

## HIV/AIDS Update (2 Hours)

### Goals & Objectives

#### Course Description

“HIV/AIDS Update (2 Hours)” is an asynchronous online continuing education course for physical therapists and physical therapist assistants. This course presents updated information about HIV/AIDS including sections on transmission, symptomology, testing, treatment, behavioral management, and legal issues.

#### Course Rationale

This course was designed to give physical therapists and physical therapist assistants information about advances being made in the understanding of HIV/AIDS so that they may limit their risk of accidental occupational exposure and provide optimal care for those infected with HIV. This course also addresses many of the legal issues that are associated with the care and treatment of individuals with HIV.

#### Course Objectives

After completing this course, the participant will be able to:

1. recognize the scope and impact of HIV/AIDS worldwide.
2. identify and differentiate the transmission modes of HIV infection
3. List the signs and symptoms of HIV infection and AIDS
4. Identify and differentiate between commonly used screening and confirmatory tests
5. Recognize current treatment recommendations for HIV infection
6. Recognize current prevention and treatment strategies for opportunistic infections
7. Recognize and understand key social intervention strategies
8. Identify available resources for additional HIV/AIDS information
9. Recognize the laws and statutes that pertain to the rights of individuals with HIV/AIDS, and to their care and treatment.

**Course Provider** – Innovative Educational Services

**Course Instructor** - Michael Niss, DPT

**Target Audience** – physical therapists and physical therapist assistants.

**Course Educational Level** – Introductory / intermediate

**Course Prerequisites** - None

**Method of Instruction/Availability** – Online text-based course available continuously.

**Criteria for Issuance of CE Credits** - A score of 70% or greater on the course post-test.

**Continuing Education Credits** – 2 hours

**Determination of Credits** - Mergener Formula:  $.9 \times [-22.3 + (0.00209 \times 38,093)] + (2.78 \times 10) + (15.5 \times 3) = 120 \text{ minutes} = 2.0 \text{ hours}$

**Fees** - \$19.95

**Conflict of Interest** – No conflict of interest exists for the presenter or provider of this course.

**Refund Policy** - Unrestricted 100% refund upon request. The request for a refund by the learner shall be honored in full without penalty or other consideration of any kind. The request for a refund may be made by the learner at any time without limitations before, during, or after course participation.

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## Overview

### Scope of the HIV/AIDS Pandemic

HIV infection and AIDS are among the most pressing concerns facing health providers worldwide. Although the impact of HIV/AIDS is serious in both developed and developing countries, it is most profound in the developing world, where resources to prevent, diagnose, and manage HIV infection are scarce.

The Joint United Nations Program on HIV/AIDS (UNAIDS) estimates that more than 40 million men, women, and children worldwide are now living with HIV/AIDS, of which 28 million are in Sub-Saharan Africa. In this region, 1 in 10 adults ages 15 to 49 is living with the virus, and in seven countries more than 20% of the population is infected. Women, especially young women, are becoming infected at alarmingly increasing rates. A great many infected people do not know they carry HIV and so may be spreading the virus to others unknowingly.

This global epidemic is now far more extensive than was predicted even a decade ago, and the challenges that HIV poses vary enormously from region to region. Since the beginning of the epidemic, AIDS has killed more than 21 million people, and it has replaced malaria and tuberculosis as the world's leading cause of death by infectious disease among adults. AIDS is now the fourth leading cause of death among adults worldwide, and more than 13 million children have been orphaned by the epidemic.

A host of economic, political, social, and cultural factors play a critical role in determining how quickly the epidemic spreads within a particular region and whether communities and countries are able to rally the resources needed to combat HIV/AIDS.

### HIV/AIDS in the Developing World

Africa, Asia, and Latin America lead the world in HIV infection, with an estimated two-thirds of the world's infections occurring in Africa, followed by 20% in Asia and 4% in Latin America and the Caribbean. In the former Soviet Union and China, recent surges in HIV and other STIs and increasing numbers of injection drug users are cause for growing concern.

## **The Future of the Epidemic**

More than 21 million people have died from AIDS. However, a staggering 40 million people are currently living with HIV, and 5 million new infections are expected yearly.

The devastation of the epidemic has clearly just begun. AIDS has already sharply reduced the rate of population growth in some countries, and within a few years, Botswana, South Africa, and Zimbabwe will experience negative population growth. Life expectancy is already dramatically reduced in many countries in Africa and has also decreased significantly in countries in Asia, the Caribbean, and Latin America.

## **Access to Treatment**

In more developed countries, recent advances in treatment have dramatically changed the perspectives of those living with HIV infection, of health workers, and of researchers. Many have now begun to think of HIV infection as potentially treatable, rather than an automatic death sentence.

However, most of those living in the developing world lack access to treatment regimens that have proved effective in extending lives and treating opportunistic infections, and the costs of such treatments—which can exceed \$10,000 per year—are well outside the reach of most individuals infected with HIV. Even though there have been price reductions in some developing countries, treatment is still out of reach for the vast majority.

Lack of access to treatment has been the cause of much recent global debate between public health activists and the pharmaceutical companies that hold the patents to these drugs, and recent events suggest that some measure of greater access may soon be achieved.

Although lack of access to treatment regimens is only one of many complex factors barring progress in the fight against HIV/AIDS in the developing world, many see improved access as an important first step.

## **Human Immunodeficiency Virus (HIV)**

HIV is a member of a group of viruses called retroviruses. A retrovirus is a virus that changes itself very rapidly. One reason why HIV is a particularly serious infection is that it attacks and destroys cells of the immune system—called T-cells or CD4 cells—that are designed to fight infections and diseases. After HIV penetrates these cells, it reprograms the cell so that it begins to produce many copies of the virus. Eventually, HIV destroys the immune cells. Another reason why HIV is a very serious infection is that it has the ability to mutate rapidly. This

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makes it especially difficult for researchers to find an effective treatment or vaccine.

There are two types of HIV. HIV-1 is responsible for the vast majority of infection and cases of AIDS in the world. HIV-2 is the more common type in West Africa and has a slower course than HIV-1.

From the time a person is infected with HIV, the virus begins to damage the immune system. Although an infected person's immune system struggles to fight back—and can do so for as many as 10 years or more in an otherwise healthy adult—the virus continues to destroy these defenses until the immune system is too weak to fight off infections.

A person can be infected with HIV and not know it, because any symptoms or illnesses related to HIV may not occur for many years after infection. Most people lead healthy and productive lives after HIV infection—in fact, many people are not aware they are infected because they feel fine. Unfortunately, even if the infected person feels fine, he or she can pass the infection on to others.

