

Chapter 22

Sexually Transmitted Infections and AIDS

Section 1

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HIV and AIDS

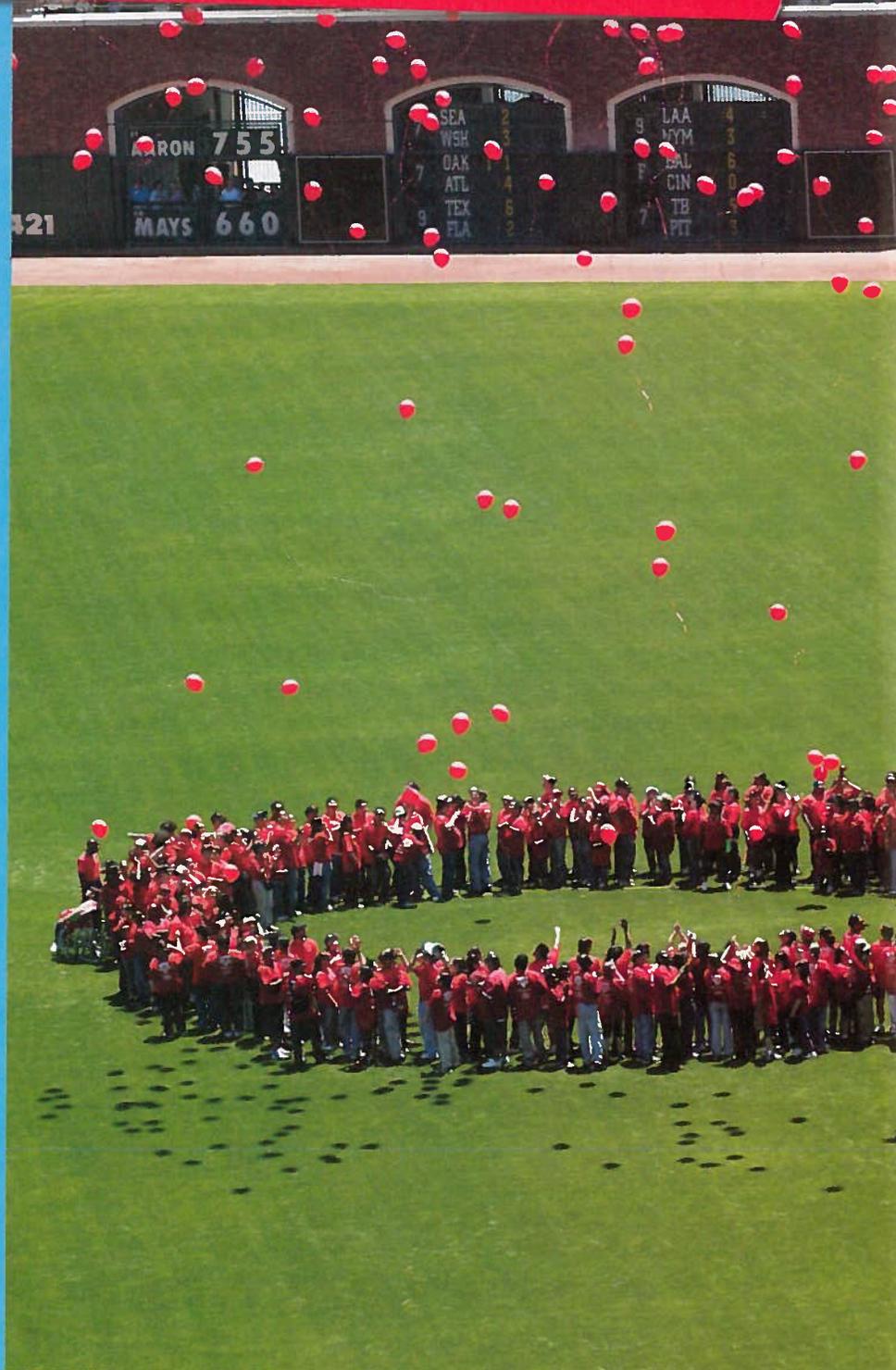
- **Hands-On Activity**
How Quickly Can HIV Spread?

Building Health Skills

- **Accessing Information**
Evaluating Internet Sources

Section 4

Protecting Yourself From
HIV and AIDS



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TEENS Talk

CLASSROOM VIDEO #22

Risks and STIs

Preview Activity

How Risky Is Sexual Activity?

Complete this activity before you watch the video.

1. Complete each of the following statements by filling in the blank.
 - a. Being sexually active as a teen is ? .
 - b. There are ? risks that come with sexual activity.
 - c. A person should not be sexually active until ? .
2. Look over your responses. In a paragraph, summarize what you learned about yourself by completing the statements. **WRITING**

Section 1

Objectives

- ▶ **Identify** risky behaviors associated with the current epidemic of sexually transmitted infections.
- ▶ **Describe** behaviors that can help prevent the spread of sexually transmitted infections.

Vocabulary

- sexually transmitted infection (STI)

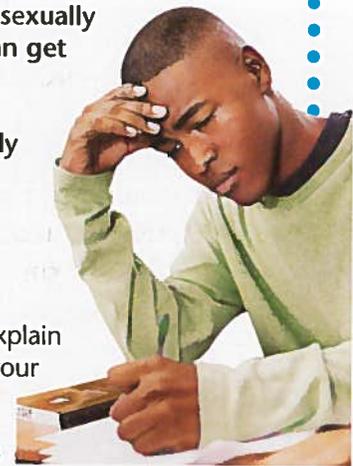
The Risks of Sexual Activity

Warm-Up

Quick Quiz Which of these statements do you think are true? Which are false?

- 1 It can take only one sexual contact with an infected person to get a sexually transmitted infection.
- 2 Even if you've been infected with a sexually transmitted infection before, you can get that same infection again.
- 3 You can have more than one sexually transmitted infection at a time.
- 4 You can get a sexually transmitted infection from sharing needles.

WRITING For each of your responses, explain why you gave the answer you did. Review your answers after reading this section.



The Silent Epidemic

Any pathogen that spreads from one person to another during sexual contact is called a **sexually transmitted infection**, or **STI**. (Such infections are sometimes called sexually transmitted diseases, or STDs.) There are 19 million new cases of STIs in the United States each year. Of those cases, over 3 million occur in people under age 20.

Harmful Effects of STIs The STI epidemic is a serious concern for several reasons. STIs are harmful in terms of physical and emotional suffering. And yearly healthcare expenses related to STIs in the United States amount to well over \$10 billion.

In the short term, STIs may cause pain, discomfort, and embarrassment. The long-term consequences of STIs may include an increased risk of certain cancers and an increased risk of infertility in both men and women. Infertility is the condition of being unable to have children.

Many STIs can be treated with medicines, but some are incurable. If left untreated, some STIs are fatal. Unlike many other infectious diseases, people do not develop immunity to STIs after being infected. A person can be cured and then reinfected with the same STI again.

Risky Behaviors and the STI Epidemic There are several risky behaviors that account for the current STI epidemic, including ignoring the risks of sexual activity, having sexual contact with multiple partners, and not getting proper treatment when necessary.

- ▶ **Ignoring Risks** Being sexually active puts a person at risk for STIs. Many people who are sexually active do not take precautions against infection. They often do not realize the risks of contracting STIs, or they choose to ignore the risks. Adolescents in particular tend to ignore the risks, thinking “It can’t happen to me.” But the reality is that it can, and it does happen to many teens.
- ▶ **Multiple Partners** Many people begin to engage in sexual activity at a young age, and some may have multiple sexual partners during their lifetimes. The more sexual partners a person has, the greater the chance of getting an STI.
- ▶ **Not Seeking Treatment** Some people who become infected do not seek immediate medical treatment. Sometimes people are too embarrassed to seek treatment. Others don’t know that they have an STI because they do not recognize the symptoms. In some cases, STIs have no symptoms and can only be detected by laboratory tests. Sometimes the symptoms go away temporarily, leading the person to think the infection has been cured. In all of these situations, the infection may go untreated, increasing the chances that the person will spread it to others.

Connect to YOUR LIFE What advice would you give a friend who seems to be ignoring the risks of sexual activity?

Go Online
HEALTH LINKS

For: Updates on sexually transmitted infections
Visit: www.SciLinks.org/health
Web Code: ctn-7221

FIGURE 1 This graph shows data for one STI, chlamydia, that is common among young people. **Evaluating** Why do you think young people are especially at risk for STIs?

