

Epidemiology of HIV/AIDS: what has changed?

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Abstract

The Authors examine the global, European and Italian epidemiology of HIV/AIDS on the basis of more recent international and national reports. All limitations in the available data were considered. The epidemic seems to have expand in all of the areas, demonstrating the need for further interventions both in the prevention of the infection and the diffusion of antiretroviral treatments, where these are lacking.

Key words: HIV infection, AIDS, epidemiology

Despite progresses in HIV prevention and treatment, the AIDS epidemic continues to increase and change globally with variations in the transmission of the virus. More than 20 years and 20 million deaths since the first AIDS diagnosis, the number of people who live with HIV has increased from 34.3 million in 1999 to 39.4 million in 2004 (Figure 1), the number of deaths increased from 2.8 million in 1999 to 3.1 millions in 2004 (Figure 2) and 5 million people have become newly infected in the past year [1-5].

The 2004 Report on the global AIDS epidemic states the current major challenges, as well as highlighting the increasing number of women at risk of infection. As at December 2003, women accounted for 50% of all people infected worldwide and 57% of those infected in sub-Saharan Africa.

The spread of the infection amongst young people is also important: in 2003 nearly half of all new infections occurred in those aged between 15-24 years. Furthermore, although the

Figure 1. Estimated number of people living with HIV globally, 1999-2004. Source: UNAIDS

