

## **HIV/AIDS: Where Are We Now?**

### **NYSNA Continuing Education**

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## How to Take This Course

Please take a look at the steps below; these will help you to progress through the course material, complete the course examination and receive your certificate of completion.

### 1. REVIEW THE OBJECTIVES

The objectives provide an overview of the entire course and identify what information will be focused on. Objectives are stated in terms of what you, the learner, will know or be able to do upon successful completion of the course. They let you know what you should expect to learn by taking a particular course and can help focus your study.

### 2. STUDY EACH SECTION IN ORDER

Keep your learning "programmed" by reviewing the materials in order. This will help you understand the sections that follow.

### 3. COMPLETE THE COURSE EXAM

After studying the course, click on the "Course Exam" option located on the course navigation toolbar. Answer each question by clicking on the button corresponding to the correct answer. All questions must be answered before the test can be graded; there is only one correct answer per question. You may refer back to the course material by minimizing the course exam window.

### 4. GRADE THE TEST

Next, click on "Submit Test." You will know immediately whether you passed or failed. If you do not successfully complete the exam on the first attempt, you may take the exam again. If you do not pass the exam on your second attempt, you will need to purchase the course again.

### 5. FILL OUT THE EVALUATION FORM

Upon passing the course exam you will be prompted to complete a course evaluation. You will have access to the certificate of completion **after you complete the evaluation**. At this point, you should print the certificate and keep it for your records.

## **Introduction**

HIV/AIDS is no longer a health problem that can be ignored. At one time, HIV/AIDS was considered by many people to be a disease that only affected “them.” Today it would be difficult to find a person who has not been directly or indirectly affected by the magnitude of the pandemic. In Sub-Saharan Africa, one out of every four people has HIV/AIDS. Twenty-five years ago, homes were occupied by nuclear families. In contrast, today many homes are occupied only by the young and the old. An entire generation is missing, a generation who would have been the next leaders, teachers, businessmen, and scientists.

“But,” you say, “that is Africa. I live in a quiet, middle-class, suburban town. Why should I be concerned?” In the U.S. unprotected sex among men who have sex with men (MSM), remains the category with the greatest incidence of HIV/AIDS. However, the number of new cases that result from unprotected heterosexual relations, especially among young women of color, continues to increase, as does the incidence among people age 50 and older. HIV/AIDS has crossed all racial and socioeconomic borders. In some way it has touched each of our families, friends, churches, schools, and communities. It threatens our children, absorbs our limited health resources, and, at this time, still has no cure.

Illegal drug use is now part of the culture of even the most rural areas in the U.S. Unfortunately, the use of illegal drugs is often associated with HIV/AIDS. Infection can occur from sharing needles when injecting intravenous drugs, and from sharing straws when snorting cocaine. Drug and alcohol abuse is often associated with increased high-risk behaviors.

Nurses are in advantageous positions to change the outcome of HIV/AIDS because of their opportunity to interact with patients. They can provide HIV prevention education, assess for high-risk behaviors and suggest testing when appropriate, provide patient education on medications and safe behaviors for patients already infected, provide hospital or community nursing care for ill patients, act as patient advocates, and provide support for infected patients and their families. Patients with HIV/AIDS require nurses that are knowledgeable about HIV because of the complexity of their medical and/or mental health diagnoses, symptom management, and psychosocial needs.

## **Objectives**

Upon completion of this course, the learner will be able to:

- Identify the scope of HIV/AIDS in the US and worldwide.
- Identify how the infection is spread.
- Describe the prevention of HIV/AIDS.
- Review the process of testing for HIV.
- Describe current treatment options for HIV/AIDS.
- Illustrate nursing implications in the treatment of HIV/AIDS.
- Identify HIV/AIDS in selected populations.

## About the Author

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Dr. Shaw received her doctoral degree from New York University, Division of Nursing in New York, New York. She received a Master of Science in nursing, Family Nurse Practitioner, from The Sage Colleges in Troy, New York and a Bachelor of Science in nursing also from Russell Sage College. She is currently enrolled in the Master of Public Health program at Johns Hopkins University in Baltimore, Maryland.

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## Overview of HIV/AIDS

### The Global Picture

The effect of HIV/AIDS is not to be taken lightly. There were estimated to be between 30 and 36 million people globally living with HIV/AIDS at the end of year 2007. In addition, about 14,000 people are infected daily. Almost 95% of the 2.5 million newly infected cases are in developing countries where there is a scarcity of resources. The number of people living with HIV/AIDS in Eastern Europe and Central Asia increased 150% between 2001 and 2007 to 1.6 million. Of these newly infected people, as many as 95% may not yet know their HIV status. The World Health Organization (WHO) estimates that more than 8,000 people worldwide die from HIV/AIDS every day, or about one person every second (WHO, 2004) (see Figure 1).



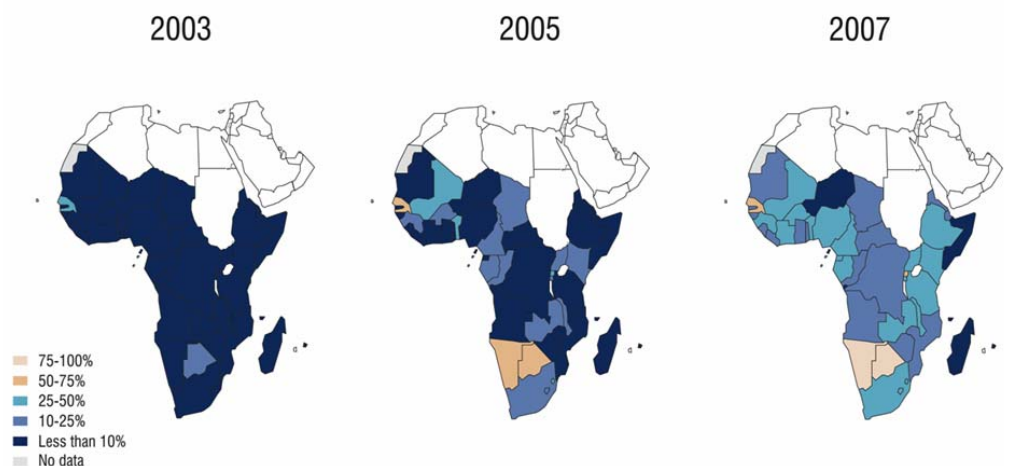
 		
<b>Global summary of the AIDS epidemic, December 2007</b>		
<b>Number of people living with HIV in 2007</b>	Total	33 million [30 – 36 million]
	Adults	30.8 million [28.2 – 34.0 million]
	Women	15.5 million [14.2 – 16.9 million]
	Children under 15 years	2.0 million [1.9 – 2.3 million]
<b>People newly infected with HIV in 2007</b>	Total	2.7 million [2.2 – 3.2 million]
	Adults	2.3 million [1.9 – 2.8 million]
	Children under 15 years	370 000 [330 000 – 410 000]
<b>AIDS deaths in 2007</b>	Total	2.0 million [1.8 – 2.3 million]
	Adults	1.8 million [1.6 – 2.1 million]
	Children under 15 years	270 000 [250 000 – 290 000]

Figure 1. Global summary of the AIDS epidemic, December 2007. Downloaded from the WHO Web site: <http://www.who.int/hiv/data/en/index.html>, August 1, 2008.

HIV prevention is a global priority. Multiple programs are in place in the developing countries to provide HIV education and health care. Still, the number of new cases continues to rise. One key factor identified in the spread of infection is the lack of medications to treat HIV/AIDS and high HIV viral burden of people responsible for infecting others. Because of financial restraints, in many developing countries less than 31% of persons who need antiretroviral medications are able to get them on a regular basis (see Figure 2). (When antiretroviral medications are available and taken properly the viral load is substantially decreased, often to the level of undetectable, thus greatly decreasing the probability of infection.) In response to what he referred to as “a global health emergency,” in 2003 the Director of WHO introduced a new “3 X 5” initiative to provide antiretroviral medications to three million people living with HIV/AIDS by 2005 (WHO, 2004). Although this program did not meet all of the goals set for increasing the availability of antiretroviral therapy (ART) globally, there was some progress to report. The number of people being treated with ART has increased from 10% to 31% according to the WHO. Additionally, that program increased awareness of the need for programs that would provide adequate medical care and treatment and was the impetus to the formation of the “Universal Access by 2010

Program.” If successful, it may be the greatest step taken thus far to stop the spread of HIV/AIDS in developing countries (see Figure 2).

