HIV/AIDS: Core Concepts

(Structure of the Human Immunodeficiency Virus)
A NATIONAL EPIDEMIC

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An Introduction to HIV

Knowledge is POWER. Accurate and timely information is a basic element of knowledge and is essential to those who are working to end the HIV/AIDS epidemic. This epidemic has created more published literature than any other disease in history, and advances in research and therapy have been extraordinary. Consequently, keeping up with the most current information can be extremely challenging. This course will assist the healthcare professional in understanding the core concepts of HIV.

What is HIV? What is AIDS?

Acquired Immune Deficiency Syndrome, better known by its acronym AIDS, results from, and is the final stage of infection with the blood-borne Human Immunodeficiency Virus (HIV). AIDS occurs when a person’s immune system is so damaged it cannot fight diseases and certain cancers.

Two types of HIV have been identified, HIV-1 and HIV-2. Both virus types target and destroy a subgroup of lymphocyte cells called CD4+ T-cells (also known as T helper cells), but each virus has its own genetic code and replication process. Both viruses share the same modes of transmission and both can cause AIDS.

Origins and spread of HIV-1 and HIV-2 Viruses

Scientists believe that a subspecies of chimpanzee native to the west equatorial region of Africa was the original source of the HIV-1 virus. Chimpanzees infected with Simian Immunodeficiency Virus (SIV) passed the virus to humans as a mutated form that became HIV-1. It is likely that the virus entered the human population through the African bush meat trade. It is also believed that Old World sooty mangabey monkeys harbored a virus that was the precursor to the HIV-2 virus.

Effects of the HIV virus were first seen in the United States in 1981 when separate groups of men who have sex with men (MSM) living in New York and San Francisco became ill. The infection presented in the form of two diseases, Pneumocystis pneumonia (PCP) and Kaposi sarcoma (KS), that had previously been associated with persons having severe immune deficiency. This marked the beginnings in the United States of the worldwide HIV/AIDS epidemic.

Epidemiology and Trends

The HIV virus itself was not identified until 1983. Prior to good testing techniques and the development of effective medications, the spread of HIV in the US occurred rapidly and silently. By 1995, statistics from the Centers for Disease Control (CDC) showed that AIDS was the leading cause of death in adults aged 25 to 44 in the United States, far surpassing cancers and heart disease.

Fortunately, since 1996, there are now extremely effective therapies known as highly active antiretroviral therapy (HAART) that can affect whether or not HIV infection will progress to AIDS. HAART has significantly reduced the annual number of AIDS diagnoses and deaths since the mid-1990s, and this trend has continued to remain stable. HAART uses a combination of drugs that target different stages of viral replication to interrupt the viral life cycle and lower the amount of virus in the blood down to undetectable levels.

HIV Surveillance

HIV disease reporting in the United States is voluntary and depends on state legislative and regulatory decisions. It is not federally mandated. Since April 2008, all 50 U.S. states, the District of Columbia, and 6 U.S. dependent territories have all used the same confidential name-based reporting system to collect HIV surveillance data. The CDC retains all data in the HIV surveillance system under the highest security standards in order to maintain both confidentiality and data security.

The CDC defines HIV incidence as the number of new HIV infections in a specific population during a specific period of time. HIV prevalence is defined by CDC as the number of people living with HIV infection in a given year (or at a given point in time). The greatest number of HIV infections continues to occur among men who have sex with men (MSM). CDC recommends that sexually active MSM be tested for HIV at the very least, on an annual basis. Because both prevalence...
and incidence are high among MSM, the CDC further suggests that MSM be tested every 3 to 6 months.

It is important to note that the number of new diagnoses of HIV does not necessarily reflect the trends in new HIV infections because some persons may be recently infected when they get tested, while others may have been infected for some time when they get tested. **Table 1** gives a quick look at HIV statistics.

### Table 1: A Quick Look at HIV Statistics+*

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of people living with HIV infection worldwide</td>
<td>33.3 million</td>
</tr>
<tr>
<td>Number of people age 13 and older living with HIV/AIDS (HIV prevalence)</td>
<td>1.2 million</td>
</tr>
<tr>
<td>Percentage of people who have their HIV disease under control</td>
<td>28%§</td>
</tr>
<tr>
<td>Number of people living with an AIDS diagnosis (AIDS prevalence)</td>
<td>490,696</td>
</tr>
<tr>
<td>Number of women living with HIV/AIDS</td>
<td>290,000</td>
</tr>
<tr>
<td>Number of new HIV infections as of 2009 (HIV incidence)</td>
<td>48,100</td>
</tr>
<tr>
<td>Percentage of people who live with but don’t know they have HIV</td>
<td>20%</td>
</tr>
<tr>
<td>Percentage of HIV infected adults who are linked to medical care after diagnosis</td>
<td>77%§</td>
</tr>
<tr>
<td>Percentage of diagnosed HIV infected adults who stay in medical care</td>
<td>51%§</td>
</tr>
<tr>
<td>Number of AIDS deaths in 2008</td>
<td>16,000</td>
</tr>
<tr>
<td>Degree in drop of the age-adjusted HIV death rate since 1995</td>
<td>77%</td>
</tr>
<tr>
<td>Highest HIV incidence in the 1980’s</td>
<td>130,000</td>
</tr>
<tr>
<td>Number of deaths since start of epidemic</td>
<td>617,025</td>
</tr>
<tr>
<td>Number of minutes between each new infection</td>
<td>9.5 minutes</td>
</tr>
<tr>
<td>Top 10 Cities with the highest concentration of HIV (Alphabetical order)</td>
<td>Atlanta, Baltimore, Chicago, Ft. Lauderdale, Houston, Los Angeles, New York, Miami, Philadelphia, and San Francisco</td>
</tr>
<tr>
<td>Top 10 States with the highest concentration of HIV (Greatest to Least)</td>
<td>New York, Florida, California, Texas, New Jersey, Georgia, Illinois, Maryland, North Carolina, and Pennsylvania</td>
</tr>
</tbody>
</table>