Chlamydia in Young Americans

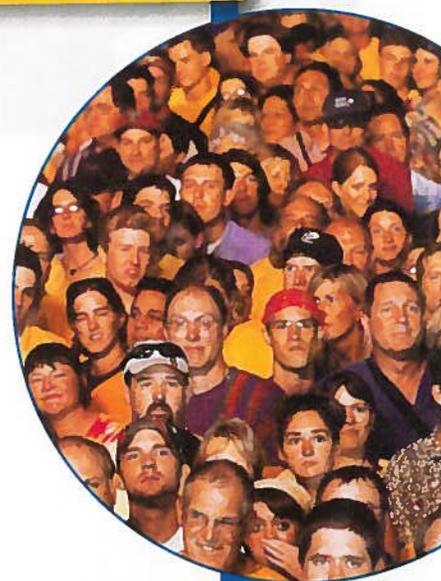
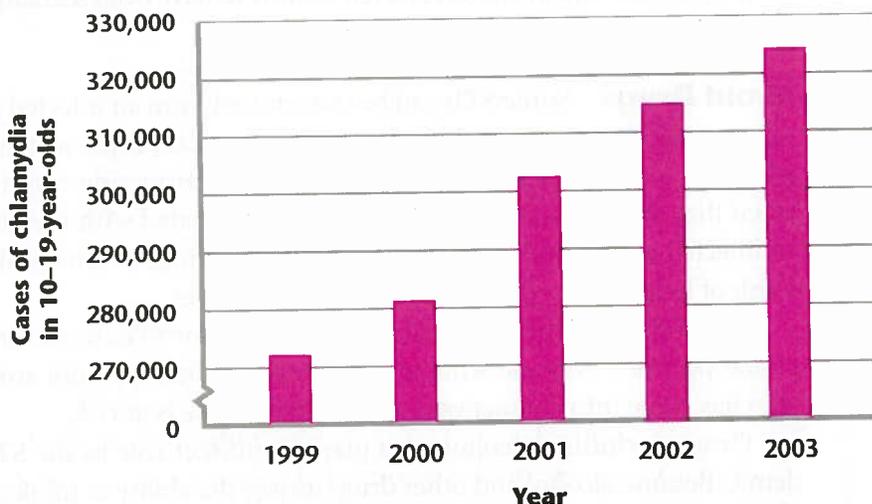
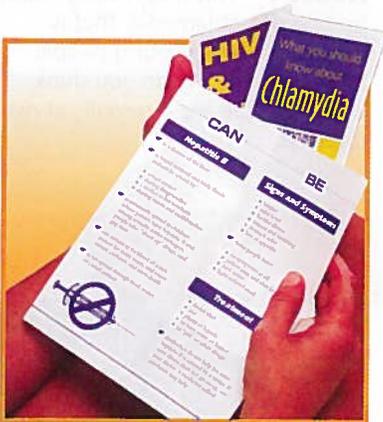




FIGURE 2 Educating yourself about STIs can help you make healthy decisions.



Avoiding STIs

STIs are transmitted mainly through sexual contact, but a few are also transmitted through contact with the blood of an infected person. The good news about STIs is that they are preventable. **Healthy behaviors such as practicing abstinence, avoiding drugs, and choosing responsible friends are ways to avoid STIs.**

Practice Abstinence Because STIs are spread mainly by sexual contact, the most certain way to avoid STIs is to practice sexual abstinence. Sexual abstinence means not having sexual intercourse, oral sex, or anal sex. Even teens who have not been abstinent up to this point can still choose to be abstinent now. However, teens who have been sexually active should be tested for STIs.

Avoid Drugs Some STIs can be transmitted from an infected person to an uninfected person by blood-to-blood contact. People who use illegal drugs or inject steroids run a high risk of contracting certain STIs when they share needles that have been contaminated with the blood of an infected person. Individuals who get body piercings or tattoos also run a risk of being infected with a contaminated needle.

Not only are people who share needles at risk for STIs, but so are their sexual partners. Anyone who engages in sexual activity with someone who has come into contact with an infected needle is at risk.

Drugs, including alcohol, also play an indirect role in the STI epidemic. Because alcohol and other drugs impair the ability to think clearly, people may make decisions they later regret. For example, they may engage in sexual behaviors that place them at risk for STIs.



Choose Responsible Friends It might sound obvious, but the best way to ensure that you practice abstinence and avoid drugs is to choose friends who have also chosen those behaviors. Friends who support your healthy decisions can make it easier to resist the pressure to use drugs or engage in sexual behavior. Furthermore, going out in groups, rather than as couples, can make it easier to choose abstinence.

Parents, teachers, and other adults can also provide support for healthy behavior choices. It may feel uncomfortable at first to talk to a parent or other adult about the pressures to engage in sexual activity. But most adults can offer helpful advice about choosing abstinence as the responsible and healthy choice.

FIGURE 3 Choosing friends and activities that encourage abstinence can greatly reduce your risk of becoming infected with an STI.

Section 1 Review

Key Ideas and Vocabulary

1. What is a sexually transmitted infection?
2. What are three risky behaviors that contribute to the current STI epidemic?
3. Explain how practicing abstinence, avoiding drugs, and your choices of friends can help you avoid STIs.

Critical Thinking

4. **Relating Cause and Effect** How is the fact that some STIs have few or no symptoms related to the STI epidemic?

Health and Community

STI Education Create a poster or a web page to educate teens about the risks of sexual activity and STIs. Include statistics about the incidence of STIs in teens. Include other facts that you think teens should be aware of. **WRITING**

5. **Evaluating** Explain how refusal skills and effective communication are important skills that teens can use to avoid STIs.

Section 2

Kinds of STIs

Objectives

- ▶ **Identify** three of the most common STIs, including their symptoms and treatments.
- ▶ **List** four other STIs and describe their symptoms.
- ▶ **Know** when a person should seek treatment for an STI.

Vocabulary

- trichomoniasis
- urethritis
- vaginitis
- human papilloma virus
- chlamydia
- pelvic inflammatory disease
- gonorrhea
- genital herpes
- syphilis
- chancre

Warm-Up

- **Myth** All STIs can be treated with antibiotics.
- **Fact** STIs caused by viruses cannot be treated with antibiotics. Antibiotics are only used to treat STIs caused by bacteria. Several STIs caused by viruses cannot be cured and can cause lifelong health problems.
- **WRITING** Do you think most teens are aware that some STIs are not easily treated? And that some may persist for years? Explain your answer.



The Most Common STIs

Like other infectious diseases you have learned about, STIs are caused by pathogens, including bacteria, viruses, and protozoans. The pathogens that cause STIs live in the reproductive organs of males and females. Some also live in the blood. STIs can be spread from person to person through blood and body fluids such as semen, vaginal secretions, and breast milk.

Early diagnosis and treatment of STIs is essential in preventing long-term health problems. Although some STIs do not have obvious symptoms, many do have distinct symptoms. Anyone experiencing symptoms of an STI should see a doctor immediately.

Three of the most common STIs in the United States are trichomoniasis, human papilloma virus, and chlamydia. It is important to be able to recognize the symptoms of these infections.

Trichomoniasis The STI known as **trichomoniasis** (trik uh moh NY uh sis) is caused by a protozoan that infects the urinary tract or vagina. In males, symptoms include painful urination, a clear discharge from the penis, and some itching. Most males experience no symptoms at all. Symptoms in females include itching and burning in the vagina, an unpleasant-smelling, yellowish discharge, and pain when urinating.

A doctor can prescribe medicine to cure a trichomoniasis infection. In males, if trichomoniasis is not treated, it can lead to inflammation of the lining of the urethra, called **urethritis** (yoor uh THRY tis). In females, untreated trichomoniasis can lead to **vaginitis** (vaj uh NY tis), which is a vaginal infection or irritation.

Human Papilloma Virus The most common viral STI in the U.S. is caused by a group of viruses called **human papilloma virus** (pap uh LOH muh), or HPV. Often, HPV causes no symptoms. So people may not know that they are infected. The body's immune system may destroy the virus. But in some people, HPV remains in the body for life.

Some forms of HPV cause genital warts, which may itch or burn. A doctor can remove the warts, but they may reappear. A more serious condition associated with HPV is cervical cancer in women. Regular pap tests help detect cervical cancer before it becomes life-threatening.

The FDA has licensed a vaccine for use in girls and young women ages 9 to 26. The vaccine protects against the four types of HPV virus that cause 70 percent of cervical cancers and 90 percent of genital warts. Research is ongoing to see if the HPV vaccine has benefits for males.

Chlamydia The most common STI caused by bacteria in the U.S. is **chlamydia** (kluh MID ee uh). People who are sexually active should be checked regularly for chlamydia, which can be cured with antibiotics.

Infected males often experience painful, frequent urination and discharge from the penis. If untreated, chlamydia may lead to urethritis.

In females, often the only symptom is a yellowish vaginal discharge. If untreated, chlamydia can cause a serious infection of the reproductive organs called **pelvic inflammatory disease**, or PID. PID can lead to infertility or an ectopic pregnancy, a potentially fatal condition where a fertilized egg implants somewhere other than in the uterus. Also, a pregnant woman can transmit chlamydia to her baby during birth. If an infected infant survives, it may suffer damage to the lungs or eyes.

Connect to YOUR LIFE For each STI, list the symptoms that a person needs to watch for.

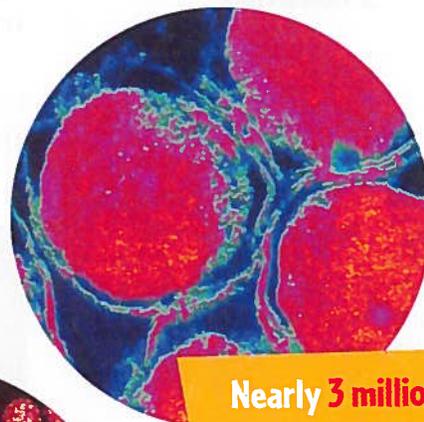
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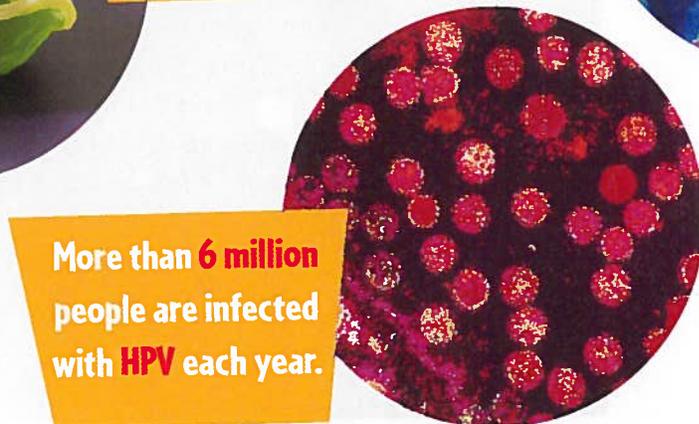
FIGURE 4 The micrographs show the pathogens that cause trichomoniasis, HPV, and chlamydia. These STIs affect millions of Americans every year.