### **Acquired Immune Deficiency Syndrome (AIDS)**

AIDS is advanced HIV infection—it is the late stage of the infection, when the immune system is weakened. Advanced infection with HIV weakens the immune system to the point that it cannot fight off infections as effectively as usual. The individual becomes more susceptible to a variety of opportunistic infections and other conditions (e.g., cancer). Some examples of opportunistic infections include chronic cryptosporida diarrhea, cytomegalovirus eye infection, mycobacterium avium complex, pneumocystis pneumonia, and toxoplasmosis. Other AIDS-associated conditions include invasive cervical cancer, Kaposi's sarcoma, and lymphoma.

Persons living with AIDS often have multiple infections, neurological disorders, extreme weight loss, diarrhea, and cancers. Although an infected person generally dies as a result of complications of these infections, conditions, and malignancies, living with AIDS is like living with other chronic diseases: sometimes the person feels sick, and at other times he or she feels fine and can go about normal activities.

No one dies from AIDS or HIV; rather, a person with AIDS dies from an infection or condition that his or her weakened immune system can no longer fight off.

In the U.S. and Europe, the average time from HIV infection to the development of AIDS is more than 11 years. In developing countries, the average time is shorter, which is probably due to multiple factors, including a higher background level of pre-existing infections; less access to care, including prophylaxis for

opportunistic infections; and poor nutrition. Progress of the infection in infants is generally much faster than in adults.

### **How HIV Affects the Immune System**

HIV is a retrovirus, a type of virus that stores its genetic information on a single-stranded RNA molecule. After a retrovirus penetrates a cell, it creates a DNA version of its genes, and its DNA becomes part of the infected cell's DNA.

HIV infects one particular type of immune system cell, called CD4 cells (or T-cells). T-cells coordinate immune regulation and secrete specialized factors that activate other white blood cells to fight off infection. In healthy individuals, the number of CD4 cells normally ranges from 450 to 1,200 cells per microliter of blood (T-cell count).

When infected with HIV, a T-cell becomes an HIV-replicating cell. In other words, the virus binds with the cell, copies itself into the cell's DNA, and causes the cell to begin producing new HIV viruses. This process eventually causes the cell to die. As the number of T-cells decreases, the infected person's immune system becomes increasingly compromised. When a person's T-cell count drops to below 200 cells per microliter of blood, the person is considered to have AIDS.

An infected person's body tries to fight off HIV infection by aggressively manufacturing antibodies.

It is particularly difficult for the immune system to fight off HIV infection for a number of reasons, including the following:

- HIV attacks the immune system itself, weakening its ability to fight back.
- HIV replicates in large quantities that are more than the compromised immune system can handle.
- HIV has the ability to mutate very quickly, making it more difficult for the body to fight the infection.

### **HIV Transmission**

HIV is spread through three main modes. These modes of transmission are as a result of exposure to body fluids (blood, semen, vaginal fluids, and breast milk) of infected individuals. Specifically, HIV can be transmitted through:

#### **1. Sexual contact:**

- Vaginal sex
- Anal sex
- Oral sex

## **2. Blood contact:**

- Injections/needles (sharing needles, IV drugs, drug paraphernalia, or injury from contaminated needles or other sharp objects)
- Cutting tools (using contaminated skin-piercing instruments, such as scalpels, needles, razor blades, tattoo needles, circumcision instruments)
- Transfusions (receiving infected blood or blood products) or transplant of an infected organ
- Contact with broken skin (exposure to blood through cuts or lesions)

## **3. Mother-to-child transmission (MTCT):**

- Pregnancy
- Delivery
- Breastfeeding

Although any exposure through one of these methods can lead to HIV infection, not every exposure results in transmission of the infection.

Many myths exist about how HIV is transmitted, and many myths are culturally specific. It is important that people realize that HIV is actually quite difficult to transmit. For example, it is far less transmissible than hepatitis B or some other STIs.

HIV is NOT transmitted through:

- Ordinary social or casual contact
- Donating blood
- Shared clothing
- Touching
- Shared food or dishes
- Dry kissing
- Shaking hands
- Toilet seats
- Insect bites
- Massaging another person
- Sexually stimulating a partner using your hand (although a risk may exist if blood, semen, or vaginal fluids come in contact with broken skin)
- Masturbation
- Living with a person with HIV

In addition, HIV is not transmitted through tears, sweat, saliva, vomit, feces, or urine. Although these substances can contain HIV, they do not contain the virus in amounts significant enough to cause infection. Extensive, continuing studies of

new HIV infections over the last 20 years in many countries have not uncovered any cases of infection through these substances. To date, there is no documentation of HIV transmission through these substances. Blood, semen, vaginal secretions, and breast milk are the only body fluids through which HIV transmission has been documented.

It is theoretically possible to transmit the virus through deep kissing if the gums have open sores or are bleeding, but this is highly unlikely. Even so, transmission in this case would be through blood rather than through saliva.

## **Signs and Symptoms**

### **HIV Infection**

During the early and middle stages of HIV infection, most people have no symptoms at all. Immediately after infection, some people may develop mild, temporary flu-like symptoms or persistent swollen lymph nodes.

As the infection progresses, those infected may begin to develop more symptoms and to experience feelings of decreased energy. These subtle symptoms may be easily attributed to systemic infections, such as tuberculosis, or to other conditions common to people living in poverty in low-resource settings.

Some of the symptoms that people with HIV may have include:

- An unexplained loss of weight lasting at least one month
- Diarrhea lasting for several weeks
- A white coating on the tongue (thrush/oral candidiasis)
- Enlarged or sore glands (lymph nodes) in the neck, armpits, and/or groin, as well as generalized swollen glands
- A cough that persists for more than one month
- Persistent fever and/or night sweats
- In women, persistent vaginal candidiasis (yeast infection)

### **AIDS**

AIDS is late-stage HIV infection. In addition to the signs and symptoms of HIV infection described above, a person with AIDS generally loses weight (wasting syndrome) and becomes ill with opportunistic infections such as chronic cryptosporida diarrhea, cytomegalovirus eye infection, mycobacterium avium complex, pneumocystis pneumonia, and toxoplasmosis. Other AIDS-associated conditions include invasive cervical cancer, Kaposi's sarcoma, and lymphoma.

The U.S. Centers for Disease Control and Prevention (CDC) defines someone as having AIDS if he or she has any one of a number of conditions indicating severe immunosuppression, or HIV infection in an individual with a CD4 (T-cell) count less than 200 cells per microliter (less than half of what is considered to be the bottom of the normal range).