+Unless otherwise noted, all numbers are estimated numbers for the United States and dependent areas from most recent available data through 2011.
§Data from the Centers for Disease Control and Prevention MMWR 60(47):1618-1623.

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### Infection of HIV

The HIV virus belongs to a class of viruses called retroviruses. They are composed of single-stranded RNA molecules with a DNA intermediate called a provirus that remains within the host cell DNA. HIV can only replicate within a living host. Unfortunately, HIV infection is still a poorly understood process despite the vast amount of research that has been done with the virus. Replication is believed to begin when a dendritic cell binds HIV and transports it to a regional lymph node. These lymph nodes are thought to be the main sites for replication and spread of the virus.

### Three Phases of HIV Infection:

1. **Acute seroconversion.** This occurs between 4-11 days after the virus has entered the infected person’s body. Seroconversion may take several weeks to several months to complete. Statistics show that about 50% of those infected with HIV will have flu-like symptoms, fever, rash, and lymphadenopathy during this time. Since individuals are so highly infectious at this time, it is advantageous to be able to detect infection as soon as possible. HIV infection has a window period that is defined as the time between initial infection and the point at which diagnostic tests can detect the presence of infection. The window period for HIV detection is between two to eight weeks, with an average of 25 days, but may be as long as six months when using tests that detect anti-HIV antibodies. An FDA approved test kit now on the market called the Architect HIV Ag/Ab Combo Test can reduce the window period by one week to as much as 20 days.

2. **Asymptomatic Infection.** During this phase, infected individuals may show no signs or symptoms of outward infection. Some persons may show a continuing generalized lymphadenopathy. Viral replication continues, and the individual’s immune system mounts a good defense. Viral load (please see the section entitled Lab Tests for assessment of HIV) may be stable, but CD4+ T-cell counts will steadily decline. This phase may last several years to over a decade.

3. **AIDS.** This phase occurs after the infected individual’s immune system becomes so damaged it cannot fight opportunistic infections and certain cancers. Since January 1, 1993, AIDS cases have been defined as adults/adolescents (>13 yrs. of age) who are HIV-infected with a CD4+ T-lymphocyte cell count of less than 200/µl or a CD4+ percentage of less than 14. This count is one-fifth the typical level of a healthy adult. A diagnosis of AIDS can also be made when a person who is positive for HIV shows the presence of opportunistic infections that are otherwise uncommon in an immunocompetent individual.
Table 2: AIDS-Defining Conditions

- Bacterial infections, multiple or recurrent*
- Candidiasis of bronchi, trachea, or lungs
- Candidiasis of esophagus†
- Cervical cancer, invasive§
- Coccidioidomycosis, disseminated or extrapulmonary
- Cryptococcosis, extrapulmonary
- Cryptosporidiosis, chronic intestinal (>1 month's duration)
- Cytomegalovirus disease (other than liver, spleen, or nodes), onset at age >1 month
- Cytomegalovirus retinitis (with loss of vision)†
- Encephalopathy, HIV related
- Herpes simplex: chronic ulcers (>1 month's duration) or bronchitis, pneumonitis, or esophagitis (onset at age >1 month)
- Histoplasmosis, disseminated or extrapulmonary
- Isosporiasis, chronic intestinal (>1 month's duration)
- Kaposi sarcoma†
- Lymphoid interstitial pneumonia or pulmonary lymphoid hyperplasia complex*†
- Lymphoma, Burkitt (or equivalent term)
- Lymphoma, immunoblastic (or equivalent term)
- Lymphoma, primary, of brain
- Mycobacterium avium complex or Mycobacterium kansasii, disseminated or extrapulmonary†
- Mycobacterium tuberculosis of any site, pulmonary,†§ disseminated,† or extrapulmonary†
- Mycobacterium, other species or unidentified species, disseminated† or extrapulmonary†
- Pneumocystis jirovecii pneumonia†
- Pneumonia, recurrent†§
- Progressive multifocal leukoencephalopathy
- Salmonella septicemia, recurrent
- Toxoplasmosis of brain, onset at age >1 month†
- Wasting syndrome attributed to HIV

* Only among children aged <13 years. (CDC. 1994 Revised classification system for human immunodeficiency virus infection in children less than 13 years of age. MMWR 1994;43[No. RR-12].)
† Condition that might be diagnosed presumptively.
§ Only among adults and adolescents aged >13 years. (CDC. 1993 Revised classification system for HIV infection and expanded surveillance case definition for AIDS among adolescents and adults. MMWR 1992;41[No. RR-17].)

