What Is AIDS?
by Joshua Fischman

The story of AIDS begins with an object smaller than a pinhead. It's a virus—a tiny parasite that invades and takes control of cells. The virus is called HIV, which stands for Human Immunodeficiency Virus.

HIV attacks certain cells of your immune system—T-cells, which are a kind of white blood cell. That's a cruel trick, since T-cells are the very cells that normally protect your body from illness. The T-cells travel throughout your body looking for outside "invaders" to destroy.

When HIV attacks the T-cells, it tells them to stop doing their usual job. Even worse, it turns those cells into little HIV factories, totally given over to the manufacture of more viruses. When these new copies of HIV attack other T-cells, the cycle starts all over again.

Soon there aren't enough T-cells working to stop invaders. The immune system is completely deficient. Invaders like bacteria and viruses can attack and cause other diseases like pneumonia and cancer. When this happens, the patient is considered to have full-blown AIDS—Acquired Immunodeficiency Syndrome.

HIV-infected patients can live for many years without developing AIDS. But eventually, AIDS does develop and the disease kills the patient. There is still no cure for AIDS.

How to Prevent AIDS

Fortunately, you can't easily be infected with HIV. It isn't like a cold or flu; there's no known risk of infection from casual contact, such as shaking hands, sharing drinking glasses, or swimming in pools.

To understand how to prevent infection, it helps to know how the virus can be spread. HIV travels in body fluids such as blood, as well as in fluids exchanged during sex. Most people have been infected by having sex—or sharing drug needles—with someone who was already infected. Some babies of HIV-positive mothers have been born infected with HIV.

Here are some prevention tips based on information from the Federal Centers for Disease Control and other experts:

- Don't do drugs, most of all intravenous drugs. Drugs impair your judgment and needles can transmit the AIDS virus.
- Avoid sex with people who might be HIV-infected. Always remember, it's okay to say "no" to sex.
- If you do have sex, doctors recommend always using a latex condom (not all condoms are made of latex). The pores in latex are very small, so small that the virus can't pass through them. That's how latex protects you. But be aware that latex condoms, while effective, are not foolproof, especially if used incorrectly. That's one reason many advisors to young people recommend abstinence.

Can you get AIDS from a mosquito bite?

Most experts say no; the AIDS virus (HIV) can't live in a mosquito, and there's no evidence that mosquitoes can carry the virus from one person to another.

How about from kissing someone who has AIDS?

You won't get HIV from a simple kiss. Experts aren't certain about open-mouth kissing. HIV is present in small amounts in the saliva of HIV-infected people, but no one has been known to get AIDS from open-mouth kissing. Health experts advise people against "French" kissing with someone who may be HIV-infected.

From having your ears pierced?

That's never happened, but ear-piercing needles can carry the virus. Make sure you go to a qualified professional, who uses sterile or brand-new equipment.

For quick and confidential information, call the National AIDS Hotline: 1-800-342-AIDS; Spanish: 1-800-344-7432.

WHAT CAUSES AIDS?

AIDS is a disease caused by the virus HIV. Once HIV gets into someone's bloodstream, it breaks into cells of the immune system called T-cells. HIV then commands the cells to make new copies of the virus. The new viruses pop out of the cells to attack other T-cells, destroying them. In the end, the whole immune system is weakened, and the person can be attacked by all kinds of diseases.
HIV and AIDS

AIDS (acquired immune deficiency syndrome) appears to be a new disease to the human population (one of the new emerging diseases). AIDS first appeared in the news in 1981, with cases being reported in Los Angeles, in the United States. By 1983, the pathogen causing the disease had been identified as a retrovirus that selectively infects helper T cells. The disease causes a massive deficiency in the immune system due to infection with HIV (human immunodeficiency virus). As yet, there is no cure or vaccine, and the spread of the disease has taken the form of a pandemic - spreading to all parts of the globe. The origin of HIV has been much debated. It is now believed to have arisen by mutation of a virus that had been endemic in some areas of central Africa for many years. The virus has been found in blood samples preserved from as early as 1959 in several African nations. Already, more than a million people a year die from the disease. See the following pages on AIDS' origin and prevalence.

The Structure of a Human Immunodeficiency Virus (HIV)

- Capsid: Protein coat that protects the nucleic acids (RNA) within the virus.
- Viral Envelope: A piece of the cell membrane budded off from the last human host cell.
- Nucleic Acid: Two identical strands of RNA contain the genetic blueprint for making more HIV viruses.
- Reverse Transcriptase: Two copies of this important enzyme convert the RNA into DNA once inside a host cell.
- Surface Proteins: These spikes allow HIV to attach to receptors on the host cells: T cells and macrophages.

