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HIV/AIDS and Infection Control



Objectives:

- Differentiate between HIV and AIDS.
- Identify modes of transmission of HIV.
- Discuss the signs and symptoms of HIV and AIDS.
- List the steps to be taken when an exposure has occurred.
- Recognize three prevention techniques to reduce the risk of exposure.
- Discuss the role of the healthcare provider regarding infection control.
- Identify the types of personal protective equipment available to healthcare workers.

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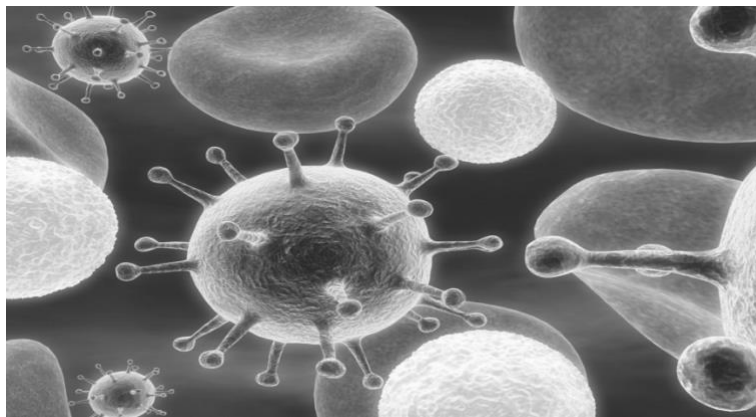
Introduction:

AIDS related illnesses have caused the deaths of over 30 million people since 1981. That is half as many deaths as in World War II. It is currently estimated that 1.1 million Americans are among the 33 million people in the world who are currently living with HIV. HIV is the virus that causes AIDS. It is believed to have originated sometime in between the year of 1884-1924 in West Central Africa when a hunter killed a chimpanzee and some of the blood may have entered the hunter's body possibly through an open wound. The virus as it originated was harmless to the chimpanzee but deadly to humans. Initially, the spread of the virus and the resulting deaths were attributed to other causes.

The CDC reported the first cases of HIV/AIDS in June of 1981. A report was published from the Los Angeles area regarding 5 homosexual men with a fatal PCP strain of pneumonia. Although PCP pneumonia is rarely seen in people with healthy immune systems, it has turned out to be one of the major infections that lead to the deaths of individuals with AIDS. Also, in July of the same year, the unusual skin cancer Kaposi's sarcoma was also attributed to causing the deaths of young homosexual men in California and New York City. In 1982, CDC identified the new disease as acquired immune deficiency syndrome or AIDS. AIDS was often seen in individuals suffering from hemophilia, which further convinced scientists that an infectious agent found in contaminated blood was spreading the disease.

In 1983 the CDC advised that AIDS may be spread by sex, both homosexual and heterosexual and could also be spread by maternal-infant transmission. The United States Public Health Services further advised that members of at risk groups stop donating blood. Around this time some of the first documented cases of heterosexual AIDS transmission were confirmed in Africa leading to the growth of public apprehension. Also in 1983, the virus was isolated from the swollen lymph gland of an AIDS patient. In 1986 the universal name of the virus became HIV, or human immunodeficiency virus. In 1985 the AIDS panic escalates as children with AIDS are banned from schools and celebrities like Rock Hudson are dying from the disease. Also in 1986, Surgeon General, C. Everett Koop, urges parents to have frank conversations with their children and teenagers regarding the spread of the virus. In 1997, President Regan made his first speech on AIDS to increase public awareness and the United States bans HIV positive people from immigrating in to the country. President Obama reversed this policy in 2010.

In 1989, scientists discover that prior to full blown AIDS developing, that the HIV virus multiplies at extremely rapid rates and the goal now shifts to finding ways to keep the HIV virus contained at low levels to decrease the opportunity for AIDS to develop. In spite of these efforts AIDS becomes the leading cause of death to males ages 25-45 and in 1992 the FDA released the first rapid HIV test. The first AIDS drug cocktail named HAART (highly active anti-retroviral therapy) was introduced to patients in 1997 and it showed great progress as the death rate from AIDS in the United States dropped by 40%. Although it was originally thought that the medication would eradicate the virus from the body, later studies showed it only forced the virus into a “hiding” state in the cells. Over time the often-severe side effects of the HAART therapy pushed researchers to develop newer more powerful drugs that have fewer side effects but still none of the medications used to treat the virus can completely cure it. Current HIV treatments can potentially increase a person’s life span by 25 years at an estimated cost of \$620,000 dollars. This high drug cost is one of the reasons that out of 33 million worldwide infected individuals; only about 3 million people are getting the prescribed medication therapy. Having viral suppression drugs available has lulled many people into a false sense of security regarding the seriousness of this illness. Unfortunately, the numbers of individuals infected with the HIV virus continue to climb – up 11% since 2003. The CDC estimates that 50,000 individuals are infected with HIV annually. The highest number continues to be the infection rates of gay or bisexual men.



