HUMAN IMMUNODEFICIENCY VIRUS & ACQUIRED IMMUNODEFICIENCY SYNDROME

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ABSTRACT

Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) have undergone significant research and recent improvements in disease outcomes and morbidity. Although it remains a chronic condition without a cure, new treatment guidelines and antiretroviral drugs have provided hope for individuals infected with HIV to live longer. Continuing education for health professionals caring for men, women and children with HIV/AIDS help to dispel myths and reduce stigma, enhance a fuller understanding of best practice trends, and improve prevention strategies to avoid transmission of the disease and complications associated with disease progression and/or treatment.
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Statement of Need
Continuing education for health professionals in the rapidly evolving area of HIV/AIDS research and treatment is needed in order to provide optimal care and prevention of HIV transmission.

Course Purpose
To provide updated knowledge on HIV/AIDS to nurses and associates in various clinic and community settings.
Learning Objectives

1. Differentiate between human immunodeficiency virus and acquired immunodeficiency syndrome.
2. List three ways human immunodeficiency virus is transmitted.
3. List three ways human immunodeficiency virus can be prevented.
4. List three common diseases associated with acquired immunodeficiency syndrome.
5. Discuss the treatment options for human immunodeficiency virus and acquired immunodeficiency syndrome.

Target Audience
Advanced Practice Registered Nurses, Registered Nurses, Licensed Practical Nurses and Nursing Associates

Course Author & Director Disclosures
Dana Bartlett, RN, MA, MSN, William S. Cook, PhD,
Douglas Lawrence, MS, Susan DePasquale, CGRN, MSN, FPMHNP-BC
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There is no commercial support for this course.

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Please take time to complete the self-assessment Knowledge Questions before reading the article. Opportunity to complete a self-assessment of knowledge learned will be provided at the end of the course.
1. **During the acute sero-conversion phase of an HIV infection:**
   a. Approximately 50% of those infected will be asymptomatic.
   b. Almost everyone who is infected will be symptomatic.
   c. Approximately 10% of those infected will be asymptomatic.
   d. Symptoms are very rare.

2. **Which of the following is measured to diagnose AIDS?**
   a. Platelet count
   b. Neutrophil count
   c. CD4\(^+\) count
   d. Lymphocyte count

3. **HIV is transmitted by:**
   a. Sexual contact or contact with HIV-infected blood
   b. Casual social contact
   c. Insect bites and contaminated water
   d. Blood transfusions and animal bites

4. **The great majority of people will have a detectable antibody response to HIV:**
   a. Within three days of being infected with HIV.
   b. Within three years of being infected with HIV.
   c. Within three months of being infected with HIV.
   d. Within three weeks of being infected with HIV.

5. **HAART is considered to be:**
   a. Curative for AIDS but ineffective for preventing transmission of HIV.
   b. Effective for preventing AIDS and transmission of HIV.
   c. Only effective at preventing AIDS in people age 15-64.
   d. Ineffective at preventing AIDS for someone with viral hepatitis.
INTRODUCTION

The human immunodeficiency virus (HIV) is a retrovirus that causes the acquired immune deficiency syndrome (AIDS). HIV can significantly depress immune system functioning and, prior to the development of anti-retroviral medications, essentially everyone infected with HIV developed AIDS and overwhelming opportunistic infections and/or neoplasms. Untreated, HIV has essentially been regarded as a death sentence.

Current drug therapy in the form of highly active anti-retroviral therapy (HAART) has allowed many people to live decades after the initial infection. However, HIV and AIDS are still serious health problems. Although the number of deaths in the United States caused by AIDS peaked in the mid 1990s and has been declining since that time, an estimated 56,000 people are newly infected each year and the incidence of new cases has not changed in over a decade. In addition, HIV and AIDS disproportionately affects the African-American community, the lesbian, gay, bisexual and transgender (LGBT) community, and under-developed countries. There has definitely been progress in preventing the spread of HIV and the treatment of AIDS, but there is still no cure and no effective vaccine.

