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The epidemiological situation of morbidity and mortality on HIV / AIDS cases in Poland and globally in recent years

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Summary

HIV is the virus that causes AIDS, which is one of the most serious challenges to public health in the world. Currently, there are so many HIV infections that we can call an infection as the pandemic. Bringing down the number of new cases of the disease is a priority and various promotional campaigns are currently carried out in order to increase people's awareness and sensitize them to appropriate preventive movements. The goal of ending the HIV / AIDS pandemic is theoretically achievable, but requires addressing this global health catastrophe at the individual, regional, national and global levels. The problem is that some people do not know they are infected with HIV, which increases the chances of the virus spreading. The path to reduce the pandemic is difficult and calls for meticulous and accurate diagnosis and effective treatment of people who are already infected.

Treatment optimization is required to extend the life of those who are infected and to prevent new cases of HIV. Since 1981 (i.e. the announcement of the first cases of the disease), acquired immune deficiency syndrome (AIDS) has become one of the deadliest pandemics in history. Since the 1980s, tremendous progress has been made in diagnosing and treating infected people. The discovery of HIV as a causative agent of AIDS by the Institut Pasteur team led by Montagnier and Barré-Sinoussi and the US National Institutes of Health team led by Gallo was just the beginning of the process. Currently, dozens of clinical trials are still underway to improve existing solutions. Many US government agencies have joined forces to turn the tide of the HIV / AIDS pandemic. They support a wide range of activities, from research to technical assistance and financial support to other countries in the fight against the global HIV / AIDS pandemic. These global activities are coordinated with PEPFAR. The U.S. President's Emergency Plan for AIDS Relief (PEPFAR) is the largest commitment by any nation to address a single disease in history, enabled by strong bipartisan support across nine U.S. congresses and three presidential administrations, and through the American people's generosity. The NIH (National Institutes of Health) continues an intensive research program about HIV / AIDS.

Key words: HIV, AIDS, epidemiology, prevention

Aim:

The aim of this review is to summarize the data on the morbidity and mortality of HIV / AIDS in the years 2000-2020 in Poland and in the world. As a result of continuous insufficient diagnostics, still millions of people are not aware of the disease, which often results in regions or countries with a significantly increased incidence. We were looking for information about the impact of the current COVID-19 pandemic on the production, distribution, and prices. Availability of drugs, especially in middle and low income countries, was also examined.

Materials and methods:

PubMed databases and statistics from the National Institute of Public Health (NIZP- PZH) and global data from the websites of WHO, UNAIDS - Global HIV & AIDS statistics and HIV.gov were searched in June and July 2020. The UNAIDS 90-90-90 program was also assessed. This programme was run until 2020. In the PubMed database, we used medical terms "hiv", "aids", "hiv / aids". No language restrictions were added.

Conclusion:

UNAIDS report on the global AIDS epidemic shows that 2020 targets will not be met because of deeply unequal success; COVID-19 risks blowing HIV progress way off course. Missed targets have resulted in 3.5 million more HIV infections and 820 000 more AIDS-related deaths since 2015 than if the world was on track to meet the 2020 targets. In addition, the response could be set back further, by 10 years or more, if the COVID-19 pandemic results in severe disruptions to HIV services. Currently, the world is plunged into the fight against COVID-19 and people are forgetting that the HIV pandemic also carries a large number of deaths. Nevertheless, the spread of both viruses is different and in developed countries the possibility of significant spread of HIV is much lower than in poor countries.

The spread of Sars-Cov2 virus is much more difficult to control. Although the risk of serious illness from COVID-19 for people with HIV is not known, people with HIV may have concerns and questions related to their risk. COVID-19 pandemic has seriously impacted the AIDS response and could disrupt it more. Progress in prevention of HIV transmission remains too slow and the estimated total number of new infections in 2019 is more than three times higher than the UNAIDS 2020 target. The UNAIDS 90-90-90 targets have established that till 2020, 90% of all people with HIV will be know about their HIV status, 90% of all people who know their HIV status will be on antiretroviral therapy (ART), and 90% of all people ART will suppress viruses. The result of that campaign reported that in 2019 all people with HIV around the world:

81% knew their HIV status

82% of all people who knew their status are on ART.