HIV - Human Immunodeficiency Virus - is a lentivirus - a subgroup of retrovirus (a unique virus that reproduces by continually mutating and changing). This virus damages and kills cells of the immune system in humans. Over a period of time, it destroys the body's ability to fight off infections and certain cancers. This virus was first identified in 1983 and diagnostic blood tests were developed in 1985 (CDC).

AIDS - Acquired Immunodeficiency Syndrome, Chronic, is an advanced stage of HIV causing nearly every organ in the body to be affected. If a person does not receive treatment for the virus at the HIV stage, it will typically progress to full blown AIDS in less than 10 years, although it has been known to convert in as little as 1-2 years or as long as 20 years. Once it has progressed to the full-blown AIDS stage, death usually occurs in less than 2 years. A person is known to have AIDS when the T-cell count (immune system cells) is below 200 per micro liter of blood. At this point a person becomes highly susceptible to opportunistic infections that would not normally cause illness in a person who had a healthy immune system.

HIV may be initially transmitted through unprotected sex, including anal and even oral sex. **Unprotected sex is the most common way the virus is passed from one person to the next.**

It is a blood borne pathogen and may also occur from contaminated blood transfusions or sharing of needles during drug usage. A pregnant woman can pass it on to her unborn baby during delivery or through breast-feeding. The method of transmission does not appear to affect the progression of HIV disease, although people who are drug abusers seem to have a shorter lifespan due to other complicated health issues. HIV infection is NOT spread through casual contact.

Certain individuals may have an increased risk of HIV infection, including the following:

- People with a history of a sexually transmitted disease
- Sexual partners of people who are infected with HIV
- Victims of sexual assault
- Men and women who have unprotected sex with multiple partners
- Men and women who exchange sex for money or drugs or have sex partners who do
- Men who have sex with men
- Injection drug users who share needles or "works"
- Anyone who is accidentally stuck with a contaminated needle or sharp in a healthcare facility

How HIV is NOT spread:

It is not spread through casual contact (sharing food, utensils, bedding, or towels). It is unlikely to spread through saliva (unless the saliva is visibly bloody). It is not spread in pools, telephones or toilets seats (Golden, 2006). No one has ever been infected with HIV from contact with environmental surfaces.

The CDC has found no evidence that mosquito bites transmit HIV. "Mosquito's specifically ingest human blood to lay their eggs and do not inject blood to anyone. The virus does not live long inside the mosquito. The mosquito actually injects saliva. Malaria and Yellow Fever are passed through saliva, not HIV. HIV cannot survive or proliferate in insects. This means the virus does not infect the mosquito and in turn the mosquito cannot infect the human with HIV." (Golden, 2006)



Once HIV infection has occurred, symptoms often develop in 60-90% of individuals. Symptoms usually begin in 2-4 weeks after exposure to HIV. This is described as the *primary stage of HIV* and most people do not initially realize they have been infected and pass the symptoms off as the flu.

Common symptoms of initial HIV infection include:

- ✓ Fever
- ✓ Fatigue
- ✓ Rash
- ✓ Headache
- ✓ Swollen lymph nodes
- ✓ Sore throat
- ✓ Muscle or joint pain
- ✓ Painful ulcers in the mouth
- ✓ Nausea vomiting or diarrhea
- ✓ Dry cough

Recognizing these symptoms and seeking early treatment is crucial because the HIV infection is highly contagious at this stage due to very large amounts of the virus, which is present in the blood at this time. Testing for HIV antibodies is the only way to know for sure if a person has contracted the virus. However there is a window of time where the initial infection might not be diagnosed because the infected individual's immune system may not have developed antibodies to the virus yet. This period of time where the virus antibody is undetectable can range from 2 weeks to 6 months. Currently new testing is available that can diagnose HIV during the "window period" as it looks for the presence of the HIV virus rather than the body's immune or antibody response to the illness. Early symptom recognition and starting treatment as soon as possible can help to decrease the risk of transmission from one individual to another.



If the initial symptoms of HIV remain undetected or untreated, the virus will eventually cause excessive weakening of the immune system. It may take several years for the damage to progress to the stage known as AIDS in which the individual becomes easily infected with organisms or cancers that do not normally cause illness in healthy immune systems. Once the opportunistic infections set in they cause serious damage to the body's defense systems.

The following symptoms could be characteristics of AIDS:

- Shortness of breath
- Persistent cough
- Painful/difficult swallowing
- Nausea, painful stomach aches
- Severe headaches, neck stiffness
- Confusion/forgetfulness
- Unexplained fevers
- Extreme fatigue/weight loss
- Vision impairments/loss
- Coma
- Cancers – cervical, lymphomas, Kaposi's Sarcoma (purple skin lesions)
- Chronic yeast infections

While the Federal government's investment in treatment and research is helping people with HIV/AIDS live longer, more productive lives, HIV continues to spread at an alarming rate. The Center for Disease Control, (CDC) data reviewed 48,100 new HIV infections in 2010. The Florida Department of Health estimated that 10% or 5,500 of those new infections occurred in Florida.

