

# **HIV and AIDS**

## **ABSTRACT:**

The human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (AIDS) continues to be an enormous public health problem in the United States and worldwide. HIV is transmitted through multiple ways but the primary risk of transmission is through sexual contact or exposure to infected blood. HIV is the virus that causes the illness called AIDS. Patients diagnosed with AIDS can become exposed to opportunistic infections and cancers, and can be discouraged with their prognosis, which is poor without the proper treatment. Importantly, the risk of HIV infection and AIDS poses a concern for all healthcare workers. Prevention, immediate and proper reporting, and treatment of any exposure to infectious blood or body fluid must be followed. Statistics of HIV infection rates for healthcare workers are discussed.

## Learning Goals:

1. Identify a definition of HIV and AIDS.
2. Identify two most common ways that HIV is transmitted.
3. Describe the types of testing for HIV.
4. Identify basic precautions used when caring for patients with HIV or AIDS, and proper steps to take if contact to patient blood or body fluid occurs.

## **Introduction**

The human immunodeficiency virus (HIV) is a virus that is transmitted through sexual contact or contact with infected blood. HIV causes an illness called acquired immune deficiency syndrome (AIDS). AIDS was first diagnosed in New York City and San Francisco in 1981. However, there is evidence that HIV has actually been infecting people for many years before it was recognized and isolated cases of AIDS had occurred long before the epidemic started. The cause of AIDS and HIV was finally isolated in 1983, and, according to 2017 statistics, there are 36.7 million people in the world that are living with HIV/AIDS. Clearly, HIV/AIDS is an enormous public health problem worldwide.

### **Human Immunodeficiency Virus**

Modern medications have now allowed many people infected with human immunodeficiency virus to avoid developing AIDS. However, there is no cure for HIV infection, the virus cannot be eliminated or eradicated, and there is still no vaccine available that can prevent the spread of HIV. While many people refer to HIV and AIDS interchangeably, it is important to remember that they are different. HIV is the virus that causes AIDS, and AIDS is the disease, or group of diseases, that are caused by infection with HIV. Someone can be infected with HIV but not have AIDS.

The human immunodeficiency virus is, as its name indicates, a *virus*. Viruses are microscopic organisms that are very common. Those who have experienced a cold or the flu have been infected with a virus. Many viruses are harmless. Also, the body has the ability to stop viruses from multiplying and causing harm. However, HIV is different, and can keep multiplying. In many cases, it eventually causes the serious disease known as AIDS.

People are constantly exposed to bacteria, viruses, and other infectious microorganisms. Bacteria and viruses that can cause disease are called pathogens. Yet, despite the constant exposure to pathogens, the human body does a remarkably good job of stopping these potentially harmful microorganisms before they can cause illnesses. The primary way people are protected against infectious diseases is through their *immune system*.

The immune system is the defense mechanism that is developed to keep people healthy, even when people are infected with harmful bacteria and viruses. The immune system is a group of specialized cells and proteins that fights and eliminates dangerous microorganisms. There are two basic mechanisms by which the immune system operates: 1) the *non-specific response* and 2) the *specific response*.

### **Non-specific Response**

The non-specific response of the immune system is the body's basic defense against infection. It starts with simple physical barriers; for example, the intact skin prevents bacteria and viruses from reaching the bloodstream. The non-specific response also includes inflammation and the complement system. Both of these processes increase blood flow to an area that has been infected, and they also bring specialized cells such as white blood cells and macrophages to an area of infection.

These specialized cells, along with others, destroy bacteria and viruses or make them vulnerable so that other parts of the immune system are able to neutralize them.

### **Specific Response**

The non-specific response, described above, is the body's first line of defense against infection. However, if the infection is particularly widespread or the bacteria or the virus is particularly strong, the non-specific response may not be able to contain the infection. If that is the case, the immune system activates the *specific response*. The specific response to infection uses *antibodies*.

Antibodies are proteins that recognize and destroy one particular type of bacteria or virus. Each of these microorganisms has a characteristic molecule on its surface that is recognized by the antibody; the antibody senses this molecule, it attaches to the microorganism, and the antibody destroys the bacteria or the virus or it makes them vulnerable to and attacked by the non-specific response.