88% of all ART recipients were virally suppressed.

Despite advances in the scientific understanding of HIV and its prevention and treatment, and many years of significant efforts by the global health community and governmental and community organizations, too many HIV-positive people still lack access to prevention, care and treatment. There is still no cure for everybody with HIV / AIDS. Moreover, the HIV epidemic not only affects human health, but also strikes households, communities, and the development and economic growth of nations.

It is emphasized that HIV tests are an essential gateway to HIV prevention, treatment, care and support, and access to HIV treatment is a key to eradicate AIDS as a public health threat.

Introductions:

Since the early 1980s, significant advances have been made in the treatment of people living with HIV. Numerous breakthrough studies have resulted in the availability of more than 30 antiretroviral drugs which are approved by U.S. Food and Drug Administration for the treatment of HIV infection, along with a comprehensive set of strategies for the prevention and treatment of HIV-related co-infections and comorbidities. (1) Drug toxicity, inconsistent adherence to complex regimens, drug resistance, divergent treatment initiation decisions, drug fatigue in some populations, and surrender to treatment have become a challenge today in HIV treatment. (2) The effectiveness of treatment is so great that nowadays proper treatment makes it possible to survive even to old age. The median survival time of the first observed AIDS patients in the United States was 1–2 years. In contrast, for an HIV-infected person in their 20s who is currently receiving combination antiretroviral therapy (ART), life expectancy is approximately 53 years. In the years 1986, the group with the most favorable survival rates was white homosexual men aged 30 to 34 years who had only Kaposi's sarcoma. Their annual cumulative survival probability was 80.5%. On the other hand black women who acquired the disease through intravenous drug abuse had the worst prognosis. The symptoms of the disease at the moment of diagnosis had the greatest impact on survival, representing an average of 56.3% of the increased risk. Also age (12.2%), race or ethnicity (10.6%), risk group (8.4%), and gender (8.0%), whereas 4.5% risk was attributed to interactions between variables. (3)

Between 1996 and 1997, the life expectancy at 20 years old for HIV positive and non-HIV positive individuals was 19.1 and 63.4 years, respectively. HIV-infected people's life expectancy at the age of 20 increased to 47.1 years in 2008 and 53.1 years to 2011. (4)

HIV and COVID-19:

The COVID-19 pandemic has changed our world in the last six months. Decades of experience in responding to HIV are being used in response to the coronavirus. Activists around the world are working hard to minimize disruption to HIV services. (5) The COVID-19 crisis is amplifying the deep inequalities that thwart the realization of individual and collective health rights. Prolonged confinement and travel restrictions - coupled with economic and social stress caused by the pandemic - have coincided with reports in many countries of an increased number of women and girls at risk of abuse. Lessons learned from the Ebola crisis show that school closings can lead to an increase in gender-based violence, teenage pregnancies, and other forms of sexual exploitation of teenage girls (including sexual abuse and online seduction). School closings can be particularly catastrophic for girls in more vulnerable situations, such as internally displaced persons, refugees and girls with disabilities. (6)

Additionally, the lockdowns and border closures imposed to contain COVID-19 have an impact on both drug production and distribution, potentially leading to increased drug costs and delivery problems.

It has been estimated that the final cost of the exported antiretroviral drugs from India could be 10-25% higher than the normal prices.

According to the UNAIDS data, six months' complete discontinuation of HIV treatment can lead to over 500,000 [471,000-673,000] additional deaths from AIDS-related diseases.