### **HIV Testing**

The most frequently used HIV tests detect the presence of antibodies to HIV, not the actual virus itself. A positive HIV antibody test indicates the presence of antibodies to the virus. A negative test result indicates either no antibodies or an undetectable level of antibodies to the virus. It is possible that these tests can miss infection in a person who was recently infected with HIV and has not yet developed enough antibodies to show a positive result.

The period of time from infection with HIV until the body has developed detectable antibody levels is called the window period. The window period is approximately three months on average. A person who is worried that he or she may have been exposed to infection should be encouraged to seek testing, and the counselor should explain that if the test comes back negative, it should be repeated after three months to confirm the result because the person could have been infected but still may be in the window period. During this period, a person may not test positive even if he or she is infected with HIV.

### **Rationale for Testing**

HIV testing should always be done voluntarily and never mandated or coerced. If people have a desire to know whether or not they are infected, they have a right to know. It is strongly recommended that clients be counseled both before and after testing. Where testing is readily available, a person who thinks he or she might have been exposed to HIV should consider being tested for a number of reasons:

- A person who knows he or she is HIV-infected can take steps to prevent transmission to others.
- In settings where medications are available to combat opportunistic infections and keep people healthy longer, it is best for people to know they are infected as soon as possible so they can begin treatment and schedule regular checkups right away.
- Women who know they are infected can make informed decisions about family planning, pregnancy, and breastfeeding. In some settings, treatment is available for pregnant women that can greatly reduce the risk of HIV transmission from mother to child.

- Some people want to know their HIV status so that if they are infected with HIV, they can make lifestyle changes that will preserve their health to live longer or better lives.

HIV counseling and testing can be important decision-making tools for clients and service providers and can help even uninfected clients understand their risk for HIV. In addition, testing enables health care providers to offer information to infected clients about living with HIV infection and assist them in obtaining any available support services, including treatment, emotional and practical support, prevention of MTCT, and legal services.

### **Types of HIV Tests**

There are two broad categories of HIV tests: screening tests and confirmatory tests. Using these two types of test together can lead to highly accurate and reliable diagnosis of HIV infection.

#### **Screening Tests**

Screening tests are used for initial testing because they are easier to perform than confirmatory tests, well suited to testing large numbers of samples, and less costly. They are highly sensitive and result in few false negatives (i.e., most infected people test positive). However, screening tests are not as specific as confirmatory tests, so in a small percentage of cases the test result will be positive even if the person is not infected. Therefore, providers should never give results from screening tests that have not been verified through a confirmatory test.

#### **ELISA tests**

The most common screening tests are enzyme-linked immunosorbent assay (ELISA) tests. These tests measure antibodies to HIV. Different types of ELISA tests are available. Most require serum specimens, though one uses urine and another uses an oral specimen.

**Serum tests.** Traditional screening tests use a blood sample. About two dozen types of ELISA tests are in use around the world.

**Urine tests.** An ELISA test for detecting HIV in urine samples has been approved for use in the U.S.; however, its biggest drawback is that there is no approved confirmatory test for urine samples (in other words, if the urine ELISA results are positive, a blood sample must then be drawn for confirmatory testing).

**Oral tests.** OraSure is an HIV test that uses mucosal transudate as the sample. (Although some call this a saliva test, the sample is not saliva, but an oral sample called mucosal transudate.) The sample is collected by placing the special

collection device between the cheek and gum. The specimen is then sent to a lab for ELISA testing. Positive ELISA results can be confirmed using the Western blot test. These tests are more expensive than blood tests.

### **Rapid Serologic Tests**

Rapid serologic tests provide results in less than 30 minutes. These tests also measure antibodies to HIV, but by different mechanisms than ELISA tests, including agglutination tests, immunocomb tests, immunodot tests, and immunochromatographic membrane tests. Most rapid tests are kits that include all of the necessary supplies. These tests are relatively simple, involve a limited number of steps, and are quite accurate when performed correctly. (Most rapid tests require refrigeration.) While the inherent sensitivity and specificity of ELISA tests may be greater than those of some of the rapid tests, the field performance of rapid tests is often as good as or better than the ELISA because the former is simpler and easier to do in a low-resource setting. One rapid HIV test is approved for use in the U.S. (Single Use Diagnostic System for HIV-1, or SUDS, manufactured by Murex Diagnostics, Inc.).

**HIV Dipstick Test Kit.** This is a rapid (results in approximately 20 minutes), inexpensive (less than \$0.50/test) test that requires no specialized equipment. Sensitivity is more than 99%, and specificity is more than 98%. The dipsticks are licensed in many countries around the world and are currently being produced in Thailand, India, Argentina, and Indonesia. They are not licensed for use in the U.S.

### **Confirmatory Tests**

A confirmatory test is done when the results of a screening test are positive. The confirmatory test is expensive and labor intensive and requires subjective interpretation, but it is very specific (in other words, false-positive results are extremely rare). The Western blot test is considered by most to be the “gold standard” for confirmation of positive screening test results. This test also measures antibodies to HIV, but it is more specific than screening tests and false positives are minimal. Another, less commonly used confirmatory test is the immunofluorescence assay (IFA). Positive results from ELISA or rapid tests are commonly confirmed using a Western blot.

### **Alternate testing strategies**

Other testing strategies besides a screening test followed by a confirmatory test have been proposed by the WHO and UNAIDS for use in low-resource settings where the Western blot may not be readily available or affordable. These strategies include using a combination of two screening tests (ELISA or rapid tests) without using the Western blot. Studies have shown that the use of two screening tests together can give results similar to, or in some cases better than, the use of a screening test followed by a confirmatory test, at a much lower cost. It is important to note that results will vary depending on the combination of

screening tests used, so it is necessary to evaluate the intended combination before undertaking widespread implementation.

### **Confidentiality**

In addition, there are concerns about maintaining confidentiality of test results, in part because of the stigma attached to HIV infection in many settings and the potential for discrimination against, violence toward, and community rejection of individuals who test positive. Also, coercion into test taking is a concern in some settings. That is why testing must always be voluntary and based on the informed consent of clients. As such, counseling is an integral component of testing.

It is essential to prevent the exposure of personal information regarding clients' test results (or even that fact that they had an HIV test) to unauthorized persons. Private client information must not be made accessible to other clients or community members through careless record storage, lack of private space for confidential counseling, or inappropriate discussion of client information inside or outside the clinic setting.