Florida HIV Disease Statistics:

- ❖ In 2010, **5,211 new HIV infections** were reported in Florida. 24 cases were among children under 13 years of age. Of the adult cases – 75% were males, 47% were black, 29% were white and 22% were Hispanic.
- ❖ The 5 leading counties in Florida that reported the highest number of new HIV cases in 2010 were:
 1. Miami-Dade (N=1,242)
 2. Broward (N=864)
 3. Orange (N=485)
 4. Duval (N=434)
 5. Hillsborough (N=352)

- ❖ In 2010 **3,459 new AIDS cases** were diagnosed in Florida.
- ❖ Cumulatively through December 2010, 121,161 AIDS cases have been reported in Florida, of which 1,542 were under the age of 13.
- ❖ In 2011 there were 395,299 HIV tests performed by county health departments in Florida, with 5,205 or **1.3%** of those positive.
- ❖ An estimated 135,000 persons or approximately 11.4% of currently HIV infected individuals are living in Florida.
- ❖ Florida ranks 3rd in the nation for residents living with AIDS.
- ❖ Florida ranks 2nd in the nation for pediatric cases of AIDS.
- ❖ According to the 2011 United States Census – Miami currently ranks # 1 in the nation in HIV cases per capita in the nation.
- ❖ It is estimated that 25% of new cases are diagnosed in people under the age of 25.
- ❖ People age 50 and older in Florida account for 27% of HIV/AIDS cases in the state.
- ❖ St. Lucie County ranks 8th in the state for AIDS cases.
- ❖ 1 in 163 Floridians are HIV infected
- ❖ 1 in 46 black males in Florida are infected.

It is important to keep in mind that this illness is not spread through casual contact and there are definitive measures that a person can take to avoid becoming infected. **First and foremost – Do not have unprotected sex with a person that you are not in a long-term monogamous relationship with.** If you do not know the HIV status of your partner, use a new condom every time you have vaginal or anal sex. Women can use a female condom. Use only water-based lubricants as oil-based lubricants can cause condoms to weaken and break. During oral sex, use a condom, dental dam or even plastic wrap to decrease the possibility of semen entering into the oral mucosa.

If needles are utilized to inject drugs, the individual should be counseled to use only sterile needles and not to share them with anyone. Many communities have a needle exchange program in an effort to keep infected needles off the street. Take advantage of these services if available. The best way to minimize the needle risk is, of course, to seek treatment for drug addiction. Other than illicit drug use, contaminated needles can spread HIV through body piercing and tattoos and the use of anabolic steroids to increase muscle mass.

Therefore it is imperative to ensure sterile needle use occurs in these settings as well. At the start of the HIV epidemic, blood transfusions or other blood products, such as those used for hemophiliacs, spread many cases of HIV. This is no longer considered a risk in this country as testing is now standard to perform on blood to detect the presence of HIV prior to transfusion.

Pregnant women should seek medical care as soon as possible, as HIV testing during pregnancy can help to identify the virus and there are effective medications that can be started to potentially decrease the risk of maternal-fetal transmission by two-thirds.

World Health Organizations are stressing the need for male circumcision. There is solid evidence that circumcision can help to reduce a man's risk of acquiring HIV.

If a person is HIV positive, they need to tell their sexual partner and anyone with whom they may have had sex with so they can be tested and receive medical care if they have the virus. It is important for them to know their HIV status so they do not infect others.

There is little evidence that HIV can be transmitted by casual exposure as in a household setting. Kissing is not considered to be a risk factor unless there are open sores in the mouth. Saliva has been shown to contain very little HIV. However the sharing of toothbrushes or razors is discouraged because they can cause bleeding and blood can contain large amounts of HIV.

Consequently, these types of personal items should not be shared with infected people. In the classroom, or workplace setting there is no risk of HIV transmission to another individual as long as there is no sexual exposure or direct contact with blood.

Looking Forward – Research and Treatment Options:

Education programs and increased public awareness have been instrumental in helping to prevent HIV transmission. These programs have helped the public to understand how the virus is acquired and the importance of taking preventative measures to decrease the risk of exposure. In spite of these educational efforts, the new infection rates continue to rise worldwide.

Currently, research is focused on the development and testing of antiretroviral drugs. The current goal is to simplify complicated medication regimens to improve treatment compliance and decrease the harsh side effects of these medications. The availability of multiple new classes of HIV drugs has made it possible to suppress viral loads to nearly undetectable levels in many individuals. Scientists continue to seek a cure with complete eradication of HIV from the body. They are also looking for ways to inactivate the virus in a HIV positive person to the state where it will no longer be able to replicate or be transmitted to another individual. Decades of research focused on the development of a vaccine that would prevent the transmission of HIV has shown little hope for success at this time.