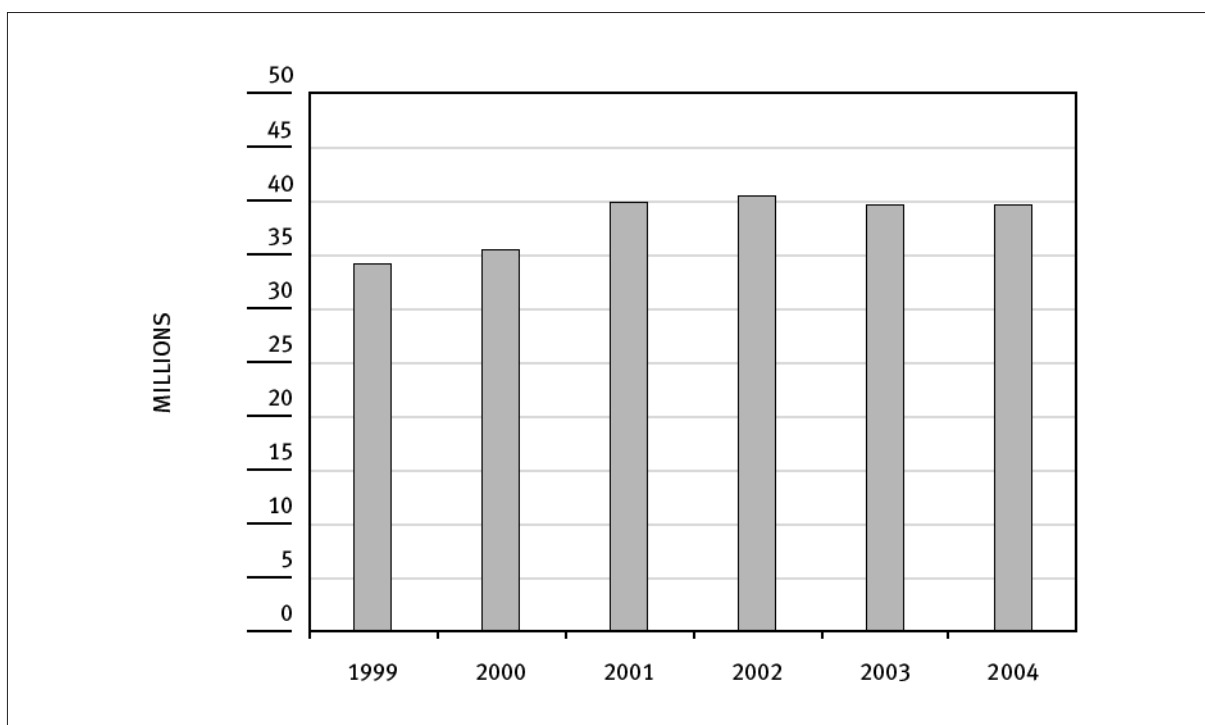
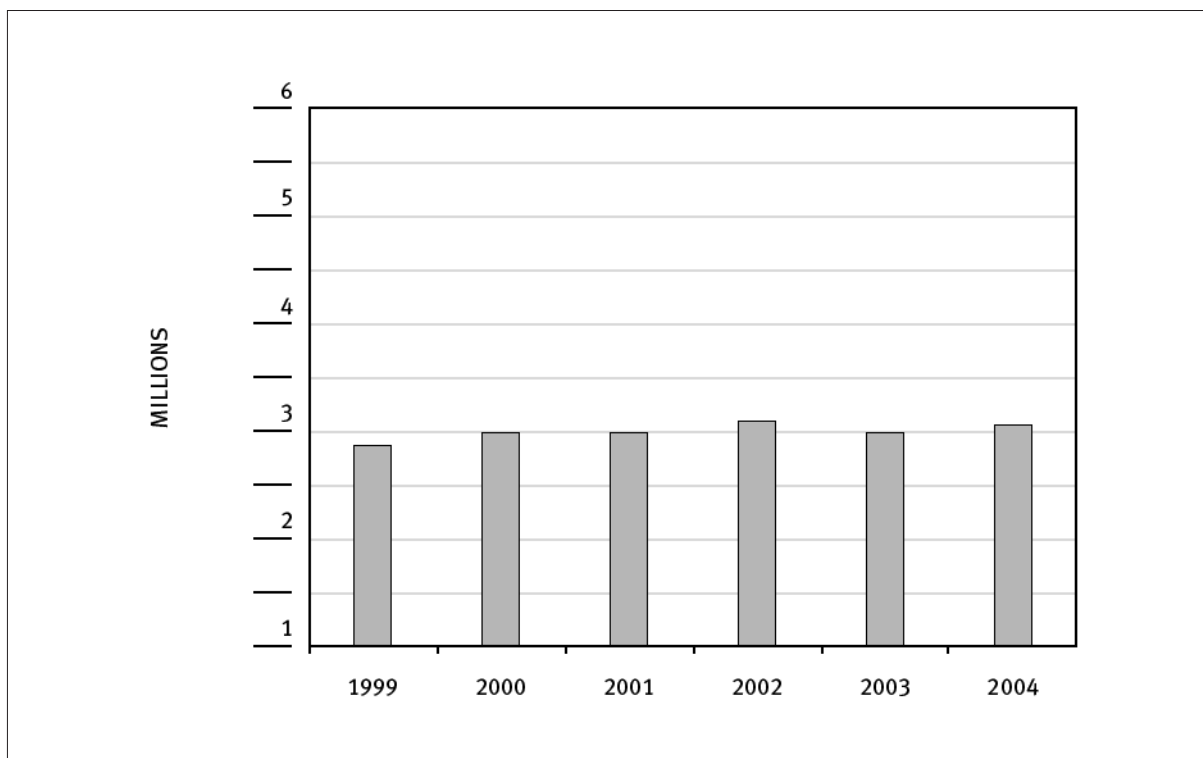




Figure 2. Number of AIDS deaths globally, 1999-2004. Source: UNAIDS



introduction of antiretroviral treatments has changed the face of the disease by extending the survival time and improving the quality of life for HIV-infected patients, access to healthcare in developing countries is still difficult and limited to 7% of those who need it (nearly 400.000 at the end of 2003). Moreover, discrimination and lack of information remain common [5].