If services to prevent mother-to-child transmission of HIV were similarly halted for six months, the estimated increase in new HIV infections among children would be higher about 162% in Malawi, 139% in Uganda, 106% in Zimbabwe and 83% in Mozambique. (7)

Epidemiology:

In 2019, 1.7 million [1.2–2.2 million] people were infected with HIV, bringing the total 38.0 million [31.6 million - 44.5 million] people living with HIV worldwide. (fig. 1) In the same year, 690,000 [500,000-970,000] people died from AIDS-related diseases.

For comparison, 75.7 million [55.9 million - 100 million] people have been infected with HIV since the beginning of the epidemic, and 32.7 million [24.8 million - 42.2 million] people have died from AIDS-related diseases.

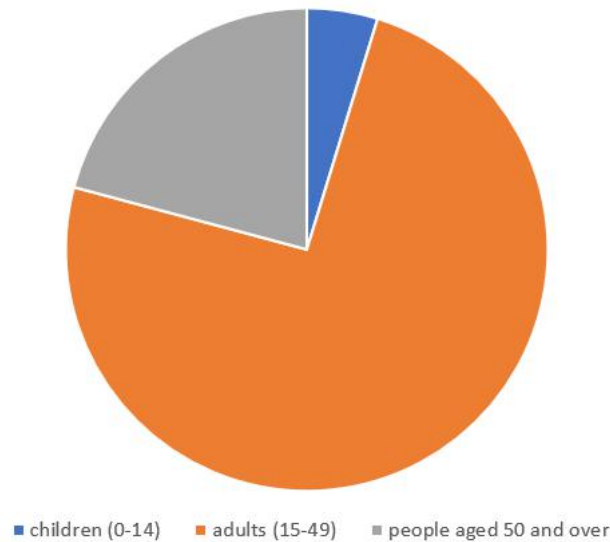


Figure 1. People living with HIV in 2019

It is estimated that in 2019 there were approximately 1.7 million new infections. It has been 23% decrease in new HIV infections since 2010. Among these new infections in 2019:

- 1.5 million cases were defined as adults
- 150,000 infections occurred in children (<15 years). (8,9)

Since the onset of the virus epidemic, a large number of infected people were in the United States, which was not only a social problem, but also a financial and economic problem. In 2000, there were 680,000 (550,000 - 840,000) people living with HIV and 14,000 (9,900 - 19,000) deaths due to AIDS-related diseases. For the United States, it was a big problem and numerous actions were introduced to stop the spread of the virus. (7) The U.S. President's Emergency Plan for AIDS Relief (PEPFAR) is the U.S. Government's response to the global HIV/AIDS epidemic and represents the largest commitment by any nation to address a single disease in history. It has strengthened the global capacity to prevent, detect, and respond to new and existing risks—which ultimately enhances global health security and protects America's borders. Among other global results, PEPFAR provided HIV testing services for 79.6 million people in Fiscal Year 2019 and, as of September 30, 2019, supported lifesaving ART for nearly 15.7 million men, women, and children. (10) The National Institutes of Health (NIH) was established to fight with HIV, and today the organization represents the largest public investment in HIV / AIDS research in the world. The NIH conducts research around the world to understand, diagnose, treat, and prevent HIV and many associated infections. The main reason for the existence of the organization is to find a cure. These actions have resulted in a reduction in the number of infected people in the US. (10)

Nowadays approximately 1.2 million people in the U.S. are living with HIV today. About 14 percent of them (1 in 7) don't know it and need testing. In 2018 an estimated 37,968 people received an HIV diagnosis in the U.S. and 6 dependent areas—an overall 7% decrease compared with 2014. The highest rates of new diagnoses (51%) continue to occur in the South part of the USA. (8,11,12) (Fig. 2) In 2018, there were 15,820 deaths among adults and adolescents with diagnosed HIV in the US.