Over **7 million** people are infected with **trichomoniasis** each year.



Nearly **3 million** people are infected with **chlamydia** each year.



More than **6 million** people are infected with **HPV** each year.

Other STIs

Other STIs can also cause health problems and require medical treatment. Information about some of these STIs is summarized in Figure 6. **Other STIs include hepatitis, gonorrhea, genital herpes, and syphilis.**

Hepatitis Hepatitis B and C, also called HBV and HCV, are sexually transmitted infections that attack the liver. They are also spread by blood-to-blood contact, such as when people share needles.

Individuals with HBV or HCV are often unaware of their infection. The most common symptoms are fatigue, abdominal pain, nausea, and jaundice. Both infections may lead to liver cancer or cirrhosis (sih ROH sis), a condition in which normal liver tissue is replaced by scar tissue.

Hepatitis B and C can be diagnosed by a blood test. Medications may relieve symptoms, but there is no cure for HBV or HCV. Children are now routinely vaccinated against HBV. Currently, there is no vaccine for HCV.

Gonorrhea A bacterial STI that infects the urinary tract of males and females and the reproductive organs of females is **gonorrhea** (gahn uh REE uh). Researchers estimate that more than 700,000 Americans are infected with gonorrhea each year. Males usually have a thick, puslike discharge from the penis and painful urination. Females sometimes experience painful urination and a puslike discharge from the vagina or urinary tract. More often, however, symptoms in a woman are very mild and may not be noticed. If left untreated, gonorrhea can lead to urethritis and infertility in males. In females it may lead to PID and infertility.

An infected woman can transmit gonorrhea to her baby during birth. In the United States, babies are given medicated eyedrops at birth to prevent infection of the eyes.

Because gonorrhea often has no noticeable symptoms, people participating in high-risk behaviors should get regular medical checkups. Treatment for gonorrhea requires antibiotics.



▲ Gonorrhea

FIGURE 5 Newborn babies are routinely given medicated eyedrops to prevent gonorrhea infection. The micrograph above shows the bacteria that cause gonorrhea.



FIGURE 6 Chancroid, bacterial vaginosis, pubic lice, and scabies are all treatable STIs. **Classifying** Which of these STIs can affect both males and females?



◀ Chancroid

Other STIs

Infection	Pathogen	Symptoms	How Spread	Treatment
Chancroid	Bacteria	Painful sores around the genitals	Contact with sores	Antibiotics
Bacterial vaginosis	Bacteria	In women, discharge, pain, itching, or burning in or around the vagina	Role of sexual activity in the spread of bacterial vaginosis is unclear	Antibiotics
Pubic lice and Scabies	Insects and mites that infest the hair around the genitals	Itching around the genitals; a rash	Direct physical contact with an infested person or with infested clothing or bedding	Medicated shampoo; washing infested clothing or bedding in very hot water

Genital Herpes Another STI caused by a virus is **genital herpes** (HUR pee-z). The virus that causes genital herpes is a herpes simplex virus. Researchers estimate that one out of five people ages 12 and older has had a genital herpes infection.

In some people, the symptoms may be hardly noticeable, and they may not realize they are infected. In other people, symptoms may be more severe, including painful blisters that appear on or around the genitals. A doctor can prescribe medicine to relieve the discomfort and dry up the blisters, but there is no cure for genital herpes. Infected people can experience periodic outbreaks of blisters throughout their lives.

An infected individual can pass the herpes simplex virus to a sexual partner whether blisters are present or not. A woman with genital herpes can infect her infant during childbirth, causing blindness and possibly death. A doctor may recommend that an infected woman have a cesarean section to prevent the baby from being infected.



▲ Pubic louse

Connect to YOUR LIFE

If a friend were considering a body piercing, what would you say about the risk of hepatitis?

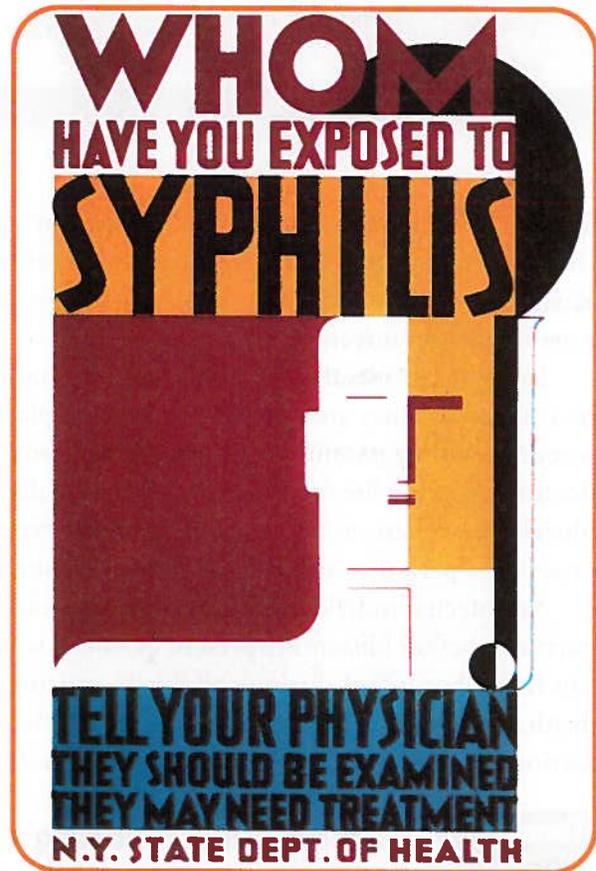
Syphilis Although far less common than it used to be, thousands of people in the United States become infected with syphilis each year. **Syphilis** (SIF uh lis) is a serious bacterial STI that progresses through three distinct stages.

- ▶ In the first stage, a painless sore called a **chancre** (SHANG kur) appears at the site of exposure. The bacteria may spread from the sore to different parts of the body.
- ▶ In the second stage, sores appear in the mouth and flulike symptoms develop. A nonitchy skin rash often appears on the hands and feet.
- ▶ In the third stage, symptoms may disappear for years. During this time, however, the bacteria attack internal parts of the body, such as the brain and heart. Eventually, untreated syphilis can cause brain damage, paralysis, and heart disease. This damage can lead to death.

In its early stages, syphilis can be treated and cured with antibiotics. Once it progresses beyond the second stage, the bacteria can be killed, but any damage that has already occurred is permanent.

A pregnant woman with syphilis will pass the disease to her developing baby. If the mother does not receive treatment during pregnancy, syphilis can damage the baby's skin, bones, eyes, teeth, and liver. A baby born with syphilis is said to have congenital syphilis.

FIGURE 7 An itchy rash on the hands is one of the symptoms of syphilis. The bacteria that cause syphilis are spiral-shaped, as you can see in the micrograph. The poster shown here was part of a public health program in the 1940s.



Seeking Treatment

Being tested for STIs may be uncomfortable and embarrassing, but it is crucial for long-term health. **People who participate in high-risk behaviors should get medical checkups every six months. Individuals who suspect they may be infected should seek prompt medical attention.**

A person who suspects an STI infection should refrain from sexual activity and see a doctor. Depending on the symptoms, the doctor may need to do a physical exam or a blood test. If an infection is present and treatable, the person should start treatment immediately. It is important to finish all of the prescribed medicine, even if symptoms disappear.

If a person finds out that he or she has an STI, it is also important to notify any sexual partners, so they can seek treatment as well. If the STI is not curable, the doctor can offer advice about how to live with the disease and how to prevent passing it on to others.

Many states have clinics that test for STIs. The results of these tests are confidential. Information about clinics that test for STIs is available from state or local public health departments or from the Centers for Disease Control and Prevention.



Doctors keep their patients' information confidential.

FIGURE 8 It is very important for long-term health to see a doctor if you think you might have an STI.

Section 2 Review

Key Ideas and Vocabulary

1. What are three of the most common STIs in the United States? What type of pathogen causes each STI?
2. Why is pelvic inflammatory disease a serious problem in women?
3. List the symptoms of hepatitis, gonorrhea, genital herpes, and syphilis.
4. Which stage of syphilis is characterized by the appearance of a chancre?
5. When should a person seek treatment for STIs?