Unfortunately, the immune system is rarely effective when it tries to control an infection with HIV. There are three basic reasons for this. First, HIV is a virus that multiplies very rapidly. Many times, the immune system simply cannot destroy the virus as quickly as the virus can replicate itself. Second, the virus can actually "hide" inside cells. When that occurs, the body does not sense the presence of HIV until the infection has spread. Lastly, and most importantly, HIV is a virus that *mutates*, and it mutates very fast.

The body can form antibodies against the virus in its original form but these antibodies only recognize and seek out *that particular form* of the virus. When the HIV senses a threat from these antibodies, it mutates, changes shape, and the new form of the virus cannot be identified and destroyed by the circulating antibodies. New antibodies can be formed but HIV manages to always stay a step or two ahead.

A useful way to think about antibodies, HIV, and mutations is to imagine how a lock and key works. The HIV is the lock and the antibody is the key that fits that lock and no other. When the HIV mutates, the key (the antibody) does not fit the lock (the virus) and the virus cannot be controlled and destroyed. Mutation is the biggest reason why the immune system cannot control HIV.

Once the infection with HIV has begun, the viruses cause harm by destroying a certain type of white blood cell, the *CD4 cell*. White blood cells in general, and the CD4 cells in particular, are a vital part of the immune system. Without CD4 cells the ability to fight infections is severely compromised. When the level of CD4 cells gets very low, the person with an HIV infection will develop AIDS. This virus does not cause damage to major organs and tissues by itself but it damages the immune system.

### **Acquired Immune Deficiency Syndrome**

Acquired immune deficiency syndrome is an infection with HIV. It is not one specific disease. The infection damages the immune system to the point that certain *opportunistic infections* or diseases occur. These infections and diseases are serious and difficult to treat. The most common are certain types of pneumonia, a type of cancer called

Kaposi's sarcoma, and certain blood cancers called lymphomas. People with AIDs are also susceptible to brain lesions and brain infections.

Someone who is infected with HIV will initially not be aware of the infection. Shortly after being infected, some people have some mild, temporary flu-like signs and symptoms but these pass quickly. These flu-like symptoms are easily ignored and then the infection enters what is called the latent period. The infection is present but it is dormant and not particularly strong. However, after a period of years (average of 10 years) the virus begins to rapidly multiply and destroy the CD4 cells. At that point, the patient has developed AIDS. Once the disease of AIDS has begun, it is fatal for literally everyone within two years unless they are treated.

### **Populations Affected by HIV and AIDS**

An HIV infection and AIDS can happen to anyone. Worldwide, the predominant way that HIV is spread is by heterosexual contact. However, in the United States the transmission and infection pattern are somewhat different. As of 2010, there were approximately 1.1 million people in the United States infected with HIV. There is also an estimated 208,000 people who are infected but do not know they are infected.

Male-to-male sexual contact accounts for approximately 48% of all cases of AIDS, heterosexual contact accounts for approximately 31% of all cases of AIDS, and intravenous (IV) drug use accounts for approximately 15% of all cases of AIDS. HIV and AIDS disproportionately affect African Americans. This ethnic group is 12%

of the population of the United States but 52% of people who have HIV are African American.

### **HIV/AIDS Signs and Symptoms**

In the early stages, the person who has HIV/AIDS will not have any signs or symptoms. As mentioned before, some people who are infected may have temporary flu-like signs and symptoms but in those situations, it is easy for someone to decide that these may all be due to a cold, the flu, or some other simple illness.

Once AIDS occurs, patients typically experience fever, weakness, weight loss, fatigue, and nausea. In the advanced stages of AIDS, patients may develop dementia and confusion and be unable to care for themselves. Eventually, the patient with HIV/AIDS will develop one of the opportunistic infections or cancers for which there is no cure and the patient will die.

### **HIV/AIDS Treatment**

A diagnosis of HIV/AIDS was once considered to be the equivalent of a death sentence as there were no effective treatments. The average time of survival after HIV infection was 9-11 years, and after AIDS started the average survival time was 6-19 months.