The epidemic varies within different regions: some areas are more affected than others, and in the same country the incidence may change between different regions or provinces. These variations are due to the different viral subtypes ability to spread, to the genetic characteristics of populations, and to cultural, economical and political factors.

For the African continent is not possible to define an overall AIDS epidemic, because infection levels vary considerably among different countries. In six nations adult HIV prevalence is below 2%, while in another six nations it is over 20%. In southern Africa all countries have a prevalence above 17%, with Botswana and Swaziland above 35%; in western countries rates are below 10%, while in Central and East Africa it ranges from 4 to 13%.

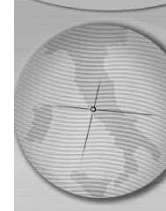
In many of the countries, the contagion is concentrated amongst high-risk groups such as injecting drug users (IDUs), especially in North Africa and Middle East, or sexual workers. HIV

transmission also probably occurs without control through homosexual contacts, which are condemned and illegal in many regions.

25.4 million people are living with HIV in sub-Saharan Africa, almost two-thirds of those infected globally. This number increased from 24.4 million people in 2002: the apparent stabilization of the prevalence (actually 7.4%) was due to a rise in AIDS deaths and in new infections. Prevalence is still increasing in some nations such as Madagascar, but has decreased in Uganda. In 2004, 3.1 million people became newly infected and 2.3 million people died.

More than three quarters of all women living with HIV are located in sub-Saharan Africa. Across the region, women are at greater risk of infection than men, particularly at an earlier age. Among young people (15-24 years), an estimated 6.9% of women and 2.2% of men were living with HIV at the end of 2004. In South Africa, where sexual aggression is common, 28% of women reported that their first sexual experience was unwanted, and 10% had been forced to have sex; the use of condoms is still rare. In West Africa, commercial sex remains the main risk factor for the spread of the infection, with the highest prevalence rates amongst prostitutes, even though the infection level amongst adults is generally low [5,6].

In Latin America, more than 1.7 million people are living with HIV and around 610.000 of these



are women. In 2004, almost 95.000 people died of AIDS and 240.000 new infections occurred. Considerably dissimilar prevalence rates were registered in the different countries. Brazil accounts for more than one third of those infected in Latin America. Injecting drug users and men who have sex with men are most affected, but heterosexual transmission is responsible of an increasing number of cases [5].

In Central America, where the epidemic is still concentrated in large urban areas, the number of HIV infections has been rising. Sexual transmission is a major risk factor, particularly amongst men who have sex with men [5].

The Caribbean, with more than 440.000 people living with HIV, is the second most affected area in the world after sub-Saharan Africa. In 2004, an estimated 53.000 new infections and 36.000 death occurred in this region. HIV prevalence in adults is over 2%, and AIDS is the leading cause of death amongst those subjects aged between 15-44 years. Caribbean countries have the highest HIV infection levels amongst women in the American regions. The epidemic is linked to heterosexual intercourse, and in many cases to sex work, but it is also spreading amongst the general population. The worst-affected country is Haiti, with a 5.6% prevalence [5].

In Asia the epidemic is increasing rapidly, with a sharp rise in new infections especially in China, Indonesia and Vietnam. An estimated 8.2 million people (including 2.3 million women) are living with HIV in this area. In 2004, 1.2 million new infections occurred and alone 540.000 people died of AIDS. 60% of the world's population lives in this region, therefore the Asian epidemic has global implications. India, with several serious epidemics, has the highest number of people living with HIV after South Africa (5.1 million).

In Asian countries the epidemic remains linked mainly to injecting drug use and sex work. In these countries, the application of preventive strategies targeting the high-risk group is often inadequate. In Thailand and Cambodia the fight against high-risk behaviour has resulted in a reduction in the infection rate amongst sex workers. However, the decrease in the number of men visiting brothels was accompanied by an increase in the number of casual sexual contacts. In China, the epidemic can be still controlled but, in spite of the efforts to disseminate knowledge about HIV, injecting drug use and paid sex continue to be the main risk factors associated with the spread of the infection. In 2003, a survey reported that two-in-five Chinese men and women could not name a single way to protect themselves against this infection. In parts

of India and China, inadequate prevention policies have allowed HIV infection to spread from people in high-risk groups to their partners. Both India and China have pledged free antiretroviral treatment [5,6].