**Antiretroviral therapy coverage in sub-Saharan Africa, 2003-2007**



Towards Universal Access – Scaling up priority HIV/AIDS interventions in the health sector. WHO/UNAIDS/UNICEF, June 2008



Figure 2. Antiretroviral therapy coverage in sub-Saharan Africa, 2003-2007.  
 Downloaded from the WHO Web site: <http://www.who.int/hiv/data/en/index.html>, August 1, 2008.

### HIV/AIDS in the U.S.

While there are fewer cases of HIV/AIDS in the U.S., the disease constitutes a major public health problem for this country as well. Data released by the Centers for Disease Control (CDC) estimated that more than 1 million people were living with HIV/AIDS in 2003. Of these, as many as 25% do not know they are infected (Glynn, 2005 as cited in CDC, n.d.). In 2006, there were an estimated 35,180 new cases of HIV/AIDS reported.

The majority of new U.S. AIDS cases in 2006 were among Blacks (49%), followed by Whites (30%), Hispanics (18%), Asian/Pacific Islander (1%), and American Indian/Alaskan Native (<1%). Male to male sexual contact (MSM) (50%) remained the exposure category with the greatest estimated number of new cases in 2006, followed by high risk heterosexual sex (33%) injection drug use (IDU) (13%), MSM and IVD (3%), and other (1%). New York State again claimed the greatest estimated cumulative number of AIDS cases in 2006 (see Table 1).

<b>Table 1. Top 10 Cases of Cumulative HIV Cases by State, 2006</b>	
<b>State</b>	<b>Percentage of Cumulative HIV Cases</b>
New York	16.5
Florida	14
Texas	9.2
New Jersey	6.9
No. Carolina	5.2
Virginia	3.9

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Louisiana	3.3
Ohio	3.2
So. Carolina	2.8
Tennessee	2.8
Source: CDC, 2008a	

## HIV Risk Behaviors

Many people are unfamiliar with what behaviors should be considered high-risk for HIV because they do not understand how the virus is transmitted from person to person. This is somewhat surprising in this day and age since we have spent billions of dollars on HIV prevention programs. Many people just tune out prevention messages because they think HIV is something that happens to “*them*,” so they are not really interested. Other people (and sadly, this also can include healthcare professionals) realize that HIV is a problem but think that it only affects people they do not come in contact with or that you can tell someone has HIV by the way they look. People also take risks because they are not empowered to say no to sexual advances, demand a condom/dental dam be used, don’t want their partner to feel like they are questioning their integrity or morals, don’t value themselves enough to care, want to look cool, don’t ask partners to have an HIV test, or are not selective of sexual partners, don’t realize that having a sexually transmitted disease (STD) puts them at greater risk of infection, or do not prefer a monogamous relationship.

The results of several studies have provided additional insight into the phenomenon of HIV transmission. In one qualitative study of adolescents newly infected with HIV, researchers found that some of the adolescents had intentionally put themselves at risk because they wanted to be eligible for the same benefits other family members/friends received because of their HIV status. In the same study other participants responded that, to them, the threat of HIV was no different than the violence, drugs, and crime they faced every day. They saw it as being inevitable, and preferred to just “get it over with” rather than have to worry constantly about being infected. In another study of gay men, researchers found that participants were “burned out” on HIV prevention messages. Like anything that you are exposed to every day, over time HIV became more common-place and seemed less of a threat. In addition, some participants remarked that they no longer considered HIV infection to be a big deal because of the effectiveness of ART.

<b>Table 2. Routes of HIV Infection</b>		
<b>Source of Virus</b>	<b>High-Risk Behaviors</b>	<b>HIV Prevention</b>
Blood	<ul style="list-style-type: none"> <li>• Intravenous drug use (IVDU)/sharing needles</li> <li>• Tattoos/piercing with used equipment</li> <li>• Transfusion prior to routine screening for HIV</li> <li>• Accidental exposure to infected blood</li> </ul>	<ul style="list-style-type: none"> <li>• Avoid sharing needles, participate in needle exchange program</li> <li>• Avoid tattoos/piercing if equipment is not sterile</li> <li>• Avoid transfusions in countries where blood is not routinely screened for HIV</li> <li>• Use Universal precautions for all exposure to blood (Healthcare workers, EMTs, family members, others)</li> </ul>
Vaginal fluids	<ul style="list-style-type: none"> <li>• Unprotected vaginal sex</li> <li>• Unprotected oral sex</li> <li>• Sharing sex toys/vibrators</li> </ul>	<ul style="list-style-type: none"> <li>• Use condoms* for all sexual acts</li> <li>• Use dental dams during oral sex</li> <li>• Properly clean (bleach) all items following exposure to vaginal secretions</li> </ul>
Semen	<ul style="list-style-type: none"> <li>• Unprotected anal sex</li> <li>• Unprotected oral sex</li> <li>• Accidental exposure to seminal fluids</li> </ul>	<ul style="list-style-type: none"> <li>• Use condoms* for all sexual acts</li> <li>• Use dental dams/condoms during oral sex</li> <li>• Be sure condoms* are safe (not damaged, correct size) and applied correctly</li> <li>• Avoid situations that could result in nonconsensual sex (date rape, rape by unknown person)</li> <li>• Use Universal precautions when handling seminal fluid</li> </ul>



		<ul style="list-style-type: none"> <li>• Avoid sexual activity that can result in trauma to the exposed areas</li> </ul>
Maternal-fetal/infant	<ul style="list-style-type: none"> <li>• Mother not on ART during pregnancy</li> <li>• Mother breastfeeds infant</li> </ul>	<ul style="list-style-type: none"> <li>• Routine testing for pregnant women</li> <li>• Consider C-section for women not on ART or with high viral load</li> <li>• Breast feeding not recommended</li> </ul>
*Latex or polyurethane condoms should be used. When used reliability they can prevent pregnancy up to 98% of the time. Breakage rate of latex condoms is about 2%. They have been shown to provide a high degree of protection against STDs, including HIV.		
Source: CDC, Division of HIV/AIDS Prevention, 1999		

HIV cannot be transmitted by casual contact, sharing eating utensils or bathrooms, casual kissing, hugging, or mosquitoes. There can be a small amount of virus in saliva and tears in patients with HIV. However, according to CDC, contact with saliva, tears or sweat from someone infected with HIV has not been shown to result in HIV transmission.

CDC reported the following breakdown of AIDS cases among adults and adolescents by race and age in 2006.

<b><u>Race</u></b>	<b><u>Percentage of New HIV Cases in 2006</u></b>
African American	49
White	30
Hispanic	18
Asian/Pacific Islander	1
American Indian/Alaska Native	<1

<b><u>Age</u></b>	<b><u>Percentage of New HIV Cases in 2006</u></b>
<13	4
13-24	15
25-34	26
35-44	32
45-54	20
55-64	6
65+	2

The incidence of new HIV Infections by transmission category is illustrated in Figure 3. In 2006, the CDC estimated that there were 56,300 new HIV infections which was higher than expected, a number that may actually be the result of more accurate data collection. The CDC reports that the estimated 40,000/year of new infections has been relatively stable since the early 1990s. A podcast released by the CDC (2008b) provides a more in-depth look at the incidence of HIV and shows the breakdown by race, gender, age and route of transmission. The podcast is presented by Dr. Richard Wilitski, the Acting Director of the Division of HIV/AIDS Prevention, and can be accessed from <http://www2a.cdc.gov/podcasts/player.asp?f=10068>.

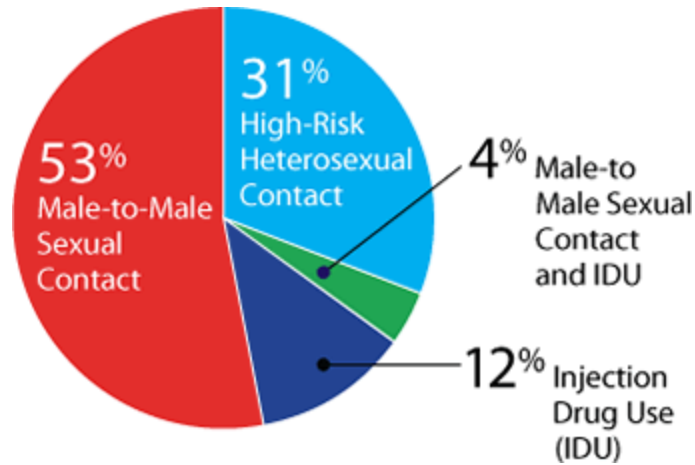


Figure 3. Estimated New HIV Infections, by transmission category, 2006. Downloaded from the CDC Web site: <http://www.cdc.gov/hiv/topics/surveillance/resources/factsheets/print/incidence.htm>, February 26, 2009.