Centers for Disease Control and Prevention, MMWR, Recommendations and Reports. December 5, 2008 / 57 [RR10].

(TABLE 2). None of these diseases alone are specific to AIDS, but are known to manifest in AIDS patients because of the severe immunocompromised state characteristic of advanced HIV disease. The time between acute seroconversion and a diagnosis of AIDS varies greatly from person to person and can depend on many factors such as when antiretroviral therapy is begun, individual response to therapy, compliance, etc.

HIV Coinfection

Persons infected with HIV may also be infected with Hepatitis B virus (HBV), Hepatitis C Virus (HCV), or with tuberculosis (TB). Injection drug users are especially at risk for HBV or HCV. Coinfection of HIV with another disease complicates each individual disease process and can greatly affect treatment courses and outcomes.

Persons infected with a sexually transmitted disease (STD) are at minimum, two to five times more likely to contract HIV if they are exposed to the virus through sexual contact (increased susceptibility). Also, individuals infected with HIV and another STD are more likely to transmit HIV through sexual contact (increased infectiousness). Herpes is an especially important example of an STD that makes individuals both more susceptible to HIV infection as well as more infectious to others when an individual has both herpes and HIV. Individuals with a known STD infection should also be tested for HIV. Early detection and treatment of curable STDs must be a major focus of all programs aimed at reducing the HIV epidemic.

Signs and Symptoms of AIDS

The only way to know if someone is truly infected with the HIV virus is to be tested. Persons who are HIV positive have been known to be asymptomatic for ten (10) or more years. The CDC has listed a number of physical signs that may be signs of advanced HIV infection, but are not specific to HIV:

- Rapid weight loss
- Dry cough
- Recurring fever
- Profuse night sweats
- Profound and unexplained fatigue
- Swollen lymph glands in the armpits, groin, or neck
- Diarrhea lasting more than a week
- White spots or unusual blemishes on the tongue, or in the mouth or throat
- Pneumonia
Table 3: Specific Ways to Avoid HIV Transmission

Behaviors
1. Avoid any behaviors that might result in contact with blood, semen, vaginal secretions, or other body fluids with visible blood.
2. Ask about the sexual history of any potential sex partner, and abstain from sex with any infected individual.
3. Reduce the number of sex partners to minimize risk.
4. Avoid anal or rough vaginal intercourse, and avoid any behaviors that would tear the skin or lining of the genitals, anus or mouth and cause bleeding.
5. Avoid deep, wet, or “French kissing” with an infected person. Even though transmission has not been documented by this route, possible trauma to the mouth can occur, possibly resulting in the exchange of blood.

Condoms
1. Always use a condom from start to finish during any type of sex, oral vaginal or anal.
2. Latex condoms should be used over other types because they offer greater protection against both HIV and STDs.
3. If a person chooses to have sex with a partner whose status is unknown, a new condom should be used for each new act of insertive intercourse (oral, vaginal, or anal).
4. Adequate lubrication should also be used during vaginal or anal sex with only water-based lubricants. These will protect the integrity of the condon and help prevent tears. Oil based lubricants such as petroleum jelly, mineral oil, massage oils, body lotions, etc. should not be used because they can weaken the latex and cause breakage.

Alcohol and Drugs
1. Avoid alcohol and illicit drugs which can impair the immune system and impair judgment.
2. Do not share needles, syringes or any other drug paraphernalia.

Personal Items
Do not share any personal items such as toothbrushes, razors, or devices used during sex because these items may be contaminated with blood, semen or vaginal fluids.

Blood Donations
If you are infected with HIV or have engaged in sex or any behaviors that put you at risk for HIV infection, do not donate blood, plasma, sperm, body organs, or tissues.

Pregnancy
All pregnant women should be tested for HIV, so that if infected, she can begin antiretroviral therapy for her health and to improve the chances that her infant will be born free of infection.

- Red, brown, pink, or purplish blotches on or under the skin, or inside the mouth nose or eyelids
- Memory loss, depression, and other neurological disorders

HIV TESTING I.C.
The CDC recommends HIV screening for:
- All persons aged 13 to 64 in all health care settings, after the patient has been informed, unless the patient declines
- Anyone beginning treatment for tuberculosis
- Anyone with symptoms of or seeking treatment for STDs
- Anyone at high risk for HIV infection, with a recommended testing frequency, at the very least, on a yearly basis
- Anyone beginning a new sexual relationship
- Anyone whose blood or body fluids are the source of occupational exposure. (Healthcare workers should be tested at the time of the exposure)

HIV testing is primarily done by the enzyme-linked immunosorbent assay (ELISA), also known as the enzyme immunoassay (EIA). In the U.S. all positive results are then confirmed by a test called the Western Blot test, and no positive test results are reported without Western Blot confirmation.

