



**SNS COLLEGE OF TECHNOLOGY**

**AUTONOMOUS**

**BIOLOGY FOR ENGINEERS**



## AIDS/HIV

- **People with AIDS can have a high viral load and may easily transmit HIV to others.** People with AIDS have badly damaged immune systems.
- They can get an increasing number of opportunistic infections or other serious illnesses. Without HIV treatment, people with AIDS typically survive about three years.
- People have a large amount of HIV in their blood and are very contagious. Many people have flu-like symptom. If you have flu-like symptoms and think you may have been exposed to HIV, to get tested.
- This stage is also called asymptomatic HIV infection or clinical latency. HIV is still active and continues to reproduce in the body. People may not have any symptoms or get sick during this phase but can transmit HIV.



## AIDS

- AIDS stands for Acquired Immune Deficiency Syndrome. AIDS is the most advanced stage of HIV disease.
- HIV causes AIDS by attacking CD4 cells, which the immune system uses to protect the body from disease. When the immune system loses too many CD4 cells, the body is less able to fight off infections and can develop serious, often deadly, infections. These are called opportunistic infections (OIs).
- When someone dies of AIDS, death is usually due to OIs or other long-term effects of HIV. AIDS refers to the weakened state of the body's immune system, which can no longer stop opportunistic infections.



# AIDS



- AIDS is a chronic immune system disease caused by the human immunodeficiency virus (HIV).
- HIV damages the immune system and interferes with the body's ability to fight infection and disease. HIV can be spread through contact with infected blood, semen, or vaginal fluids.
- There's no cure for HIV/AIDS, but medications can control the infection and prevent disease progression.
- Acquired immunodeficiency syndrome (AIDS) is a **chronic, potentially life-threatening condition caused by the human immunodeficiency virus (HIV)**.



## FACTS FOR AIDS

### 1. Fact: Anyone Can Get HIV

- One misconception that stubbornly endures is that only gay men can get HIV.
- It's true that in the United States, gay, bisexual, and other men who have sex with men (MSM) continue to have the greatest risk of HIV infection.
- In 2020, MSM accounted for an estimated 71 percent of new HIV diagnoses, according to the federal government website HIV.gov.
- But many individuals acquire HIV through heterosexual contact. In 2020 these cases accounted for more than one in five new HIV infections — 22 percent.



## FACTS FOR AIDS

### 2. Fact: Black and Hispanic/Latino People Have Been Hit Especially Hard by HIV

- HIV has had an outsize impact on communities of color in the United States.
- Black Americans make up only about 12 percent of the population but accounted for 42 percent of new HIV cases in 2020.
- Racism, HIV stigma, homophobia, poverty, and barriers to healthcare are powerful forces driving this disparity, according to the Centers for Disease Control and Prevention (CDC).
- Hispanic/Latino individuals have also been disproportionately impacted by HIV, representing 19 percent of the U.S. population yet making up 27 percent of new HIV diagnoses in 2020.



## FACTS FOR AIDS

### 3. Fact: Women and Babies Can Get HIV

Approximately one-quarter of people with HIV in the United States are female, and most were exposed to the virus through heterosexual sex.

A person who is pregnant and has HIV/AIDS can pass HIV to their unborn child, and can also transmit the virus during childbirth and when breastfeeding, the CDC says.

### 4. Fact: HIV Rates Are Astronomical in Some Parts of the World

Since 1981, more than 84 million people worldwide have contracted HIV, and approximately 40 million have died of AIDS, including more than 700,000 in the United States.

In some countries, HIV is ubiquitous. The prevalence of HIV in the population in some sub-Saharan African countries currently exceeds 30 percent.



## FACTS FOR AIDS

### 5. Fact: You Can Have HIV and Not Know It

- It's estimated that about one in eight people with HIV don't know they have it.
- Within the first two to four weeks of an HIV infection, a person may experience flu-like symptoms such as fatigue, fever, headache, sore throat, and muscle and joint pain. Other HIV symptoms can include painful, swollen lymph nodes and a skin rash with small bumps.
- But in some cases people won't experience any symptoms at all during this early (acute) stage of infection, the CDC reports, and they can spread the virus without realizing it.
- The only way to know for sure whether you or a partner is HIV positive is to get tested.





## FACTS FOR AIDS

### 6. Fact: You Can't Get HIV From Insect Bites or Toilet Seats

- Myths still abound about HIV transmission. You can't get HIV from insect bites or stings, hugging, shaking hands, or sharing toilets or dishes, according to the CDC.
- You can't get HIV from a closed-mouth kiss or contact with an infected person's sweat or tears, nor can you get it by simply working or hanging out with someone who is HIV-positive or has AIDS.
- HIV transmission from one woman to another woman through sexual contact is also rare, per the U.S. Department of Health and Human Services.



## FACTS FOR AIDS

### 7. Fact: There Are Several Ways to Prevent HIV Transmission

- Because HIV is transmitted by the exchange of bodily fluids such as semen (including pre-seminal fluid), rectal fluids, vaginal fluids, and blood, the best way to stave off infection is to always practice safer sex and avoid sharing drug paraphernalia like needles.
- “Condom use is an effective way to prevent HIV, and it’s also the *only* way we have to prevent sexually transmitted infections,” says Omar Harfouch, MD, MPH, an assistant professor at the Institute of Human Virology at the University of Maryland School of Medicine in Baltimore, and a physician and researcher who specializes in HIV treatment and prevention.