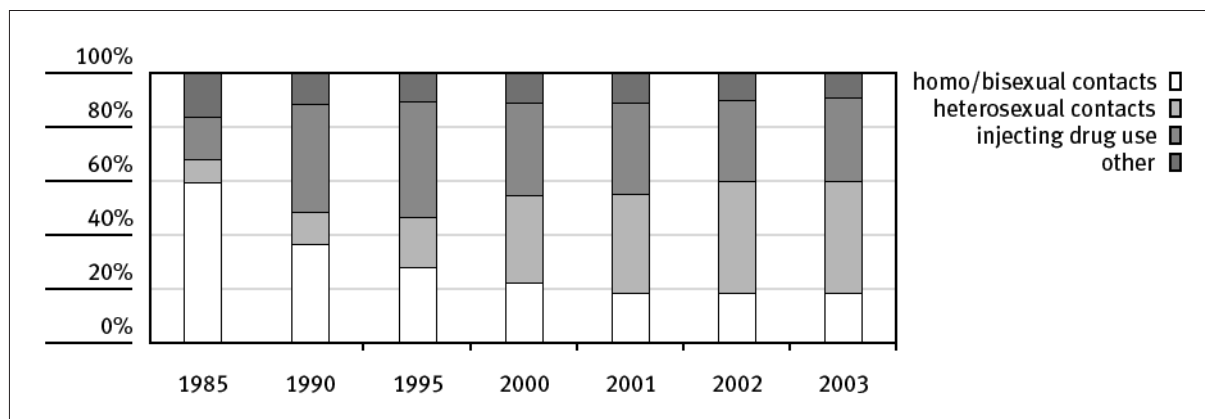
In Eastern Europe and Central Asia, the AIDS epidemic is expanding due to the increase in the diffusion of injecting drug use. An estimated 1.4 million people are living with HIV in these countries, compared with 160.000 in 1995. More than 80% of these people are under the age of 30 and 490.000 are women. In 2004, 210.000 people were newly infected and 60.000 people died of AIDS. Estonia, Latvia, the Russian Federation and the Ukraine are the worst-affected countries, but the virus continues to spread in Belarus, Kazakhstan and Moldova. The Russian Federation, with 860.000 infected people at the end of 2003, accounts for 70% of all HIV infections in this area. The number of pregnant women with HIV in Russia increased from 125 in 1998 to 3.531 in 2003. The main transmission route is injecting drug use, but in some countries sexual transmission is becoming increasingly common, especially amongst injecting drug users and their partners. Women account for an increasing proportion of the new cases [5,6].

An estimated 1.6 million people are living with HIV in high-income countries. In 2004, 64.000 new infections and 23.000 AIDS deaths occurred in North America, Western and Central Europe. Unlike in other areas, in these countries the access to antiretroviral therapy is easy, and therefore it is possible to survive longer than elsewhere. In the USA, one third of new infections were caused by heterosexual intercourse; similarly, this is the main risk factor for infection in Western Europe. The role of injecting drug use varies amongst the high-income countries: in the United States of America and Canada this transmission route accounts for about 25% of the new infections, whereas, in Australia and in Europe, about 10% of new diagnoses have been attributed to this mode of transmission [5].