Transmission of HIV
HIV is readily transmitted through sexual contact and exposure to blood and/or blood products and certain body fluids. Studies indicate the highest percentage of HIV transmissions occur during sex acts where body fluids are exchanged. Body fluids include blood, blood products, saliva, tears, urine, semen, vaginal secretions, breast milk, and perspiration. The use of contaminated needles by injecting drug users is the second most frequent route of transmission of HIV. HIV can also be transmitted from pregnant women to their children during childbirth. HIV can also be transmitted through accidental needlesticks or
HIV is NOT transmitted by shaking hands, insect bites, or the sharing of eating utensils, drinking glasses, towels, toilet seats, swimming pools, etc. HIV is not spread by kissing, but some sources recommend against “deep kissing” of infected persons.

Preventing the Transmission of HIV

National, Community and Individual Levels

Statistics from the CDC have shown that prevention programs in the U.S. have averted over 350,000 HIV infections to date. In the 2010 fiscal year, the U.S. spent $26 billion dollars of federal funding to combat the HIV epidemic. In July of 2010, the White House released the first comprehensive government plan known as the National HIV/AIDS Strategy (NHAS) to address this epidemic.

Proper patient education and counseling on the part of the healthcare worker is of utmost importance in preventing the spread of HIV. Infected persons should be counseled about the risks of infecting others, safe sex practices, and the importance of informing all previous sex partners of their positive HIV status.

Because of multiple HIV strains, it is possible for infected individuals to be co-infected with more than one strain of HIV. Infected persons should be counseled not to seek out other persons who are also HIV positive so they can feel “safe” about having sex with these individuals. A person who is being treated for their HIV infection may contract a co-infection that results in deterioration of a previously successful treatment course. There is also evidence of initial drug resistance in new infections.

Ways to Avoid Transmission of HIV

The CDC recommends three main ways to avoid infection with HIV:
1. Abstain from sexual intercourse (oral, vaginal, or anal sex)
2. Be in a long-term, mutually monogamous relationship with an uninfected partner
3. Abstain from sharing needles or syringes for nonprescription drugs

Prevention at the Healthcare Level

Handwashing

Handwashing is the single most effective method to prevent the transmission of infection. Numerous studies have shown handwashing is inadequate in the healthcare field. For handwashing to be effective, hands must be washed with a sufficient amount of product, with correct technique, and for a sufficient length of time in order to reduce the number of transient organisms. Alcohol-based hand sanitizers are preferred over soap and water because they are more effective at killing pathogens, and are less damaging to skin. The correct method for use is to apply enough to wet all hand surfaces while focusing on fingernails and fingertips, rubbing until hands are dry. Drying time should take a minimum of 15-20 seconds or an insufficient amount of sanitizer was used. When hands are visibly soiled, handwashing with soap and water should be done as follows: 3 ml of soap should be used to create a vigorous lather, scrubbing all hand surfaces for at least 20 to 30 seconds (the amount of time it takes to sing the “Happy Birthday” song two times, or the “ABCs” song). For more information on handwashing, please see the NCCE course entitled “Science of Infection Control Principles #2024”

Standard Precautions

The U.S. Department of Labor division of the Occupational Safety and Health Administration (OSHA), whose laws protect healthcare workers, requires the practice of Universal Precautions which states that human blood and other potentially infectious material must be treated as if known to be infectious. The CDC has broadened these requirements by recommending that Standard Precautions be used for all patients in any healthcare setting regardless of their confirmed infectious status. Standard Precautions apply to 1) blood, 2) all body fluids, secretions, and excretions except sweat regardless of whether or not they contain visible blood, 3) non-intact skin and 4) mucous membranes. Although it has not been specifically implicated in the transmission of HIV or other bloodborne diseases, saliva has not been removed from the list of body fluids that require caregivers to exercise Standard Precautions. (See Table 5 on the next page)

Review of the Bloodborne Pathogens Standard

In 1991, OSHA issued the Bloodborne Pathogens Standard to protect healthcare workers from HIV/AIDS and other bloodborne pathogens. To view the entire Standard, see www.osha.gov. Major components of the Standard include:

1. Training. All employees who are exposed to blood or other potentially infectious material (OPIM) must receive proper training at the time of initial work assignment. Training must include procedures to be followed should an exposure occur, and what is necessary for post-exposure follow-up.