There is still no vaccine that can prevent an infection with HIV but highly active antiretroviral therapy (HAART) has proven to be very successful. It is a treatment regimen of drugs that prevent HIV from multiplying. If HAART is used properly and conscientiously, the life

expectancy from the time of diagnosis is now approximately 20-50 years.

Highly active antiretroviral therapy is effective but it is a difficult treatment to tolerate. The patient must take many medications, the medications must be taken correctly, and the therapy is a lifelong commitment. There are also numerous unpleasant side effects.

### **HIV Transmission and Testing**

Human immunodeficiency virus and AIDS are very frightening, and there are valid reasons people would fear becoming infected or diagnosed with HIV/AIDS. However, this fear, along with a lack of information, has caused some people to become irrationally afraid of becoming infected with HIV. There has been a lot of research about HIV transmission, and experts in the field are confident that they know exactly how HIV is transmitted and how it is *not* transmitted.

The transmission of HIV depends on many factors, such as the number of exposures, the level of HIV in the blood or body fluid, and the presence of other sexually transmitted diseases. The human immunodeficiency virus is transmitted in the following ways.

### **Blood Transfusion and HIV Infected Blood**

Transmission of HIV during a blood transfusion is rare. The risk of being infected with HIV from a blood transfusion is about 0.3 per 10,000 donors, which has reportedly dropped since the start of routine HIV antibody screening and because of careful donor selection criteria.

### *Contact with HIV Infected Blood*

Contact with HIV infected blood means that HIV must be introduced into the bloodstream. This most commonly occurs when IV drug users share needles, and sharing needles is an effective way of transmitting HIV. Contact with infected blood can also happen when a healthcare worker gets stuck with a needle. And contact with infected blood can also happen if a healthcare worker has HIV infected blood splashed into the eyes, nose, or mouth, or HIV infected blood is splashed onto an open cut.

Transmission of HIV and subsequent infection, however, is rare. Between 1985–2013, 58 confirmed and 150 possible cases of HIV infection among healthcare workers were reported to the Centers for Disease Control and Prevention (CDC). Those exposures reportedly occurred due to needle stick injuries, percutaneous and mucocutaneous exposure, and exposure to visibly bloody fluid, and other/unspecified body fluids.

Occupations of the exposed healthcare workers also varied widely with some working in a laboratory where the live virus was being handled, and others during the course of providing clinical care.

### *Contact with Body Fluids*

Contact with body fluids has occurred but it is rare. It is not the body fluids themselves that are infected, but the body fluids are contaminated with blood.

As a healthcare worker, what is the risk of contracting HIV infection? Current data of healthcare worker infection suggests the risk of getting HIV from a needle stick and exposure through direct skin contact with body fluid is less than 1%. Also, the risk of infection from a human bite is between 0.1% and 1% during the course of patient care.

### **HIV Transmission during Sexual Activity**

Some sexual activity is much riskier than others, but *any* form of intimate sexual activity that is unprotected can result in transmission of HIV. The virus is transmitted through the semen. It can also be transmitted through vaginal secretions.

The risk of HIV transmission during unprotected vaginal intercourse has been estimated to be approximately 0.08% per act male-to-female, and 0.04% per act female-to-male. The risk of HIV transmission during anal intercourse is much higher, and the risk of HIV transmission from oral sex is essentially zero.

Condoms help to prevent the transmission of HIV during sexual activity, but they are not entirely reliable. The condoms can break, spill, or be misused. The only way to completely prevent HIV transmission during sexual activity is to make sure the individuals involved do not have an HIV infection. The only way to avoid contracting AIDS through sexual contact is by abstinence.

### **Pregnancy, Childbirth and Breastfeeding**

If the mother's HIV infection is recognized early, she is treated with medications, and the child is delivered by Cesarean section rather than a vaginal delivery, the risk of the child being infected with HIV is <1%.

There is also reported risk during pregnancy to the unborn child and during breastfeeding. HIV transmission during pregnancy, childbirth and breastfeeding from the mother to the child is the most common way children are infected with HIV, and there are reported deaths of children who have died because of AIDS.