### **Pretest and Posttest Counseling**

All individuals who are tested for HIV should have access to a counseling and education session before the test is done, and then again once the test results are available.

#### **Pretest counseling**

Pretest counseling provides an opportunity for counselors and clients to talk about the HIV testing process, the meaning of positive and negative test results, the client's potential risks, ways to reduce risk, and the client's intended plan of action once he or she has received the test results.

Pretest counseling should not focus on getting the client to admit to various behaviors, which may be considered socially unacceptable or which he or she may feel uncomfortable discussing. The keys to HIV counseling are to discuss all of the behaviors that may increase the risk of HIV infection in a client-centered, nonjudgmental way, as well as to discuss ways to reduce risk.

Pretest counseling and education will help both the health care provider and the client assess the client's understanding of HIV/AIDS, testing, modes of transmission and prevention, along with his or her ability to handle the results.

In addition, counselors should attempt to work with clients to develop personalized HIV risk-reduction plans, focusing on realistic, incremental steps toward behavior change.

It is important to note that before taking an HIV test, a client should be aware that if the result is positive, he or she will have an illness that carries a social stigma. In some settings, people with HIV have been thrown out of their homes, fired from jobs, victimized in their community, and physically assaulted. Clients need to think through these possible problems before they decide to be tested.

### **Posttest counseling**

All individuals who are tested for HIV antibodies should have access to a posttest counseling and education session at the time they are given the test results. This session will help both the health care provider and the client assess the client's understanding of the results of this test. Test results should be given as soon as possible so that the client has time to absorb this information. When giving negative test results, remind clients that the results may not be accurate if the client has engaged in behaviors that put him or her at risk during the three months before testing or since the test was done. If appropriate, clients should be offered a repeat test at an appropriate time in the future.

When disclosing a negative test result, the counselor should explain what the test result means, answer any questions, address the client's emotional response, and discuss strategies for remaining HIV-negative. This could include further discussion of the client's risk-reduction plan.

### **Recognizing Clients' Anxieties**

Most clients who test positive for HIV are likely to have a high degree of anxiety, even before learning of the diagnosis. Many people at high risk for infection have friends or acquaintances who are currently living with HIV infection or who have already died from AIDS, and many may have misperceptions about the facts of HIV infection. Even clients who already have a good level of information about HIV infection in general will require personalized information about the infection regarding the specifics of their own individual case.

While giving information, health care providers should be aware that the anxiety and emotion that accompany a positive result are likely to have a profound effect on the client, and the client may need some time to come to terms with the results before being able to deal with more detailed information. For many clients, it might be more appropriate to wait for a little while to discuss treatment options, perhaps with the supportive presence of a friend or family member.

### **Talking About Clients' Prognoses**

When discussing HIV infection with newly diagnosed clients, health care providers must walk a very thin line between the clients' simultaneous needs for

honesty, factual information, practical information, advice, and hope for the future.

Many clients are likely to ask difficult questions, such as “How long will I live?” after learning of the diagnosis. Honesty and realism are essential tools for health care providers when discussing a client’s prognosis, but a realistic optimism should be applied whenever appropriate.

While recognizing the seriousness of the diagnosis, providers should avoid speculating about a client’s survival time, stressing that each individual case is different and that strategies to extend survival and new treatment therapies are being developed and tested at a rapid pace; however, this may offer little comfort in settings where treatment options are not readily available.

## **Management of HIV Infection**

### **General Considerations**

In general, the needs of HIV-infected clients and their families can be categorized into four overlapping areas:

1. Medical needs, including treatment information and treatment
2. Psychological needs, including emotional support
3. Socioeconomic needs, including orphan support and medical and transport expenses
4. Human rights and legal needs, including access to care and protection against violence and discrimination

Because HIV infection is both chronic and progressive, most medical management is provided by the client’s primary care physician on an outpatient basis, particularly during the long asymptomatic stage of the infection.

In addition to any available drug therapies, clients living with HIV/AIDS need a host of clinical services. For example, children with HIV/AIDS require routine medical care and immunizations, and women with HIV/AIDS may require specialized contraceptive and prenatal counseling and services.

### **Range of Services Needed**

Aside from clinical care, though, health care workers should be aware that clients living with HIV require a wide range of services, and that infected clients also often face difficult psychosocial issues, including a high incidence of depression. Health care providers need an understanding of the social, economic, psychological, behavioral, and philosophic factors that affect management of the

infection and should consider all aspects of a client's life when making management and drug recommendations.

Because clients often need assistance in terms of housing, food, child care, and other social services, optimal management of the infection should include thoughtful counseling, close cooperation with family members and friends, and referral for additional medical and non-medical services, as available.

The most urgent management goal for health care providers working with HIV-infected clients is counseling to prevent further transmission of the infection, treatment of any conditions that require immediate attention, and the use of a nonjudgmental approach to encourage clients to remain within the health care system for follow-up.

Clients with HIV infection often experience shame or social stigma either because of the infection itself or because of risk behaviors leading to infection. In addition, some clients may have experienced biases or had negative interactions within the health care system.

Health care programs need to address such stigma and discrimination against people with HIV/AIDS. Staff in health care facilities can benefit from training that addresses the needs and human rights of those affected by HIV and that emphasizes clients' rights to privacy, confidentiality, dignity, and services free of discrimination and judgment. Staff can also have their fears about occupational exposure to HIV addressed through training in standard precautions. Procedures can also be put in place to ensure clients' rights and confidentiality.

### **Antiretroviral Drugs**

Antiretroviral drugs are the most effective intervention to date in managing HIV infection. These drugs have the potential to dramatically improve the health and extend the lives of many people living with HIV/AIDS.

Antiretroviral drugs work by interfering with HIV's life cycle and its ability to reproduce. This group of drugs includes reverse transcriptase inhibitors, which work by neutralizing an enzyme HIV needs at the beginning of its life cycle, and protease inhibitors, which neutralize an enzyme HIV needs near the end of its life cycle.

The goals of antiretroviral drugs are to prolong the health and life of HIV-infected clients, improve the symptoms of HIV infection, improve immune function, and suppress the replication and mutation of HIV.

In developed countries, combination therapy, in which several antiretroviral drugs (usually three or more) are used together, has been credited with the decline in

the number of HIV infections that progress to AIDS and the number of AIDS-related deaths. Studies have shown a dramatic reduction in the viral load (level of virus in the blood) through combining various antiretroviral drugs.

Protease inhibitors may eventually prove to be more effective than reverse transcriptase inhibitors, or the two together may prove to fight HIV in ways that either alone does not. The protease inhibitors seem less toxic than reverse transcriptase inhibitors and reduce the level of HIV in the blood to a greater degree than reverse transcriptase inhibitors.