### Nursing Implications

Because of their interactions with patients, nurses are in a valuable position to assess for high-risk behaviors and to refer patients for HIV testing (see Table 3). Patients diagnosed at an early stage of the disease are likely to have more positive outcomes. Early diagnosis may also reduce the probability of infecting others. If HIV test results are negative it may prevent future infection by introducing the impetus for behavior change.

**Table 3. Nursing Interventions for HIV Prevention**

Assess for high risk-behaviors	<ul style="list-style-type: none"> <li>• Discuss sexual history</li> <li>• Assess for recreational drug/alcohol use</li> <li>• Determine other risk factors: tattoos, piercing, etc.</li> </ul>
Refer for HIV testing and Counseling	<ul style="list-style-type: none"> <li>• Explain anonymous vs. confidential testing</li> <li>• Provide names of facilities where testing can be done</li> </ul>
Provide HIV education to promote behavioral change	<ul style="list-style-type: none"> <li>• Discuss risk factors including unprotected vaginal, anal, oral sex</li> <li>• Encourage use of barriers</li> <li>• Identify high-risk behaviors associated with recreational drug and alcohol use</li> <li>• Encourage ART adherence to maintain viral suppression and decrease the probability of transmission</li> </ul>
Act as patient advocate	<ul style="list-style-type: none"> <li>• Be available for follow-up questions</li> </ul>
Identify available resources	<ul style="list-style-type: none"> <li>• Identify community resources as needed (e.g., food pantries, etc.)</li> <li>• Refer to the Partner Notification Program if needed</li> </ul>

## **Clinical Manifestations of HIV/AIDS**

Patients who are acutely ill with HIV during the seroconversion process usually present with typical signs of a viral illness including: fever, nausea, vomiting, diarrhea, headache, chills, sore throat, and/or anorexia. In some cases diffuse lymphadenopathy may be present. Other patients may have very few, if any, symptoms. After several weeks patients usually recover, and if risk factors for HIV are not identified, can go on for years with few symptoms until their immune system becomes so compromised they are unable to resist infection. Many people, especially the elderly, are never tested for HIV until they seek medical care for an opportunistic infection. In this case, their initial diagnosis will be AIDS.

## HIV Testing

Unfortunately, it is not uncommon to see a newly diagnosed patient present for their first clinic visit with AIDS. CDC data estimates that as many as 25% people in the U.S. are not yet aware they are infected with HIV (Glynn, 2005 as cited in CDC, n.d.). This may simply be because many people who are “at risk” do not follow routine health maintenance recommendations. They may not have medical insurance, so are treated only as needed in emergency departments. However, even if patients have a regular provider, clinics are often overbooked and time is focused on acute problems rather than a thorough health history. Younger providers and nurses may also feel uncomfortable conducting a detailed sexual history with someone who is older or who has a sexual orientation different from their own. When caring for an established patient, providers and nurses may not realize that a change has occurred in their patient’s lifestyle.

### **Case Study**

Mrs. White is well known to the clinic and has been a patient for more than 15 years. Her husband died four years ago just after their 42nd anniversary. At first she had difficulty sleeping and was seen in the clinic more often than usual because of multiple vague complaints. After about one year she adjusted to her loss and was doing very well both physically and emotionally.

Recently, Mrs. White has been feeling very tired and complained of flu-like symptoms that lingered on for almost a month. She had an intermittent low-grade fever and diffuse lymphadenopathy. She did not make an appointment right away because many people that she knew had the flu or another viral illness that was going around. She feels better today, and the nurse and provider assured her that as you get older recovery from acute illnesses may take longer. She left the clinic reassured that she would be fine.

No one asked Mrs. White if there had been any changes in her life. If they had, they would have found out that she had “become involved with a nice older man” she met at the Senior Citizen Center. He is a retired teacher and spends every winter in Florida. She unconsciously realizes that he has probably had other sexual partners, but never considered that he could be HIV positive. Because of her age and familiarity with the clinic staff, she will probably not be identified as having high-risk behaviors for HIV. In fact, like many other older adults, it is likely that she will only be tested after developing an opportunistic infection.

When patients are identified as being at risk for HIV infection they should be strongly encouraged to be tested. Except in cases of extreme circumstances, it is unethical to test someone for HIV unless the patient agrees to have the test done (for example, a healthcare provider experiences a needle stick while caring for an unconscious patient in the ED and the healthcare proxy gives permission for HIV testing). In most states, people who request an HIV test must sign an informed consent and be provided with pre and post counseling. However, several states adopted the CDC recommendations and offer HIV testing on an “opt out” basis. NYS currently still requires an informed consent for all persons being tested for HIV.

If the patient does not want to have the results of the test in his medical records he should be directed to a site that provides anonymous testing. While the need for strict patient confidentiality is always stressed to personnel in the healthcare field, patients may be worried that someone they know will find out if they are tested. People may also be afraid their medical insurance could be cancelled if they are tested for HIV. It is important to let patients know that all results will be kept confidential.

Standard testing for HIV consists of an HIV-EIA and a confirmatory Western Blot (WB). Using both tests increases the likelihood of accurate results since they are sensitive (HIV-EIA) and specific (WB) for HIV-1. Depending on the laboratory used, results from the HIV-EIA and WB are usually available in one to two weeks.

According to a podcast from the CDC (2007), about one fourth of the million U.S. residents living with HIV are unaware of their HIV infection (visit <http://www2.cdc.gov/podcasts/player.asp?f=6262> to listen to the podcast). Out of this group, about 31% never return for their results. This may be a major contributing factor to the continued incidence of new cases of HIV/AIDS. The OraQuick Rapid HIV test (for use on whole blood, plasma specimens, and oral fluid) was developed partially in response to this problem. Preliminary positive or negative results can be given to patients in less than 30 minutes. This test has been shown to be 99.3% sensitive in identifying positive results and 99.8% specific in identifying negative results. A confirmatory WB test using serum is still required on all preliminary positive results (Bartlett & Gallant, 2004).

There are three possible HIV test results:

- Positive: patient is infected with HIV.
- Negative: no antibodies to HIV-1 detected.
- Indeterminate: a reaction occurs, but results do not meet criteria to determine HIV-1 infection.

Patients who are at risk for HIV infection must be reminded that a negative test result may indicate a current lack of HIV-1 antibodies. These antibodies usually take one to three months to reach a level of detection after infection. Anyone who has engaged in high-risk behaviors should be retested again in three and six months, and continue to be tested every year if their behaviors do not change (CDC, Division of HIV/AIDS Prevention, 2006).

Indeterminate results can be caused by numerous reasons including: HIV antibodies below the level of detection, non-HIV antibodies that cause the test to react (such as autoimmune disease, liver disease, multiple sclerosis), infection with HIV-2, or lab error. Following indeterminate results, HIV tests should be repeated at one, two, and six months. Assessment for high-risk behaviors is essential in determining the need for continued testing after six months (Bartlett et al., 2004).

As of June 1, 2000, the New York State Department of Health (NYSDOH) implemented the HIV Reporting and Partner Notification Law. It required physicians and laboratories to report all positive HIV test results, diagnoses of HIV-related illnesses, viral load tests, tests resulting in CD4 counts less than 500, and newly diagnosed cases of AIDS to NYSDOH. In addition, physicians must report the names of known sexual or needle-sharing partners to NYSDOH.

Under this law, patients can't be forced to reveal the names of contacts, and will not be penalized for refusing to do so. Contact names are sent to the Partner Notification Program and, in a manner similar to the process that occurs with other sexually reported diseases, contacts are notified of a possible exposure and recommended for testing. The name of the HIV infected person is not revealed in this process. Before contacting individuals who may have been exposed, the DOH staff must determine if there is any risk of domestic violence or injury to the index patient, children, or contacts (NYSDOH, AIDS Institute, 2006). Laws may vary regarding mandatory HIV reporting, data reported, and partner notification among states.

In April of 2005, the New York State Department of Health announced an initiative aimed at increasing HIV testing, streamlining the pre-test counseling and consent process, and requiring reporting of all HIV viral resistance, viral load and CD4 tests results. The *2005 Guidance for HIV Counseling and Testing and New Laboratory Reporting Requirements* are available at the NYSDOH Web site ([http://www.health.state.ny.us/diseases/aids/regulations/2005\\_guidance/labreportingrequirements.htm](http://www.health.state.ny.us/diseases/aids/regulations/2005_guidance/labreportingrequirements.htm)).

### *Nursing Implications*

Patients facing a crisis situation are often willing to listen to information or consider changes that could improve their situation. Nurses caring for patients referred for HIV testing may be in a position to discuss behavioral changes and provide HIV education that will impact future decision making (see Table 4). A non-judgmental approach to the patient's lifestyle and sexual preferences will allow for open communication, clarification of risks, and lead to identification of positive changes.