### **HIV Transmission due to Needle Sharing**

Needles should never be shared, and proper use of needles and sharp instruments in the healthcare setting is essential.

### **Myths of HIV Transmission**

Myths of HIV transmission exist and health clinicians can support patients and each other by dispelling those myths. HIV is *not* transmitted by 1) mosquito bites, 2) contact with the saliva, tears, or urine from someone with an HIV infection, 3) touching/hugging someone with an HIV infection, 4) using public restrooms, public telephones, public drinking fountains, public health clubs/gymnasiums, or public swimming pools, 5) sharing food with someone with an HIV infection, or sharing eating utensils that have been used by someone with an HIV infection, and 6) being in the same room with someone with an HIV infection; HIV is not transmitted through the air.

### **HIV Laboratory Testing**

The only way to be sure that someone is infected with HIV is to perform a blood test. A small amount of blood is taken from a vein and examined. If there are anti-HIV antibodies, a second, confirmatory test is done. If both are positive, that person has an HIV infection.

Infection with HIV cannot always be detected right away. It can take up to 6 months after exposure and infection to detect HIV in a blood test. That length of time is unusual and most infections can be detected within weeks of an exposure.

### **HIV/AIDS Prevention And Safety**

Some may feel uncomfortable or afraid of having close physical contact with someone who has HIV or HIV/AIDS. Those feelings, at first, are certainly natural since HIV and AIDS can be deadly. It is important to remember that HIV *cannot* be transmitted through casual contact. Sexual activity and blood transmission are essentially the only ways the virus is passed from person-to-person. As a CNA, there might possibly be contact with blood that is infected with HIV, but that would be unusual.

There is no reason to be frightened for one's health and safety when caring for a patient with an HIV infection or AIDS. It is important to remember that *if using standard precautions and common sense, infection with HIV can be avoided*. Also, as a healthcare workers have a duty to care for all patients, and people with HIV infection are no exception.

Under the *Americans with Disabilities Act* of 1990, people with an HIV infection cannot be refused healthcare. Healthcare workers cannot refuse to care for someone who has an HIV infection or who has AIDS.

The precautions a CNA must take when caring for a patient with HIV are really no different than the precautions a CNA would use when caring for any patient. All healthcare workers should consider all body fluids as possibly contaminated.

The human immunodeficiency virus cannot be transmitted by contact with urine, stool or other body fluids/secretions from someone who has HIV. However, patients with HIV/AIDS may have infections that can be transmitted by body fluids other than semen or blood. Although it is possible for body fluids other than blood and semen to be contaminated with HIV, healthcare workers should always be using standard precautions to always be protected.

Healthcare workers should always wash their hands before caring for patients (to protect the patient) and always wear disposable latex gloves when delivering personal care or when handling *any* body fluids or secretions. Wearing gloves protects the healthcare worker, protects the patient, and prevents the spread of any infectious agent that could be in body fluids.

Importantly, healthcare workers should always wash their hands after caring patients, even if wearing gloves.

There is no need for healthcare workers to wear a mask when caring for the patient with HIV or HIV/AIDS unless that patient has a disease that is spread by inhalation.

Proper handling of all body fluids, proper disposal of all body fluids, and proper use and disposal of all needles and sharp objects are absolutely critical. CNAs should be observant to how other health team members around them handle body fluids and needles/sharps, and raise a professional concern when observing unsafe practices, such as a exposed needles left on a procedure tray at the patient's bedside. It

is not the duty of the CNA to dispose of contaminated, potentially hazardous items. For example, if an exposed contaminated needle had been left underneath a surgical towel where the CNA did not know it was left that could lead to injury from blood exposure. It is also critically important that the CNA or any other healthcare worker never reuse single-use medical items.

It is important to observe these precautions to protect oneself and to protect the patient. Remember, the patient with an HIV infection or HIV/AIDS cannot fight infections as well as a healthy individual. Also, these precautions, standard precautions, are used whenever healthcare workers are providing patient care.

