sup>15</sup>.

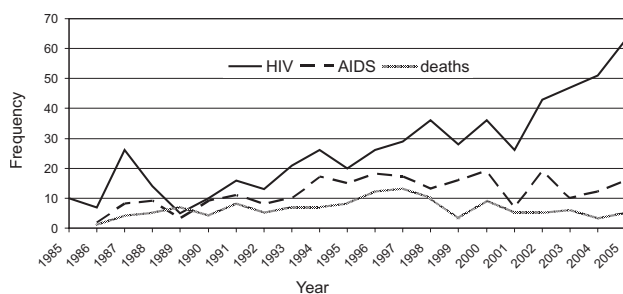


Fig. 1. Annual number of persons in the Republic of Croatia with diagnosed HIV infection, AIDS and the number of deaths of persons infected by HIV; for the period 1985–2005.

The incidence of AIDS cases in Croatia increased yearly until 1994, when it began to stabilize and stayed so till 1999. Between 1994 and 1999, there was a mean of 16 diagnosed cases per year. With the introduction of the highly active anti-retroviral therapy, the number of AIDS cases and deaths from AIDS showed a slight decrease, while the number of HIV positive persons increased. This increase can partially be explained by increased reporting due to improved diagnostic measures, especially within MARPs<sup>16</sup>. The annual AIDS incidence is decreasing at a value less than 4 per 1 million inhabitants, and HIV infection incidence is at 10–14 per 1 million inhabitants. These values place Croatia in the category of countries considered to have a low HIV/AIDS incidence.

From laboratory registries, an average of 170,000 persons are tested each year, and around 80 HIV positive tests are registered annually. This system of monitoring HIV infected persons provides a valuable indicator of trend movements, but as with all the information systems used to collect data from laboratories, it is subject to over-reporting (testing in another laboratory, testing of earlier reported cases). Based on individual reports in 2005 there were altogether 63 new HIV infected persons.

In Croatia, AIDS is being registered almost exclusively within MARPs (Table 1) and is seen predominantly among men who have sex with men (42.7%). HIV-infected heterosexuals are almost always men who have spent extended periods of time abroad and their steady female partners in Croatia. In the male heterosexual population, sexual contact with sex workers of the opposite sex is the dominant mode of transmission. Eight children in Croatia have contracted HIV from their mothers, and three have progressed to AIDS.

Among those infected via heterosexual transmission, there are no adolescents. All the infected individuals are above the age of 20.

A number of cases have been reported in Croatia in which HIV has been transmitted through blood or blood products. Since 1985, 13 patients with hemophilia have contracted HIV and 8 have developed AIDS. All patients with hemophilia received imported blood derivatives. Since 1992, there were no new registered HIV infected patients from this group. There were also two registered non-hemophiliac cases of HIV infection after transfusion of blood from within the country (one in 2003 and the one in 2004).

Voluntary donation, low prevalence of HIV infection, and mandatory blood product testing has kept the rate of infection via receipt of blood and blood products low. In Croatia, all donated blood has been tested on for HIV since 1987, and additional prevention measures are employed when taking blood from higher-risk donors. According to the National HIV/AIDS Health Protection Programme, only blood from donors in Croatia is used, a principle known as »self containment«. This principle is likewise followed with other blood products. If import of

TABLE 1  
AIDS CASES IN CROATIA ACCORDING TO MOST  
AT RISK GROUPS

Group	Number of cases	%
Men who have sex with men (MSM)	102	42.7
Hemophiliac	8	3.3
Heterosexual men	77	32.2
Injecting drug users (IDUs)	20	8.4
Partner of a HIV infected person	20	8.4
Child of a HIV infected mother	3	1.3
Unknown	9	3.8
Total	239	100

blood derivatives is necessary, a set of procedures exist to ensure the safety of the blood products. Approval by the Croatian Agency for Medicinal Products and Medical Devices is required<sup>8-9</sup>.