<b>Table 4. <i>Nursing Interventions for Patients Following HIV Testing</i></b>	
Positive result	<ul style="list-style-type: none"><li>• Assess for harmful thoughts toward self or others</li><li>• Stress the need to use barriers during sexual relations (condoms, dental dam)</li><li>• Suggest referral to Partner Notification Program if applicable</li><li>• Discuss routes of transmission: avoid sharing razors, toothbrushes, needles; clean blood spills with bleach</li><li>• Assure patients regarding behaviors that are not routes of transmission: casual kissing, hugging; sharing utensils, dishes, and bathrooms</li><li>• Identify available resources</li></ul>
Negative results	<ul style="list-style-type: none"><li>• Discuss test limitations (related to antibody development) and the need for future tests depending on length of time since last possible exposure</li><li>• Identify and discuss ways to change high-risk behaviors</li><li>• Stress the need to use barriers for vaginal, anal, and oral sex</li></ul>
Indeterminate results	<ul style="list-style-type: none"><li>• Instruct patient that results are not conclusive</li><li>• Assess possible risk behaviors</li><li>• Stress need for additional testing to verify results</li><li>• Discuss HIV prevention behaviors including use of barriers</li></ul>

## The HIV Lifecycle

Understanding the lifecycle of HIV makes it easier to conceptualize how the disease progresses and how ART works in the body. Each class of medication acts at a specific point during reproduction to interfere with the replication process. Thus, combination therapy is aimed at increasing the probability of success by increasing the number of opportunities to disrupt the cycle.

### *Infection*

<b>Clinical Presentation</b>	<b>Asymptomatic</b>	<b>Symptomatic</b>	<b>AIDS Defining Illness</b>
CD4 > 500 mm <sup>3</sup>	A1	B1	C1
CD4 200-499 mm <sup>3</sup>	A2	B2	C2
CD4 < 200 mm <sup>3</sup>	A3	B3	C3

Source: Adapted from Bartlett et al., 2004

The most common routes of HIV infection are unprotected sex with an infected partner and injection of infected blood. HIV is found in blood and other body fluids such as vaginal fluids and semen. In order for infection to occur, the virus must find a way to cross the body's natural barrier, the skin. When infected blood or body fluids are allowed to enter the body through an open area in the skin or mucosa, infection can occur. Cases have also been reported in persons who had organ transplants and blood transfusions prior to routine screening for HIV. Once in the body, HIV primarily targets the CD4 helper cells, a type of lymphocyte. Lymphocytes are important because they protect the body from invasion by organisms that can cause infection. HIV results in a decreased number of CD4 cells, making it difficult for the immune system to fight off organisms threatening the body.

### *Fusion*

Once HIV has successfully entered the body, it attaches to the CD4 cell by fusing to receptors on the outer cell surface. Using a type of "lock and key" mechanism, proteins on the cell of the virus (CCR5/CXCR4) bind to proteins on the cell of the CD4 cell (gp 120, gp 41) in a process known as viral attachment. People who do not have these receptors are less likely to become infected with HIV or, if infected, are less likely to progress to AIDS as quickly. They are often referred to as "non-progressors."

### *Uncoating/Reverse Transcription*

After attachment is complete, the virus uncoats and sends a single strand of genetic material into the cytoplasm of the CD4 cell. This material is called RNA. RNA is converted to DNA in a process called reverse transcription. During this process, single stranded RNA is transcribed into double stranded DNA utilizing an enzyme known as reverse transcriptase. This genetic material is a blueprint that describes how the cell should function. Prior to integration viral DNA is transported to the cell nucleus.

### *Integration*

HIV uses an enzyme called integrase to insert the double stranded HIV DNA into the cell's existing DNA. Once completed, the cell produces virions instead of CD4 cells when it reproduces.

### *Cleavage, Viral Assembly, and Budding*

Once subunits of the virus have been produced and transported out of the nucleus they are separated for assembly into new virions. This process, which uses the enzyme protease to accomplish the task, is known as cleavage. New virions leave the cell and circulate in the bloodstream.



## Monitoring the Progress of HIV

Two main tests are used to monitor HIV progress:

1. *CD4 count*: estimates the number of CD4 lymphocytes and is an indicator of the immune status of the individual. The higher the CD4 count, the greater the number of cells available to defend the body against invasion by organisms that can cause disease.
2. *Viral Load*: estimates the number of copies of virus (HIV) in the bloodstream. The lower the number of copies, the slower the progress of disease. When someone is successfully treated with antiretroviral medication the results should be an undetectable viral load.

As HIV progresses patients may develop AIDS. The term AIDS denotes an advanced stage of HIV disease. The CDC criteria for AIDS are based on the CD4 count and/or the presence of AIDS defining illnesses.

Conditions classified as *AIDS Defining Illnesses* by CDC include:

- Candidiasis
- Cervical cancer
- Coccidioidomycosis
- Cryptosporidiosis
- Cytomegalovirus (CMV)
- Herpes simplex (HSV)
- Histoplasmosis
- HIV-related Dementia
- HIV-related Wasting Syndrome
- Isoporosis
- Kaposi's Sarcoma (KS)
- Lymphoma
- Mycobacterium avium complex (MAC)
- Mycobacterium tuberculosis (TB)
- Pneumocystis carinii pneumonia (PCP)
- Progressive multifocal leukoencephalopathy (PML)
- Salmonella
- Toxoplasmosis

The likelihood of infection following exposure to an organism is much greater for someone with AIDS because their immune system cannot mount an effective defense against it. Opportunistic infections (OIs) occur for that reason. Organisms that are natural flora in the body or ubiquitous in the environment can cause severe illness if the immune system is compromised (Shaw & Mahoney, 2003). Regular monitoring of the CD4 count and viral load provide a means to predict the status of the patient's immune system (see Table 6). Prophylaxis against certain OIs are recommended based on CD4 count: PCP < 200 mm<sup>3</sup>, MAC < 50 mm<sup>3</sup>, and Toxoplasma gondii < 100 mm<sup>3</sup> (Shaw et al., 2003).

Table 6. Nursing Interventions for Patients based on CD4 Count and Viral Load	
CD4 > 200	<ul style="list-style-type: none"> <li>• Stress need for barrier use during sexual relations</li> <li>• Encourage healthy lifestyle including balanced diet, exercise, relaxation</li> <li>• Discuss need for adherence with clinic visits, labs, immunizations, medication</li> <li>• Provide HIV education and support for patient and family/SO</li> <li>• Identify community resources</li> </ul>

CD4 < 200	<ul style="list-style-type: none"> <li>• Monitor for signs/symptoms of infection</li> <li>• Encourage frequent followup</li> <li>• Encourage adherence</li> <li>• Monitor weight</li> <li>• Assess for depression/insomnia/anorexia</li> </ul>
VL > 50 (or detectable based on lab limits)	<ul style="list-style-type: none"> <li>• Encourage medication adherence</li> <li>• Review dietary and dosing restrictions for ART</li> <li>• Assess financial/social limitations</li> </ul>

## Antiretroviral Therapy

Prior to the advent of ART, diagnosis with HIV was a certain death sentence. Now with more recent pharmaceutical developments, many view HIV as a chronic illness. Patients who have been infected with HIV for many years are doing very well. Many have had significant CD4 rebounds and been able to maintain an undetectable viral load. For these individuals, successful use of combination therapy is responsible for this dramatic change in their health status.

Each class of ART is intended to interrupt the viral replication cycle at a specific point. Currently five classes of antiretroviral medications are available:

- **Entry inhibitors:**

Circulating HIV attach to CD4 cells by fusing to receptors on the cell surface. Entry inhibitors compete for available binding sites, decreasing the likelihood of viral attachment.

- **Nucleoside reverse transcriptase inhibitors/Non-nucleoside reverse transcriptase inhibitors/Nucleotide Reverse Transcriptase Inhibitors:**

After attachment, the virus uncoats, sending single stranded RNA into the cytoplasm of the CD4 cell. RNA is transcribed into DNA via reverse transcription. These classes of inhibitors are designed to interfere with the process of reverse transcription.

- **Integrase Inhibitors:**

Prevent the integration of viral DNA into the DNA of the CD4 cell in the nucleus.

- **Protease inhibitors:**

Subunits of virus are transported out of the nucleus and prepared for assembly. Cleavage and assembly take place prior to budding of new virons. Protease inhibitors interfere with the process of viral assembly.