Health at Home

Accessing STI Information Write down a list of questions that you have about STIs. Set up a time with a parent or other trusted adult to discuss your questions. If the person doesn't know the answers, ask for his or her help in finding the answers. **WRITING**

Critical Thinking

6. **Classifying** Which of the STIs that you learned about in this section can be treated but not cured? Which can be cured if treated early?
7. **Applying Concepts** Suppose a friend is worried about a possible STI. Write an e-mail to your friend, offering your advice about what to do. **WRITING**

Section 3

HIV and AIDS

Objectives

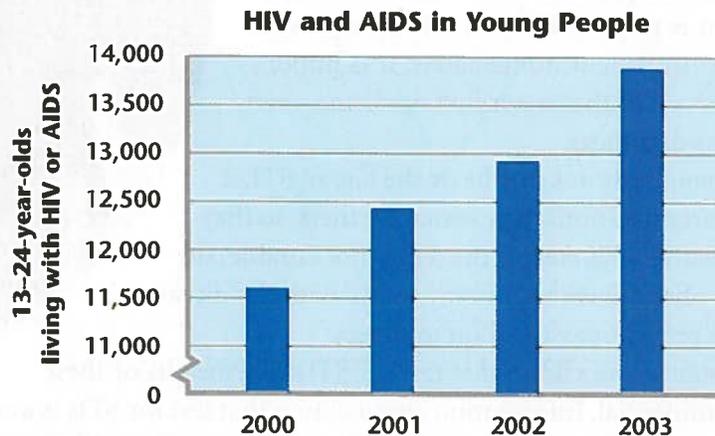
- ▶ **Explain** how HIV infection leads to AIDS.
- ▶ **Describe** how HIV is transmitted from person to person.
- ▶ **Summarize** the state of HIV infection and AIDS throughout the world.

Vocabulary

- HIV
- AIDS
- asymptomatic stage
- opportunistic infection

Warm-Up

Health Stats What health trend does this graph reveal?



WRITING What factors might account for this trend?

HIV Infection

The most serious incurable STI is caused by the human immunodeficiency virus, commonly called **HIV**. As of 2006, about 1 million people in North America were living with HIV. In the United States, 13- to 24-year-olds account for about 13 percent of HIV cases.

HIV infection can lead to **AIDS**, or acquired immunodeficiency syndrome, which is an often fatal disease of the immune system. **HIV attacks specific cells of the immune system, disabling the body's defenses against other pathogens. When the immune system becomes severely disabled, the infected person has AIDS.**

How HIV Attacks the Immune System Inside the body, HIV infects helper T cells, which stimulate other cells of the immune system to produce antibodies against invading pathogens. Inside a helper T cell, HIV reproduces, killing the cell in the process. The new viruses are released from the cell and move on to destroy other helper T cells.

Doctors can use the number of helper T cells that remain active in the body to monitor the progression of HIV infection. The fewer helper T cells, the more advanced the disease. Figure 9 shows how helper T cell counts can be used to monitor the progression of the disease.

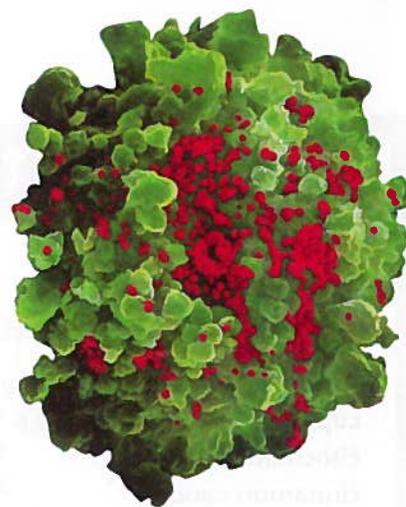


Stages of HIV Infection HIV slowly destroys the immune system. Doctors describe HIV infection as progressing through three stages.

- ▶ **Asymptomatic Stage** Soon after exposure to HIV, an infected person may experience flulike symptoms, which usually go away after a few weeks. Many months or years may follow during which the person shows no outward signs of disease. Because of the lack of symptoms, this period is called the **asymptomatic stage**. During this stage, the virus destroys helper T cells. People in the asymptomatic stage can infect others even though they feel fine.
- ▶ **Symptomatic Stage** When an HIV-infected person starts to experience symptoms, he or she has entered the symptomatic stage of infection. Symptoms may include weight loss, a persistent fever, diarrhea, or fungal infections. Such symptoms may not appear until 7 to 10 years after infection with HIV.
- ▶ **AIDS** The onset of AIDS is usually marked by a very low number of helper T cells in the blood, as shown in Figure 9. At this stage, HIV-infected people are usually experiencing even more severe symptoms than in the symptomatic stage. Because the body's ability to fight disease has been weakened by HIV, they are susceptible to infections that a healthy person's immune system could easily fight off.

Connect to YOUR LIFE

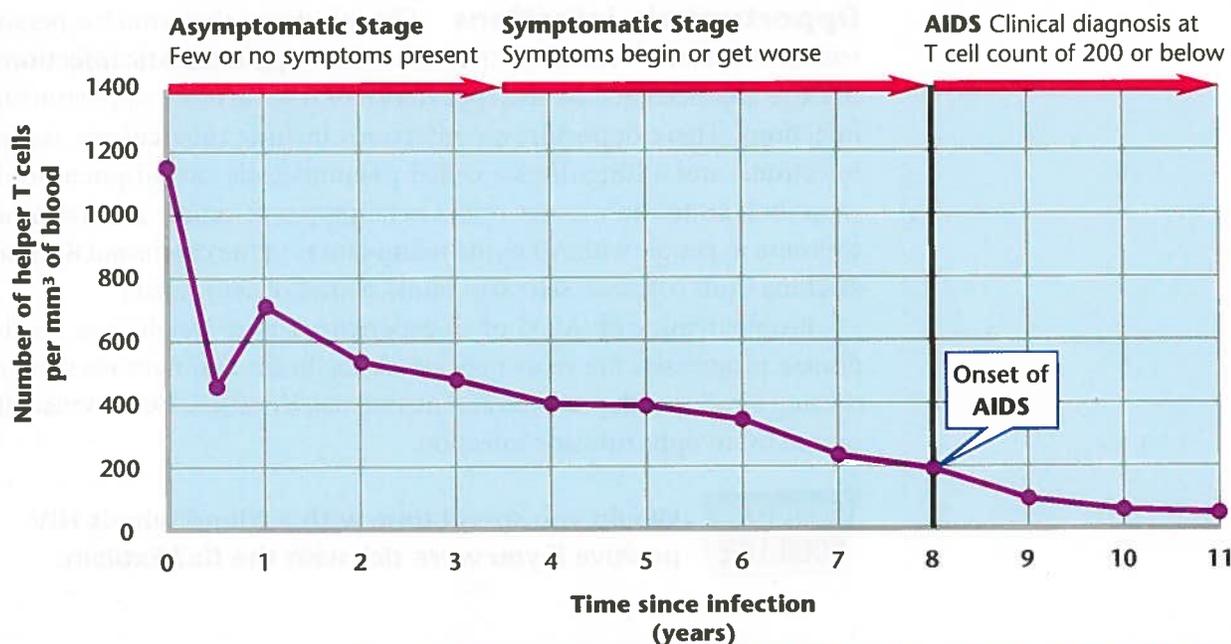
Can you assume that someone who looks healthy is not infected with HIV? Explain.



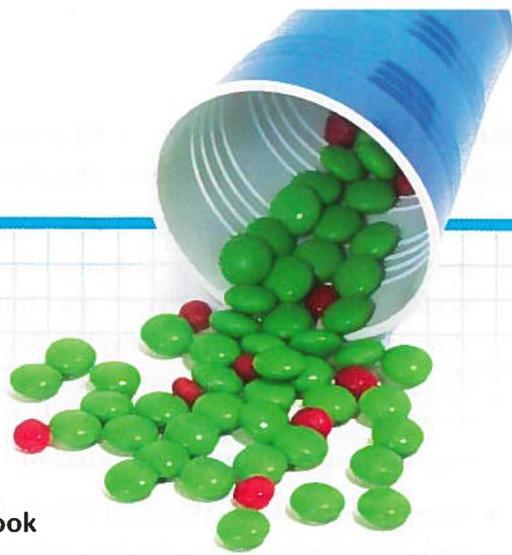
▲ HIV viruses (red) emerging from a human helper T cell

FIGURE 9 The number of helper T cells in the blood decreases as HIV infects and destroys more cells. **Reading Graphs** Describe how T cell counts change over time in a person infected with HIV.

T Cell Count and HIV Infection



Hands-On Activity



How Quickly Can HIV Spread?

Materials

cups
chocolate candies
cinnamon candies

Try This

- 1 Your teacher will give you a cup filled with small candies. Do not look inside the cup.
- 2 Walk around the room until your teacher tells you to stop. At that point, pair up with the student closest to you.
- 3 Pour a few of the candies from your cup into your partner's cup. Your partner should also pour some candies into your cup.
- 4 Repeat steps 2 and 3 two more times.
- 5 Look at the candies in your cup. If you have a cinnamon candy, you have been "infected" with HIV.

Think and Discuss

- 1 How many people in your class ended up with a cinnamon candy (HIV) in their cup? Would it surprise you to learn that only one person was infected to begin with?
- 2 Suppose that each person you exchanged candies with represents a sexual partner. How many people other than you did each of your partners exchange candies with? What does this suggest about having multiple sexual partners and the chances of getting infected with HIV or another STI?

Opportunistic Infections The infections that attack a person with a weakened immune system are called **opportunistic infections**. AIDS is characterized by the appearance of one or more opportunistic infections. These opportunistic infections include tuberculosis, fungal infections, and a lung disease called pneumocystis carinii pneumonia (noo moh sis tis kuh ry nee eye). Certain types of cancer are also more common in people with AIDS, including cancer of the cervix and Kaposi's sarcoma (kuh POH seez sahr KOH muh), a kind of skin cancer.

People living with AIDS often experience severe weight loss. As the disease progresses, the virus may attack the brain and nervous system, causing blindness, depression, and mental deterioration. Death is usually caused by an opportunistic infection.

Connect to YOUR LIFE

Would you spend time with a friend who is HIV-positive if you were sick with the flu? Explain.