The European situation has been described in the report issued in September 2004 by the European Communities Statistical Office (Eurostat), based on information collected by the European Center for the Epidemiological Monitoring of AIDS - Euro HIV. This centre publishes anonymous data on AIDS cases and new HIV diagnoses every 6 months. The notification of new HIV infections enables a more complete picture of the epidemic to be obtained rather than data on AIDS cases alone, but should be interpreted with caution because they may not



Figure 3. AIDS cases by transmission category, Europe 1985-2003. Source: Eurostat



represent the real HIV incidence. Furthermore, the number of new diagnoses is closely connected to diagnostic and epidemiological practices which may differ among countries. Finally, a reporting system has not yet been implemented in all European countries, and in some of these the coverage remains incomplete: Italy and Spain contribute with information from 5 and 3 regions, respectively. In those countries which have new or modified methods for data collection, a high number of infections are diagnosed initially, followed by a decrease in the later reporting period [7,8].

Taking into account these considerations, the number of AIDS cases decreased in the European countries, from more than 25.000 in 1994 to 6.441 in 2003, with a reduction of 24% compared to 2002 (8.449 cases). The AIDS incidence rate decreased from 56.3 to 14.2 per million population. All 25 EU countries recorded this decline, except for Portugal (from 68.1 to 78.6) and some new participants such as Estonia (from 0.7 to 7.4), Latvia (from 0.8 to 25.0), Lithuania (from 0.5 to 2.6) and Poland (from 2.6 to 4.4), because of the later onset of the epidemic in these countries. The new Member States accounted for less than 5% of the new cases in 2003 [7,8].

Instead, for the total of the 17 Member States for which data are available, the number of newly diagnosed HIV infections increased by almost 75% from 1996 (7.641 cases) to 2003 (13.257 cases).

During that year, 41.8% of the newly diagnosed AIDS cases were attributed to heterosexual transmission, while injecting drug use accounted for 30.7% and homosexual and bisexual contacts for 19.1%. Other transmission routes, i.e. transfusion or mother to child, were responsible for 8.4% of the cases. As shown in Figure 3, the role of the different risk factors has changed considerably since 1985, when homosexual and bisexual males were the main high-risk group.

Men are still more often affected than women, but the growing number of infected women (which changed from 10% in 1985 to 20% in 1995 and to 27% in 2003) reflects the increase in transmission through heterosexual contacts [7,8].

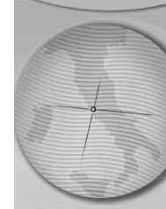
In a review issued in 2004, Hamers and Downs analysed data from 15 western Europe countries, based on 2003 reports of Euro-HIV surveillance network [9].

For the 12 Member States (which account for 51% of the total population) for which data on new infections are available, the number of new diagnoses increased by 46% from 1997 (7.770 cases) to 2002 (11.337 cases), with a 28% rise in 2002 compared to 2001 (8.871 cases). This data reflects the situation found in the United Kingdom, which accounted for 40% of the HIV infections diagnosed during 1997-2002, but similar trends were reported in Belgium, Denmark, Germany, Sweden, Switzerland and Ireland. However, variations in the number of new diagnoses may depend on the extend of the diffusion of HIV testing and/or surveillance systems rather than on an increase in the number of HIV infections, and thus these figures should be considered with caution [9].

Highly effective antiretroviral treatments, widely used in western Europe since 1996-97, has reduced the HIV-related morbidity and mortality: this has resulted in a decrease in the incidence of AIDS cases and deaths.

The number of AIDS cases fell drastically after 1995, and since 1998 this trend has leveled off. Unfortunately, many people (55% of subjects developing AIDS in 2002) discover their infection shortly before AIDS diagnosis, and thus have fewer opportunities to benefit from therapy compared to recent HIV-infected subjects [9].

With regard to transmission categories, the number of new infections decreased by 16% from 1997 to 2002 among injecting drug users, whereas heterosexual transmission increased considerably



(122%). This was correlated with the increasing proportion of cases diagnosed among migrants from countries with high infection levels, particularly sub-Saharan Africa. In Portugal, where the number of new infections is higher compared with other countries, injecting drug use remain the major risk factor in 46% of cases, while heterosexual contacts account for 43%; in Italy, Spain and France heterosexual contact is the primary route of transmission [9].