Early detection and medical intervention remain key aspects of a successful disease management program. Getting an infected person tested and on appropriate drug therapy lowers the chance of transmission significantly. A barrier to achieving this goal has been the reluctance of many individuals to seek testing. This step could become a great deal easier as the release of a home test kit will make it possible for people to learn in the privacy of their home if they are infected. The home test has been approved by the FDA and should be available for sale in drugstores by the end of 2012. The test will consist of taking a swab of the oral mucosa and will provide results in about 20 minutes. The test maker says the test results are accurate 99% of the time.

Furthermore when the product becomes available on the market, the company that makes the HIV test will be providing a 24-hour question and resource hotline. Hopefully these measures will make the test more available to the general public and help to reduce the stigma associated with HIV testing.

Another issue that is surfacing is the “graying” of the AIDS population. For years, world health authorities did not even estimate prognosis in HIV positive individuals over 49 years of age. With successful viral suppression programs, people with the HIV virus are surviving into middle age and beyond. And while this is good news, it does present challenges that are new to the movement. The presence of the virus accelerates the aging process of the bones, cardiovascular and nervous systems. As the AIDS population ages we are seeing 16-30% of these individuals who are suffering from neurological effects like biological depression, anxiety and HIV associated dementia. These biological depressions have been linked to an increased incidence of drug addiction and mental illness in the over 50 population. The goal is to recognize the accelerated aging process of the bodies of older HIV clients and to support research that can promote quality of life at any age. It is important to note that older *adults continue to be newly diagnosed with HIV at an alarming rate*. It appears that they have let down their guard to protect themselves from a sexually transmitted disease. Already one third of people living with HIV in the U.S. are over the age of 50. They also account for 17% of new diagnoses, which is up from 13% in 2001. These sad statistics are proof that the virus does not discriminate by age, race or gender.

The International AIDS Conference met in Washington in July of 2012 and closed with a message that getting treatment to more of the 34 million people worldwide who have HIV is the key to curbing the epidemic, because a vaccine or cure appears to still be years away. Access to treatment worldwide would be vastly expensive but the investment should save money over time, as it would be cheaper than the cost to treat AIDS-related illnesses. This is thought to be good strategy until data shows how hard it is to get people who live in developed countries to follow a treatment regime. For example: here in the United States most people have access to treatment immediately after diagnosis yet just 1 in 4 Americans follow the prescribed treatment and have their illness under control. The summit closed with the following recommendations for the future—

- Increase the availability of HIV testing to rapidly identify those for early treatment – which reduces transmission risk
- Consideration of providing healthy individuals, who engage in high-risk activities, (men who have sex with men or sex with a known HIV positive partner), with a daily dose of the AIDS medication (Truvada) to lower their risk of potential infection.
- A push to educate women to utilize consistent forms of protection when their partners won't use a condom.

Although much has been accomplished in the HIV/Aids epidemic, there is still a long way to go. Many private and government agencies continue to work together to utilize research and prevention strategies at the community, state, national and global level. At this point, **only a vaccine is thought to be able to stop this pandemic**. However, after 20 years of research the vaccine still eludes scientists. Currently, programs are focused on improving treatment, care and support for those living with HIV/AIDS in the United States and around the world. Researches remain hopeful that new treatments will be on the horizon to either eradicate or cure the virus.

INFECTION CONTROL

Individuals who work in the health care field need to take specific precautions when working with **all** patients, not just those they suspect to have HIV. This is best accomplished by the use of Standard Precautions, which is utilized to reduce the risk of transmission of pathogens in the health care setting. Health care workers are required to wear personal protective equipment when potentially encountering blood or other bodily fluids. In the past, blood was considered to be largest risk for transmission of blood borne pathogens but that theory has changed to include all body fluids as pathogens have been identified in all body fluids, except sweat, whether or not visible blood is seen. A blood borne pathogen is an illness that is found in blood and other body fluids and can be transmitted to another individual via contact with contaminated blood or body fluids. Some of the more common blood borne pathogens is HIV and Hepatitis. The methods of transmission in the general public include unprotected sexual contact and sharing of used drug needles. However, in the health care setting there are other ways that pathogens can be transmitted.

Some of these pathways include:

- ✓ Puncture to the skin by a contaminated object such as a needle stick, scalpel, broken glass, or razor blades.
- ✓ Open cuts on the skin, which comes in contact with blood or body fluid.
- ✓ A spray of blood or body fluids to a mucous membrane (nose, mouth, eyes)

The Occupational Safety and Health Administration (OSHA) established by Congress in 1970 to monitor and protect the health of Americans in the workplace setting. OSHA sets standards for safe work place practices and ensures that these practices are indeed being carried out through routine inspections of workplace locations. In 1991, OSHA issued standards regarding the transmission of blood borne pathogens in the health care setting. As a response to the growing numbers of exposures in the workplace setting the Exposure Control Plan was developed and includes recommendations for training requirements and policies that require personnel to be educated on upon hire and annually thereafter.