HUMAN IMMUNODEFICIENCY VIRUS

The human immunodeficiency virus is a retrovirus. HIV enters a cell and uses its RNA and the host’s DNA to produce copies of itself. There are two types of HIV: HIV-1 and HIV-2. HIV-1 is most common in the United States, whereas, HIV-2 infections are seldom seen in this country. HIV-2 is less easily transmitted and infection with HIV-2 progresses more slowly than does an infection with HIV-1. An infection with HIV is a process of viral entry
into the body, attachment of HIV to cells in the immune system, and entry of HIV into those cells and then replication.

There are three phases of an HIV infection.\textsuperscript{1,2} The first phase is the \textit{acute sero-conversion phase}. It typically begins 4-11 days after the virus enters the body. This phase lasts from a few weeks to a few months, and it is characterized by HIV entering the cells, rapid viral replication, and the establishment of viral reservoirs. During the acute sero-conversion phase approximately 50\% of those infected will be asymptomatic and 50\% will develop non-specific signs and symptoms such as fever, flu-like illnesses, and rashes. These signs and symptoms last for several weeks and then subside.

The second phase is the \textit{asymptomatic HIV infection phase}. During this phase the virus becomes established in cells of the immune system, particularly a sub-set of T lymphocytes called helper T cells (to be discussed in more detail later). The infected host is asymptomatic because her/his immune system at this point is capable of containing the virus to a degree sufficient to prevent the development of AIDS; however, because HIV has the ability to replicate and mutate very rapidly, elimination of the virus is not possible. In addition, the viral reservoirs cannot be eliminated. The asymptomatic phase lasts for a median of approximately 10 years.

The third and final phase is AIDS. This phase is characterized by a very low level of the T-helper cells, severe damage to the immune system, and the development of opportunistic infections and neoplasms. The T-helper cells function (in part) by releasing cytokines, which are proteins that influence the anti-viral activity of other immune system cells.
The T-helper cells are sometimes referred to as CD4\(^+\) cells because they have a glycoprotein on their surfaces called CD4\(^+\). CD4\(^+\) helps the T-helper cells recognize HIV, so if the CD4\(^+\) T-helper cells are infected with, and damaged by, HIV they cannot initiate and coordinate an immune response to the virus. If the CD4\(^+\) cell count is below 200/µL and/or the patient has one of the diseases that are considered to be indicative of a severely compromised immune system, then the patient is diagnosed as having AIDS.

The Center of Disease Control (CDC) divides HIV and AIDS into three categories, and those are divided into subcategories.

1. Category A:
   Asymptomatic HIV infection without a history of symptoms or AIDS-defining conditions.

2. Category B:
   HIV infection with symptoms that are directly attributable to HIV infection (or a defect in T-cell–mediated immunity) or that are complicated by HIV infection.

3. Category C:
   HIV infection with AIDS-defining opportunistic infections.

These three categories are divided into sub-categories which are based on the CD4\(^+\) T-cell count:

<table>
<thead>
<tr>
<th>CD4(^+) T-cell count</th>
<th>Sub-categories</th>
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<tr>
<td>&gt; 500/µL</td>
<td>A1, B1, C1</td>
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<tr>
<td>200-400/µL</td>
<td>A2, B2, C2</td>
</tr>
<tr>
<td>&lt; 200/µL</td>
<td>A3, B3, C3</td>
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More than 90% of people who have AIDS and who do not receive treatment will die, and the average time to death after the onset of AIDS is two years. The severe damage to the immune system results in opportunistic infections and neoplasms, and HIV and AIDS and can cause diseases of essentially every organ system.

**HIV TRANSMISSION**

HIV is found in blood, semen, breast milk, and vaginal fluids, and the virus can be transmitted by contact with any of these fluids. Estimating the risk of transmitting HIV is quite complicated. For example, the risk of developing an HIV infection from sexual activity can be estimated for a single sexual encounter or for multiple sexual encounters over a period of time; and, estimating this risk must also consider factors such as condom use, viral load, the use or non-use of HAART, male circumcision, types and frequency of sexual activity, and the presence of sexually transmitted diseases (STDs).