Table 4: Risk Factors for HIV Infection

- Having unprotected sex (oral, vaginal, or anal)
- Having multiple sex partners
- Men who have sex with Men (MSM)
- Having a sex partner who has other multiple sex partners or is a MSM
- Having a sex partner who is an injection steroid or injection drug user
- Sharing needles or any equipment that is used to inject drugs (cookers, filtration cotton, etc.)
- Engaging in a business that exchanges sex for money or drugs
- Having a recent STD
- Being born to a mother who is infected with HIV
2. An Exposure Control Plan. Any employer with employees who may potentially encounter blood or OPIM must have a written plan to eliminate or minimize exposure.

3. Engineering Controls. Engineering controls refer to methods of isolating or removing a bloodborne pathogen from the workplace. These include sharps disposal containers, needleless systems, and other mechanical devices to reduce the handling of contaminated needles.

4. Work Practice Controls. These are techniques that reduce the likelihood of exposure by changing the way a task is performed. For example, employers must provide areas for handwashing. Other examples include never recapping needles with two hands, and not eating or drinking in areas of potential exposure.

5. Personal Protective Clothing and Equipment. All PPE must be provided at the employer's expense. Examples include gloves, gowns, lab coats, face shields, masks, eye protection, etc. Employer enforced use of PPE is an OSHA mandate.

6. Labels and Signs. The OSHA biohazard warning label must be placed on all items containing blood or OPIM.

7. Housekeeping. Employers must ensure that the employee's worksite is clean and sanitary, and maintain a written schedule for cleaning and decontamination.

8. Recordkeeping. Employers must maintain accurate and updated records for each employee who has had an occupational exposure. Employers must also maintain employee training records.

9. Hepatitis B Vaccination. Employers must offer the hepatitis B vaccine at no cost to all employees and for consultation with experts and management of exposed healthcare workers.

10. Post-Exposure Follow-up. Systems should be in place for the timely evaluation and management of exposed healthcare workers and for consultation with experts in the treatment of HIV should post exposure follow-up be necessary.

Disinfection and Sterilization of HIV in the Environment

General Disinfection

Although HIV has been kept alive under certain laboratory conditions, medical authorities agree that the virus does not survive well in the environment. Standard procedures currently recommended for disinfection and sterilization are adequate to control HIV. HIV has not posed any special requirements or procedures for the caregiver in order to achieve proper sterilization or disinfection within the healthcare environment.

OSHA Recommended Disinfectants

The Environmental Protection Agency (EPA) oversees the registration of antimicrobial products and determines which disinfectants are appropriate or approved. For antimicrobial disinfection, OSHA recommends cleaning with an “appropriate disinfectant” which includes: 1) a diluted bleach solution (usually 1:10) made every 24 hours with a contact time considered to be the time it takes for the bleach solution to dry, or 2) an EPA registered antimicrobial product. More information is available at www.epa.gov.

It must be noted that certain products registered as HIV effective may not be effective against tuberculosis or HBV. When cleaning and decontaminating with an EPA-approved product labeled for decontamination against HIV-1 and HBV, the EPA requires that personal protective equipment (PPE) be worn, and that all blood and organic material be cleaned before applying the product. The surface being decontaminated should be left wet with the product for 30 seconds for HIV-1 decontamination, and 10 minutes for HBV decontamination. When bloodborne pathogens other than HBV or HIV are of concern, OSHA continues to require use of EPA-registered tuberculocidal disinfectants or a sodium hypochlorite (bleach) solution diluted 1:10 with water.

Medical Devices

When preparing medical devices or instruments requiring disinfection or sterilization, they should be thoroughly cleaned first, and then exposed to antimicrobials as per manufacturer’s instructions. Healthcare workers should check with their individual facility policy for specific instruction on cleaning of routine and high level critical patient care devices and instruments. For more information on disinfection in healthcare institutions, please see the CDC’s most current publication Guidelines for Disinfection and Sterilization in Healthcare Facilities, 2008, available at www.cdc.org

Blood Spills and Body Fluids

In patient care areas where visible blood or body fluids are present, or spills of blood or body fluids have occurred, these should first be thoroughly cleaned, and then the areas should be decontaminated with a disinfectant that is EPA approved as tuberculocidal.

Laundry and Soiled Linen

Although soiled linen has been shown to be a source of large concentrations of certain pathogenic organisms, studies by the CDC have reported the risk of actual transmission of HIV from soiled linen to be negligible. In fact, the CDC has suggested that the use of hygienic principles coupled with common sense to be the guidelines for handling soiled linen.

Infective Waste

Hospital waste, which requires special precautions regarding disposal in all cases, includes microbiology laboratory waste, pathology waste and blood specimens or blood products. Generally, infective waste should either be incinerated or be autoclaved before it is disposed into a sanitary landfill. Bulk blood, suctioned fluid, and secretions may be carefully poured down a drain connected to a sanitary sewer. The sanitary sewer can also be used to dispose.

Post-Exposure Prophylaxis (PEP)

The National Institute for Occupational Safety and Health (NIOSH) estimates that there are between 600,000 to 800,000 needlestick injuries each year, and that about half of these go unreported. Fortunately, the risk of HIV infection following needlestick is less than 1% (0.3% or 1 in 300 per CDC data), and the risk of infection from exposure in ways other than needlestick (such as a body fluid splash onto skin) is less than 0.1% (approximately 0.09% per CDC data). Nonetheless, seroconversion to HIV following occupational exposure is a possibility, and healthcare workers must protect themselves in all possible ways.