After a decrease in previous years, the number of new HIV infections among homosexual and bisexual men increased by 22% in 2002; the estimated prevalence of infection in this group is actually 10-20% in many European countries [10].

Data regarding sex workers are scarce, but confirm the association between contagion and injecting drug use. Prevalence is generally below 2%, except among injecting drug users [10,11]. Many prostitutes in western Europe have come from eastern Europe, where since 1996, HIV has spread rapidly [12].

In Italy 52.836 AIDS cases, 53.416 adjusted for reporting delays, have been reported since 1982. In 2003, 1.758 new infections were diagnosed. This confirms the decreasing trend of the epidemic since 1995, when 5.651 cases were registered (ministerosalute.it). However, in 2003, the proportion of new cases in Italy was the highest in Europe, with Italy and Spain (1.363 cases) accounting for about 50% of all diagnoses. With regards to the incidence rate, Italy (30.6 per million population) is third among the 25 Member States of European Community after Portugal (78.6) and Spain (32.8) [7].

The incidence rate of new infections reported by Ministry of Health is 6.7/100.000 inhabitants. This estimated value is based on data from 5 regions, which account for 20% of the total population; by extending this incidence to all Italian regions, an

estimate of 3.500 new infections have occurred each year in our country (ministerosalute.it).

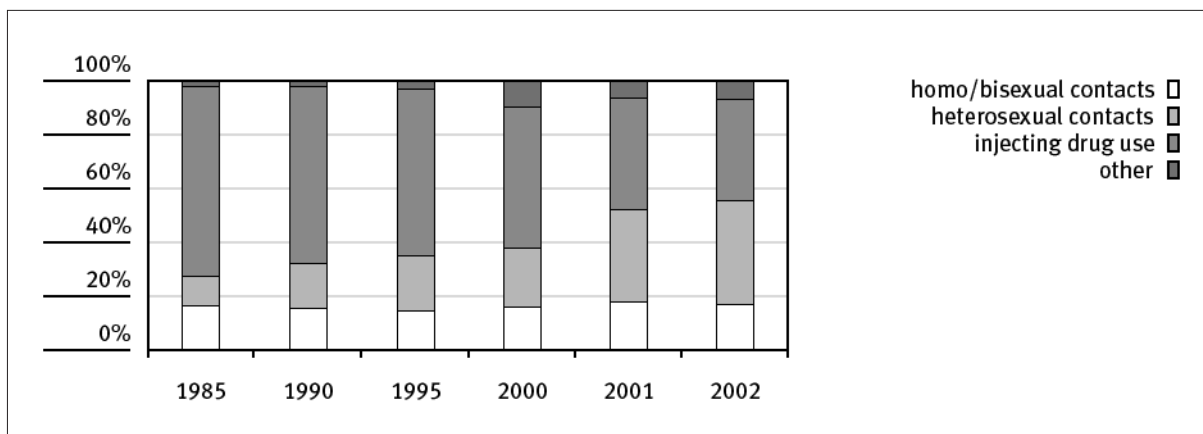
The employment of highly effective combinations of antiretroviral treatments has allowed for a reduction in the number of deaths but has increased the proportion of seropositive subjects (actually 110.000-130.000) and therefore there is still the need to control this epidemic. The main HIV transmission category has shifted from injecting drug use to heterosexual intercourse (Figure 4) (ministerosalute.it). Amongst western European countries, the highest HIV prevalence in heterosexual non-IDU subjects was recorded in Italy, with an increase from 2% in 1990-1996 to 3-7% in 1997-2002 [13]. In 2003, heterosexual transmission accounted for 33% of AIDS cases diagnosed in men and for 68.4% in women: in 1985 these values were 1.9% and 7.7%, respectively. Moreover, the number of subjects which discover their seropositivity at the onset of AIDS is increasing.