## FACTS FOR AIDS

### **8. Fact: Medications Can Protect You After a Possible HIV Exposure**

PEP (post-exposure prophylaxis) is medicine to prevent HIV after a possible exposure. The CDC advises you to alert a healthcare provider or an emergency room doctor and begin PEP within 72 hours. The sooner you start, the better.

PEP is not meant to replace other HIV prevention methods. If you may be exposed to HIV frequently, talk to your healthcare provider about PrEP.



## FACTS FOR AIDS

### 9. Fact: HIV Treatment Can Make Your Viral 'Load' So Low It's Undetectable

Before 1996, HIV was basically a death sentence. But over the course of the next two decades, a lifesaving regimen of drugs known as antiretroviral therapy (ART) came into use.

ART is a combination of HIV medicines taken every day. This treatment regimen helps prevent the virus from replicating, which reduces the viral load (the amount of HIV in the body). This gives the immune system a chance to recover so that it's strong enough to fight off infections and certain HIV-related cancers.

A primary goal of HIV treatment is to reduce a person's viral load until it is undetectable in the blood, as measured in a viral load test.



## FACTS FOR AIDS

### **10. Fact: There Are a Few Ways to Get Tested for HIV, Including an At-Home Test**

The CDC recommends that everyone between ages 13 and 64 get an HIV test at least once, and seek out testing as often as every six months if they have multiple sexual partners, have unprotected sex, or use needles to inject drugs.

You can see your doctor for a conventional blood test or visit almost any health department or sexual health clinic for a blood or saliva test (usually free). These centers also offer confidential on-site counseling.

You can also test yourself. The FDA has approved several home HIV tests now sold online or at drugstores. Many of these tests require you to prick your finger with a needle, place a few drops of blood on a blotter pad, and then mail the sample to a lab.



## AIDS/HIV

- **Human immunodeficiency virus infection and acquired immunodeficiency syndrome (HIV/AIDS)** is a spectrum of conditions caused by infection with the human immunodeficiency virus (HIV), a retrovirus. Following initial infection an individual may not notice any symptoms, or may experience a brief period of influenza-like-illness.
- Typically, this is followed by a prolonged incubation period with no symptoms. If the infection progresses, it interferes more with the immune system, increasing the risk of developing common infections such as tuberculosis, as well as other opportunistic infections, and tumors which are otherwise rare in people who have normal immune function.
- These late symptoms of infection are referred to as acquired immunodeficiency syndrome (AIDS). This stage is often also associated with unintended weight loss.



## AIDS/HIV

- HIV/AIDS has had a large impact on society, both as an illness and as a source of discrimination.
- The disease also has large economic impacts. There are many misconceptions about HIV/AIDS, such as the belief that it can be transmitted by casual non-sexual contact. The disease has become subject to many controversies involving religion, including the Catholic Church's position not to support condom use as prevention. It has attracted international medical and political attention as well as large-scale funding since it was identified in the 1980s.



## STAGES OF AIDS

### 1. Acute HIV Infection

- Acute HIV infection is the earliest stage of HIV infection, and it generally develops within 2 to 4 weeks after infection with HIV. During this time, some people have flu-like symptoms, such as fever, headache, and rash.
- In the acute stage of infection, HIV multiplies rapidly and spreads throughout the body. The virus attacks and destroys the infection-fighting CD4 cells (CD4 T lymphocyte) of the immune system.
- During the acute HIV infection stage, the level of HIV in the blood is very high, which greatly increases the risk of HIV transmission. A person may experience significant health benefits if they start ART during this stage.





# STAGES OF AIDS



## 2. Chronic HIV Infection

- The second stage of HIV infection is chronic HIV infection (also called asymptomatic HIV infection or clinical latency). During this stage, HIV continues to multiply in the body but at very low levels.
- People with chronic HIV infection may not have any HIV-related symptoms. Without ART, chronic HIV infection usually advances to AIDS in 10 years or longer, though in some people it may advance faster.
- People who are taking ART may be in this stage for several decades. While it is still possible to transmit HIV to others during this stage, people who take ART exactly as prescribed and maintain an undetectable viral load have effectively no risk of transmitting HIV to an HIV-negative partner through sex.



## STAGES OF AIDS

### 3. AIDS

- AIDS is the final, most severe stage of HIV infection. Because HIV has severely damaged the immune system, the body cannot fight off opportunistic infections. (Opportunistic infections are infections and infection-related cancers that occur more frequently or are more severe in people with weakened immune systems than in people with healthy immune systems.)
- People with HIV are diagnosed with AIDS if they have a CD4 count of less than 200 cells/mm<sup>3</sup> or if they have certain opportunistic infections.
- Once a person is diagnosed with AIDS, they can have a high viral load and are able to transmit HIV to others very easily. Without treatment, people with AIDS typically survive about 3 years.



## CONCLUSION

- The AIDS epidemic has also taught us another powerful and tragic lesson: that the nation's blood supply because it is derived from humans is highly vulnerable to contamination with an infectious agent. A nation's blood supply is a unique, essential, life-giving resource.
- Whole blood and many blood products are lifesaving for many people. As a whole, our nation's system works effectively to supply the nation with necessary blood and blood products and its quality control mechanisms check most human safety threats.
- The events of the early 1980s, however, revealed an important weakness in the system—in its ability to deal with a new threat that was characterized by substantial uncertainty. The potential for recurring threats to the blood supply led this Committee to reappraise the processes, policies, and resources through which our society attempts to preserve its supply of safe blood and blood products.



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