Transmission of HIV

People with HIV are infectious whether or not they have any symptoms of disease. **Individuals infected with HIV can pass the virus on to someone else through the exchange of blood, semen, vaginal secretions, or breast milk.**

Risky Behaviors There are four main ways that HIV spreads from person to person.

- ▶ **Sexual Contact** HIV can be transmitted through any form of sexual contact that involves contact with an infected person's body fluids, including vaginal, oral, and anal sex. Infected fluids can enter a person's bloodstream through sores or tiny cuts in the lining of the mouth, vagina, rectum, or opening of the penis.
- ▶ **Shared Needles** HIV can be transmitted through shared needles or syringes that are contaminated with the blood of an infected person. Therefore, sharing needles for tattoos or body piercings and injecting illegal drugs put you at risk for HIV infection.
- ▶ **Contact With Blood** HIV can be transmitted if a person has an open cut or sore that comes into contact with the blood or blood parts of an infected person. Avoid all contact with others' blood.
- ▶ **Mother to Baby** HIV can pass from an infected mother to her child, either during pregnancy, birth, or breast-feeding. Certain drugs can decrease the chances of transmission during pregnancy, and the doctor might deliver the baby by cesarean section to reduce the risk of transmission during birth. In addition, mothers infected with HIV should not breast-feed their babies.

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HEALTH LINKS™

For: Updates on AIDS
Visit: www.SciLinks.org/health
Web Code: ctn-7223

FIGURE 10 It is safer for an HIV-positive mother to bottle-feed, rather than breast-feed, her baby.



**In the United States,
mother-to-child
transmission of HIV
has decreased
dramatically in
recent years.**



FIGURE 11 Playing contact sports such as rugby does not put you at risk for HIV infection.

FIGURE 12 The global distribution of HIV infections is uneven.

Sequencing List the areas of the world from greatest number of infected people to smallest number of infected people. What position does North America have on the list?

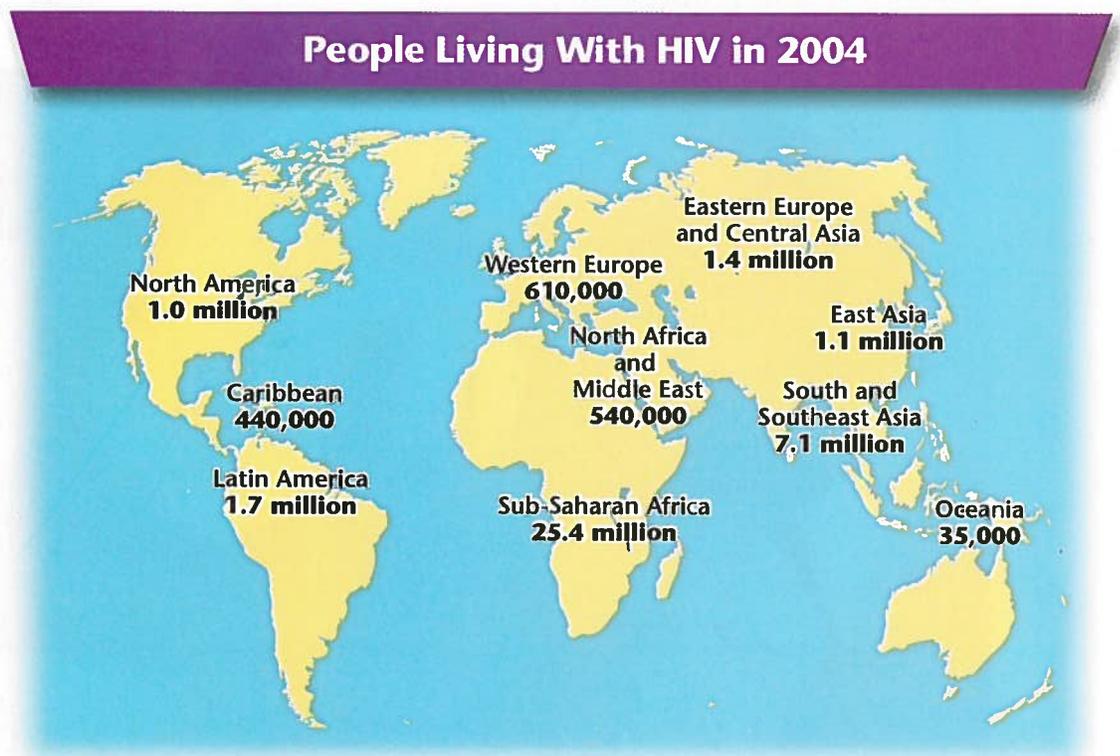
Safe Behaviors HIV is not transmitted by casual contact. You cannot get HIV by going to classes or eating lunch with an infected person. You cannot get HIV by holding hands or hugging an infected person. Families who live with an infected person are not at risk of contracting HIV unless they engage in high-risk behaviors. Small amounts of HIV occur in saliva, tears, and perspiration. However, the amounts are so small that infection from contact with these fluids is unlikely.

The Safety of Donated Blood The risk of getting HIV from blood transfusions is extremely small. Since 1985, all of the blood collected in the United States has been tested for the presence of HIV. Blood that tests positive for HIV antibodies is discarded. Potential donors are interviewed and are not allowed to give blood if they have engaged in behaviors that place them at risk for HIV infection.

A Global Problem

Figure 12 shows the global distribution of HIV infections. **With approximately 40 million people infected around the world, HIV and AIDS represent a global health problem.**

- ▶ **Africa** Sub-Saharan Africa accounts for more than half of all global infections. Some estimates indicate that, if infections continue to rise at the current rate, 80 million Africans may die from AIDS by 2025.
- ▶ **Asia** HIV infections are also increasing in certain parts of Asia. For example, researchers estimate that over 5 million people are living with HIV and AIDS in India.



High-Risk Groups In all areas of the world, HIV is spreading among people who share needles to inject drugs and people who engage in high-risk sexual behaviors. In many countries, young women represent the majority of new HIV infections. In sub-Saharan Africa, for example, 75% of young people infected with HIV are female. The higher infection rates in women are often due to a lack of information about how to protect themselves or, in some cases, a lack of power to protect themselves.

Education and Prevention Several international organizations are working to lessen the toll that HIV and AIDS are taking on populations all over the world. The World Health Organization and the Joint United Nations Programme on HIV/AIDS monitor the situation and recommend steps for stemming the epidemic in different countries.

The main goal of international organizations is HIV education. Making people in high-risk countries aware of how to protect themselves from HIV infection is a huge step toward prevention. Because treatment can be very expensive and inaccessible for the people at highest risk, much effort is put toward preventing HIV infection in the first place.

In addition to prevention education, international organizations coordinate treatment efforts for people already living with HIV and AIDS. Efforts are being made to provide medicine to millions of infected people in countries most affected by HIV and AIDS.

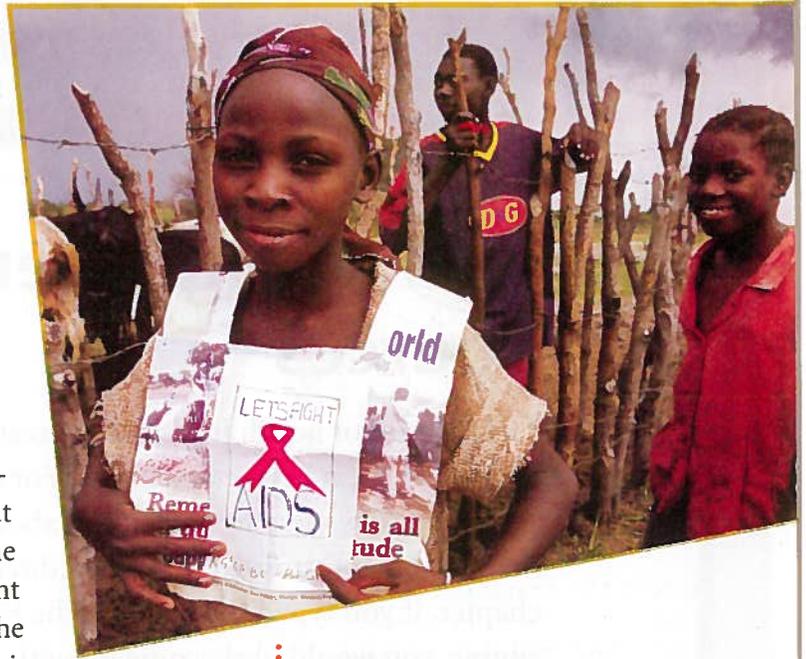


FIGURE 13 A girl from Zambia, a country in Africa, holds a sign she made for World AIDS Day.

Section 3 Review

Key Ideas and Vocabulary

1. Explain how HIV affects the immune system and how it eventually leads to AIDS.
2. What is meant by an **opportunistic infection**? Give an example.
3. What are four ways that HIV can be transmitted from an infected person to an uninfected person? List three ways HIV is *not* transmitted.
4. Which region of the world accounts for the majority of HIV infections?

Critical Thinking

5. **Making Judgments** Should teens in the United States be concerned about the global AIDS problem? Why or why not?