The age of individuals at the point of diagnosis rose to 40 years for men and 38 for women. The number of women infected, which increased in the past years, appears to have stabilized.

The geographical distribution of AIDS cases shows high variability. In 2002, the Update of National Committee for the fight against AIDS reported the regions with higher number of cases: Lombardia (5.192 cases), Lazio (2.548) and Emilia Romagna (1.500) [14]. Lombardia (4.9/100.000), Lazio (4.8), Liguria (4.7) and Val D'Aosta (3.3) have the higher incidence rates, while lower rates were registered in Molise, Campania, Friuli Venezia Giulia, Basilicata and Calabria (ministerosalute.it).

The number of new cases in foreigners is increasing (from 3% in 1993 to 13% in 2003) (ministerosalute.it). Instead, incidence triennial rates amongst foreigners coming from developing and advanced countries has shown a decrease since 1995-1997 (Table 1). This trend conforms to the

Figure 4. AIDS cases by transmission category, Italy 1993-2002. Source: ISS



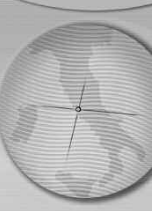


Table 1. AIDS incidence rates (per 100.000) in foreigner old > 17 years, in comparison with the Italian population. Source: ISS

AREA OF ORIGIN	PERIOD		
	1992-1994	1995-1997	1998-2000
Developing countries	56,1	72,1	53,5
Advanced countries	22	24	8,7
Italy	8,8	8,3	3,5

general trend as shown in the Italian population and probably correlates with the introduction of antiretroviral therapy: great efforts have been made in our country to guarantee access to healthcare for legal migrants. The reduction in the incidence was seen in both men and women of all the ages, however, without similar epidemiological changes in their countries of origin. This confirms that the trend observed is not dependent on the variations in migration nor on the demographic changes of the migrant population [15].

Since 1997, the number of children born from seropositive women has increased. This is probably due to the optimism generated by the improvement of treatment. The level of mother-to-child transmission decreased from about 20% to less than 2%, due to the application of treatment at the point of birth, to the choice of cesarean section and to the avoidance of breast-feeding (ministerosalute.it).

Until 2002, 725 pediatric HIV infections had been reported, including diagnoses in patients aged <13 years and vertical transmission cases. The distribution across regions is similar to that registered for adults, with higher values in Lombardia, Lazio and Emilia Romagna. As for adults, since 1996, the number of pediatric AIDS cases has reduced due to the administration of antiretroviral therapy for both pregnant women, in order to reduce the risk of mother-to-child transmission, and for infected subjects, which extends their survival time [14].

It is possible to reflect on the epidemic data shown in many ways and some of these inevitably contrast with each other. Although the number of AIDS cases and deaths decreased, the number of new infections remains seriously high. This is a global phenomenon and not one that occurs where the socio-economic level is low or prevention measures are yet to be adopted. The situation seems to be grave, even in Europe and in our country, Italy, where the successes obtained with the adoption of prevention policies and the distribution of antiretroviral drugs have not led to a drastic reduction in the spread of the infection.

Likewise in other high and medium income countries, in Italy, the prolongation of the latency period from infection to disease and the extension of the survival time in AIDS patients, as a result of the improvement of therapy, has led to a decrease

in the mortality rate. However, the subsequent rise in the number of seropositive subjects has increased the burden of the epidemic.

The decrease in the number of AIDS cases should not lead to an underestimation of the problem: the risk of infection is as high today as it was yesterday, and the necessity for preventive measures is still a major public health issue. Finally, the implementation of a national surveillance network is needed in order to obtain real and timely data on the epidemic trend, as recently recommended by the National Committee for the fight against the AIDS.

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Consulted web sites:

- <http://www.ministerosalute.it>
<http://www.unaids.org>
<http://www.eurohiv.org>