**Sexual transmission**

HIV infection is predominantly a sexually transmitted disease. However, determining the risk of HIV transmission from a particular sexual act is very difficult, and many factors determine if the virus will be transmitted. For example, ART greatly decreases the risk of sexual transmission of HIV as does a low level of HIV-1 in the plasma. Additionally, a sexually transmitted disease (especially a genital ulcer) or viral hepatitis increases the risk of sexual transmission of HIV. In men, heterosexual vaginal intercourse with an infected partner confers an approximate risk of 1:500; and, for women the approximate risk is 1:1000.³ Anal intercourse is riskier, most likely due to tearing of the anal mucosa, and cells in the tissues of that area that are susceptible to infection with HIV.
The risk of HIV transmission for men and women during unprotected receptive anal intercourse has been estimated to be approximately 1:200, and the risk of insertive anal intercourse is approximately 1:1500. There have been case reports of HIV transmission from oral sex, both cunnilingus and fellatio, but the rate of transmission by this route is thought to be extremely low. Male circumcision does not appear to decrease the risk of male-to-female transmission of HIV, but it can decrease the risk of female-to-male transmission by 50%-60%.

**Blood transmission**

HIV is transmitted effectively by contact with infected blood, but the risk of transmission depends on many factors. People who use intravenous drugs and share needles are at high-risk for HIV infection, and intravenous, intramuscular, and subcutaneous drug injection exposure can all transmit HIV. The risk of HIV transmission by intravenous drug use has been estimated to be 0.65% or slightly less than 1 per 100 injections.

The risk of HIV transmission by blood transfusion is very low, approximately 1 in every 2 million transfusions. Potential donors are screened for HIV infection, and donated blood is tested for HIV antibodies, HIV antigen, and HIV nucleic acid.

**Occupational exposure**

An exposure that places a healthcare professional at risk for infection with HIV or other infectious diseases is defined as:

". . . a percutaneous injury (i.e., a needlestick or cut with a sharp object) or contact of mucous membrane or nonintact skin (i.e., exposed skin that is chapped, abraded, or afflicted with dermatitis) with blood, tissue, or other body fluids that are potentially infectious."
Studies of healthcare workers have shown that the risk of transmission of HIV after a puncture wound from a needle or a sharp containing blood infected with HIV is 0.3%, or 1 of every 300 exposures. The risk of HIV transmission after mucous membrane exposure to blood infected with HIV is 0.09%, or 1 of every 1100 exposures. HIV transmission after a percutaneous injury or a mucous membrane splash has increased risk if the viral load is high, the amount of blood injected or splashed is high, or a large bore, hollow needle was involved.

Amniotic fluid, cerebrospinal fluid, pericardial fluid, peritoneal fluid, and pleural fluid are considered infectious, but the risk of HIV transmission through contact with any of these fluids is not known. Feces, nasal secretions, saliva, sputum, sweat, tears, urine, and vomit are not considered to be infectious unless they are visibly bloody.

**Mother to infant transmission**

The American Academy of Pediatrics advises mothers who are HIV-positive not to breast feed. The risk of HIV transmission through breast milk has been estimated to be approximately 17%, but both higher and lower levels of transmission have been reported. Interestingly, the risk of HIV transmission through breast milk is higher if the infant is both breast-fed and given formula instead of exclusively breast-fed.

The transmission of HIV from mother to infant depends on many factors. If the mother receives pre-natal treatment for her HIV infection, if the child is not breast-fed, and the child is given post-natal prophylaxis, the risk of an infant becoming infected with HIV has been estimated to be 0.1%.
Other causes of transmission

Men having sex with men, people who are bisexual, people with multiple sex partners and/or involved in prostitution, people with sexually transmitted diseases, and intravenous drug users have a relatively high risk of becoming infected with HIV. HIV is not transmitted by casual contact such as hugging, shaking hands, or touching objects that were touched by someone who is infected with the virus. HIV is not transmitted through air or water or by insect bites. Blood spills on environmental surfaces can pose a risk of transmission, but the virus cannot live outside the body for more than a few hours.