What should the CNA do if he/she suspects or are worried that a patient has an HIV infection or has AIDS? Can the CNA simply ask that person? That is a complicated question that is not easily answered. Whether or not the CNA can ask a patient if he/she has HIV or AIDS depends on the situation. In certain circumstances, asking someone about his/her HIV status could be considered an invasion of privacy. If in doubt, it is best to simply use basic precautions, which should always be done, and ask an immediate supervisor how to handle the issue to keep safe, avoid problems, and protect the patient's privacy.

### **Basic Care Of Patients With HIV/AIDS**

People with HIV/AIDS can develop one or several many different infections or cancers. It is difficult to provide a list of signs and symptoms that may be seen but the basic care of a patient with HIV/AIDS is not difficult. The areas of care the CNA will need to focus on are highlighted here.

## **Employee Infection Control**

Human immunodeficiency virus transmission can occur if the healthcare worker becomes careless or does not follow proper infection control procedures. Clinicians should be sure to wear recommended disposable protective gloves if and when they may have contact with the patient's blood. Because people with HIV/AIDS may have another infection that can be spread through body fluids like sputum or stool, health clinicians and care aids should always wear disposable gloves when handling any body fluids/secretions. As mentioned, healthcare workers should always wash their hands before and after caring for patients. This protects the worker, the patient, and other people.

Handling sharp objects such as a needle that has punctured the skin or has been in contact with blood from someone who is infected with HIV, has been discussed earlier. The health facility should have policies in place for the handling and disposing of contaminated needles, sharp objects, and any other contaminated or hazardous material. These policies are usually discussed during employee orientation. The basis of standard precaution is that *all blood and body fluids should be considered to be potentially infected.*

## **Infection Control for the Patient**

Health employees that have a communicable disease, such as the flu, should check with their immediate supervisor before caring for a patient with HIV/AIDS. These patients cannot fight off infection the way a healthy person can.

Health clinicians should all help patients with HIV or HIV/AIDS to learn to live safely and sensibly. All healthcare workers should become knowledgeable about the ways HIV can and cannot be spread so they can answer questions and educate patients.

## **Nutrition**

Good nutrition is one way to keep the immune system healthy. Encouraging patients to eat well, and explain to them the reason for proper nutrition is an important role of the health team. CNAs should let their immediate supervisor know if the patient cannot or will not eat, and document the patient's dietary intake promptly after each meal or snack.

## **Medications**

People with HIV must take a large number of medication tablets or capsules each day to prevent HIV from causing AIDS. Taking large amounts of medications can be difficult. Also, many of these drugs have serious side effects. Although the success rate of the latest drug therapy for treating or preventing AIDS is very good, it can be easy for these patients to become discouraged.

The patient diagnosed with HIV may reason that they have a fatal illness and the complicated therapy and nasty reactions are not worth the possible benefit. However, these drugs have made a big difference in treatment outcomes, and all members of the treatment team can certainly help patients by reminding them of this. Patients need to be encouraged to talk about their feelings, and encouraged to try and follow the treatment plan.

## **Emotional and Psychological Support**

Having an HIV infection or AIDS can be emotionally and psychologically devastating. The amount of emotional and psychological assistance the health team gives to these patients will depend on their needs, their resources, and the comfort level of all concerned. Regardless of the support healthcare workers may provide, the CNA must remember *not* to be judgmental about patients diagnosed with HIV or HIV/AIDS. Every sick patient, regardless of what type of illness he/she has, deserves a basic level of courtesy and compassion.

## **Exposure To HIV Infected Blood**

Any healthcare worker who has an unprotected exposure to blood or body fluids should notify a supervisor *immediately*. Any needle stick injury or any splash to an unprotected area of skin is potentially a risk for transmission of HIV and other bloodborne diseases such as hepatitis B and/or hepatitis C.

When an exposure to blood or body fluids has occurred, the healthcare worker should *not* try and determine the level of risk alone. Not all unprotected exposures are dangerous, and treatment may not be needed but determining the level of risk and deciding if treatment is needed are the responsibilities of a physician or another specially trained healthcare professional, such as an infection control nurse or physician. This is an important process to follow in order for healthcare workers to protect their health and it is also a standard workplace requirement.