This training must include:

- The origin and transmission of blood borne pathogens
- Safe work place practices
- Use of personal protective equipment (PPE)
- Action to take, if an exposure has occurred
- Information regarding the Hepatitis B vaccine, which must be offered free of charge to employees
- Information regarding isolation and biohazard signs
- Access to a copy of the facility's policies regarding blood borne pathogens and exposure control plan
- Training logs must be maintained that document the content of the sessions and the names of the individuals that conducted the training.

Further information regarding OSHA required training could be found at: www.osha.gov

Exposures to blood borne pathogens in the healthcare setting can be avoided by standard safety practices that have been proven to reduce exposure risk. One of the most important changes has been the implementation of a safety needle program. Needles should never be recapped and contaminated sharp instruments like scalpels must be placed in a biohazard container that is labeled accordingly.

PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) must be readily available to the healthcare worker and must provide protection from the expected level of exposure. Some examples of PPE include gloves, gowns, masks and face shields and eye protection. These materials should be easy to locate and available in various sizes. Visitors must also be instructed on the proper precautions they must take before they can safely enter the room. If the employee has a question regarding the correct type of PPE to wear for the task at hand, they should always be advised to stop and seek further instruction.



It is important to remember to remove all PPE items before leaving the patient area and to place the soiled PPE into designated areas for disposal. The employee must wash their hands using antimicrobial soap for a

minimum of 20 seconds using good friction and rinsed well under running water. Hands should be dried using a paper towel and that paper towel should also be used to turn the faucet off and then disposed of.

Another blood borne pathogen that has become an increasing area of concern is the transmission of the hepatitis virus. Hepatitis may be present in the blood or body fluids of an infected person and the virus may be passed to a healthcare worker in the same way HIV can be transmitted, via contaminated needle stick or sharp injuries. The risk is also present in splash exposures of blood or body fluids to the mucous membranes. Hepatitis is a serious illness that causes widespread disease and inflammation of the liver.

Individuals who are not health care workers may come in contact with hepatitis through unprotected sex, sharing drug needles or from an infected mother to her baby at birth. Hepatitis B (HBV) and Hepatitis C (HCV) pose special challenges to the health care worker. Although healthcare workers place great emphasis on minimizing the risk of exposure to HIV, it is a well-known fact that Hepatitis B is easier to transmit and results in more deaths than HIV.

Additionally, the virus can live outside the body for up to two weeks on surfaces; increasing the risk of transmission via objects such as contaminated razor blades, tattoo needles and even toothbrushes. There are an estimated 1.2 million Americans who are infected with Hepatitis B and about 30 % of those individuals have no symptoms of the illness, which makes it even harder to diagnose and treat.

Signs and symptoms of Hepatitis B infection include the following:

- Yellowing of the skin and eyes (jaundice)
- Nausea and vomiting; abdominal pain
- Fatigue; joint pain

Hepatitis B infection significantly raises the risk of eventual liver cancer and cirrhosis. New cases in the United States have declined due to the implementation of the vaccine against HBV that became widely available in 1981. It is a safe vaccine and provides the best protection to decrease the spread of the virus. The vaccine has become one of the required immunizations on the recommended childhood panel. The current OSHA standard for HBV prevention requires that healthcare workers who are at an increased risk for occupational exposure be offered the vaccine at no cost. This vaccine is to be offered within 10 days of employment. Health care workers may choose to decline the vaccine and usually do so because they have been previously vaccinated or they are allergic to the vaccine components. The vaccine is effective because it causes the body to produce its own protection called antibodies, against the disease.

Hepatitis C, (HCV), is now the most chronic blood borne pathogen in the United States. Transmission is primarily via open skin contact with contaminated blood. Illegal drug use is the main method of transmission in the general public whereas healthcare workers risk contamination through needle sticks or sharp injuries. Contaminated blood that comes in contact with open areas of the skin also poses a very serious risk. Sexual contact is the least likely way to spread this type of hepatitis. The symptoms for HCV are similar to HBV and a blood test is needed to confirm the diagnosis. Up to 70% of HCV infected individuals remain without symptoms. It is often called the silent killer for this reason. The Center for Disease Control (CDC) has recommended that every American born between 1945 and 1965 get tested for the presence of the virus.

They estimate that this across the board testing of the baby boomers would identify more than 800,000 infections and could save more than 120,000 lives. Although a vaccine is not currently available for HCV, there are medications that can eradicate the virus in the bloodstream in about 75% of cases. In addition to drug therapy, an infected individual can further promote their good health by avoiding alcohol and cautiously using medications that may affect the liver.

Post Exposure Protocol:

Healthcare workers are at an increased risk for exposures to blood borne pathogens. These incidents happen when a puncture to the skin occurs with a **contaminated** needle or sharp injury or through contact via a mucous membrane or non-intact skin (open sore, or chapped abraded skin).