PREVENTION OF HIV/AIDS

The transmission of HIV can be prevented in many ways, such as through sexual abstinence, by not sharing drug injection equipment, and through contraception.

Contraception

The effectiveness of condoms in preventing the transmission of HIV, if they are used consistently and properly, has been estimated to be 80%-90%. Lambskin condoms are less effective in preventing HIV transmission than latex and polyurethane condoms. Oral contraceptives do not positively or negatively affect the rate of HIV transmission. Over-the-counter spermicidal jellies do not prevent the transmission of HIV, and douching can increase the risk of HIV transmission. A dental dam (a thin square of latex) or condoms can be used to help prevent transmission of HIV from oral sex.
**Anti-retroviral therapy (ART)**

If couples are sero-discordant (i.e., one person is HIV positive, the other is not), then HAART can decrease the risk of transmission of HIV.\(^{17}\)

**Sterile syringe programs**

Providing intravenous drug users with sterile syringes reduces needle sharing and decreases the incidence of HIV infections.

**Pre-exposure prophylaxis**

The CDC recommends pre-exposure prophylaxis (PrEP) with Truvada® (emtricitabine and tenofovir) to prevent the transmission of HIV. The CDC’s PrEP guidelines state that with the use of Truvada®:

> “Recent findings from several clinical trials have demonstrated safety and a substantial reduction in the rate of HIV acquisition for men who have sex with men (MSM), men and women in heterosexual HIV-discordant couples, and heterosexual men and women recruited as individuals.” \(^{18}\)

Pre-exposure prophylaxis should be prescribed for: \(^{18}\)

1. Men who have sex with men, and have
   a. an HIV-positive sexual partner;
   b. recently had a bacterial STD;
   c. had a high number of sex partners;
   d. a history of inconsistent or no condom use;
   e. involvement in commercial sex work.
2. Heterosexual women and men who have
   a. an HIV-positive partner;
   b. had a high number of sex partners;
   c. a history of inconsistent or no condom use;
   d. involvement in commercial sex work.

3. IV drug users who have
   a. an HIV positive partner;
   b. share injection equipment;
   c. recently undergone drug treatment but are not currently injecting drugs.

Other requirements for pre-exposure prophylaxis are:
1. a documented negative HIV test;
2. no signs or symptoms of an acute HIV infection;
3. normal renal function;
4. no use of medications that are contraindicated;
5. hepatitis B vaccination.

The complete document on pre-exposure prophylaxis can be viewed on the CDC website or at: http://www.cdc.gov/hiv/pdf/PrEPguidelines2014.pdf.

**HIV SCREENING**

Screening for HIV should be done for all individuals:
1. aged 13-64 years in all healthcare settings;
2. women who are pregnant or may become pregnant;
3. who are in a high-risk group;
4. who seek treatment for an STD;
5. who are starting treatment for tuberculosis.19,20
Screening is done by blood tests that look for antibodies to HIV and HIV antigen. In the great majority of people, an antibody response to HIV will be detected within three months of an infection with the virus. Alternatively, a person who tests negative but has been involved in high-risk behavior within three months of the test could have an HIV infection, which is the testing window often mentioned in discussions of HIV screening.

The latest (2014) CDC guidelines to screen for HIV in adults and children 2 years of age and older are: 21

1. A combination test that detects antibodies to HIV-1 and HIV-2 and p24Ag (an HIV antigen). The combination test detects HIV antigens, which can be seen 12-26 days after an infection, and antibodies formed against HIV-1 and HIV-2, which can first be detected 20-45 days after the infection.

2. If the combination test is negative, there is no infection.

3. If any part of the combination test is positive or indeterminate, than nucleic acid testing should be done. Nucleic acid testing checks for target sequences of specific HIV genes.

4. If the nucleic acid testing is positive there is an HIV-1 infection. If the nucleic acid testing is negative there is no infection.