Steps to Take Following Occupational Exposure

If exposure should occur:

1. The area should be immediately washed with soap and water. Exposed mucous membranes should be irrigated with copious amounts of water or saline. If a puncture or needlestick has occurred, bleeding should be induced by applying pressure to the area, and it should be washed with soap and water. If eyes are affected, they should be irrigated with water, saline or sterile irrigants.
Table 5: A Review of Standard Precautions

2. The name of the source patient, their HIV status and any information concerning their stage of disease, antiretroviral therapy, etc. should be obtained. If known, the source patient’s address and phone number, and the name of the source patient’s physician should all be obtained.

3. The exposure should be immediately reported to the department in charge of exposure management. Employers must then follow all state and federal reporting requirements, including those set forth by OSHA.

4. Immediate medical assessment should be obtained from a private physician or the emergency department so that, if indicated, antiretroviral medication may begin as soon as possible. Detailed questions concerning the exposure will be asked such as the cause of the wound, details of the procedure being performed, PPE worn, length of contact time, visible blood, etc.

5. A baseline blood sample should be obtained. If possible, a baseline blood sample should also be obtained from the source patient.

Urgency of PEP

Early post-exposure prophylaxis does work, and can reduce the risk of HIV infection tenfold. Should seroconversion occur despite prophylaxis, early suppression of the virus can lower the viral load and greatly slow the course of the disease. PEP should be initiated as soon as possible, preferably within hours of exposure. Data from the CDC has shown that the median time from exposure to initiation of PEP in healthcare workers has been 2 hours. Timely initiation of PEP should not be delayed by the need for expert consultation; rather the basic regimen should be started immediately and modified later if deemed necessary. Assistance in assessing HIV risk and management of PEP to HIV and other bloodborne pathogens can be obtained 24/7 from the National Clinician’s Post-Exposure Prophylaxis Hotline (PEPline) at 1-888-448-4911.

Drugs Used for PEP

Determining which drugs should be used for PEP is based on numerous factors including resistance (known or suspected) of the virus to antiretroviral drugs, drug toxicity profiles, and the frequency, severity, duration, and reversibility of drug side effects. A full four week (28 day) course of PEP is recommended. PEP may be a two-drug combination, or even a three to four-drug combination.

Care of Persons with HIV/AIDS

Complexity of HIV Care

Many studies have shown that patients experience better outcomes when cared for by clinicians with HIV expertise. Because of the complexity of the HIV virus and its lengthy disease process, the HIV/AIDS patient should be under the care of an expert in this field whenever possible. Also because of continual advances in research and antiretroviral therapy, clinicians caring for HIV/AIDS patients should enroll in ongoing continuing medical education (CME). When expert care is not possible (for example in rural areas), primary care providers without HIV experience should have expert consultation in place that can be accessed when needed.
Lab Tests for Assessment of HIV

Medical care of the HIV/AIDS patient begins with a series of tests which will help with assessment of disease staging and choice of antiretroviral (ARV) drug therapy. Two of the most important tests in evaluation of the HIV/AIDS patient are the CD4+ count and viral load test.

1. CD4+ (T Cell) Count is a primary indicator of immune function. It is done as an indirect cell count made by calculations based on total white blood cell count (WBC) and percentage of CD4+ T lymphocyte cells. Counts are reported as number of cells per mm³. CD4 tests should be done at the same time of day and by the same laboratory each time. CD4 tests should not be done until several weeks after an infection or immunization.

2. Viral Load tests are a measure of the number of virus particles in the blood and are expressed as copies of RNA per milliliter of blood. Because different types of viral load tests will yield different results for the same sample, the same type of test should be used each time viral load is tested. Viral load tests can count as high as one million copies and as low as 48 copies. An “undetectable” viral load does not mean there is no virus in the blood; it means the amount of virus is too low for the test to detect. It should also be noted that only about 2% of HIV can be found in blood. Viral load does not measure how much HIV is in other tissues such as the spleen, lymph nodes, or brain. Because viral load tests can be greatly affected by infection, they should not be given within 4 weeks of any immunization or infection.

Antiretroviral Treatment

Treatment guidelines for antiretroviral therapy in the United States are set by the U.S. Department of Health and Human Services (HHS) office of AIDS Research Advisory Council (OARAC). The primary goal of ART is to reduce morbidity and mortality by restoring and preserving immunologic function. Other benefits of ART are suppression of viral load, reduction of HIV-associated inflammation, and reduction in HIV transmission.