Healthcare workers need to know, in advance, of an exposure what choices they may be expected to make while working in a limited time frame. These decisions are best made informed and with the input of close family members as they may also be impacted if an exposure incident occurs. Of course it is always best to prevent an exposure than to treat one; so safe work place practices like utilizing standard precautions and consistently wearing PPE are crucial components to an exposure control plan. If despite your best efforts, an exposure occurs; the following steps will need to be taken:

Provide immediate first aid-

- ✓ Wash the affected puncture area with soap and rinse well with copious amounts of water.
- ✓ Do not squeeze or otherwise try to make the wound bleed.
- ✓ Do not apply bleach, disinfectants or antibiotic washes to the affected area.
- ✓ If eyes or mucous membranes have been splashed, flush the area gently with flowing water for at least 15 minutes.

Report the exposure to your supervisor immediately –

- ✓ Fill out the exposure report form.
- ✓ These reports should be completed by the employee, not the supervisor – for legal reasons.
- ✓ Document the route of exposure and the circumstances under which the exposure incident occurred.
- ✓ Your supervisor will direct you to the medical team for further evaluation, according to facility protocol.

Report for medical treatment protocol-

- ✓ The individual that sustained the occupational exposure will need to have a baseline blood test drawn to test for the presence of HIV, Hepatitis or other blood borne illnesses.
- ✓ Once informed consent is obtained, blood will be drawn on the source patient, if known. This blood is tested for the presence of HIV, Hepatitis and other blood borne pathogens as indicated.
- ✓ Consent for HIV testing may vary according to state and local applicable laws so know what the laws are in the state in which you practice.
- ✓ Information can also be obtained from the patient's chart when available; which may confirm or exclude the presence of a blood borne infection, if known.
- ✓ Confidentiality of the source patient must be maintained at all times.
- ✓ An FDA approved rapid HIV antibody test kit (20 min) should be utilized in this situation to aid you in making a decision on post exposure prophylaxis (PEP). Remember, this is a decision that YOU will have to make with your physician's input.

Prepare for the possibility of post exposure prophylaxis (PEP) treatment-

- ✓ Recommendations for HIV PEP include a basic 4-week regimen of 2 or 3 of the following medications – zidovudine (ZDV), lamivudine (3TC), or stavudine (d4T). Other drugs may also be added depending on the severity of the exposure.
- ✓ These medications are best utilized when the initial dose can be provided to the healthcare worker within 2 hours of initial exposure.
- ✓ It is estimated that when these meds are started within one hour after exposure, they may be over 80% effective in halting the HIV blood conversion process.
- ✓ Nearly 50% of individuals who take (PEP) will experience the following common adverse symptoms – nausea, diarrhea, abdominal pain, malaise, headache and anorexia.
- ✓ It is estimated that approximately 33% of individuals will stop taking PEP before the duration is complete because of the severity of the adverse side effects.
- ✓ Close medical management will be required while on the prescribed dose of PEP to monitor for signs of liver or kidney failure.

Counseling will be provided to the healthcare worker –

- To provide information regarding source testing information.
- To discuss compliance of the medication regimen.
- To inform the healthcare worker of the need to abstain from sexual activity to “prevent secondary transmission”, especially for the first 6-12 weeks after the exposure when most HIV infected persons are expected to seroconvert.
- If abstinence is not likely, the individual should be counseled on the appropriate type of protection (condoms etc.), to be utilized during sexual encounters.
- If a woman is breastfeeding, she should be advised to discontinue breastfeeding, as the virus has been known to pass through breast milk.
- Special considerations will need to be made for a pregnant woman who has had a potential exposure to blood borne pathogens as PEP therapy data is limited regarding the potential effects of antiretroviral drugs on the developing fetus.
- Personal items should not be shared between individuals that may have a potential for blood transfer like razors and toothbrushes.
- Alcohol use is discouraged during PEP treatment because of the potential for increased liver toxicity.
- No blood, plasma, tissue, organ or semen donations may be made during this time.

The reporting, treatment and counseling procedure is the same for healthcare workers who may have been exposed to the various types of hepatitis; although the medications used for PEP are different. Much emphasis is placed on the transmission of HIV to a healthcare worker but in reality many more cases of hepatitis transmission are reported to CDC annually. CDC reports that the risk of HIV transmission to a healthcare worker following percutaneous exposure is approximately 0.3% while the risk of conversion via Hepatitis B exposure is much higher and estimated to be approximately 33%.

Remember-*knowledge is power*, and the time is now to become educated regarding treatment options, timelines and the impact an exposure will have on you and your loved ones.