**ELISA and western blot testing**

Two other commonly used diagnostic tests are the enzyme-linked immunosorbent assay (ELISA) test and the Western blot; both test for antibodies formed against HIV. Standard procedure is to do the ELISA first.
If the ELISA is negative then HIV infection is unlikely and further testing is usually not needed. If the ELISA is positive or indeterminate it is typically repeated and, if the results are the same, the Western blot should be done for confirmation, as it is a more sensitive test than the ELISA. If the Western blot shows antibodies to all three major HIV genes, an HIV infection is present; and, if negative, there is no HIV infection. An indeterminate Western blot result should be repeated.

**Home screening tests**

The Food and Drug Administration (FDA) has approved two home screening tests used to detect HIV: *OraQuick®* and *Home Access HIV-1 Test System*. *OraQuick®* uses an oral swab and a test liquid and the results are ready in 20 minutes, and is accurate for 91.7% of people who are HIV positive and 99% accurate for people who are HIV negative, but a false negative is possible for high-risk behavior (i.e., needle sharing, high risk sexual behavior) occurring less than three months from the test date. A positive test result should be confirmed with clinical laboratory testing.\(^{22}\)

The Home Access test requires the individual to use a lancet and place several drops of blood on a test card. The test card is mailed to a laboratory and the results are available seven days later; the test is 99.9% accurate. If the test is positive, a confirmatory test should be done.\(^{23}\) Neither *OraQuick®* or the Home Access test can be used to test for HIV-2.

**SIGNS AND SYMPTOMS OF AIDS**

The clinical picture of AIDS is very complex and every organ system can be affected. The signs and symptoms of AIDS, such as anorexia, cough,
diarrhea, fatigue, fever, and weight loss, are non-specific and AIDS can only be diagnosed through blood testing.

The illnesses caused by AIDS can develop as a result of drug therapy, as a direct result of the infection, or from opportunistic infections such as *Pneumocystis* pneumonia and neoplasms, i.e. Kaposi’s sarcoma. Some of the systemic diseases caused by AIDS include:\(^1\)

1. **Cardiovascular disease**
   Coronary artery disease, cardiomyopathy, and myocardial infarction are more common in people who are HIV positive than in people who are not. The increased incidence in cardiovascular disease is a direct result of the infection that is independent of traditional risk factors and a consequence of HAART.

2. **Pulmonary disease**
   Pulmonary disease is a typical complication of AIDS. Sinus infections, bacterial and fungal pneumonias, and tuberculosis are common in people who have AIDS.

3. **Neurologic disease**
   Almost every patient with an HIV infection has some degree of neurologic impairment. Neurologic diseases are an especially serious cause of morbidity in people who have AIDS, and they are caused by:
   a) opportunistic infections such as toxoplasmosis;
   b) neoplasms such as Kaposi’s sarcoma; and,
   c) a direct result of the HIV infection, i.e., aseptic meningitis and AIDS dementia complex.
4. *Oral lesions*
   Fungal and viral infections of the mouth are a very common complication of AIDS.

5. *Liver disease*
   Hepatitis B and hepatitis C infections are common in people who are HIV-positive, and the majority of HIV-positive drug users are infected with hepatitis C.

6. *Hematologic diseases*
   Anemia, leucopenia, and thrombocytopenia are typical complications of AIDS. As with other diseases associated with AIDS, the hematologic disorders can be caused by drug therapy, a direct effect of HIV, or due to secondary infections and/or neoplasms that are characteristic of AIDS.

7. *Endocrine diseases*
   Dyslipidemias, i.e., elevated serum cholesterol and triglycerides are a complication of HAART, and hyperglycemia and insulin resistance are often seen in people with AIDS.

8. *Dermatologic diseases*
   Dermatologic problems occur in > 90% of people who have AIDS: the most common are seborrheic dermatitis (an inflammatory skin disorder that affects the face, scalp, and torso), folliculitis (infection of the hair follicles), and opportunistic infections. Shingles and herpes simplex infections may also be seen.
9. **Neoplastic diseases**

Kaposi's sarcoma, non-Hodgkin's lymphoma, and invasive cervical carcinoma are neoplasms considered to be AIDs-defining diseases.