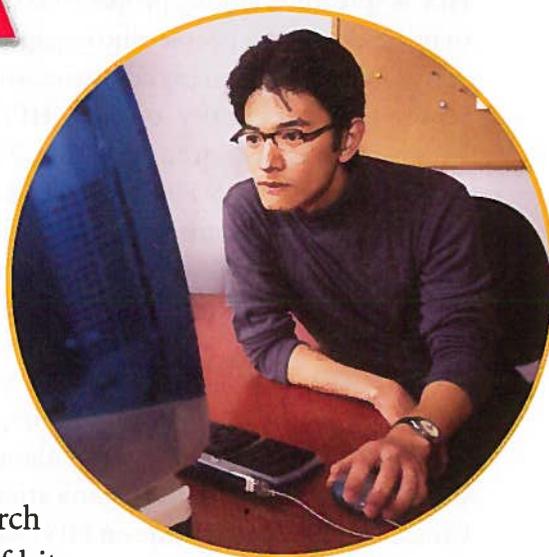
Health at School

AIDS Awareness Plan an AIDS Awareness Day at your school. Divide your class into groups to make posters about different aspects of HIV and AIDS. For example, one poster could focus on how HIV is transmitted. Another poster could focus on the status of the AIDS epidemic. Display your posters at school to help educate other students. **WRITING**

6. **Evaluating** HIV is more common in poorer countries than in wealthier countries. Why do you think this might be the case?

Evaluating Internet Sources

The amount of health information available on the Internet can be overwhelming. For example, suppose you wanted to learn more about one of the sexually transmitted infections discussed in this chapter. If you typed the name of the STI into a search engine, you would likely come up with thousands of hits. You can't possibly visit every site, so how do you decide which sites have accurate information? The following guidelines will help you evaluate the reliability of Internet sources. These guidelines apply to Internet sources on all kinds of topics, not just health topics.



The screenshot shows a web browser window with the address bar displaying <http://www.cdc.gov/std/chlamydia/stdfact-chlamydia.htm>. The page header includes the CDC logo and navigation links. The main content area is titled "Sexually Transmitted Diseases" and "Chlamydia - CDC Fact Sheet". On the left, there is a photograph of a woman with the word "Chlamydia" overlaid. Below the photo are links for "en Español" and "Print Version". On the right, there is a list of ten questions with blue hyperlinks for each, such as "What is chlamydia?", "How common is chlamydia?", and "Where can I get more information?".

1 Determine the type of Web site you are looking at and its purpose.

The Web address tells you what type of company or organization operates the site.

- ▶ A .gov in the address indicates that the site is run by a government organization. This type of site will usually provide reliable information. It may also represent the current administration's point of view.
- ▶ A .com or a .net indicates that it is a commercial site. A commercial site may provide information about products that are for sale. If the site is sponsored by the business that would profit from sales of those products, you probably will not find any negative information about the products on that site.
- ▶ A .edu indicates that an educational institution runs the site. Professors and students often post their own research on such sites.
- ▶ A .org indicates that a non-profit organization runs the site. Be aware of the organization's agenda as you consider its content.

2 Identify the author(s) of the site.

The author(s) should be indicated clearly at the top or bottom of the page, or on a page that is linked to the page you are looking at. What are the author's credentials? Is there contact information for the author? If it is not clear who takes responsibility for the content, it may not be reliable.

3 Determine if the information is current.

Many Web sites indicate when their content was last updated. Information on some topics may become out-of-date quickly. For example, if you are looking for the number of people who have been diagnosed with AIDS this year, you should look for a site that has been updated recently.

4 Determine the quality of the site.

Does the site look organized and professional, or does it look like it was put together haphazardly? Is the information presented in a straightforward way, or does it ramble?

5 Verify the information on the site with information from another source.

Does the site provide sources for the information it provides? If not, look elsewhere for information.



Practice the Skill

1. Go online to the HealthLinks site indicated below. Choose one page and click on it. See if you can answer the following questions based on that page:
 - a. Who is the author of the site?
 - b. What bias might the author have regarding the topic?
 - c. When was the site last updated?
 - d. What sources did the author use?
2. Based on your answers to the questions above, evaluate the reliability of the information on that Web site. Would you trust the information provided there? How would you verify that information?

Go Online
HEALTH LINKS™

For: Updates on AIDS
Visit: www.SciLinks.org/health
Web Code: ctn-7223

Section 4

Objectives

- ▶ **Identify** three behaviors that can prevent the spread of HIV.
- ▶ **Describe** how a person gets tested for HIV.
- ▶ **Describe** the goal of HIV treatment.

Vocabulary

- universal precautions
- HIV-positive
- viral load

Protecting Yourself From HIV and AIDS

Warm-Up

Dear Advice Line,

Lately my boyfriend has been asking me to have sex. I really like him, but I'm not ready for that. Plus I'm not sure he's telling me everything about his past. What should I do?

WRITING Write a response to this teen, encouraging her to choose abstinence. What would you tell her about the risk of becoming infected with HIV and other STIs?



Preventing HIV Infection

At present there is no cure for HIV or AIDS. But, the good news is that you can choose behaviors that will help you avoid this very serious disease. **You can protect yourself from HIV by practicing abstinence, avoiding drugs, and avoiding contact with others' blood and body fluids.**

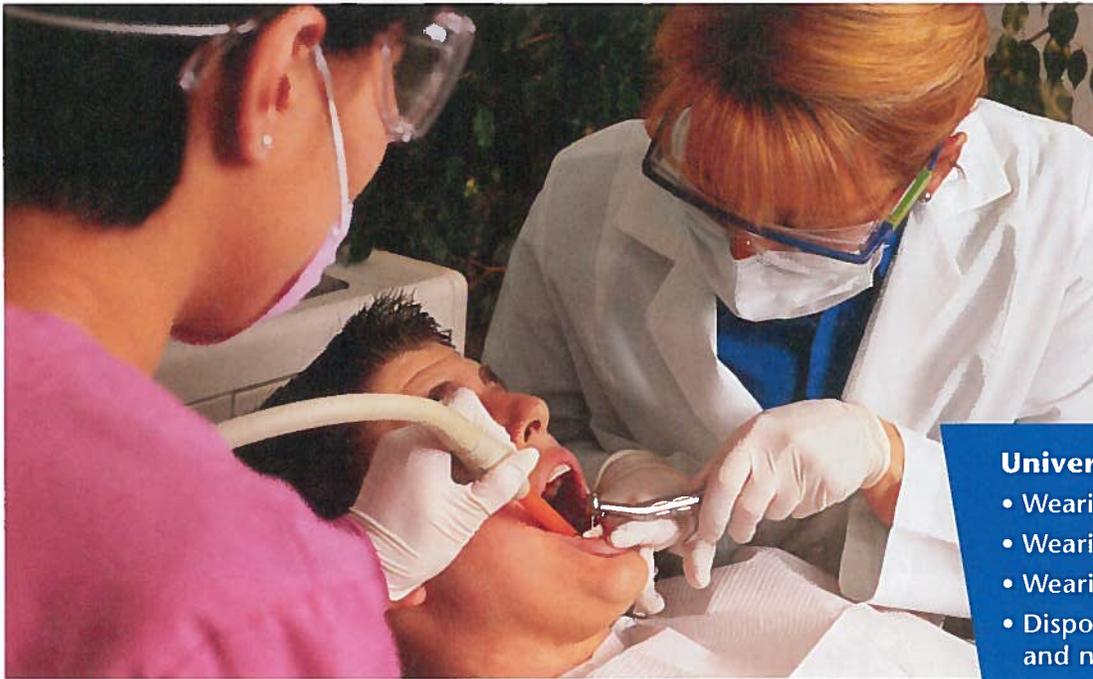
Practice Abstinence Choosing sexual abstinence is the best way to avoid HIV and AIDS. Even if you have been sexually active, you can choose abstinence. It is much easier to be abstinent if you have friends who are also abstinent. Spending time with responsible friends can reduce the pressure you may feel to engage in sexual behavior.

Avoid Drugs Avoiding drug use is also extremely important for reducing the risk of HIV infection. People who share contaminated needles to inject themselves with drugs are at a high risk for contracting HIV. People who have sex with drug abusers are also at high risk. Do not inject illegal drugs, and avoid sexual contact with anyone who uses illegal drugs.

Using alcohol or other drugs can impair a person's judgment. People with impaired judgment are more likely to engage in behaviors that place them at risk. To guard against infection, you need to be able to think clearly so you can make healthy decisions.

Connect to YOUR LIFE

How can your choice of friends help you avoid risky behaviors?



Universal Precautions

- Wearing gloves
- Wearing gowns
- Wearing masks
- Disposing of syringes and needles properly

Avoid Contact With Blood or Body Fluids Never share any personal items that may have blood or other body fluids on them. For example, razors, syringes, and piercing or tattoo needles should never be shared. In addition, mothers who are infected with HIV should not breast-feed their babies because the virus can be transmitted through breast milk.

Healthcare providers often come into contact with the blood and body fluids of patients. To reduce the risk of HIV transmission, doctors, nurses, dentists, dental hygienists, and other healthcare providers practice **universal precautions**, as listed in Figure 14.

Sexual Fidelity in Marriage For people in a long-term sexual relationship it is important to practice sexual fidelity. Sexual fidelity is practiced when both partners agree to have sexual contact only with one another—to be monogamous. If both partners are uninfected, sexual fidelity eliminates the risk of getting HIV or another STI. If either partner has practiced risky behaviors in the past, he or she should be tested for HIV and other STIs.

Barrier Protection People in long-term relationships may not be sure that their partners are faithful and uninfected. They can reduce the risk of HIV infection by using a condom during every sexual encounter. The condom must be made of latex or polyurethane, be free of tears, and be used in accordance with the directions on the package. Condoms serve as a physical barrier against HIV and some other pathogens that cause STIs. It is important to know that condoms are not 100 percent effective in preventing the transmission of HIV. Abstinence is the best way to protect yourself from HIV and other STIs.