Airborne Precautions:

Healthcare workers must also be educated in the transmission of airborne pathogens. Airborne pathogens are spread through the air when an infected person coughs, is suctioned, sneezes, laughs or sings. These tiny microbes hitch a ride on dust particles or small respiratory droplets and can stay suspended in the air while traveling with currents or breezes for a prolonged period of time. Some examples of airborne infections include:

- ✓ Tuberculosis
- ✓ Rubeola (measles)
- ✓ Chicken pox
- ✓ Influenza
- ✓ Smallpox
- ✓ Anthrax (inhalational)

Tuberculosis is on the rise and posing a threat to healthcare workers across the country. It is more likely to spread quickly where living conditions are close like nursing homes, prisons, migrant housing and hospitals. Infection occurs when a person inhales air that contains the TB bacillus and that infection is transmitted to the lungs and may spread to other areas of the body. Individuals who are immunosuppressed are more susceptible to develop TB following an exposure to the bacillus.

It is essential that healthcare facilities utilize proper screening tools to minimize the risk of TB transmission during the hospital stay. There is an increased risk not only to other patients but to the staff as well. Upon admission patients should be asked the following questions to assess their potential TB risk:

(Symptoms of TB)

- Do you have a cough?
- If so, has it lasted longer than 3 weeks?
- Do you have bloody sputum?
- Do you have a fever?
- Do you have night sweats?
- Are you experiencing severe fatigue?

Patients, who answer yes, should raise a high degree of suspicion and immediately be evaluated for airborne isolation until tests can confirm whether or not the patient has TB. Isolation areas have a ventilation system that allows for removal or dilution of contaminated air. The door to the isolation room must remain closed and healthcare personnel have to be trained in the use of a protective respirator mask that has been fit tested to the face and size of the individual. This training must be documented and available for inspection from regulatory agencies such as OSHA. The respiratory device utilized in airborne precautions must be classified as N95, or NIOSH approved. These respiratory devices provide more protection than a simple surgical mask. They provide the best protection when used properly and are well sized to the healthcare workers face. Reevaluation of size and efficacy of the mask must occur annually to ensure proper fit and technique is being maintained in accordance with airborne precaution recommendations. A list of approved NIOSH masks can be found at <http://www.cdc.gov.niosh>.



It is important that the patient with an airborne infection be placed in an isolation room that has negative airflow with 6-12 air exchanges to that area in one hour. All personnel who enter the isolation room must always wear an approved N95 respirator, even if they are only going to be in the room for a short amount of time. The door to the isolation room should be kept closed at

all times except when personnel are entering or leaving the room. If the patient must be transported to other areas of the hospital, it is necessary for the patient to wear a surgical mask, *not a N95 respirator*, in order to minimize the risk of airborne contamination to other individuals.

Healthcare workers are required to undergo annual screening to detect if exposure to TB has occurred. This screening is generally done via a simple skin test which will show a reddened, measurably elevated area if exposure has occurred. If the healthcare worker tests positive for exposure, they have a chance to start medication that will serve to wall off the bacillus so it cannot be spread to other individuals or cause further damage to the body. Once the individual has a positive skin test, they will always test positive so additional skin tests are not warranted. They will instead complete a medical questionnaire to detect the symptoms of active TB. An increasing concern is the presence of strains of TB that are resistant to conventional drug therapy. These strains of TB require treatment with more complex medications that are to be taken for longer periods of time. This directly affects compliance issues as many patients simply stop taking the medications when they feel better causing the TB bacillus to emerge even stronger and more resistant to medications.

Droplet Precautions:

Droplet precautions are utilized when a patient has certain illnesses that can be spread through the air; but they do not stay suspended in the air for long as they are heavy particles than tend to only fly for a few feet before dropping to the ground. These particles are released from the mouth or nose when an infected individual coughs, sneeze, laugh, sings or is suctioned.

Pathogens spread by droplet transmission include:

- Pertussis (whooping cough)
- Influenza (flu)
- N. Meningitis
- Adenovirus
- Rhinovirus
- Group A streptococcus (for the first 24 hours of antibiotic therapy)

It is preferred that these individuals be placed in a private room and healthcare workers must wear a mask when providing patient care. A simple surgical mask is appropriate as the use of a respirator is not required. Once again, the patient will also need to wear a mask when being transported to other areas of the hospital.

Contact Precautions:

Contact precautions involve those organisms that can be spread from one individual to the next by touching the infected patient or by touching surfaces or objects that have been contaminated by the presence of certain pathogens. Some significant sources of contact transmission are found in patients who have:

- ✓ Methicillin resistant staphylococcus aureus (MRSA)
- ✓ Vancomycin resistant enterococcus (VRE)
- ✓ Respiratory syncytial virus (RSE)
- ✓ Clostridium difficile colitis (C-Difficile)

These patients need to be placed in a private room and personnel are instructed to wear gowns and gloves when providing care for the patient. Personal protective equipment must be worn when entering the patient room and then removed upon exiting the room. Hands must be washed thoroughly after removing PPE. This helps to contain the pathogens inside the area and prevent their spread. Special care must be taken

when cleaning these rooms to ensure that surfaces where pathogens can be readily transmitted such as bed rails, light switches, call bells and doorknobs are adequately disinfected. If private rooms are not available, then patients who have similar infections may be placed in a room together (cohorting), with the consent of the infection control department.