### **Treatment Regimens and Adherence**

Both the client and the provider should agree on an approach to drug therapy, and health providers should discuss the risks and benefits of any available treatment options.

Treatment regimens may be difficult for clients to follow. Antiretroviral drugs can cause a number of side effects that clients need to learn to deal with or can require clients to switch to other drugs if the side effects are too severe. In addition, combination therapy requires taking a large number of pills on a complicated schedule.

Different clients may have widely different views about taking these drugs. For example, some clients may be skeptical about taking drugs with potentially significant side effects, while others may request the most aggressive therapies possible. In addition, it is difficult to predict whether clients will be willing or able to adhere to a complicated schedule of medication.

Adherence to a drug regimen—taking every dose of the prescribed drug(s) when and how it is prescribed—is critical to the success of treatment; missing even a single dose can compromise suppression efforts or contribute to the development of resistant strains of HIV. Effective treatment requires health care providers to design therapy with individual adherence in mind.

Because of the long-term consequences of the development of drug-resistant HIV strains, the initial therapy tried should be considered “the best shot” at the virus. To maximize the possibility of success, clients should undertake a treatment regimen only after they are fully committed to it and ready for treatment and are assured adequate supplies of medication.

### **Preventing and Treating Opportunistic Infections**

Where available, preventive therapies and treatment of opportunistic infections can help prevent opportunistic infections, reduce mortality, slow the progress of HIV infection, and ease painful symptoms.

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Therapies to prevent some of the most common opportunistic infections are shown in the following table:

<b>Opportunistic Infection</b>	<b>Preventive therapy</b>
Pneumocystic carinii pneumonia	Trimethoprim-sulfamethoxazole (Co-trimoxazole)
Tuberculosis (TB)	Isoniazid
Toxoplasmosis	Trimethoprim-sulfamethoxazole (Co-trimoxazole)
Mycobacterium avium complex (MAC)	Azithromycin

Unfortunately, in many low-resource settings facilities for diagnosis are inadequate and drug supplies are erratic, even for those opportunistic infections that are easy to diagnose and less costly to treat. Access to treatment for clients in these settings will remain compromised until drugs and diagnostic equipment are accessible and countries can afford to equip their health systems with the necessary infrastructure and well-trained staff.

### **Other Management Issues**

#### **Nutrition**

Nutrition is an important issue for HIV-infected persons, who are particularly vulnerable to malnutrition and weight loss. Infected individuals may require an extremely high caloric intake to maintain weight, and drugs and conditions affecting the gastrointestinal tract can result in severe weight loss due to nausea, vomiting, or malabsorption. In addition, HIV-infected clients may experience loss of appetite or may be too sick or lack adequate income or resources to obtain food.

Those at risk for opportunistic infections should avoid eating raw foods, which might contain bacteria or other microbes that could make them sick. However, there is little evidence that highly specialized diets, such as a macrobiotic diet, have any beneficial effect.

#### **Alternative Therapies**

Many people with HIV use some kind of alternative or complementary therapy, such as herbs, acupuncture, megavitamins, or other therapies that are purported to strengthen the immune system. Some alternative therapies may be beneficial, some can be dangerous, and others may be safe but ineffective.

It is important to take a nonjudgmental approach to the use of these types of treatments, so long as they are not harmful to clients. Knowing about nonprescription treatments enables providers to assess the possibility of side effects from these treatments and potential drug interactions.

### **End-of-life issues**

Clients often wish to discuss issues regarding death and dying after diagnosis with HIV infection or during management and treatment. Although these topics might be difficult for health care providers to discuss, it is important to listen and respond to clients honestly.

Because of the progressive and terminal nature of HIV infection, clients should be encouraged to consider issues regarding loss of income, the likelihood of increased incapacitation, care of children and other dependents, and decisions regarding the level of care they would want to receive in case of terminal illness or respiratory arrest.

Although health care providers should be realistic and not overly optimistic when discussing a client's probable life span, it is equally important and reasonable to hope that research findings, new developments, improved access to treatment, and other factors will enable some currently infected people to live out their normal life spans.

### **Pregnant Women with HIV**

The majority of cases of mother-to-child transmission, (also called vertical transmission or maternal-fetal transmission and, more recently, parent-to-child transmission) appear to occur during labor and delivery. This may take place, for example, during contact with infected secretions, including blood from the mother's genital tract during labor and delivery.

It is important to know the mother's HIV status during pregnancy in order to begin employing risk-reduction therapies as quickly as possible. These include prophylactic treatment of opportunistic infections and antiretroviral therapy both for the mother during pregnancy and for the child postpartum in settings where these treatments are available.

### **Sexually Transmitted Infections (STI)**

Since the presence of other STIs can increase susceptibility to HIV infection, as well as hasten the development of AIDS, efforts to diagnose and treat curable STIs have become a major strategy in combating the HIV epidemic. Although ulcerative STIs (e.g., syphilis, herpes) can most readily facilitate HIV transmission, other STIs have been shown to do so as well. STI/HIV diagnosis

and treatment efforts include counseling to ensure proper treatment and strategies to notify partners for treatment.

## **Key Interventions and Strategies**

### **Behavior Change Communication (BCC)**

Behavior change communication involves efforts to assist individuals to change high-risk behaviors and to educate communities to support long-term change. BCC can involve a variety of intervention types, including:

- Mass media and small media
- Interpersonal communication/counseling—individual, small group, couple, or family
- Peer education/counseling

### **Voluntary Counseling and Testing (VCT)**

Voluntary counseling and testing (VCT) is a combination of two activities — counseling and testing—into a single service that can amplify the benefits of both. In its ideal form, VCT can be used as a form of prevention rather than strictly for diagnostic purposes, or to facilitate entry into HIV care services.

The “gold standard” for VCT incorporates pretest counseling and posttest counseling. Helping clients understand and perceive their own risk (and the risks that their behavior may pose to others) and reduce that risk, are integral components of VCT counseling.

VCT is an important entry point to other HIV/AIDS services, which can benefit clients with positive or negative results. When it is well implemented, VCT services offer the possibility of benefiting the community by “normalizing” the existence of HIV/AIDS, thereby reducing stigma and promoting awareness.