<i>Table 7. FDA Approved Antiretroviral Medications</i>		
<b>Class</b>	<b>Medication</b>	<b>Year of FDA Approval</b>
Nucleoside Reverse Transcriptase Inhibitors (NRTIs)	Ritonavir	1987
	Videx	1991
	Hivid	1992
	Zerit	1994
	Epivir	1995
	Combivir (epivir & ritonavir)	1997
	Ziagen	1999
	Trizivir (ritonavir, epivir, abacavir)	2000
	Emtriva	2003
Non-Nucleoside Reverse Transcriptase Inhibitors	Viramune	1996
	Sustiva	1998
	Rescriptor	1997
Non-Nucleotide Reverse Transcriptase Inhibitor	Tenofovir	2001
Protease Inhibitors	Invirase	1995
	Norvir	1996
	Crixivan	1996

	Viracept	1997
	Agenerase	1999
	Kaletra	2000
	Reyataz	2003
	Lexiva	2003
	Prezista	2006
	Aptivus	2005
Entry Inhibitors	Fuzeon	2003
	Selzentry	2007
Integrase Inhibitor	Isentress	2007
Combination Medications (Not listed above)	Truvada (emtriva & tenofovir)	2004
	Epzicom (abacavir & epivir)	2004
	Atripla (efavirenz, emtriva, tenofovir)	2006
Source: AIDSmeds, 2008		

Early in the HIV/AIDS pandemic, monotherapy proved not to be a successful treatment option. Combination therapy has proven to be much more successful because it attempts to target several different sites during the HIV replication cycle, thus increasing the probability of success. There are five classes of antiretroviral medications approved by the FDA. However, new and novel medications are being tested in laboratories and clinical trials in response to the increasing threat of HIV/AIDS.

HIV/AIDS pharmacology is a complex topic, and too extensive to be included in depth in this course. The names and classification of antiretroviral medications commercially available are listed in the table below. Treatment guidelines can be found at [www.cdc.gov](http://www.cdc.gov). These guidelines change based on the results of current research.

ART has many potential side effects and interactions with other medications. The need to follow dietary guidelines for proper absorption should be stressed. Some medications need to have dose adjustments for renal or liver disease. For that reason, healthcare providers and nurses with expertise in the field of HIV/AIDS are preferred to manage ART. Additional information that is easy to read, accurate, and up-to-date on antiretroviral medications for patients and providers can be found at [www.aidsmeds.com](http://www.aidsmeds.com).

## HIV/AIDS and Adherence

Over the past few years, medication adherence has become its own science. Many larger clinics have Adherence Programs that focus on teaching, problem solving, and providing social and financial support to patients who have difficulty taking their medications and keeping medical appointments. In addition to nurses and social workers, peer educators are trained to work one-on-one to provide support for patients who need additional help. There is often a question of why so much effort should be used to help people take their medication. After all, don't they have the choice to decide if they want to do it or not?

HIV/AIDS continues to affect the poor and minorities in greatest numbers. Overall, these patients have fewer resources and options. Basic needs such as food and shelter may not be available to them. They may lack the necessary skills to find steady employment and, if they do work, are more likely to be paid a minimum wage. Single mothers may be forced to choose between using their scarce resources to pay for their own medical expenses or to provide basic needs for their children. The struggle against drugs, violence, crime, and poverty may supersede the importance of obtaining medical care. Even if they do manage to find a clinic, adherence can become just another part of their struggle.

### Case Study

JR is twenty years old and has three children. She was infected with HIV by a boyfriend when she was 16. She thought he might have been using drugs, but he was good looking, had lots of money, and said he loved her. They went together for about one year; she became pregnant and had a baby. He was arrested and went to prison. She dropped out of school and had two more children with two other boyfriends. She took HIV medication each time she was pregnant because the nurse told her it would decrease the risk of her baby being infected with HIV. After each baby she stopped the medication because it made her feel sick to her stomach and caused diarrhea. It was just too much to try to take care of three kids and feel sick all the time. Someone told her if she took the medication with food it would be better. Unfortunately, she usually ran out of food stamps before the end of the month and it wasn't always easy to get around to the local food pantries with three kids. It seemed like one of them was always sick, and some days she just didn't feel like going out to do anything.

She split up with the father of her youngest child six months ago, and moved back home with her mother and two brothers. Just after she arrived she developed a cough and intermittent fever that had persisted for several weeks. Her mother was worried about her health, and willing to care for the children so that she could go to the clinic. Her brother, three cousins, and uncle had also been infected with HIV. Her mother told her that without medication she could get sick and die.

During the initial assessment the nurse asked if she would be willing to join the adherence program and support group for single mothers at the clinic. She explained that understanding HIV would help her make good decisions about her medical care and medications. In addition, attending the support group would provide social support from other women who faced a similar situation. She was informed that she would be provided with bus tokens for transportation and childcare at the clinic during the support group. She agreed to join both groups.

After only six months JR is doing much better. At her last adherence visit she had missed only one dose of medication that month. She was prescribed a once-daily ART by her provider, and referred to several community organizations for financial assistance. She has not had any adverse side effects from her new medication. She is encouraged by some of the other women in the group who have enrolled in a vocational training program and can see that when her children go to school she will have the opportunity to improve her situation as well. She has chosen to take birth control pills, and also faithfully uses the female condoms provided by the clinic staff to avoid other STDs. Her CD4 count is > 400 and VL is undetectable.

As illustrated in the case study of JR, some patients face numerous hurdles to adherence. Regardless how efficacious her original ART may have been, because it produced side effects that were intolerable she was not able to continue taking it. Using a holistic approach, the nurse was able to identify several other factors that were affecting her ability to be adherent. First, she did not have adequate social support. Moving home with her mother, who was willing to help her with the children and encourage her to get medical care, was the first step towards getting the help she needed. Next, enrolling in the adherence program assured that she would have transportation and other incentives to keep her appointments. The support group provided a safe place for her to discuss her situation with peers who were able to listen to her concerns and support her decisions. The women were role models who encouraged her to look beyond her present situation and make plans for her future.

### Consequences of Non-Adherence

Overall, estimates are that only about 50% of patients with chronic illness take medications as prescribed (McDonald, Garg, & Haynes, 2002).

Many studies have been conducted in an attempt to identify factors that influence patients' desires and ability to take medications in a way to ensure the best possible efficacy. Different studies have tried to determine a relationship between non-adherence and age, race, gender, and psychosocial factors. However, results are inconclusive.

One question that has been the center of controversy is related to what degree of adherence is needed to optimize viral suppression. Paterson et al. (2000) reported that less than 95% adherence to protease inhibitors was an independent predictor of virologic failure among patients in their study. Other studies have also shown significant differences in viral concentrations between patients who took medications 95-100% compared to 90-95% (Low-Ber, Yip, O'Shaughnessy, & Montaner, 2000).

With other chronic illnesses, non-adherence predominately affects the health of the patient with the illness. In contrast, the effect of non-adherence with ART has several negative effects:

- **Disease progression and poor prognosis:** Except in very rare cases, (e.g., non-progressors) untreated HIV results in depletion of the body's immune defenses and naturally progresses to AIDS and death. Along the continuum of the disease, patients can become sick from opportunistic illnesses, infections, dementia, neurological complications, etc., which can result in hospital admissions, disabilities, financial hardship, and a diminished quality of life. However, like other chronic diseases, these effects are limited to the patient and his or her family/friends.
- **Increased risk of infection:** Every patient with HIV/AIDS is potentially infectious even if their viral load is undetectable. Persons exposed to blood or body fluids of patients with HIV/AIDS (e.g., sexual contact, needles, healthcare staff, etc.) have a greater risk of infection if the patient is not prescribed or is non-adherent with ART because the higher the viral load the more probable infection will occur. Patients who are non-adherent with ART not only put themselves at risk, they also increase the likelihood that they will infect others.
- **Development of multiple drug resistant strains of HIV:** As with other organisms (MRSA, MSSA, MDR TB), HIV could develop into a strain of highly drug resistant virus (Ickovics et al., 2002). Non-adherence encourages the development of mutations that can lead to resistance to certain drugs, or to all drugs in certain classes. Infection with a resistant strain of HIV can limit or eliminate treatment options. People newly diagnosed with HIV who were infected by patients with resistant virus may have few, if any, effective options for treatment.

## Considerations for Choosing ART

Before prescribing ART or changing ART, current guidelines recommend an HIV genotype and/or phenotype to evaluate the presence of viral mutations and drug efficacy.

- HIV-1 Genotype (GT):

The GT is a specialized test that reads the genetic code of HIV to detect mutations. Results are used as a tool to help identify viral resistance and select medications. Decisions for ART are based on GT and PT results along with clinical expertise.

- Phenotype (PT):

Similar to a “culture and sensitivity,” the PT measures the amount of drug needed to suppress the growth of HIV in the lab. Results are presented as “levels of resistance.”