FIGURE 14 Healthcare providers protect themselves and their patients by following universal precautions.

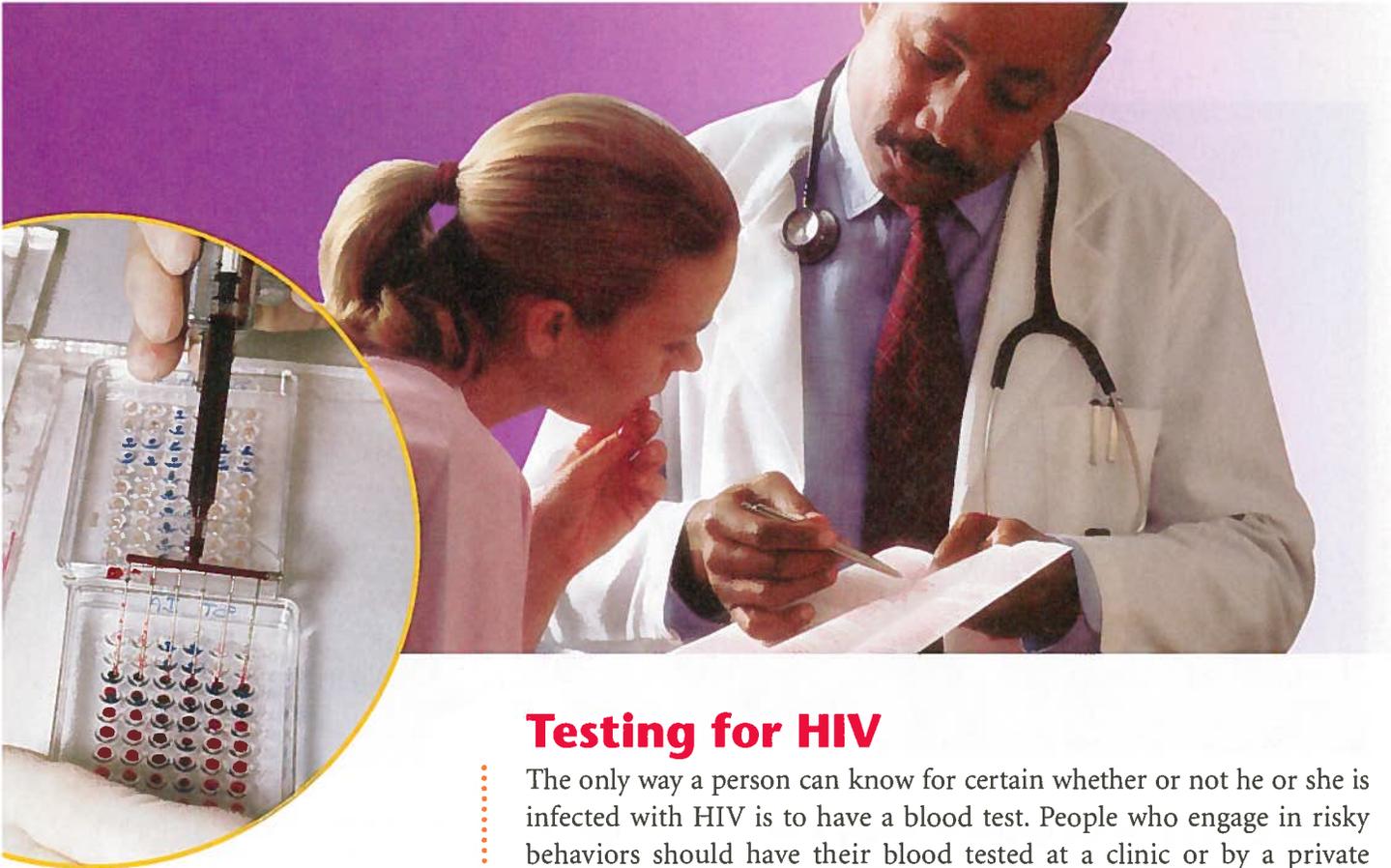


FIGURE 15 A blood test can reveal if a person is infected with HIV. Getting an HIV-positive result can be frightening and depressing. Therefore, it is important that HIV-positive individuals receive counseling to help them deal with the emotional impacts of their infection.

Testing for HIV

The only way a person can know for certain whether or not he or she is infected with HIV is to have a blood test. People who engage in risky behaviors should have their blood tested at a clinic or by a private physician. The names of clinics that provide confidential HIV testing are available from each state's department of public health or from the Centers for Disease Control and Prevention. People who think they may have been exposed to HIV should practice abstinence to avoid spreading the virus.

In an HIV test, a person's blood is tested for antibodies to HIV. If antibodies are detected, a second test is done to verify the result. A person who is diagnosed as being infected with HIV is said to be **HIV-positive**.

An HIV-Positive Diagnosis If a person is diagnosed as HIV-positive, he or she needs to notify all previous sexual partners so that they can also be tested. Early diagnosis is important to prevent the spread of the disease and to start treatment as soon as possible.

It is difficult to cope with an HIV-positive diagnosis. For this reason, it is recommended that individuals receive counseling from a healthcare professional before being tested. People who learn they are HIV-positive should receive additional counseling.

Reasons for Follow-Up Testing If an HIV infection is recent, a blood test may not be accurate. This is because there is a lapse between the time of infection and the time when antibodies show up in a person's blood. Antibodies usually show up within three months after infection. So even if no antibodies are detected in the person's first blood test, he or she should avoid all high-risk behaviors and be tested again in three months.

Connect to YOUR LIFE How could you convince someone of the importance of follow-up testing?



In the United States, medical costs for a person living with HIV are about **\$25,000** a year.

FIGURE 16 A common treatment regimen requires an HIV-positive person to take many pills each day. If the person misses too many doses, the virus may develop resistance to the medication.

Treatment for HIV and AIDS

Although there is no cure for HIV infection and AIDS, some treatments can add many years to a patient's life. The sooner a person begins treatment, the more effective it can be in slowing the progress of the disease.

The Goal of Treatment The main goal of HIV treatment is to keep the person's immune system functioning as close to normal as possible. To achieve this goal, the treatment must

- ▶ keep the person's **viral load**—the number of virus particles circulating in the body—as low as possible, and
- ▶ keep the person's T cell count as high as possible.

If both of these goals are achieved, the patient's immune system is more capable of fighting off opportunistic infections. Remember that current treatments do not rid the body of HIV. They try to stop HIV from destroying the immune system.

Combination Drug Therapy The most common treatment for HIV infection today is known as Highly Active AntiRetroviral Therapy, or HAART. HAART uses a combination of drugs to reduce the viral load in the blood. Multiple drugs are necessary to prevent the virus from reproducing inside helper T cells. A doctor prescribes a combination of drugs that is right for each individual patient.

Some drawbacks to HAART are its complicated dosage schedules, its cost, and its side effects, which can include liver and kidney damage. Furthermore, if a person is not consistent about taking the drugs exactly as prescribed, drug resistance can develop quickly.

Go  **Online**
PHSchool.com

For: More on HIV/AIDS prevention
Visit: PHSchool.com
Web Code: ctd-7224

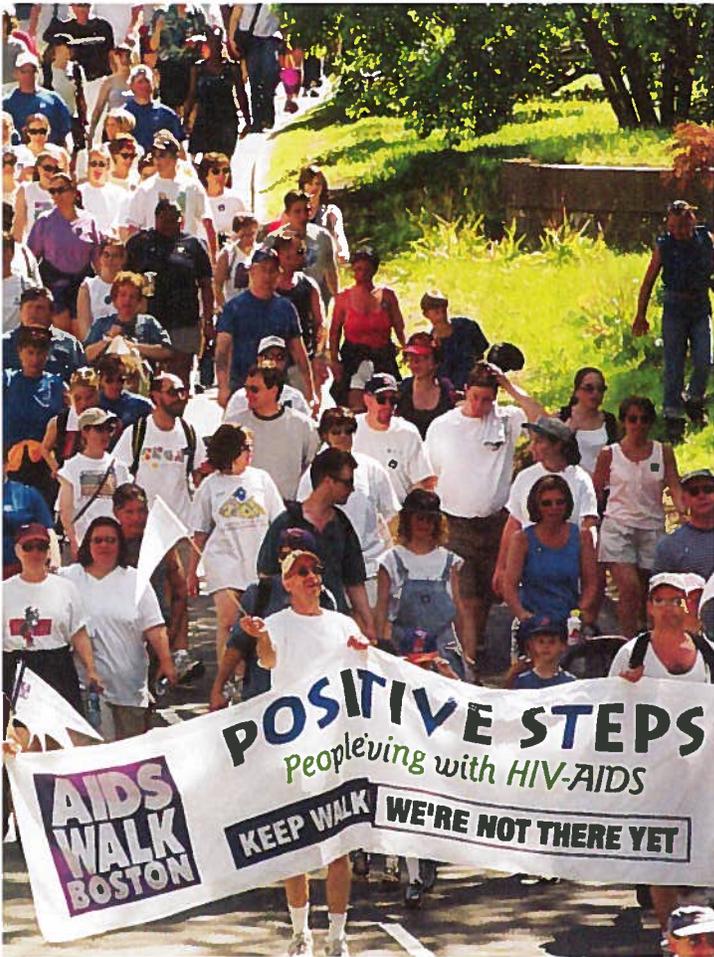


FIGURE 17 Every year, thousands of people participate in walks to help raise money for AIDS research and education.