10. **Genito-urinary diseases**

Infections of the genito-urinary system are a common feature of AIDS. Infections and neoplasms that are considered to be AIDS-defining diseases include: ²

- Candidiasis of bronchi, esophagus, lungs, or trachea
- Cervical cancer
- Coccidioidomycosis
- Cryptococcosis
- Cryptosporidiosis
- Cytomegalovirus disease
- Cytomegalovirus retinitis with vision loss
- HIV-related encephalopathy
- Herpes simplex
- Histoplasmosis
- Isosporiasis, chronic intestinal
- Kaposi sarcoma
- Lymphomas
- Mycobacterium avium complex/Mycobacterium kansasii infection
- Tuberculosis infection, pulmonary or extrapulmonary
- Pneumocystis pneumonia
- Pneumonia, recurrent
- Progressive multifocal leukoencephalopathy
- Salmonella septicemia
- Toxoplasmosis of the brain
- Wasting syndrome due to HIV infection
TREATMENT

Treatment of AIDS is focused on three goals: 1) managing the infection with HAART, 2) monitoring for and treating complications, and 3) preventing transmission.

Highly active anti-retroviral therapy has decreased the mortality rate of AIDS by approximately 50%, and it decreases the rate and risk of HIV transmission as well. In the US, HAART is usually initiated when the patient has an AIDS-defining illness or his/her CD4+ count is < 350/μL. There are six classes of anti-retroviral drugs that can be used. Each class affects a specific stage of the HIV life cycle, and prescribing and monitoring the patient for side effects and effectiveness of therapy can be complicated.

HAART Medications

- Chemokine receptor antagonist (CCR5 antagonist)
- Integrase inhibitor (II)
- Fusion inhibitor (FI)
- Nucleoside reverse transcriptase inhibitors (NRTIs)
- Nonnucleoside reverse transcriptase inhibitors (NNRTIs)
- Protease inhibitors (PIs)

Guidelines for HAART have been published by the US Department of Health and Human Services (DHHS) Panel on Antiretroviral Guidelines for Adults and Adolescents.\(^24\) The specific HAART regimen that is used depends on
patient factors, but treatment-naïve patients will usually be prescribed at least three drugs - two NRTIs and an NNRTI, a PI, or an II. Four to six drugs may be needed if the patient develops drug resistance. Specific regimens that are recommended by DHHS are:

- Efavirenz/tenofovir/emtricitabine (NNRTI/NRTI/NRTI)
- Ritonavir-boosted atazanavir + tenofovir/emtricitabine (PI/NRTI/NRTI)
- Ritonavir-boosted darunavir + tenofovir/emtricitabine (PI/NRTI/NRTI)
- Raltegravir + tenofovir/emtricitabine (II/NRTI/NRTI)
- Dolutegravir + tenofovir/emtricitabine

Other HAART regimens are used for children, pregnant women, people who have been previously treated with HAART, and people who have specific medical problems.

Prior to beginning HAART the patient’s medical, psychological, and surgical history should be reviewed and the prescription, over-the-counter, and herbal/natural medications that the patient is taking should also be reviewed. If needed, the patient should receive vaccinations for influenza, hepatitis A, hepatitis B, pneumonia, and varicella. In addition, The Infectious Diseases Society of America recommends the following before initiation of HAART: 25

- CD4\(^+\) cell count
- Complete blood count with differential.
- Liver function tests.
- Total protein and albumin
- Serum electrolytes
- BUN and creatinine
• Fasting lipid profile
• Blood glucose and hemoglobin A1c
• Urinalysis
• Glucose 6-phosphate-dehydrogenase screen
• STD screening
• Screening for hepatitis B and hepatitis C
• Screening for latent tuberculosis
• Screening for varicella
• Screening for cytomegalovirus (CMV)
• Serologic Testing for *Toxoplasma gondii*
• HIV viral load
• HIV resistance testing
• Chest x-ray
• Trichomoniasis screening (Pregnant women)
• Pap smear

During treatment with HAART periodic monitoring of laboratory studies is needed to evaluate the effectiveness of HAART and to monitor for drug side effects. The patient will also need close monitoring for, and possibly treatment of, the complications of AIDS. Aside from the systemic complications discussed previously, the side effects of HAART include anorexia, diarrhea, fatigue, low energy levels, skin rashes, sleep disturbances, and vomiting.