The GT and PT are tools to help identify viral variations. Clinical correlation and an assessment of the following factors should be considered before a final decision is made:

- CD4 count
- HIV-1 Viral Load
- GT results
- PT results
- Co-Morbidities
- Lifestyle
- Adherence
- Treatment Guidelines

**Table 8. Nursing Interventions for Patients Who Have difficulty with Adherence**

Medications	<ul style="list-style-type: none"> <li>• Assess for adverse side effects</li> <li>• Instruct proper dietary and dosing restrictions</li> <li>• Recommend simplified ART regimens that allow for daily dosing if possible</li> <li>• Identify reasons for missing medication doses and develop strategies to ensure adherence</li> <li>• Encourage the use of pill boxes and alarm devices</li> <li>• Check for possible drug-drug or food-drug interactions</li> </ul>
Financial	<ul style="list-style-type: none"> <li>• Assess for stable, safe housing</li> <li>• Evaluate need for assistance with food, utilities, transportation</li> </ul>
Social	<ul style="list-style-type: none"> <li>• Assess adequacy of support systems</li> <li>• Discuss domestic violence</li> <li>• Investigate the use of recreational drugs or alcohol</li> <li>• Assess for depression</li> <li>• Discuss future plans</li> </ul>

## Side Effects of ART

While successful ART has helped in many cases, patients with HIV/AIDS often complain of various symptoms that are difficult to live with. Identifying interventions that can eliminate, or at least improve, symptoms is important to assure an improved quality of life. Patients who have adverse side effects from ART may consider stopping medications or reducing their dosage in an effort to decrease symptom intensity and frequency. While this may seem like a good solution to the patient at first, we have already discussed how non-adherence to ART can lead to viral resistance and treatment failure. Patients should be asked about adverse side effects to medications, new problems, and personal concerns at each visit.

<b>Table 9. Nursing Interventions for Frequent HIV/AIDS Symptoms</b>		
<b>Symptom</b>	<b>Common Causes</b>	<b>Interventions</b>
Diarrhea	<ul style="list-style-type: none"> <li>• Medications</li> <li>• Diet</li> <li>• Infections</li> </ul>	<ul style="list-style-type: none"> <li>• Follow dietary recommendations when taking ART</li> <li>• Increase dietary fiber</li> <li>• Avoid unsafe water supplies</li> <li>• Wash hands frequently</li> <li>• If diarrhea continues, test for infection and parasites</li> <li>• Use antidiarrheal agents if needed</li> <li>• Consider change in ART if medication is suspect</li> </ul>
Fatigue	<ul style="list-style-type: none"> <li>• Insomnia</li> <li>• Viral infection (HCV)</li> </ul>	<ul style="list-style-type: none"> <li>• Teach relaxation techniques</li> <li>• Encourage exercise</li> <li>• Limit caffeine intake</li> </ul>
Lipodystrophy/atrophy	<ul style="list-style-type: none"> <li>• Medications</li> <li>• HIV</li> </ul>	<ul style="list-style-type: none"> <li>• Avoid ART known to be associated with fat redistribution</li> <li>• Discuss treatment with growth hormone</li> <li>• Consider surgical interventions</li> </ul>
Erectile Dysfunction	<ul style="list-style-type: none"> <li>• Medication</li> <li>• Fear of infecting others</li> <li>• Depression</li> <li>• Vascular disease</li> </ul>	<ul style="list-style-type: none"> <li>• Review medications</li> <li>• HIV prevention education</li> <li>• Counseling</li> <li>• Medication</li> </ul>
Upper and Lower extremity pain/tingling/weakness	<ul style="list-style-type: none"> <li>• Peripheral neuropathy</li> <li>• Side effect of ART</li> </ul>	<ul style="list-style-type: none"> <li>• Nerve conduction study to establish diagnosis</li> <li>• Consider change in ART if appropriate</li> </ul>
Insomnia	<ul style="list-style-type: none"> <li>• Stage of HIV/AIDS</li> <li>• Disturbed sleep patterns</li> <li>• Side effects of ART</li> <li>• Depression</li> </ul>	<ul style="list-style-type: none"> <li>• Check for medication side effects</li> <li>• Teach relaxation techniques</li> <li>• Assess daily exercise</li> <li>• Refer to mental health if needed for depression, anxiety, grief counseling, etc.</li> </ul>
Anorexia/Weight loss	<ul style="list-style-type: none"> <li>• Medications</li> <li>• Depression</li> <li>• Financial need</li> </ul>	<ul style="list-style-type: none"> <li>• Review dietary recommendations for ART use</li> <li>• Review dietary log</li> <li>• Refer for community resources</li> <li>• Assess for diarrhea/side- effects from ART</li> </ul>



Depression	<ul style="list-style-type: none"> <li>• Grief</li> <li>• Multiple losses</li> <li>• Fear</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate adequacy of social support</li> <li>• Refer for Counseling</li> <li>• Antidepressants</li> <li>• Assess spiritual needs</li> </ul>
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Effective nursing interventions can greatly improve the quality of life for patients with HIV/AIDS and promote a positive health outcome. Working as part of a team with patients, providers, and other disciplines ensures a comprehensive and holistic approach to health care and planning. Ensuring that patients have the knowledge to make good decisions and having them as part of the planning team increases the likelihood of adherence and effective communication.

**Case Study**

Mr K. is a gay male who has been infected with HIV for about 15 years. He is very concerned about his health and, in the past, has taken his medications without missing doses. He is very up to date on new developments in HIV/AIDS, and gets most of his information from reading magazines, searching on the Internet, and talking with friends who are also HIV positive. He exercises regularly, eats a nutritious diet, and avoids tobacco, alcohol, and recreational drugs. He also takes vitamin supplements.

Several months ago he began to notice some wasting in his facial tissue. He also thought he was gaining weight around his waist, and possibly losing some muscle in his arms and legs. Otherwise he has been doing well.

Results from a recent clinic visit are somewhat alarming. Mr. K. now has a VL that is >50,000 and his CD4 has gone down as well. The nurse calls to let him know the results, and asks again about adherence. He admits that he stopped taking ART about four months ago because he was worried about the facial wasting and weight gain. He told her, "I still date, and I am worried that someone will take one look at me and say 'that guy has the virus.' The gay community here is very close, and if the news gets out that someone has the virus it spreads quickly. I'm also worried about losing my job."

The nurse suggested that some ART appears more likely to contribute to lipodystrophy, or fat redistribution and wasting. She encouraged Mr. K. to talk with his provider and ask about other medications that might not have the likelihood of causing problems. She reminded him how important it is to have the highest CD4 count possible and an undetectable viral load. He agreed to a clinic visit the following week to discuss other treatment options.

Because the nurse had been able to establish an open and trusting relationship with the patient on previous visits, he felt safe disclosing his concerns about continuing therapy, and also accepted her offer to discuss other options. Early identification of a problem allowed for discussion, education, and an intervention that should benefit the patient physiologically and psychologically.

## HIV and Infection Control in the Healthcare Setting

No specific recommendations are made for caring for patients with HIV in the healthcare setting. Strict adherence to Universal Precautions is recommended to protect staff from transmission of HIV. As with other blood borne and communicable diseases, safe behaviors designed to avoid contact with, and spread of, infective organisms should be used at all times by all staff, visitors, and other patients. Use of gloves, masks, protective eyewear, and gowns are not indicated for routine care. They are recommended if there is the likelihood of contact with blood or body fluids containing blood, semen, and vaginal secretions. They also pertain to tissue and cerebrospinal, synovial, pleural, peritoneal, pericardial, and amniotic fluids. Universal precautions do not include feces, nasal secretions, sputum, sweat, tears, urine, or vomitus unless they contain visible blood (CDC, 2001).

Staff with areas of broken skin that is exposed should always wear protective clothing. Wearing gloves for digital exams, digital examination of the mucous membranes, endotracheal suctioning, and providing mouthpieces available for mouth-to-mouth resuscitation will assure workers' safety. As with all patients, handwashing is essential.

The most common HIV/AIDS exposure risks for healthcare workers (HCW) are needlestick injuries or exposure to infected blood through breaks (cuts, lacerations) in the healthcare worker's skin, eye, or mucosa. Even after exposure the risk of infection is generally low, but because there is no cure for HIV events should be reported immediately.