Nearly half (47%) of these deaths were in the South; 22% were in the Northeast; 17% were in the West; 12% were in the Midwest; and 2% were in the US dependent areas. These deaths may be due to any cause. (11) (Fig. 2)

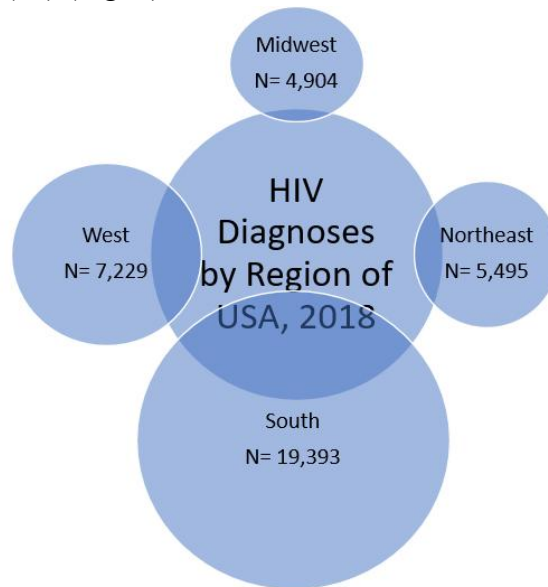


Figure 2. HIV Diagnoses in the 50 States and the District of Columbia by Region, 2018; source: CDC (Centers for Disease Control and Prevention)

The majority of HIV-positive people are found in low- and middle-income countries. In 2019, there were 20.7 million people infected with HIV in East and South Africa (54%), 4.9 million (13%) in West and Central Africa, 5.8 million (15%) in Asia and the Pacific, and 2.2 million (6%) in Western and Central Europe and North America. (9) The data shows progress in reducing new HIV infections, increasing access to treatment and ending AIDS. However it is uneven and more visible in richer countries. (9) (Fig. 3)

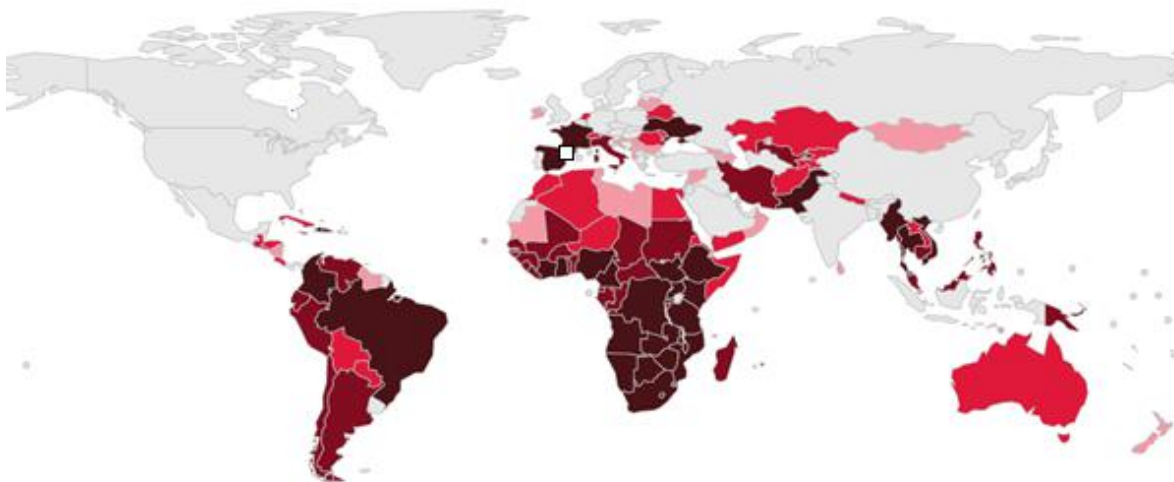


Figure 3. People living with HIV in 2019 – all ages

In 2019, the number of AIDS-related deaths fell by 60% in comparison to the 2004 peak. In the same year, approximately 690,000 people died from AIDS-related diseases worldwide, compared with 1.1 million in 2010. (13) (Fig. 4)