VCT is an essential component of prevention of MTCT programs because such programs cannot be implemented if women do not know their HIV status. Programs, however, should not focus only on identifying HIV-positive women for MTCT intervention, but they should also focus on risk reduction and helping women who test negative to remain that way. VCT programs for pregnant women can benefit from the involvement of men. Some studies have shown that when women test positive for HIV and their male partners are not tested, the women are often blamed for introducing the infection into the couple. Such unfounded blame can lead to conflict, abandonment, and even violence.

There has been debate concerning the effectiveness of voluntary counseling and testing (VCT) as a strategy for HIV prevention. In theory, if a person tests

negative, an opportunity exists to counsel him or her about primary prevention (how he or she can remain uninfected). If a person tests positive, an opportunity exists for secondary prevention (how he or she can prevent transmission to others). The relationship between knowledge of HIV status and changes in risk behaviors—in particular decreases in such behaviors by people who know they are infected with HIV—is unclear. Study results vary, with some finding significant decreases in risk behaviors in those who knew they were HIV-positive, and others not. While it is clear that some individuals do reduce risks after knowledge of a positive HIV test, it is also clear that others do not. Similar results have been seen in people who tested negative. Ongoing counseling and testing (in other words, repeatedly over time) appears to have a greater impact on reduction of risk behaviors than one-time counseling and testing.

Access to affordable treatment is an important ethical and programmatic concern that must be taken into account when testing services are established. Testing is now being actively encouraged in the developed world, where effective medications for the treatment of HIV and opportunistic infections are more readily available and early treatment is often feasible.

In developing countries, despite lower levels of access to treatment, VCT is receiving increasing support since it can be an important entry point for accessing care as well as prevention. On the community level, when prevention and care are offered together as a part of a “prevention-to-care continuum,” they work synergistically. They improve community acceptance, reduce the stigma of HIV/AIDS, and encourage HIV-infected people to practice preventive behaviors and seek care and support.

VCT is also recognized as an essential component of care for pregnant women in order to determine options for prevention of mother-to-child transmission (MTCT).

### **Community Interventions**

Although the term “community interventions” can include many different types of approaches, interventions that seek to shift social norms or mobilize communities for action are recognized as key strategies in confronting the HIV epidemic. For example, such efforts might include reaching out to individuals in their homes or gathering places with information and education; organizing community educational events (through, for example, theater or sporting events); working with religious organizations and leaders, as well as with traditional healers; working with young people in schools, as well as with out-of-school youth; or integrating STI/HIV prevention education into existing community-health-outreach and community-based contraceptive-distribution programs. The aim of outreach efforts in these various settings is to combat stigma and discrimination associated with HIV/AIDS, educate community members how to protect

themselves from infection, organize care and support for those who are ill or otherwise affected, and provide care for children orphaned by AIDS.

It is important that people already infected with HIV help prevent the spread of the infection through such practices as safer sex and safer drug use. Not only do infected people run the risk for infecting others, but they are also at risk for contracting other, and possibly more virulent, strains of the virus, as well as other illnesses which are transmitted sexually (i.e., syphilis) or through shared drug equipment (i.e., hepatitis B and C).

Because no cure for HIV/AIDS is available, the only way to prevent HIV infection is to avoid behaviors that put a person at risk. Many people infected with HIV have no symptoms, and, therefore, there is no way of knowing with certainty whether a sexual partner is not infected unless he or she has repeatedly tested negative for the virus—and has not engaged in any risky behavior between tests.

### **Behavior Change**

A variety of related and overlapping behavior change theories and paradigms have been used to inform the development of prevention programs and interventions. In general, these theories and paradigms recognize the complexity of human behavior and the myriad psychological, sociocultural, and structural factors that play a role. More recently, increased attention has been given to the idea of looking beyond individual behaviors to the contextual factors that make people vulnerable to STI/HIV infection and that influence behavior. These include, for example, social norms, gender inequalities, and poverty.

In STI/HIV prevention, as in other areas of health and behavior, the knowledge-attitude-behavior (KAB) or knowledge-attitude-practice (KAP) continuum is often referred to. It is simply a convenient way to organize the many aspects of knowledge and attitudes that must be present before changes in behavior or practices can occur.

Sexual behavior, however, is not easy to change. Simply telling clients that certain behaviors put them at risk for STIs or HIV is generally insufficient. For example, a person must know which practices can put an individual at risk (knowledge), must believe that “people like him or her” can be at risk (attitude), and must believe that he or she is at risk (attitude) before that person can take action to change his or her own behavior (practice). Interventions must be in place to address all three levels, and people must know what to do to protect themselves, must feel that they have the ability to effect change, and must have the skills and resources to do so. Most important, people must have willing partners and a supportive environment.

## “Stages of Change” Model

A variety of theoretical models examine the factors that contribute to behavior change. One such model is the “stages of change” model.

This model suggests that individuals or groups pass through six stages when changing behavior: pre-contemplation, contemplation, preparation, action, maintenance, and relapse. For example, when people change their behavior, the stages they pass through could be described as:

1. Pre-contemplation: Has not considered that they are at risk
2. Contemplation: Becomes aware of their risk
3. Preparation: Begins to think about actions to reduce their risk
4. Action: Takes actions to reduce risk for fewer than six months
5. Maintenance: Consistently performs new behavior for six months or more
6. Relapse: Practices new behavior less consistently or discontinues completely

These stages are not linear; people tend to move back and forth fluidly between stages, and relapse to a prior stage is always possible. In fact, people can relapse to any stage, but a return to pre-contemplation is least likely. It is important to remember that changing behaviors, especially intimate and private behaviors, is a complex process.

## Risk Assessment

Risk assessment is a strategy used within individual counseling as part of the behavior change process. During risk assessment, health care workers use a client’s responses to questions about the client’s behaviors and partners in order to gauge the client’s risk for HIV infection.

Questions about risk often focus on, for example:

- Age (less than 20)
- Partnership status (in some cultures)
- New sexual partners
- Multiple partners
- Partners with multiple partners
- Partner who often travels
- History of an STI, pelvic inflammatory disease (PID), reproductive tract infection (RTI)
- Partner with symptoms of an STI
- Current symptoms or signs

Risk assessment is sometimes done using a brief checklist, which is more appropriate for screening purposes than behavior change purposes. It can also

be done by providing the client with information about risks in general, and asking the client to self-assess whether or not he or she is at risk without revealing specific information. This approach is often used where it is deemed culturally inappropriate to probe for more specific information about sexual practices and partnerships. Another approach is for a counselor or provider to encourage a client to discuss his or her specific practices and circumstances as part of an interactive, exploratory counseling process. This approach is likely to be more effective in assisting a client to perceive his or her risk for infection than the former.