The steps that must be taken after an unprotected exposure are:

- Immediately wash the area with soap and water, or simply rinse with water if the contact was oral or ocular.
- If there is a sustained needle stick or a puncture injury, do not squeeze the wound to make it bleed.
- Do not use disinfectants on a wound or an area that has had splash contact.
- Notify a supervisor immediately.
- When time is available, document the circumstances of the exposure.
- If the exposure is considered to pose a risk for transmission of HIV, hepatitis B, or hepatitis C, blood samples will be obtained at the time, and an employee may be advised to start treatment with medications. If the employee decides to accept treatment, the medication regimen will be started right away.

It cannot be emphasized enough that when exposure to blood or body fluid has occurred, the healthcare worker must act *immediately* and follow facility policy to ensure their own safety. If someone who is unprotected is exposed to HIV infected blood, and the exposure is considered to be significant, treatment should be started *within hours of the exposure*. Most sources recommend treatment within two hours. Clearly, when a healthcare worker is exposed to HIV infected blood or body fluids, there cannot be any delay in seeking help.

### **Case Scenario: An Unexpected Needle Stick Injury**

Mary was assigned to work as a float pool certified nurse assistant on a busy medical surgical unit. She was an experienced CNA who had recently joined the hospital float pool to work a variety of areas where surgical treatment could occur, such as the emergency department, surgical day care, medical surgical unit and even the birthing unit. Her

role was to provide basic patient care within her scope of CNA training and certification, and handling surgical instruments or handling infusion catheters and drainage systems were not one of her standard role. She was allowed to empty Foley catheter bags and to provide perineal care, which she was very skilled and experienced at doing.

Close to late morning, she was assigned to care for a 25-year old female patient who had recently undergone an open reduction and surgical repair of a lower leg fracture. An area of infection had occurred and earlier in the morning a surgical resident had performed an incision and drainage near the infected area. When she arrived to the patient's room the surgical leg was neatly dressed, and there was a small procedure tray near the patient's bed that appeared to have all of the minor surgical instruments removed with a surgical towel left on the procedure tray. Mary went to remove the towel from the tray to rid the patient's area of soiled material and planned to dispose of the towel in the room's linen hamper. She picked up the towel and felt a sharp object on her middle finger, and immediately saw that her finger was bleeding. Because the towel was folded over itself, she did not realize a needle that was used to inject a local anesthetic into the patient prior to the incision and drainage procedure had been forgotten on the tray underneath the towel. She noticed the needle had dried blood on it.

Mary sustained a needle stick injury from a contaminated needle used to inject local anesthetic into the patient to numb the area prior to and possibly during a bedside surgical procedure of incision and drainage of an infected area. *What should Mary do next?*

### *Mary's Actions*

This is a needle stick injury that has endangered Mary to exposure of a possible transmittable disease because of careless neglect by the surgical personnel to appropriately dispose of the needle along with other surgical instruments and drapes. Additionally, the sharp prevention feature had not been properly used so that even if the needle had been forgotten on the surgical tray, and not properly disposed placed into a biohazard waste container, the possibility of injury from a contaminated needle would have been low.

Fortunately, Mary realized what happened right away. She did not waste time trying to address proper protocol of the exposed needle because she did not understand the protective features of the product the same as a surgical nurse or physician would. She set the surgical tray aside with the towel and needle (clearly exposed now on top) away from the patient and notified the Registered Nurse assigned to her team. The nurse understood the safety features of the needle and was able to properly dispose of it and the towel into the appropriate soiled linen hamper.

The nurse informed the patient of the injury Mary had encountered while caring for her, and the patient immediately consented to necessary testing to rule out blood-borne pathogens such as HIV and hepatitis. The patient's wound had already been cultured during the procedure to isolate the offending organism that had caused the surgical site infection. Mary was immediately sent by the supervising nurse to the employee health department for prompt evaluation of the needle stick injury and to fill out the appropriate work-related injury forms according to the health facility's policy.