Post exposure prophylaxis (PEP) with antiretroviral medication has been shown to significantly (>81%) reduce HIV infection after exposure (Roland et al., 2003). Following exposures that meet the criteria for PEP, antiretroviral medications should be started as soon as possible, ideally within two hours, but definitely within 36 hours from exposure. The following recommendations are approved by the NYSDOH for post-exposure care:

- Wash exposed skin surfaces immediately with soap and water.
- Flush exposed mucous membranes with water.
- Request HIV test from source patient (requires informed consent for testing).
  1. If rapid testing is available, wait for preliminary results (usually about 30 minutes).
  2. If positive, initiate ART immediately.
  3. If negative evaluate risk behaviors of source patient, assess need for PEP.
  4. If rapid test is not available, follow criteria to determine HIV risk for source patient and need for PEP.
  5. If PEP is started and standard HIV test of source patient comes back negative and patient is determined to be low risk, stop PEP.
- Obtain a baseline HIV test from HCW, include pre-test counseling within 72 hours of exposure.
- If PEP is recommended:
  1. Provide ART and explain possible adverse side effects.
  2. Refer to appropriate provider for follow up care (employee health, private provider).
  3. Re-evaluate within 72 hours of exposure.
  4. Treat with ART for 4 weeks.
  5. Discuss need for additional HIV tests at 1, 3, and 6 months post-exposure.
  6. Monitor labs for drug-induced toxicities.
  7. Evaluate weekly for PEP adherence, emotional status, side effects.

Specific guidelines for PEP in other states can be found on the DOH Web sites.

**Table 10. Risk of Infection Following Exposure by Blood Infected with HIV**

Method of Exposure	% of Risk
Needlestick	0.3% (1/300)
Exposure to eye, nose, mouth	0.1% (1/1,000)
Non-intact skin	0.01% (1/10,000)

Source: Adapted from CDC, National Center for Infectious Diseases, Division of Healthcare Quality Promotion, Division of Viral Hepatitis, 2003

As of May 13, 1992, the CDC was aware of HIV test results for more than 15,000 patients who were treated by 32 HIV-infected HCWs (CDC, 1993). The CDC (2009) reports that the transmission of HIV from a healthcare worker to patients is extremely rare. In the early 1990s, CDC reported on six patients infected by a Florida dentist and following these incidents, only three additional cases have been reported: two occurrences from France, one from an orthopedic surgeon, another from a nurse to a patient, and the third from Spain where a gynecologist may have infected a patient during a cesarean section delivery. The risk from a surgeon to patient is still considered to be minimal (Perry, Pearson, & Jagger, 2006).

Additional information about occupational exposure to blood borne pathogens can be obtained from [http://www.cdc.gov/ncidod/dhqp/wrkrProtect\\_bp\\_prevent.html](http://www.cdc.gov/ncidod/dhqp/wrkrProtect_bp_prevent.html).

### **Case Study**

Vicki works in material management in a large urban teaching hospital. One of her duties is to deliver and store supplies in the room used for autopsies. She is generally very happy at work and always smiling. Late one afternoon she went to the office of the Infectious Disease Nurse Practitioner to ask questions about HIV. She was obviously upset, and began to cry as soon as the door was shut. Once the conversation started she recounted that several days ago she found out that a patient with HIV/AIDS had an autopsy performed in a room where she delivers supplies. She had no physical contact with any blood or body fluids, since her job was to fill the equipment cabinets, but she was afraid that she could have been exposed to HIV if someone involved with the autopsy touched the cabinet doors with contaminated hands, or if she stepped in blood or other body debris on the floor while working, got something on her boots, and transferred organisms to her hands when she took her boots off at home.

She does not remember anything on the floor or cabinets, she does not go into the room before it has been cleaned following procedures, but she was afraid there might have been something she did not see. She was angry because she felt that she should have been informed if anyone with an infectious disease had been in the room so that she could take proper precautions. The event had happened 4 days prior to this time, and she had cried every day since.

The Nurse Practitioner explained how HIV is transmitted, and how Universal Precautions are recommended to protect HCWs from infection. She went through a checklist of possible exposures and when Vicki answered them all negatively, she assured her that she was not at risk of infection. She provided emotional support and told Vicki that she could come back anytime if she had additional questions.

The Nurse Practitioner asked for permission to include information on HIV in the new employee orientation sessions to educate HCWs how they can protect themselves and the importance of not stigmatizing patients with HIV/AIDS.

## Special Populations

### HIV & Pregnancy

Vertical transmission (transmission from mother to child during the birth process) of HIV remains a serious problem in many undeveloped countries where antiretroviral medications are not readily available. CDC estimates that globally, as many as 1,600 babies are infected daily and over half a million yearly (CDC: Routine Perinatal Testing). The National Institutes of Health (NIH) sponsored the Pediatric AIDS Clinical Trial Group study (PACTG 076), which provided evidence that the use of AZT by mother and newborn could significantly reduce the risk of vertical infection to 2%.

In this landmark study, the Pediatric AIDS Clinical Trial Group study (PACTG 076), showed that AZT can significantly reduce HIV transmission from an infected woman to her infant and that there are no long term effects on the uninfected children exposed to the Zidovudine (Culnane et al., 1999). The children in PACTG 076 were exposed for six weeks to AZT or a placebo *in utero* and during labor and delivery, and also as newborns. Despite these findings, a sizable number of US women, especially minority women with few resources, who are at risk for HIV/AIDS are not tested prior to becoming pregnant and may present for obstetrical care late in their pregnancy or at the time of delivery. Because of the increased risk of HIV infection, CDC recommends that HIV testing be included for all women along with other routine prenatal tests. The recommendations are for an approach in which HIV is presented as a routine part of prenatal testing and will be performed unless the woman chooses to “opt-out” of the test. Even with this approach, in most states women must sign an informed consent and receive pre and post-test counseling. Rapid testing (also with the opt-out approach) is recommended for women who present for labor and delivery and have not had a current HIV test.

If results of the HIV test are positive, combination ART should be offered to the mother following current guidelines and continued throughout her pregnancy and following delivery. All antiretroviral medications are assigned to a class depending on possible toxicity to the fetus. Information on specific medications can be found on packet inserts provided by the pharmaceutical company, on the FDA Web site, or in current HIV treatment guidelines. A woman diagnosed with HIV during labor can be started on antiretroviral medications as soon as possible (in the labor and delivery suite) and the newborn will be started on medications following delivery. Several factors increase the risk of vertical transmission, including maternal:

- Elevated plasma viral load
- Low CD4 count
- Co-infections
- Duration of Ruptured of Membranes
- Mode of delivery
- Breastfeeding

NYS requires HIV testing, if the mother agrees, for every woman who presents for delivery without documentation of her HIV status. If the woman refuses HIV testing, infants are tested immediately after birth. There is no consent required for newborn testing. Testing criteria and guidelines may vary according to state.

Additional Guidelines for Pregnancy and HIV/AIDS can be found at the following Web sites:

- CDC - [www.cdc.gov/hiv/projects/perinatal/materials/optout.htm](http://www.cdc.gov/hiv/projects/perinatal/materials/optout.htm)
- NYSDOH - [www.hivguidelines.org](http://www.hivguidelines.org)

## Adolescents and HIV

HIV can impact adolescents in several ways. Because adolescence is a time for experimenting, it can also be a time of high-risk behaviors for HIV/AIDS. Drugs, alcohol, and sexual experimentation place adolescents in dangerous situations. Wanting to “look cool” or “be one of the group” can lead to behaviors that are risky. While searching to find one’s identity is a natural process, adolescents need the support of family and safe friends to grow and develop. Keeping a non-judgmental approach helps to facilitate open communication.

Another group of adolescents facing a difficult transition are the children who are HIV infected and now are living into young adulthood. Like other adolescents with chronic disease, they must learn how to find their own identity in the face of uncertainty. Disclosure of their HIV/AIDS status to friends can be a difficult choice and can have an effect on the way they are accepted among peers and allowed to form relationships. Managing medications, medical appointments, tests, episodic illness, and the usual life of an adolescent can result in conflict.

Some adolescents may have other family members who are also infected, or may be living with only one parent or in another situation if their parents have already died. They have had to face multiple losses and instability when other friends may be concerned only with dating or music. Without support these adolescents may become isolated, depressed or angry compounding an already difficult life.

## HIV and the Correctional Setting

Inmates are a population vulnerable for infection with HIV/AIDS. Behaviors leading to incarceration often place them at high-risk for HIV/AIDS. Intravenous drug use, snorting cocaine, using other recreational drugs and alcohol, sexual assaults, multiple sexual partners, STDs, and homelessness create an environment that promotes HIV transmission. Once in prison, sex is traded for money, protection or favors, fights result in blood exposure, drugs are used with makeshift works often sharing needles, and homemade tattoos and piercing is done with unsanitary tools. Prisons have their own culture and unofficial inmate government that often involves wars raging between gangs and violence as a way to protect territories. Condoms are often not provided for inmates. HIV/AIDS education for patients, nurses, and correction officers, providing condoms, and establishing support groups have been found to be effective in some instances in preventing the spread of HIV/AIDS in the correctional setting.

