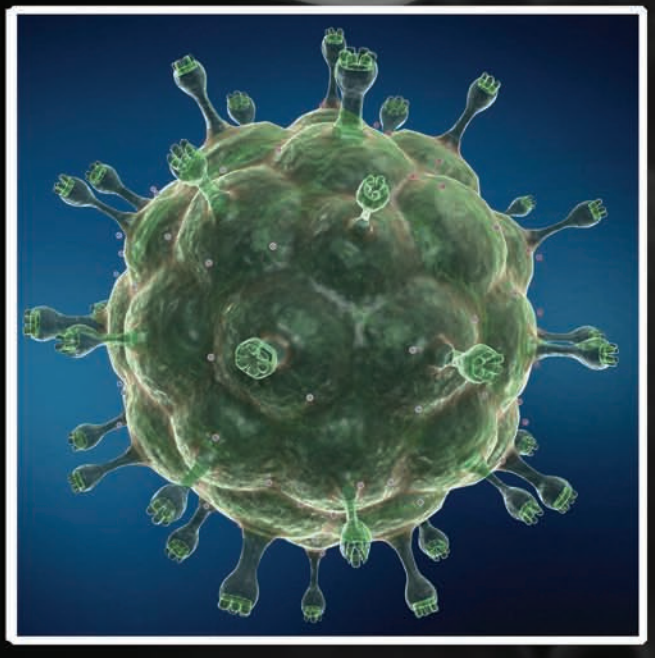

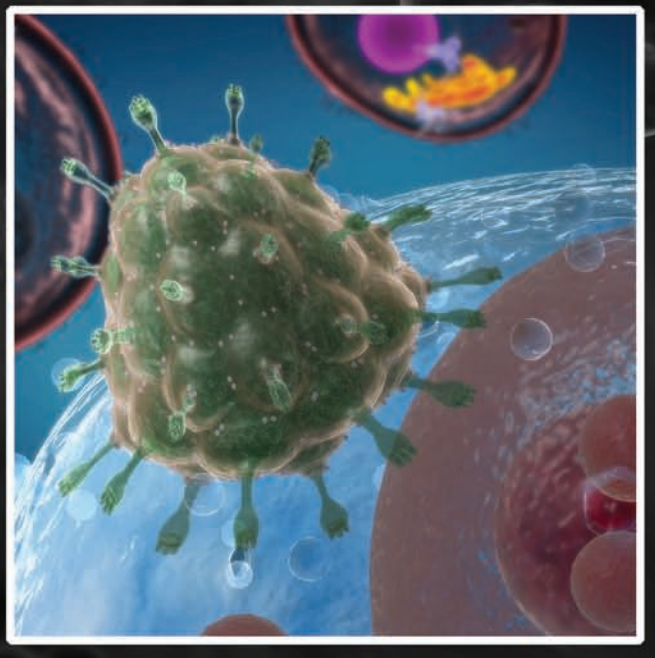

HIV update:

Where are we now?

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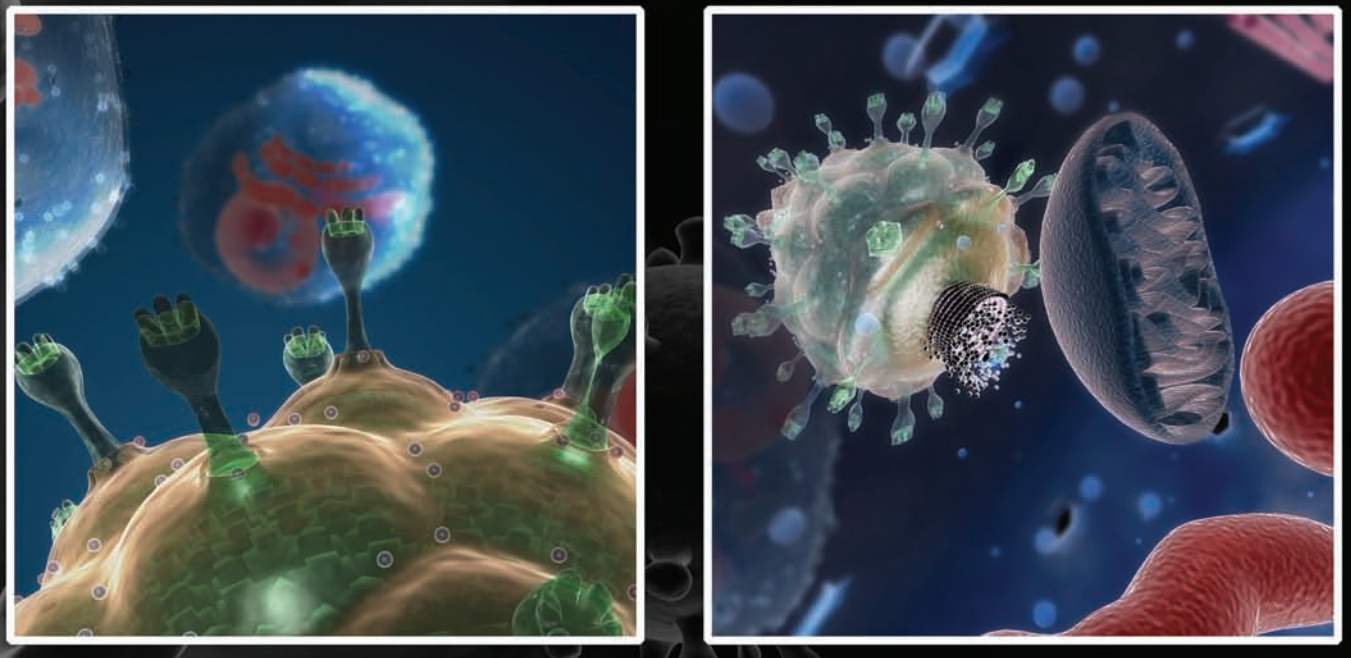