Symptoms of AIDS

Individuals affected by the virus may have no symptoms, while medical examination may detect swollen lymph glands. Others may experience a short-lived illness when they first become infected (resembling infectious mononucleosis). The range of symptoms resulting from HIV infection is huge, and is not the result of the HIV infection directly. The symptoms arise from an onslaught of secondary infections that gain a foothold in the body due to the suppressed immune system (due to the few helper T cells). These infections are from normally rare fungal, viral and bacterial sources. Full blown AIDS can also feature some rare forms of cancer. Some symptoms are listed below:

- Fever, lymphoma of the brain (a cancer), toxoplasmosis of the brain, dementia
- Eye infections (cytomegalovirus)
- Skin inflammation (dermatitis) particularly affecting the face
- Oral thrush (Candida albicans) of the oesophagus, bronchi and lungs
- A variety of opportunistic infections, including: chronic or persistent herpes simplex, tuberculosis (TB), pneumocystis pneumonia, shingles, shigellosis and salmonellosis
- Marked weight loss
- Diarrhoea caused by Cryptosporidium or toxoplasma
- A number of autoimmune diseases, especially thrombocytopenia
- Kaposi's sarcoma - a highly aggressive malignant skin tumour consisting of blue-red nodules, usually start at the feet and ankles, spreading to the rest of the body later, including respiratory and gastrointestinal tracts.

The Stages of an HIV Infection

AIDS is actually only the end stage of an HIV infection. Shortly after the initial infection, HIV antibodies appear within the blood. The progress of infection has three clinical categories shown on the graph above.
FACTS OF HIV and AIDS

FACT: once you have become infected with HIV it takes an average of 8 years and 4 months for the first symptoms to appear. This is why it’s rare to see teenagers with full blown AIDS. The symptoms of the disease won’t appear until the teenage victims reach their 20s. In fact, in 1989, 17220 cases were diagnosed among 20 to 29-year olds. When did they get the virus? During their teens—mostly through sexual contact.

FACT: Some believe that the AIDS epidemic is over or has peaked and is on the decline. The epidemic reached a crisis in the 1990s—especially among the young, poor, and women. See the graph below—looks like numbers are increasing.

Global Trends: Number of people living with HIV versus Time (years) (http://www.avert.org/worldstats.htm)

FACT: Once infected with HIV: 20% develop symptoms within five years, 50% develop symptoms within ten years, 75% develop symptoms within fifteen years, 95% develop symptoms within twenty years. What about the 5% who never show symptoms, yet are carriers of the virus? Carriers, with no symptoms, are the most dangerous people to the rest of the population. They are “invisible” to detection unless they elect to be tested.

FACT: Cases of AIDS in the U.S. are being reported at the rate of 50 000 to 80 000 per year. The number of cases doubles every 16 to 20 months. There are roughly 180 new cases per day for the country.
FACT: you contract HIV through sexual intercourse, or by sharing needles or syringes. HIV virus has also been found in saliva, but kissing has not been shown to be a risk factor for contracting the virus. There is, however, a theoretical risk of contracting the virus through oral contact if blood in the mouth of an infected person is contacted through the mucus membrane of his or her partner. There have never been any documented cases involving this type of transmission.

FACT: This is no "safe sex"—just safer sex. Only latex condoms lower your risk and should be used with a sperm killing foam, cream, or gel with nonoxyno-9 to further reduce risk of infection.

FACT: The more sexual partners you have, the greater your risk. You can contract HIV through just one sexual encounter. Don’t be afraid to ask about your partner’s sexual history. Remember a person can be a carrier for years and not show any symptoms. 20% of high school students report having 4 or more sex partners.

FACT: One of every ten girls under the age of 20 becomes pregnant in the U.S. each year. One out of eight is infected with a sexually transmitted disease every year.

FACT: Early HIV diagnosis remains a challenge in high-income countries. In the USA, 21% of people living with HIV, and 27% in Canada, are unaware of their HIV status. For Europe as a whole, between 15% and 38% of HIV-positive people are diagnosed late. (UNAIDS.org)

QUESTIONS: (please answer on a separate sheet of paper)

1. A) What cells does HIV attack?
2. B) Why is this a cruel trick and why does it have such a devastating effect on our body’s ability to fight disease?

3. How long does it take to develop symptoms once you are infected with HIV?

4. Consult the graph on the “Stages of HIV” diagram (page 2). This graph shows the stages of HIV infection. Describe how the HIV virus population changes with the progression of the disease.

5. Name three common ways HIV can be transmitted from one person to another. (Modes of transmission)

6. Explain why HIV has been so difficult to develop a vaccine for.

7. A) What percentage (%) of infected people develop symptoms within 5 years? 10 years? 15 years? 20 years? Never?
   B) Why is this last group of people the most dangerous to society?
   C) What percentage of Canadians with HIV are unaware that they have HIV?

8. Has the AIDS epidemic reached its peak? Is it on the decline now?

9. Why are teenagers at such a great risk to become infected?