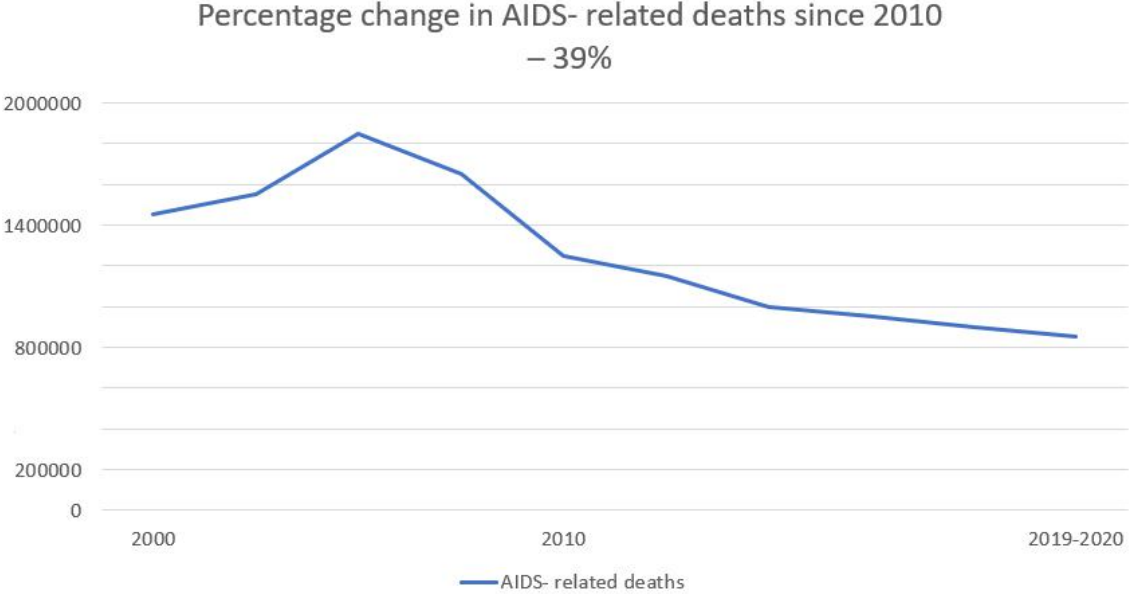


Figure 4. Percentage change in AIDS-related deaths since 2010 (5)

The epidemiological situation in Poland:

From the implementation of the research in 1985 to December 31, 2019, 25,544 people were infected with HIV, there were 3,768 cases of AIDS; 1,429 sick people died. Among the total number of registered infection, there were at least 6,396 infected people due to drug use, 1,934 infected people through heterosexual contact and 4,196 through sexual contact between men (MSM). (14)

In 2019, 1,615 new HIV infections, 100 AIDS cases and 20 AIDS deaths were registered. (14)

Transmission and prevention of infection:

There is a strong correlation between the use and abuse of illicit drugs and the spread of the human immunodeficiency virus (HIV). It is well known that illicit drug users constitute a high-risk HIV-positive population with increased rates of HIV transmission and replication. The high prevalence of HIV infection among illicit drug users is primarily due to high-risk activities such as needle sharing and unprotected sex. Cocaine, amphetamines, methamphetamine, heroin, and morphine modulate molecular genomic mechanisms to increase HIV transcription and replication, and also stimulate glial activation, and deteriorate the blood brain barrier (BBB), according to recent research. (15)

High maternal HIV incidence contributes substantially to mother-to-child HIV transmission (MTCT). Since 2006, HIV retesting during the third trimester and breastfeeding has been recommended by the World Health Organization in higher prevalence ($\geq 5\%$) settings to reduce MTCT. (16)

Some of the people are at higher risk and regular testing is recommended:

1. Men who have sex with men (MSM) are recommended to be tested for HIV at least once a year, or every 3 months if they have unprotected sex with new or random partners

2. Black African men and women should be tested regularly for HIV and STI (sexually transmitted infection) if they have unprotected sex with new or random partners. (17)

