

Fact Sheet

HIV/AIDS

Twenty-Five Years Ago

- On June 5, 1981, the first cases of a new and fatal disease now known as acquired immunodeficiency syndrome (AIDS) were reported in the CDC publication *Morbidity and Mortality Weekly Report*.
- AIDS was first recognized in homosexual men, but it was soon determined that the virus that causes AIDS can spread through sexual contact, blood and blood products, and from mother to infant during pregnancy, delivery and breast feeding.
- AIDS is caused by the human immunodeficiency virus (HIV). By killing or damaging cells of the body's immune system, HIV progressively destroys the body's ability to fight infections and certain cancers. People diagnosed with AIDS may get life-threatening diseases called opportunistic infections, which are caused by microbes such as viruses or bacteria that usually do not make healthy people sick.
- At the beginning of the AIDS pandemic, treatment was confined to palliative care and management of opportunistic infections.

Today

- Today, HIV/AIDS is a global catastrophe. According to the Joint United Nations Program on HIV/AIDS (UNAIDS), approximately 38.6 million people worldwide are living with HIV/AIDS, and more than 4 million people were newly infected in 2005 — about 11,000 each day. In the United States, more than 1 million people are living with HIV/AIDS, with one fourth of the people unaware of their status, and approximately 40,000 new infections occurring each year. Worldwide, more than 25 million people with HIV died since the pandemic began, including more than 520,000 in the United States. In 2005, there were an estimated 2.8 million deaths worldwide due to HIV/AIDS.
- As shocking as these numbers are, they do not begin to adequately reflect the physical and emotional devastation to individuals, families, and communities coping with HIV/AIDS, and of the terrible impact of HIV/AIDS on regional and global security and the global economy.

- Today, the National Institutes of Health (NIH) effort represents the largest public investment in HIV/AIDS research anywhere in the world. In fiscal year 2006, the budget for NIH HIV/AIDS and HIV/AIDS-related research was \$2.9 billion.
- The NIH supports a comprehensive biomedical research program of basic, clinical, and behavioral research on HIV infection, its associated co-infections, opportunistic infections, malignancies, and other complications. This represents a unique trans-NIH and global research program that strives to better understand the basic biology of HIV, develop effective therapies to treat and control HIV disease, and design interventions to prevent new infections.
- The risk factors associated with HIV transmission are now well defined, providing the foundation for prevention efforts. In virtually all developed nations and in a growing number of developing countries, prevention programs are slowing the spread of HIV infection, although rates of new infections, even in countries considered to be “success stories,” continue at an unacceptably high level.
- Scientists around the world illuminated the structure and genetic make up of HIV and made rapid advances in understanding its disease-causing mechanisms. These advances in turn facilitated the rapid development and testing of potent anti-HIV drugs and guidelines for the use of these medications.
- Many HIV-infected people are living with the benefits resulting from NIH-supported therapeutics research. Combination antiretroviral therapy, also known as highly active antiretroviral therapy or HAART, plays a major role in the dramatic decreases in HIV-related morbidity and mortality where these medications are available and used. A recent study indicates that AIDS drugs saved 3 million years of life in the United States. In addition, certain antiretroviral drug regimens dramatically reduce the risk of HIV transmission from mother to child.

- However, the use of antiretroviral therapy is now associated with a series of serious side effects and long-term complications that may have a negative impact on mortality rates. More deaths occurring from liver failure, kidney disease, and cardiovascular complications are being observed in this patient population. About one quarter of the HIV-infected population in the United States is also co-infected with hepatitis C virus (HCV). The appearance of multi-drug resistant strains of HIV presents an additional serious public health concern.
- The AIDS research investment provides benefits for people with other infectious, malignant, neurologic, autoimmune, and metabolic diseases, and led to an entirely new paradigm to treat other viral infections. For example, the drug 3TC, developed to treat AIDS, is now a widely used and effective therapy for chronic hepatitis B infection. Drugs developed to prevent and treat AIDS-associated opportunistic infections also provide benefit to patients undergoing cancer chemotherapy or receiving anti-transplant rejection therapy. In addition, AIDS research is providing a new understanding of the relationship between viruses and cancer.
- Despite advances in HIV/AIDS research, the pandemic continues to undermine lives, communities and societies. There is no cure for AIDS or a vaccine to prevent infection. Scientific, medical, logistical, and operational challenges remain to make HIV therapies, prevention services, and other interventions available to poor countries.
- If left unchecked, HIV/AIDS will continue to have devastating consequences around the world for decades to come in every sector of society.

Tomorrow

Personalized approaches:

- The increasing incidence of HIV drug resistance and drug-related complications in patients underscores the critical need for new and better treatment regimens.
- Improved regimens also are needed to reduce drug interactions between HIV treatments and treatments for opportunistic co-infections, including hepatitis B and C, and problems with adherence to complicated treatment regimens,
- A high priority of NIH-sponsored AIDS therapeutics research continues to be the development of drugs and therapeutic regimens that limit the development of drug resistance, can enter viral reservoirs to inhibit viral replication, are less toxic with fewer side effects, facilitate easier adherence, and are less expensive and more readily accessible.

Preventing infections - Pre-empting HIV:

- NIH is committed to the development of preventive interventions to protect individuals against HIV infection.
- The ultimate defeat of HIV/AIDS will require a multi-pronged effort - difficult, if not impossible, without a safe and effective HIV vaccine. Over the past five years, NIH devoted approximately \$2 billion to HIV/AIDS vaccine research. The development of an HIV vaccine is a complex research challenge because HIV is unusually well equipped to elude immune defenses, due to its ability to vary extensively, to persist in viral reservoirs, and to eventually overcome the immune system.
- NIH has now conducted or initiated approximately 80 Phase I, 2 Phase II, and 1 Phase III clinical trials of nearly 50 vaccine candidates, individually or in combination, in collaboration with partners in academia and industry. Among these is a vaccine targeted to multiple HIV subtypes found worldwide that is in the second phase of clinical testing.
- NIH is supporting the development of topical microbicides, which include creams, gels, or other substances that could be applied topically to prevent the transmission of HIV and other sexually transmitted infections. It is believed that topical microbicides might be more effective than condoms in preventing HIV infection because they would be easier to use and women would not have to negotiate their use, as they often must do with condoms.
- Prevention priorities also include improved prevention of mother-to-child transmission, behavioral research strategies, interventions related to drug and alcohol use, and newer areas of promising investigation, such as circumcision, early treatment of co-infections, use of antiretroviral therapy as prevention, cervical barrier methods, and combination prevention strategies.
- NIH places high priority on the need for affordable and sustainable prevention and treatment approaches that can be implemented in resource-limited nations.