Despite the mandatory training of all health workers, including surgical residents and fellows, on bloodborne pathogens and prevention of needle stick injuries, in this case, the surgical resident assisting the patient's surgeon that morning failed to properly dispose of the needle after he had used it, and the needle was forgotten and had remained hidden underneath the procedure drape where Mary, unaware of the needle being left there, was at risk of a serious injury and unnecessary exposure to the patient's blood that had been aspirated into the needle several times as the local anesthetic was being injected to numb the patient before starting the incision and drainage procedure.

An incident report was also completed according to her unit and hospital policy for trending locations and types of needle stick injuries occurring on an annual basis, which was part of the process of quality review of safety protocol.

### *Discussion*

Needle stick injuries are an increasing concern in the health industry because of the number of health care workers exposed and known to have sustained needle stick injuries.

Worldwide, millions of healthcare employees are subjected to unnecessary risk of exposure to blood-borne pathogens every year. The World Health Organization (WHO) has reported that the majority of needle stick injuries are not ever reported within the workplace. The frequency of accidental blood exposures at hospitals to all healthcare workers providing patient care has led to reports of 100 needle stick injuries for one thousand employees every year, and some researchers have suggested the actual rate of injuries is even higher.

Unfortunately, this also means that healthcare workers are exposed to patients known to be carriers of hepatitis C, hepatitis B, or HIV. The Centers for Disease Control and Prevention (CDC) has reported that needle stick and sharps injuries are primarily associated with the transmission of hepatitis B, hepatitis C, and HIV, amongst other types of infections. Mary, as a CNA, as well as students in training, are particularly at high risk for needle stick injuries because they are not trained or licensed to deal with surgical instruments or to understand needle safety systems and methods of disposal. They are, in fact, inexperienced and should not be required to clean up surgical trays following a bedside procedure, such as on the day Mary was at work when she was injured. The CDC has reported exposure rates as being as high as 50% for inexperienced members of the health team, such as students.

Most health organizations and hospitals now have policies that prevent and regulate needle stick injuries, which includes patient cooperation to consent for testing. Mary would have taken a bloodborne pathogen exposure training course required by the health organization where she worked, but she would not be considered experienced enough to be handling a surgical tray left in the room, and could have avoided injury by first reporting the neglected procedure tray disposal to her immediate supervisor and not handling it herself. A nurse and/or physician called forward to address the remaining surgical procedure items would have been more alert to the possibility of a needle being left behind and would have carefully looked first before gathering up the surgical towel where a needle, syringe and other surgical instruments and bowls would have been laid out.

Employee safety procedures at health work locations where needles are used, such as the injection needle that Mary was exposed to, must follow current U.S., occupational safety guidelines that require *all* health employee nurses and physicians provide directives to employees to fill out questionnaires related to their health as well as to the patients involved in an injury claim by a healthcare employee. Policies of individual health organizations guide these steps and should be strictly followed, and they are subject to State Health department surveys and audits.

Several international studies have focused on the deficiencies by healthcare workers with reporting needle stick injuries. It is important that healthcare managers establish a standard plan that promotes workplace safety and proper reporting of needle stick injuries through continual education such as annual training and updates for all employees. Fortunately, in Mary's case, her immediate nurse supervisor and Mary knew and understood the importance of prompt medical attention, laboratory testing, and reporting of a needle stick injury to occupational health in the health organization where Mary was working.

### **Summary**

The human immunodeficiency virus (HIV) is a virus that is primarily transmitted through sexual contact or contact with infected blood. HIV causes an illness called acquired immune deficiency syndrome (AIDS). There are 36.7 million people in the world that are living with HIV/AIDS, which is an enormous public health problem worldwide.

Patients diagnosed with AIDS can become exposed to opportunistic infections and cancers. Often, the AIDS patient can be discouraged with their prognosis, which is poor without the proper treatment. HIV infection has reportedly affected all age groups. Exposure can occur during pregnancy, childbirth and breastfeeding and these are the most common causes of AIDS related death in children. All healthcare workers must be concerned about the risk of HIV contact and infection. Knowledge of the prevention, required reporting, prompt medical evaluation and testing, and immediate proper treatment of any exposure to infectious blood or body fluid by all healthcare workers is a safety requirement of their job.