Intravenous drug users (IDUs) comprise 8.4% of total AIDS cases in Croatia and 9.6% of the total HIV infected population. HIV infection among drug users is monitored on an annual basis, with an average of 800 persons tested annually. Among IDUs, the HIV prevalence is around 1%. The percentage of HIV infected IDUs has not increased over the last 15 years.

Incidence, prevalence, and dominant modes of transmission of HIV vary by region in Croatia. AIDS patients and the HIV infected persons are found in all parts of the country. The incidence and prevalence, of both HIV and AIDS, is somewhat higher in the coastal areas, though the total number of AIDS cases is the highest in the capital, Zagreb. Among the infected in Zagreb, HIV is transmitted most frequently through MSM contact. Epidemiologic data shows that this is the case of virus transmission among the domestic MSM population. In the most southern coastal parts of the country, there is a somewhat higher proportion of transmission via MSM contact. In the coastal regions (Primorje and Dalmatia) transmission via heterosexual contact is dominant. In these regions, the infection is often transmitted by men infected abroad during contact with promiscuous persons and sex workers. This infection is then conferred to regular sexual partners, usually wives and girlfriends, living in the country. In Istria, transmission via intravenous drug use and needle sharing is dominant, though other routes of transmission present in this area.

## Strategies for Prevention

Unlike some European countries with a low incidence of AIDS, Croatia has conditions conducive to an early HIV epidemic: open borders, citizens traveling abroad, migrant workers, a developed tourism industry, etc<sup>17</sup>. The first AIDS cases in Croatia indicate that HIV infection in Croatia appeared as early as in the mid-1970s. At that time, the transmission of classical sexually transmitted diseases was still somewhat high (around 2000 registered gonorrhea and 400–500 registered syphilis patients annually). With the start of a widespread educational campaign in the mid-1980s, the number of classic sexually transmitted diseases has dramatically decreased, reaching today's level of 40 cases of gonorrhea and less than 10 cases of syphilis annually<sup>10</sup>. Other sexually transmitted diseases as well as indirect indicators (inflammatory pelvic diseases etc.) of diseases which do not fall into the category of mandatory reported diseases also show a regressive trend or a stable state. This educational campaign also helped prevent an HIV epidemic in Croatia.

The National HIV/AIDS Health Protection Programme, implemented before the first AIDS cases were reported in Croatia, has helped keep infection rates low. The programme has been updated and modified according to new understanding of AIDS epidemiology and

AIDS prevention and control measures. The program has also been modified to reflect the changing epidemiologic situation within the country.

Basic outbreak control measures in Croatia include the monitoring of the epidemiologic situation in the country and in the world, ongoing education of citizens, development of health-educational programs for specific segments of the population including MARPs, and education of AIDS patients and HIV infected individuals. In addition to educational efforts, there is the continuous application of measures to prevent the transmission of HIV through blood and blood derivatives and human organs and tissues. Within health organizations, universal precautions are followed to prevent transmission of HIV and other blood borne infections. In Croatia, there is also a National Programme of Prevention of Drug Abuse in place that contributes to prevention among IDUs. Furthermore, the treatment of HIV infected persons and AIDS patients is free of charge and patients also receive free HAART treatment which reduces virus blood level and has immediate benefit on HIV prevention.

In order to keep infection rates low, it is necessary to continue with the application of all the prevention and control measures in the country, and to foster protective behavior, strategies that have thus far proven an effective means of reducing risk of HIV infection. A number of factors outside the control of health services may influence rates of HIV infection. Unemployment, the subsequent increase of high-risk occupations, and changes of social status of IDUs could result in rising infection rates. If these factors do indeed change, additional national efforts would be required to stem the potential increase in infection rates.

As of late, smaller epidemics of gonorrhea and syphilis among the MSM population in bigger cities have been noted. These outbreaks serve to remind us of the need to intensify outbreak control measures within this group.

Research conducted within the Project »Scaling-up HIV/AIDS Response in Croatia« as part of the Programme HIV-5 has resulted in the following findings: crude prevalence of HIV among MARPs was 8/843 (0.9%) with a 95%CI=0.3–1.6%. In Table 2 preliminary results divided according to most-at-risk populations are shown.