Treatment with HAART is very effective, although failures do occur. With careful monitoring, good patient compliance, and adjustments to the medication regimen, many people on HAART can live for decades with HIV. However, the treatment itself can contribute to organ system complications,
and patients on HAART are still at risk for non-AIDs associated diseases. HAART is not a cure. In the 2014 HAART guidelines, the DHHS notes:

“Eradication of HIV infection cannot be achieved with available antiretroviral (ARV) regimens even when new, potent drugs are added to a regimen that is already suppressing plasma viral load below the limits of detection of commercially available assays.”

**OCCUPATIONAL EXPOSURE**

The CDC and the US Public Health Service recommend post-exposure prophylaxis for healthcare workers with exposure to HIV. The exposed individual and the source should be evaluated for the presence of HIV, hepatitis B, and hepatitis C. In the case of puncture to the skin, basic wound care should be performed and the exposed person’s tetanus immunization status should be reviewed. There is no evidence that antiseptics, squeezing the wound, or applying bleach to the body area of exposure will decrease the risk of transmission. Post-exposure prophylaxis should be started as soon as possible, preferably within a few hours of the exposure.

Post-exposure prophylaxis should be started preferably within a few hours of the exposure. The compete guidelines for HIV post-exposure prophylaxis are available on-line at the CDC website and through this link [http://www.ncbi.nlm.nih.gov/pubmed/23917901](http://www.ncbi.nlm.nih.gov/pubmed/23917901). Further assistance is available 24 hours a day at the National Clinicians’ Post-Exposure Prophylaxis Hotline, 1-888-448-4911.
SUMMARY

Individuals infected with human immunodeficiency virus can experience significantly depressed immune system functioning, and develop the chronic condition of acquired immune deficiency syndrome. For many, prior to anti-retroviral medications, individuals with HIV and AIDS often encountered opportunistic infections and/or neoplasms, and their prognosis and chance for survival were grim.

This course has offered an update on the current diagnosis, and of major improvements in the medical treatment and prognosis for individuals with HIV/AIDS. The CDC recommendations for prevention of HIV transmission and the existing guidelines on HAART drugs and post exposure prophylaxis for HIV exposure remain critical to health team knowledge and patient education, as well as to public health and safety.

Please take time to help the NURSECE4LESS.COM course planners evaluate nursing knowledge needs met following completion of this course by completing the self-assessment Knowledge Questions after reading the article. Correct Answers, page 25.
1. During the acute sero-conversion phase of an HIV infection:
   a. Approximately 50% of those infected will be asymptomatic.
   b. Almost everyone who is infected will be symptomatic.
   c. Approximately 10% of those infected will be asymptomatic.
   d. Symptoms are very rare.

2. Which of the following is measured to diagnose AIDS?
   a. Platelet count.
   b. Neutrophil count.
   c. CD4+ count.
   d. Lymphocyte count.

3. HIV is transmitted by
   a. Sexual contact or contact with HIV-infected blood.
   b. Casual social contact.
   c. Insect bites and contaminated water.
   d. Blood transfusions and animal bites.

4. The great majority of people will have a detectable antibody response to HIV:
   a. Within three days of being infected with HIV.
   b. Within three years of being infected with HIV.
   c. Within three months of being infected with HIV.
   d. Within three weeks of being infected with HIV.

5. HAART is considered to be:
   a. Curative for AIDS but ineffective for preventing transmission of HIV.
   b. Effective for preventing AIDS and transmission of HIV.
   c. Only effective at preventing AIDS in people age 15-64.
   d. Ineffective at preventing AIDS for someone with viral hepatitis.
CORRECT ANSWERS:

1. A
2. C
3. A
4. C
5. B

Footnotes:


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