Many people have difficulty perceiving their own risk for infection, even if they know, in general, what places a person at risk. When a counselor or provider understands the individual risks of a client, he or she can apply information to that client's particular circumstances, which makes the risks more apparent and assists in improving risk perception.

## **Future of Prevention**

### **Microbicides**

Since many women's risk derives primarily from their partners' behaviors rather than their own, and the fact that the major current strategies for HIV prevention—partner reduction, monogamy, condom use, and treatment of STIs—are not feasible for many women, there has been a growing call for the development of a means of protection against HIV that women can control.

In response to this need, research is currently being conducted into the development of microbicides, products that can be used vaginally (and possibly rectally) to prevent transmission of HIV and, potentially, other STIs, by blocking transmission or killing the pathogen. Over the past 10 years, significant progress has been made in microbicide research and development. A number of promising new products are currently in different stages of development, and the results of marketing and acceptability research have been encouraging. Nonetheless, it is likely to be another decade before safe, effective, and affordable microbicides are readily available.

In general, scientists are using two approaches to the development of microbicides: developing and testing new substances, and researching the potential microbicidal activity of existing spermicidal products. Today, approximately 38 small biotechnology firms, 28 nonprofit research institutes, and six public-sector agencies are working on microbicides.

Although promising, initial results of Phase III trials of the Nonoxynol-9 spermicide, Advantage-S, have indicated that use of the product may actually increase HIV transmission. These trials were conducted among women who

used the product with a high degree of frequency, some up to 20 times per day. It is thought that highly frequent use may irritate the mucosal surfaces in the vagina and cervix and create portals of entry for HIV. This may or may not occur with less frequent use.

## **Vaccines**

Research is currently being conducted on a variety of potential HIV/AIDS vaccines. Only one potential vaccine has entered Phase III human efficacy trials, and one is in Phase II trials. There are more than 60 Phase I trials with approximately 30 candidate vaccines. Although there has been significant progress and there is great promise, it is not likely that a highly effective vaccine will be available in the near future. It is worth noting that once a vaccine is developed, it may be only partially effective, and may only stop or delay progression of the disease or reduce infectiousness among people already infected, rather than prevent primary transmission.

## **Omnibus AIDS Act**

The Florida Omnibus AIDS Act is comprehensive legislation created in 1988 to combat the spread of HIV and to protect the rights of those infected. It mandates that every licensed healthcare professional must take a course on HIV/AIDS and every healthcare facility must educate its employees about HIV infection.

## **Testing**

The Omnibus Act places these provisions on testing:

1. Informed consent must be obtained.
2. Reasonable efforts must be made to notify the test subject about the test results.
3. Positive test results must be confirmed through a corroborating test before informing the subject of the test results.

## **Informed Consent**

Prior to testing, an individual must understand and explicitly agree to the HIV test. General consent to draw blood and to run unspecified tests is insufficient.

## **Information Requirements**

The provider is required by law to report the test subject's name to the local county health department if the HIV test results are positive. If the test subject has concerns about this reporting, anonymous testing sites must be made available to them. The provider must also disclose to the test subject the extent of confidentiality given to the test results. For the purposes of HIV testing, minors in the state of Florida are considered adults, and are allowed to provide consent for testing of themselves.

### **Notification Responsibilities**

Test providers must confirm the test subject's identity. They must also establish a procedure to confirm the identity of the person to whom the test results are given. The provider must provide post-test counseling. In instances where the test results are negative, this should include information on preventing the transmission of HIV. When the test result is positive, post-test counseling must include information on the availability of appropriate medical and support services, the importance of notifying partners who may have been exposed, and prevention of the transmission of HIV.

### **Confirmatory Tests**

The preliminary test for HIV is usually the ELISA test. If the patient tests positive using this test, a second confirmatory test, usually the "Western Blot" or "IFA" test, must be performed prior to notification of the test subject.

### **Confidentiality**

Florida's Omnibus AIDS Act considers the results of an HIV test to be "superconfidential". This places additional responsibilities on those who know the results of this testing. This superconfidentiality relates only to the fact that an HIV test was performed and the results that were obtained from it.

#### **Special Handling of HIV Information**

Test results may only be released to a third party after written authorization has been obtained from the test subject. Access to HIV test results is limited to employees or agents who either provide care to the test subject, conduct necessary administrative supportive tasks, or handle body fluids or tissues of a test subject.

### **Permitted Disclosures**

If the test subject is incapacitated or unable to understand the information, a person authorized by law to make decisions for that person, may be told. Test information may also be disclosed within correctional facilities on convicted prostitutes and people convicted of certain offenses in which transmission might have occurred.

### **Consequences of Breaching Confidentiality**

In the state of Florida, it is a first-degree misdemeanor to unlawfully disclose HIV test results, and a third degree felony if it is done with malicious intent.

### **Notification of Third Parties**

The Act eliminates any legal obligation for providers to tell third parties of the danger posed by the behavior of an individual infected with HIV. However, providers may willingly intervene and disregard superconfidentiality when certain conditions have been met.

1. Identification of the third party must come from the patient.
2. The practitioner must recommend that the patient notify the partner.

3. The practitioner must advise the patient of the practitioner's intent to notify the partner.
4. The preceding three steps must be documented in the patient's medical record without identifying the third party.
5. The practitioner takes full responsibility for notifying the third party.

### **Accidental Exposures to Healthcare Workers**

An exposure is considered significant when skin or mucous membranes are exposed to the blood or body fluids of a patient, or if they experience a "sharps" accident. Healthcare workers and non-medical workers exposed while providing emergency medical assistance, have the right to know the patient's HIV status.