The abovementioned research has confirmed that the MSM population is at greatest risk of HIV infection. Among all the populations the prevalence found was lower than 5%, but it is still nearly one hundred times higher than in general population, underscoring the importance of prevention measures in these populations.

An innovation introduced through the Programme HIV-2 is anonymous and voluntary free of charge testing, with pre and post test in-depth counseling. Within two years, 4406 counseling sessions were held nationwide, and 2283 HIV tests conducted, through which 5 infected persons were found. These results imply that the routine monitoring of HIV provides an accurate snapshot of the patterns of HIV infection in Croatia. There are no large MARP in Croatia in which we could expect an unnoticed epidemic.



**TABLE 2**  
PRELIMINARY RESULTS OF THE STUDY OF SEROPREVALENCE OF HIV AMONG MOST-AT-RISK POPULATIONS

Population	N	HIV Prevalence (%)	95% CI
Men who have sex with men	130	4.6	1–8.2
Sex workers	43	2.3	0–6.8
History of sexually transmitted diseases	178	1.1	0–2.7
Clients of sex workers	189	1.1	0–2.5
Injecting drug users (IDUs)	248	0.8	0–1.9
Sailors	276	0.4	0–1.1

## Future Directions

At this time in Croatia, it is necessary to continue the application of all protection measures according to the National HIV/AIDS Health Protection Programme. In addition, it is considered a priority to:

- continue with the work of centers for voluntary counseling and testing
- intensify health education within the MSM population
- systematically and efficiently combat the still existing prejudice towards the HIV infected persons and MARPs.

After 20 years of HIV in Croatia, there are renewed requests in Croatia, from both within the medical community and lay population, for mandatory testing and discrimination of HIV infected persons. MARPs should be able to fully trust their physicians and their community in general. The success of the outbreak control measures depends on this trust.

In addition, Croatian society should undertake everything in its power to create conditions in which unemployment will decrease. Minimizing unemployment will

likewise minimize the number of unemployed individuals belonging to high-risk groups, such as SWs and IDUs. Finally, we should prioritize efforts to measures directed toward decreasing risk of HIV infection, including surveillance of hospital infections transmittable through blood, as well as in further surveillance of blood and blood products.

While the seroprevalence of HIV in Croatia stays low, and infection is largely confined to MARPs, the country possesses particular attributes that could foster a growth of the infected population. Only comprehensive efforts of politicians, health professionals and society in general could give an opportunity to Croatia to remain a low-level epidemic country.

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## **EPIDEMIOLOGIJA HIV INFEKCIJE I AIDS-a U HRVATSKOJ – PREGLED**

### **S A Ž E T A K**

U članku je prikazana epidemiološka situacija u Hrvatskoj 20 godina nakon prvog registriranog oboljelog u zemlji, sustav nadzora nad HIV/AIDS-om i preliminarni rezultati istraživanja seroprevalencije HIV-a u skupinama s povećanim rizikom koje vodi Služba za epidemiologiju zaraznih bolesti Hrvatskog zavoda za javno zdravstvo (HZJZ). Hrvatska je zemlja s niskom pojavnosću i učestalošću HIV-a i AIDS-a. Do kraja 2005. zabilježeno je 553 slučaja zaraze HIV-om, od kojih je 239 osoba razvilo AIDS. AIDS se u Hrvatskoj registrira isključivo unutar grupa povećanog rizika i dominira u grupi muškaraca koji prakticiraju seks s muškarcima. Oboljeli i zaraženi HIV-om registrirani su u svim dijelovima zemlje. Ukupna prevalencija HIV-a u skupinama s povećanim rizikom je 0.9%. Potrebno je i dalje provoditi sve mjere suzbijanja i sprečavanja ovog oboljenja u zemlji, te poticati protektivno ponašanje, običaje i navike populacije – koji su se do sada pokazali efikasnim u smanjenju rizika od HIV infekcije.