## HIV and the Elderly

When we think about populations at risk we do not always think about someone the age of our parents. For years providers were aware that there were a few scattered cases of HIV among the 50+ age group, but often they were seen as exceptions to the rule. It wasn’t until 1997 when the CDC announced the first decline in new AIDS cases in the U.S. overall, that the focus was shifted to a rise in AIDS among older patients. In fact, the percentage of people age 50+ with AIDS in the US increased from 10% to more than 20% of the total AIDS population. Studies indicated that many patients age 50+ are diagnosed during a hospitalization and are less likely to know how they were infected. The need for a complete sexual history yearly to identify high-risk behaviors could facilitate early identification and treatment.

## HIV and IV Drug Users (IVDU)

In many instances patients with HIV/AIDS are blamed for their disease. This is not unique to HIV/AIDS, but is common with any disease that results from actions chosen by the patient. Prejudice and stigma can ultimately affect the care patients receive.

Ding et al. (2005) evaluated physician’s attitudes toward patients with HIV/AIDS who are IVDUs, and the quality of care they received. They selected this population because as of December

2002, 34% of all AIDS patients, and 43% of women with HIV/AIDS were injection drug users according to CDC. Subjects for their study (N = 2864) were also participating in the HIV Cost and Services Utilization Study (HCSUS). Subjects were asked to identify their primary care provider, who were also contacted and asked to complete a survey designed to collect demographic data, including sexual orientation, age, ethnicity, race, years of practice, HIV knowledge, stress, and attitudes towards HIV-infected IVDUs. Results indicated that 23.9% of patients in this study had a history of IVDU. About 14% of physicians agreed or strongly agreed that treating HIV-infected IVDUs seems futile, and if they had a choice 8.6% would prefer not to treat that population. Finally, IVDUs who had physicians with negative attitudes were significantly less likely to be exposed to ART. Predicted percentages of patients exposed to ART by physicians with negative attitudes were 13.5% for IVDUs versus 36.1% for non-IVDUs. Among patients treated by physicians with positive attitudes 32.3% of IVDUs versus 34.4% of non-IVDUs were exposed to ART. However, overall, physician attitudes toward HIV-infected IVDUs were not significantly related to the patient's quality of care, although IVDUs reported more unmet needs. Only about 17.4% of the physician's in this survey had negative attitudes about this population.

## **Standards for HIV/AIDS Care**

Healthcare professionals involved in HIV/AIDS care are obligated to follow the same standards put forth for all patients. These standards have been developed to assure that patients are treated with dignity and respect regardless of illness or stage of life. The American Nurses Association revised their Code of Ethics for Nurses in 2008, providing nurses with direction for an ethical practice. Highlights from this document include:

- Respect for human dignity
- Right for patient self-determination
- Respect of the worth, dignity, and rights of all human beings despite health problems
- Provision of care that transcends individual differences
- Respect for human values and needs without prejudice
- Consideration of lifestyle, value system, and religious beliefs when planning care
- Advocate for delivery of humane and dignified care
- Preservation of the primacy of patients' interests
- Assurance of privacy and confidentiality
- Monitoring for safe participation in research
- Advocate for social reform

## **HIV Related Stigma**

Stigma is a Greek term that means to be “marked, or set aside.” For centuries, people have been stigmatized because of defects, illness, political views, or other characteristics that make them different from the main group in a given society. Unfortunately, many people are still stigmatized today based solely on race, culture, religion, or behavioral characteristics. Because the majority of patients with HIV/AIDS are from minority races or participate in behaviors that are not socially acceptable (e.g., IVDU, homosexual, multiple sexual partners, party drugs), they are already more likely to be stigmatized. A diagnosis of HIV/AIDS (an incurable disease) may compound the stigma they face and lead to fear and isolation. Even healthcare professionals must be careful not to let their personal values interfere with patient care.



## **Conclusion**

Caring for patients with HIV requires expertise and good nursing skills. Patients often present with complex problems and needs. While medical expertise is very important, many of the needs of patients infected with HIV are psychological, social, or spiritual. As illustrated by the case studies, treatment may fail due to factors that are not directly related to medications. Unless patients have the basic needs of food and shelter successful treatment is unlikely.

The number of new cases of HIV globally is estimated to rise by about 14,000 cases daily. Early identification of HIV, HIV prevention education, and ART adherence have been identified as factors that could eventually change the course of the pandemic. These areas all fall within the scope of nursing practice, and can be implemented autonomously in many different arenas of practice.

Increasing HIV awareness and knowledge among members of the nursing profession is an important step in changing attitudes and practice in the field of HIV/AIDS.

## **Resources**

### **Joint United Nations Programme on HIV/AIDS (UNAIDS)**

*08 Report on the Global AIDS Epidemic*

Available from: [http://img.thebody.com/unaid/2008/JC1510\\_2008GlobalReport\\_en.pdf](http://img.thebody.com/unaid/2008/JC1510_2008GlobalReport_en.pdf)

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## HIV/AIDS: Where Are We Now?

### Course Exam

After studying the downloaded course and completing the course exam, you need to enter your answers online. **Answers cannot be graded from this downloadable version of the course.** To enter your answers online, go to e-leaRN's Web site, [www.elearnonline.net](http://www.elearnonline.net) and click on the Login/My Account button. As a returning student, login using the username and password you created, click on the "Go to Course" link, and proceed to the course exam.

1. It is estimated that there are between 30 and 36 million people globally living with HIV/AIDS at the end of year 2007 and that approximately 14,000 people are infected daily with the HIV virus. Of newly infected people, as many as 95% do not know that they are infected with HIV.
  - A. True
  - B. False
2. In the United States the exposure categories in rank order of the greatest number of AIDS cases in 2006 were:
  - A. Male-to-male sexual contact, injection drug use, high-risk heterosexual contact, and male-to-male sexual contact and injection drug use.
  - B. Heterosexual sex, male-to-male sexual contact, injection drug use, and other.
  - C. Male-to-male sexual contact, high-risk heterosexual contact, injection drug use, and male-to-male sexual contact and injection drug use.
  - D. Heterosexual sex, injection drug use, male-to-male sexual contact, and other.
3. HIV can be transmitted by casual contact, sharing eating utensils or bathrooms, casual kissing, hugging, and mosquitoes.
  - A. True
  - B. False
4. A major nursing intervention in the prevention of HIV transmission is taking a thorough sexual history. Many nurses struggle with this because:
  - A. Time constraints that make a focus on health history prohibitive; clinicians focus on the presenting problem.
  - B. They may be embarrassed or uncomfortable with the subject particularly with older patients or those who have a sexual orientation other than the nurse's own orientation.
  - C. Not recognizing that there may have been a change in a patient's lifestyle, even among established patients.
  - D. All of the above.
5. In contrast to standard HIV testing, which takes approximately 2 weeks to obtain results (which allows for some people do not return for results) the Oraquick Rapid HIV testing can be accomplished in 30 minutes.
  - A. True
  - B. False

6. There are five stages in the HIV lifecycle. The 5 stages are:
- A. Infection, integration, fusion, cleavage/viral assembly/budding, uncoating/reverse transcription.
  - B. Fusion, infection, uncoating/reverse transcription, cleavage/viral assembly/budding, integration.
  - C. Infection, fusion, uncoating/reverse transcription, integration, cleavage/viral assembly/budding.
  - D. None of the above.
7. Antiretroviral medications used to treat HIV are divided into classifications that target the virus at differing stages in its lifecycle. Protease inhibitors are a classification of antiretroviral medication that interferes with the process of viral assembly.
- A. True
  - B. False
8. The main tests used to monitor the progress of HIV disease are:
- A. CD4 count which is an indicator of immune status; the higher the number, the more CD4 lymphocytes available to defend the body against HIV.
  - B. Viral load which indicates the number of copies of virus in the blood; the lower the number, the slower the progression of disease.
  - C. Both A and B.
  - D. Neither A or B.
9. Among the consequences of non-adherence to ART are all the following **EXCEPT**:
- A. An increased risk of infection to others.
  - B. Faster disease progression and poorer prognosis.
  - C. The development of multiple drug resistant strains of HIV, which makes for poor treatment options for the patient and others who they may infect.
  - D. An abnormally high CD4 count.
10. The most common HIV/AIDS exposure risk for healthcare workers are needlestick injuries or exposure to infected blood through breaks (cuts, lacerations) in the healthcare worker's skin, eye, or mucosa. The risk of infection following needlestick exposure is approximately 0.3%.
- A. True
  - B. False