### **Supplemental Information**

#### [Human Immunodeficiency Virus Transmission](#)

Nanjul, G. O. (2011). Human Immunodeficiency Virus Transmission. In V. Venketaraman (Ed.), *Global View of HIV Infection*: InTech. CC BY 3.0

#### [Bone Metabolism and HIV Infection](#)

Coaccioli, S. (2011). Bone Metabolism and HIV Infection. In E. Aghdassi (Ed.), *HIV Infection in the Era of Highly Active Antiretroviral Treatment and Some of Its Associated Complications*: InTech. CC BY 3.0

#### [Pulmonary Manifestations of HIV Disease](#)

Chakaya, M. J. (2011). Pulmonary Manifestations of HIV Disease. In E. Aghdassi (Ed.), *HIV Infection in the Era of Highly Active Antiretroviral Treatment and Some of Its Associated Complications*: InTech. CC BY 3.0

#### [The Causes of HIV-Associated Cardiomyopathy: A Tale of Two Worlds](#)

Lumsden, R. H., & Bloomfield, G. S. (2016). The Causes of HIV-Associated Cardiomyopathy: A Tale of Two Worlds. *BioMed Research International*, 2016. CC BY 4.0

#### [Treatment of Dermatological Conditions Associated with HIV/AIDS: The Scarcity of Guidance on a Global Scale](#)

Paul, S., Evans, R., Maurer, T., Muhe, L. M., & Freeman, E. E. (2016). Treatment of Dermatological Conditions Associated with HIV/AIDS: The Scarcity of Guidance on a Global Scale. *AIDS research and treatment*, 2016. CC BY 4.0

#### [What is required to end the AIDS epidemic as a public health threat by 2030? The cost and impact of the Fast-Track Approach](#)

Stover, J., Bollinger, L., Izazola, J. A., Loures, L., DeLay, P., Ghys, P. D., & Fast Track modeling working group. (2016). What is required to end the AIDS epidemic as a public health threat by 2030? The cost and impact of the Fast-Track Approach. *PloS one*, 11(5). CC BY 4.0

## Resources

**AIDS** ([www.aidsonline.com](http://www.aidsonline.com)) Provides access to full-text content, online-only content, features and services, author submission materials, and title-specific information.

**AIDS Education Global Information System (AEGIS)** ([www.aegis.com](http://www.aegis.com))  
Features HIV/AIDS information and news.

**AIDS Research Alliance of America** ([www.aidsresearch.org](http://www.aidsresearch.org))  
Working to find the most effective drug therapies and the discard highly touted therapies that show little or no benefit.

**AIDSmap.com** (<http://www.aidsmap.com/>) offers news reports, publications, fact sheets, etc.

**American Foundation for AIDS Research (AmFAR)** ([www.amfar.org](http://www.amfar.org))  
Leading nonprofit organization dedicated to the support of HIV/AIDS research.

**Bulletin of Experimental Treatments for AIDS (BETA)** (<http://www.sfaf.org/beta/>) from the San Francisco AIDS Foundation.

**eMedicineHealth: HIV** ([www.emedicinehealth.com/hivaids/article\\_em.htm](http://www.emedicinehealth.com/hivaids/article_em.htm))  
Provides an overview of HIV and its causes, symptoms, and treatment.

**HIV i-base** (<http://www.i-base.info/>): "HIV treatment information for healthcare professionals and HIV-positive people."

**HIV Medicine** (<http://hivmedicine.com/>) is an online medical textbook with open access.

**HIVandHepatitis.com** (<http://www.hivandhepatitis.com/>) contains treatment information about HIV and hepatitis including news, resources and special reports.

**Journal Watch: AIDS Clinical Care** ([aids-clinical-care.jwatch.org](http://aids-clinical-care.jwatch.org))  
Includes medical information and findings related to AIDS research and clinical care.

**National AIDS Treatment Advocacy Project (NATAP)** ([www.natap.org](http://www.natap.org))  
Reporting on the latest HIV drug treatments, therapies, and conferences.

**National Minority AIDS Council** (<http://www.nmac.org/home/>) contains searchable online treatment publications, among many other valuable resources.

**New Mexico AIDS InfoNet** (<http://www.aidsinonet.org/>) has online fact sheets on a variety of topics including treatments, side effects, opportunistic infections, etc. There's also an index of HIV/AIDS related Internet bookmarks and information in Spanish.

**Positively Aware** (<http://www.tpan.com/index.shtml>) issues include an annual anti-HIV drug guide.

**Women Alive** (<http://www.thebody.com/content/art56.html>) is a coalition of, by and for women living with HIV/AIDS. The site includes an index to articles published in their quarterly newsletter on women's health and HIV/AIDS.

**WORLD** (<http://www.womenhiv.org/>) stands for Women Organized to Respond to Life-threatening Disease.

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**HIV/AIDS Update (2 Hour)**

**Post-Test**

1. It is estimated that worldwide more than \_\_\_\_\_ are now living with HIV/AIDS. (p. 3)
  - A. 1 in 10 adults
  - B. 20 percent of the population
  - C. 40 million people
  - D. 13 million children
  
2. Which of the following is NOT an opportunistic infection commonly associated with AIDS? (p. 5)
  - A. Schistosimiasis
  - B. Mycobacterium Avium Complex
  - C. Pneumocystis Pneumonia
  - D. Toxoplasmosis
  
3. A person infected with HIV is considered to have AIDS when their T-cell count is less than \_\_\_\_\_. (p. 6)
  - A. 200 cells per microliter of blood
  - B. 450 cells per microliter of blood
  - C. 1,200 cells per microliter of blood
  - D. 1,750 cells per microliter of blood
  
4. HIV transmission is possible through contact with which one of the following body fluids? (p. 6-8)
  - A. sweat
  - B. saliva
  - C. vomit
  - D. breast milk
  
5. During the early stages of HIV infection, most people experience \_\_\_\_\_. (p. 8)
  - A. enlarged glands
  - B. a persistent cough
  - C. no symptoms at all
  - D. chronic diarrhea
  
6. The definitive test for confirming HIV infection is the \_\_\_\_\_. (p. 11)
  - A. ELISA Serum Test
  - B. ELISA Oral Test
  - C. Western Blot Test
  - D. Rapid Serologic Test

7. Which group of drugs works by neutralizing an enzyme that HIV needs near the end of its life cycle? (p. 15)
  - A. Reverse transcriptase inhibitors
  - B. Protease inhibitors
  - C. Both A & B
  - D. None of the above
  
8. Most cases of mother-to-child HIV transmission occur during \_\_\_\_\_. (p. 18)
  - A. first trimester rapid blastocoel division
  - B. third trimester fetal development
  - C. post-partum breast feeding
  - D. labor and delivery
  
9. An intravenous drug abuser began participating in a clean needle exchange program 3 weeks ago. He would be in which stage of the “Stages of Change” model? (p. 21-22)
  - A. Action
  - B. Pre-contemplation
  - C. Preparation
  - D. Contemplation
  
10. Which one of the following statements pertaining to the Omnibus AIDS Act is TRUE? (p. 24-26)
  - A. General consent to draw blood and to run unspecified tests is sufficient to perform an AIDS test.
  - B. Health care workers and non-medical workers exposed while providing emergency medical assistance, have the right to know the patient’s HIV status.
  - C. Individuals who test positive for HIV on the ELISA test must be notified of their positive status before a Western Blot Test is performed.
  - D. Post-test counseling is not required when test results are negative for HIV infection.

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