Living With HIV People who are HIV-positive must take extra care to practice healthful behaviors. Eating right, exercising, and getting plenty of sleep are especially important for people who are HIV-positive. Regular visits to the doctor are also important for monitoring a patient's health and the effectiveness of HIV treatment.

When they are healthy, HIV-positive people can carry on with their careers and other activities. But they do have to avoid high-risk behaviors that put them at risk for infecting someone else. And because HIV compromises the immune system, they should stay away from anyone who has an infectious disease.

The Need for Support As with any serious disease, people who are HIV-positive as well as their loved ones need a lot of support to help them deal with their distress and anxiety. Support may include counseling, healthcare services, and financial assistance.

HIV-positive individuals should be treated with compassion. They also should be allowed to live their lives with dignity. Because HIV cannot be transmitted by casual contact, such as hugging or shaking hands, no one needs to be fearful of working or going to school with someone who is HIV-positive.

Section 4 Review

Key Ideas and Vocabulary

1. What are three behaviors that can help you avoid HIV infection?
2. What does an HIV test involve?
3. What does HIV-positive mean?
4. What is the main goal of HIV treatment? How is that goal achieved?

Critical Thinking

5. **Evaluating** Depression can be a serious problem in people who are HIV-positive. What do you think are some ways to help people deal with the mental and emotional effects of this disease?

Health at School

HIV Prevention Some schools introduce HIV prevention education in grades six to eight. Find out if you or a group of classmates could prepare a program to help educate these younger students about protecting themselves from HIV infection. Then, develop an outline for your program. **WRITING**

6. **Relating Cause and Effect** Doctors recommend that people who are HIV-positive should stay as healthy as possible, eating well, getting enough sleep, and avoiding exposure to anyone with an infectious disease. Why do doctors recommend this?

Risks and STIs List three things you learned from the video about the importance of sexual abstinence.

Section 1 The Risks of Sexual Activity

Key Ideas

- ✓ Risky behaviors that account for the current STI epidemic include ignoring the risks of sexual activity, having sexual contact with multiple partners, and not getting proper treatment.

- ✓ Practicing abstinence, avoiding drugs, and choosing responsible friends are ways to avoid STIs.

Vocabulary

- sexually transmitted infection (STI) (574)

Section 2 Kinds of STIs

Key Ideas

- ✓ Trichomoniasis, human papilloma virus, and chlamydia are common STIs in the United States.
- ✓ Other STIs include hepatitis, gonorrhea, genital herpes, and syphilis.
- ✓ People who participate in high-risk behaviors should get medical checkups every six months. Individuals who suspect they may be infected should seek prompt medical attention.

Vocabulary

- trichomoniasis (578) • urethritis (578)
- vaginitis (578) • human papilloma virus (579)
- chlamydia (579) • pelvic inflammatory disease (579)
- gonorrhea (580) • genital herpes (581)
- syphilis (582) • chancre (582)



Section 3 HIV and AIDS

Key Ideas

- ✓ HIV attacks the immune system, disabling the body's defenses. When the immune system becomes severely disabled, the infected person has AIDS.
- ✓ Individuals infected with HIV can pass the virus on to someone else through the exchange of blood, semen, vaginal secretions, or breast milk.

- ✓ With 40 million people infected around the world, HIV and AIDS represent a global health problem.

Vocabulary

- HIV (584) • AIDS (584)
- asymptomatic stage (585)
- opportunistic infection (586)



Section 4 Protecting Yourself From HIV and AIDS

Key Ideas

- ✓ You can protect yourself from HIV by practicing abstinence, avoiding drugs, and avoiding contact with others' blood and body fluids.
- ✓ In an HIV test, a person's blood is tested for antibodies to HIV. If antibodies are detected, a second test is done to verify the result.

- ✓ The main goal of HIV treatment is to keep the person's immune system functioning as close to normal as possible.

Vocabulary

- universal precautions (593) • HIV-positive (594)
- viral load (595)

Reviewing Key Ideas

Section 1

- A reduced ability to have children is
 - STI.
 - epidemic.
 - infertility.
 - abstinence.
- Describe two ways to avoid getting an STI.
- Critical Thinking** If you found out that the person you were dating had injected illegal drugs in the past, how would that affect your relationship?

Section 2

- A serious infection of the female reproductive organs that can be caused by chlamydia is
 - pelvic inflammatory disease.
 - genital warts.
 - syphilis.
 - trichomoniasis.
- An STI that cannot be treated with antibiotics is
 - gonorrhea.
 - chlamydia.
 - human papilloma virus.
 - syphilis.
- How can genital herpes affect a newborn baby?
- What steps should be taken by a person who suspects that he or she is infected with an STI?
- Critical Thinking** Why should someone who is diagnosed with an STI notify all of his or her sexual partners?

Section 3

- The virus that causes AIDS is
 - herpes.
 - HPV.
 - PID.
 - HIV.
- HIV destroys
 - neurons.
 - antibodies.
 - B cells.
 - T cells.
- Why do people with AIDS fall victim to opportunistic infections?
- Describe four ways that HIV is spread.
- Critical Thinking** Jason has engaged in high-risk sexual behavior, but he feels fine. He sees no reason to get tested for HIV or any other STI. What would you tell Jason about the importance of getting tested?

Section 4

- Which of these behaviors is *not* a way to protect yourself from HIV?
 - avoiding contact with blood
 - practicing abstinence
 - sharing needles
 - avoiding alcohol
- HIV-positive people receive treatments to keep
 - their viral load as high as possible.
 - their viral load as low as possible.
 - their viral load equal to their T cell count.
 - their T cell count as low as possible.
- In what ways can HIV treatment be difficult?
- Critical Thinking** Alyssa has engaged in high-risk sexual behavior in the past three months. She had an HIV test a month ago that came back negative. Should she be tested again? Explain.
- Critical Thinking** Experts consider education critical in preventing HIV infection. Do you agree? Explain your answer.



Building Health Skills

- Analyzing Influences** Do the media do a good job in educating people about HIV and other STIs? Give examples to support your answer.
- Advocacy** What could teens do to make abstinence an easier choice for their peers?
- Setting Goals** List some goals you have for the next ten years. How could practicing abstinence help you achieve those goals? **WRITING**

Health and Community

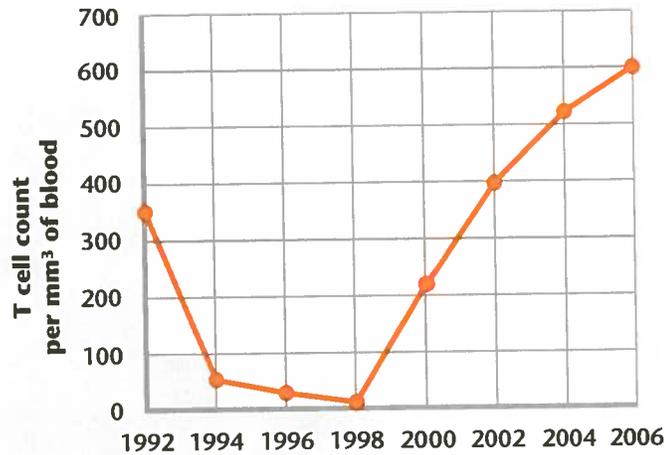
Public Service Announcement Some people behave in sexually risky ways. And in many cases, they don't get tested regularly for HIV or other STIs. Create a public service announcement that emphasizes the risks of certain behaviors and the importance of getting tested. Indicate where people in your community can go to get tested for HIV and other STIs. **WRITING**



Standardized Test Prep

Math Practice

The graph shows the helper T cell counts recorded for a person who is HIV-positive. Use the graph to answer Questions 22–24.



22. What is the lowest helper T cell count recorded for this patient?
- A 300 T cells per mm³ of blood
 - B 100 T cells per mm³ of blood
 - C 50 T cells per mm³ of blood
 - D 10 T cells per mm³ of blood
23. During which year do you think this patient started treatment for HIV?
- F 1996
 - G 1998
 - H 2000
 - J 2002
24. Between 2002 and 2006, the patient's T cell count
- A increased steadily.
 - B decreased steadily.
 - C fluctuated.
 - D remained the same.

Test-Taking Tip

Underline important words and phrases as you read. Then when answering questions, you can access the important content quickly.

Reading and Writing Practice

Read the passage. Then answer Questions 25–28.

Researchers are working to develop preventive HIV vaccines to protect people who are HIV-negative and control the spread of HIV. Multiple HIV vaccines may be necessary to prevent infection in the same way that multiple drugs are needed to treat people who are already infected. Researchers are also evaluating therapeutic HIV vaccines to treat people who are HIV-positive. A therapeutic vaccine could theoretically be given during early infection to delay the need for antiretroviral therapy and reduce the risk of transmission.

25. A therapeutic vaccine would
- A prevent HIV infection.
 - B treat people who are HIV-positive.
 - C be given prior to HIV infection.
 - D increase the need for antiretroviral therapy.
26. In this passage, the word *antiretroviral* refers to
- F drugs that treat HIV infection.
 - G an HIV vaccine.
 - H T cell count.
 - J viral load.
27. According to the passage, which of these statements is true?
- A Only one vaccine will be needed to prevent HIV infection.
 - B If a vaccine works to prevent HIV infection, it will also be able to treat someone who is HIV-positive.
 - C Preventive vaccines will not control the spread of HIV.
 - D A therapeutic vaccine should delay the need for antiretroviral therapy.

Constructed Response

28. In a paragraph, compare the two different types of HIV vaccines being developed.