Antiretroviral drugs are classified based on the phase of viral replication inhibited by the drug. Categories include nucleoside and nucleotide reverse transcriptase inhibitors (NRTIs), non-nucleoside reverse transcriptase inhibitors (NNRTIs), protease inhibitors (PIs), fusion inhibitors (FIs), CCR5 antagonists, and integrase strand transfer inhibitors (INSTIs). Combination therapy of three to four antiretroviral drugs from different classifications is also known as highly active antiretroviral therapy (HAART). For a list of recommendations on specific combination drug regimens as well as side effects, see the HHS recommendations available at www.aidsinfo.nih.gov/guidelines/

End-of-Life Care

Terminal or palliative care for the AIDS patient is a process aimed at relief of suffering and improvement of quality of life for both the patient and their loved ones. Over the years, this care has shifted from the hospital environment to the home and hospice settings. End-of-Life care involves the following:

- Pain and symptom management
- Communication about illness and prognosis
- Psychosocial and spiritual support
- Coordination of patient care

For more information on palliative care, please see the NCCE course entitled “Palliative Care: Essentials” 1 Hr. or “End-of-Life Care” 10 Hrs.

HIV and the Law

Americans with Disability Act of 1990

Individuals with HIV/AIDS are protected from discrimination on the basis of their disability by section 504 of the Rehabilitation Act of 1973, and by Title II of the Americans with Disability Act of 1990 (ADA). These laws are enforced by the Office of Civil Rights (OCR) of the United States HHS. Section 504 prohibits discrimination by healthcare and human service providers who receive federal funding such as Medicare, or other types of federal assistance. In 1998, the U.S. Supreme Court ruled that HIV-infected people are protected by the federal ban on discrimination against the disabled even if they suffer no symptoms of HIV. Under ADA law, discrimination may occur if providers exclude a person with HIV from participating in a service, if providers deny benefits or medical treatment, or if providers delay treatment or services solely because a person has HIV/AIDS.

Informed Consent

When an individual is tested in any way for HIV, whether it is to determine status or to monitor the progress of active infection, he has the right to informed consent. Individuals must give their express consent to be tested and must be informed of the reason for testing. If requested, complete results and an explanation of the testing must also be given. Individuals must also consent to be treated for HIV. Patients in hospitals cannot be tested without consent unless the patient needs emergency treatment. When a hospitalized patient is mentally ill, consent for testing must be given by a family member.

Compulsory Testing of HIV

Mandatory HIV testing is required for the following:

1. all blood and organ donors
2. all active duty military personnel
3. certain federal or state prisoners, such as those convicted of sex crimes
4. in certain states, newborns born to mothers of unknown HIV status

Criminal Transmission of HIV

In the United States, and many other countries, it is a crime to intentionally infect another person with the HIV virus. Failure to disclose a positive HIV status to one’s partner when engaging in sexual intercourse is considered a criminal offense, and can result in successfully prosecuted charges of attempted manslaughter or manslaughter. In certain states, spitting at another person or the transmission of HIV through infected body fluids, especially when the target person is a prison official, is also a criminal offense. The donation of HIV infected blood, tissues, or an organ is also grounds for criminal prosecution when a person is aware of their positive status.

Preventing Improper Disclosure/Confidentiality

HIV positive persons are not required by law to reveal their status to anyone except spouses and sexual partners. It is important, however, to both the individual and the medical provider for infected individuals to reveal their positive status so optimal medical care can be given and the provider can be diligent about safety precautions.

Stringent confidentiality laws have been enacted requiring medical personnel to keep an individual’s HIV status in the strictest confidence. Information about a person’s HIV status can only be disclosed with permission of the patient or with permission of the parent if the patient is a minor. Confidentiality applies to all patient medical records, and all diagnostic procedures and lab results.

When consent is needed to disclose health information, it must be in writing and must
specifically state what information will be released, to whom, and the length of time the consent is valid. When HIV-related data is released, a statement prohibiting the receiving party from further disclosing the information without the patient’s consent should be included.

Final Considerations

Treatment of patients when personal health is a risk factor has been a topic of much debate over the years. When care of the HIV patient is the chosen path, the bottom line for consideration becomes education and preparedness. If healthcare providers are educated and equipped to handle patients with infectious disease, a level of confidence is obtained in caring for these patients. Caregivers will be able to help patients with HIV/AIDS lead successful lives in spite of such a potentially devastating disease.

All caregivers are urged to familiarize themselves with the relevant legal requirements in their own State and local jurisdictions.

Healthcare professionals continue to play an important role as educators and advocates for this unique population.

Keeping current with research, new and emerging treatment options and compassion are just a few ways to assist clients and families of this multifaceted disease … that is MORE THAN JUST A VIRUS.

Just Released …July 2012

OraQuick In-Home HIV Test

The U.S. Food and Drug Administration (FDA) approved the first over-the-counter, self-administered HIV test kit to detect the presence of antibodies to human immunodeficiency virus. OraQuick In-Home HIV Test is designed to allow individuals to collect an oral fluid sample by swabbing the upper and lower gums inside of their mouths, then place that sample into a developer vial, and obtain test results within 20 to 40 minutes.

A positive result with this test does not mean that an individual is definitely infected with HIV, but rather that additional testing should be done in a medical setting to confirm the test result.