Isolation Signs:

Isolation rooms must have clearly posted signs on the outside of the door that will alert hospital personnel and visitors to the special precautions that will need to be taken upon entering the room. If the hospital staff or visitor is not sure how to properly protect themselves from the pathogens they might encounter inside the area, they should always stop and ask for further assistance.



Biohazard Waste Disposal:

Biohazard waste is composed of blood or other potentially infectious material (OPIM) and must be disposed of in clearly marked containers that have the biohazard label visible. A red bag is also a known biohazard container for non sharp item disposal while a rigid container is used for needles and other sharp objects.

HANDWASHING:

Proper handwashing is the number one action that can be taken in healthcare facilities to reduce the rate of infection. Handwashing needs to be done before and after patient contact. In addition hands need to be washed prior to assisting with any procedures and after coming in contact with blood or body fluids. It also needs to be done correctly. Studies from the CDC have confirmed that approximately 65% of healthcare workers do not meet the minimum standard for hand hygiene. It is well believed to be one of the main reasons why healthcare acquired infections are on the rise. Approximately 99,000 individuals die every year from serious infections that were obtained in the healthcare system. Many more acquired an infection and lived but at great cost for time lost from work and the high price of multi-level antibiotic daily therapy. Insurance companies and the government are starting to deny payment to facilities for the cost to cover an infection, if it is picked up in the hospital setting.

Handwashing standards for healthcare workers include:

- ✓ Apply soap to wet hands.
- ✓ Utilize good friction to cleanse the hands taking special care to the area in between the fingers and the nail beds. Include the wrists.
- ✓ Rings need to be removed or moved so that the skin under and around the ring can be cleaned.
- ✓ Wash for a minimum of 20 seconds – every time.
- ✓ Rinse hands thoroughly with running water.
- ✓ The hands should be dried with a paper towel that can then be used to turn off the faucet.

The amount of time that is spent on the handwashing procedure is important. Studies have shown that very few organisms are removed from the hands when shorter time frames are utilized. Personnel feel that their hands are adequately decontaminated after about 5-7 seconds of handwashing. When in reality, **a minimum of 20 seconds** is required to reduce the amount of microorganisms on the surface of the hands. It is the combination of an adequate amount of soap and good friction for the correct amount of time that affords the optimal opportunity to significantly decrease the amount of microorganisms on the surface of the hands.



Proper handwashing not only minimizes the amount of pathogens to the caregiver's hands but also helps to limit the germs that are passed on to the patient, equipment and surfaces. Unfortunately, research still suggests that healthcare workers only wash their hands in about fifty percent of the situations that require handwashing.

If a handwashing station is not readily available, an alcohol based hand sanitizer may be used unless the hands are visibly soiled with blood, body fluids or protein based substances. When using a sanitizing gel it is important to use enough gel to be able to circulate it on the hands with good friction for a minimum of 15-20 seconds. Once again, special care needs to be taken in the area in between the fingers and the nailbeds.

In the event of contact with spore-forming bacteria such as *Clostridium Difficile*, handwashing is best accomplished utilizing soap and water for a minimum of 20 seconds rather than alcohol based hand sanitizers as they have not been proven to have any effect on spore activity.

CONCLUSION

All healthcare workers have an obligation to provide care in a manner that minimizes the risk of infection to the patients they provide care for while also protecting themselves from infectious agents. Healthcare facilities have policies in place that must be followed to ensure compliance. These policies include environmental control measures as well as safe practices regarding specimen collection and exposures to pathogens.

These standards are set forth by various government agencies that have been tasked with providing guidelines while monitoring their effectiveness. Some of the agencies responsible for the implementation of a successful infection control regime are:

- ✓ Center for Disease Control (CDC) – Gathers data and provides surveillance on infections and communicable disease. Every state is required to report to CDC on various disease control practices and the presence of communicable disease. Additional information can be found at www.cdc.gov
- ✓ Occupational Safety and Health Administration (OSHA) - Known as the enforcer of various healthcare standards and workplace safety. Established in 1970 specifically to protect the health of United States workers. Additional information is available at www.osha.gov
- ✓ Association for Professionals in Infection Control and Epidemiology (APIC) – An international multi-disciplinary organization that is focused on disease prevention through expert collaboration in research and education. More information can be found at www.apic.org
- ✓ Joint Commission on Accreditation of Healthcare Organization (JCAHO)
A nationwide organization responsible for monitoring compliance standards and applying accreditation scores to healthcare facilities that meet mandated requirements. Although the accreditation status is voluntary, many organizations value the status it affords as many states will accept accreditation by JCAHO in place of state sponsored inspections. Additional information can be found at www.jcaho.org.