In 2018, the highest percentage of HIV infection was attributed to sexual contact between a man and a man (67% overall and 82% among men). (9) HIV-1 heterosexual transmission is extremely rare among people undergoing antiretroviral therapy (ART) with undetectable viremia. The estimated transmission risk under these circumstances is so low that it is considered negligible. (18,19) Therefore, the World Health Organization (WHO) has recommended the use of antiretroviral therapy (ART) in all HIV-infected individuals, regardless of CD4 cell count, to reduce the risk of HIV transmission. However, people should not be forced to start ART immediately and should be supported in making a choice when to start ART and what treatment regimen to use. (20)

Although the use of condoms coupled with ART would seem to be a reasonable preventative option when the viral load is not suppressed, it can be imperfect. The other challenge to prevention efforts is that the presence of co-infections with other sexually transmitted infections (STIs) may increase the genital HIV viral load and enhance the transmission risk despite adequate ART use and serum viral load suppression. (18)

Knowing your HIV status depends on thorough HIV testing and is the first step to accessing HIV treatment and prevention programs. (21) The past decade has seen a rapid expansion of HIV testing and treatment services. HIV testing services are introduced, developed and expanded. The World Health Organisation (WHO) recommends a testing strategy that includes the use of HIV-specific antibody point-of-care tests (POCT). New guidelines have been introduced on HIV self-management and assisted partner notification with a focus on HIV self-management. Currently, there are also self-tests, the result of which is available after about 10 minutes. People with reactive self-test results are advised to visit a health clinic for confirmation tests. 77 countries have adopted HIV self-testing policies, while many others are currently developing them. (21,22) While immediate ART is recommended for all people with PLHIV (people living with HIV), studies have shown that starting ART in acute HIV infection may result in a delayed or complete failure to produce HIV-specific antibodies, which presents a diagnostic challenge that is particularly important in resource constrained, high HIV viral load areas where POCT with HIV antibodies is the standard of care. (21) This indicates further research into a type of ART therapy used.

HIV Testing conclusion —Approximately 81% of people with HIV globally knew their HIV status in 2019. The remaining 19% (about 7.1 million people) still need access to HIV testing services. HIV testing is an essential gateway to HIV prevention, treatment, care and support services. (22)

Treatment:

Antiretroviral therapy has dramatically improved survival for people living with HIV (PLHIV) and globally there has been an improvement in treatment coverage. Viral suppression on ART confers an individual health benefit, and a significant reduction in the risk of onward transmission, with an impact on HIV incidence at a population level. (21) Oral ART is used as pre-exposure prophylaxis (PrEP) in people at risk of HIV infection are highly effective in reducing HIV infection if taken correctly.

According to the latest reports from the Joint United Nations Program on HIV / AIDS (UNAIDS), in 2019 25.4 million [24.5–25.6 million] people had access to antiretroviral therapy, and 38.0 million [31.6 million - 44.5 million] people worldwide have lived with HIV (66.8% of all people living with HIV in the world, that means 12.6 million people are still waiting for therapy), and since 2005, AIDS-related deaths have declined by half. Currently, most efforts to treat people with HIV / AIDS focus on reaching infected people and implementing optimal therapy to them, which is a great success in the fight against the disease. (1,23)

Currently, in the United States, the probability that a child will be infected by an HIV-infected mother is less than 1% when taking HIV medications. It indicates high efficacy of treatments against HIV. It is important for people to know their HIV status so they can take medicine to treat HIV if they have the virus. Taking HIV medicine every day can make the viral load undetectable. People who get and keep an undetectable viral load (or stay virally suppressed) have effectively no risk of transmitting HIV to HIV-negative sex partners. (9)

Conclusion:

HIV affects many people around the world, often when they are young, productive and part of the workforce. HIV research and therapeutic services have developed rapidly in the last decade. Innovative approaches have been developed and implemented to expand the scope of HIV testing services, and it is important to continue introducing improved methods to combat the HIV / AIDS pandemic by 2030.

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