Similarly, a negative test result does not mean that an individual is definitely not infected with HIV, particularly when exposure may have been within the previous three months. The test has the potential to identify large numbers of previously undiagnosed HIV infections, especially if used by those unlikely to use standard screening methods.

Clinical studies also have shown this test has an expected performance of 99.98 percent for test specificity, the percentage of results that will be negative when HIV is not present. This means that one false positive would be expected out of every 5,000 test results in uninfected individuals.

References


Additional References available upon request.
Florida HIV Law

Florida’s Omnibus AIDS Act is vital for healthcare professionals to understand. This legislation corresponds closely with federal guidelines and accepted medical practice. The Omnibus AIDS Act has undergone several significant changes since its passage in 1988, requiring HIV infection reporting, “streamlining” HIV testing by eliminating mandatory counseling in most settings, providing for “rapid” HIV tests, and requiring “opt out” testing for pregnant women. For the most part, however, these changes have “fine-tuned” the Act, leaving its basic structure intact.

Violations are heavily penalized, and good-faith efforts at compliance do not ensure anyone against legal difficulties. The principal methods for dealing with the HIV/AIDS epidemic as specified in the Florida Omnibus AIDS Act are education and testing that is informed, voluntary, and confidential. Florida legislation stipulates four reasons for deviation from traditional educational and testing methods:

- It is assumed that involuntary and non-confidential testing may drive HIV-infected individuals underground.
- The government cannot constitutionally investigate or regulate much of the private behavior that permits the transmission of HIV.
- Because there is no effective cure for AIDS, there is less incentive to enforce mandatory testing and notification of individuals who have been exposed.
- The excessively anxious and sometimes intensely hostile public reaction.

More changes to Florida’s HIV/AIDS laws will occur as scientific knowledge, medical diagnosis and treatment, and public perceptions develop. Over time, compliance with the Omnibus AIDS Act, now in existence for more than two decades, increasingly has become a routine part of meeting the public’s health needs.

For more information on the Omnibus AIDS Act visit: [http://www.doh.state.fl.us/disease_ctrl/aids/legal/Omnibus_2010.pdf](http://www.doh.state.fl.us/disease_ctrl/aids/legal/Omnibus_2010.pdf)

Kentucky HIV Law

902 KAR 2:020 (7).

Disease Surveillance (HIV/AIDS).

RELATES TO: KRS 211.180(1), 214.010, 214.645, 333.130

STATUTORY AUTHORITY: KRS 194A.050, 211.090(3), EO 2004-726

Section 7. Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) Surveillance.

(1) Physicians and Medical Laboratories shall report:

(a) 1. A Positive test result for HIV infection including a result from:
   a. Elisa;
   b. Western Blot;
   c. PCR;
   d. HIV antigen; or e. HIV culture;
   2. CD4+ assay including absolute CD4+ cell counts and CD4+%;
   3. HIV detectable Viral Load Assay; and
   4. A positive serologic test result for HIV infection; or
   (b) A diagnosis of AIDS that meets the definitions of AIDS established within the Centers for Disease Control and Prevention (CDC) guidelines and reported in the:

1. “Adult HIV/AIDS Confidential Case Report Form”; or
2. “Pediatric HIV/AIDS Confidential Case Report Form”.

(2) An HIV infection or AIDS diagnosis shall be reported within five (5) business days and, if possible, on the “Adult HIV/AIDS Confidential Case Report form” or the “Pediatric HIV/AIDS Confidential Case Report form”.

(a) A report for a resident of Jefferson, Henry, Oldham, Bullitt, Shelby, Spencer, and Trimble Counties shall be submitted to the HIV/AIDS Surveillance Program of the Louisville-Metro Health Department.
(b) A report for a resident of the remaining Kentucky counties shall be submitted to the HIV/AIDS Surveillance Program of the Kentucky Department for Public Health, or as directed by the HIV/AIDS project coordinator.

(3) A report for a person with HIV infection without a diagnosis of AIDS shall include the following information:

(a) The patient’s full name;
(b) Date of birth, using the format MMDDYY; and
(c) Gender;
(d) Race;
(e) Risk factor, as identified by CDC;
(f) County of residence;
(g) Name of facility submitting report;
(h) Date/type of HIV test performed;
(i) Results of CD4+ cell counts and CD4+%;
(j) Results of viral load testing;
(k) PCR, HIV culture, HIV antigen, if performed;
(l) Results of TB testing, if available; and
(m) HIV status of the person’s partner, spouse or children.

(4) Reports of AIDS cases shall include the information in subsections (1) - (3) of this section; and

(a) The patient’s complete address;
(b) Opportunistic infections diagnosed; and
(c) Date of onset of illness.

(5) (a) Reports of AIDS shall be made whether or not the patient has been previously reported as having HIV infection.
   (b) If the patient has not been previously reported as having HIV infection, the AIDS report shall also serve as the report of HIV infection.

For more information visit [http://lddha.org/Handouts.pdf](http://lddha.org/Handouts.pdf)