3D4 MEDICAL / SCIENCE SOURCE

Although there have been many advances in the past 30 years, HIV remains a healthcare concern throughout the world. Nurses play a critical role in educating patients about HIV transmission, treatment, and prevention, as well as identifying at-risk patients for preexposure prophylaxis.

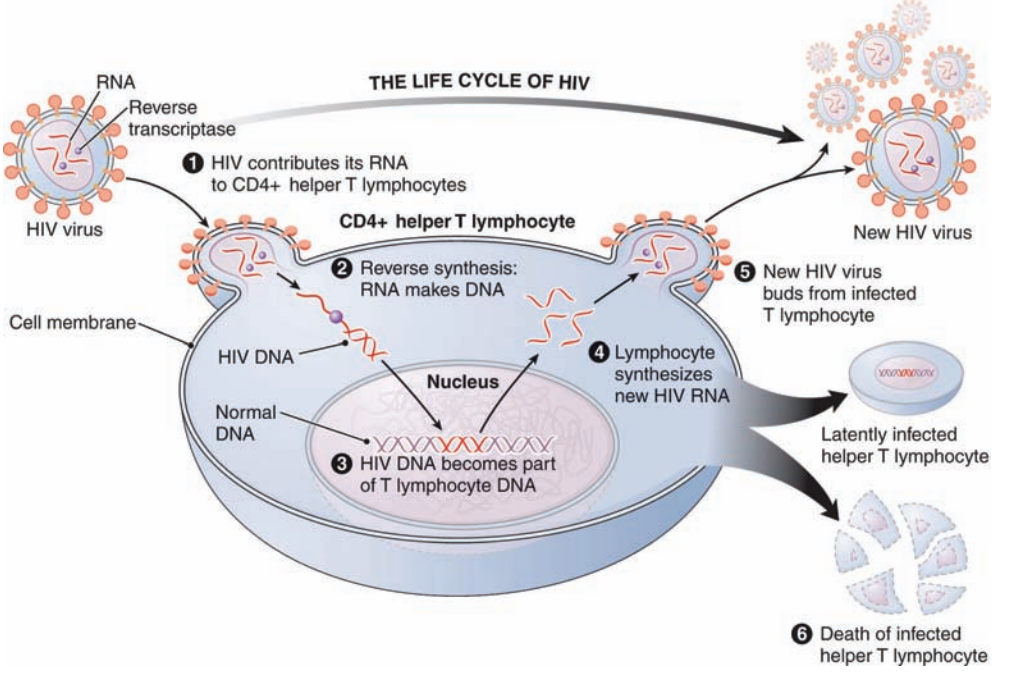
By Mary Shannon, MSN, ACRN

There are approximately 1 million people living with human immunodeficiency virus (HIV) in the United States, with approximately 40,000 new cases annually. HIV is a chronic disease that attacks the immune system, specifically the T cells or CD4 cells—a type of white blood cell that plays an important role in the immune system. The person with HIV is vulnerable to opportunistic infections due to a weakened immune system. These infections include pneumocystis pneumonia, mycobacterium avium complex, cytomegalovirus, and HIV encephalitis. Advances in treatment have made it possible for those with HIV to avoid these infections and live long, productive lives.

It's important that nurses know about updates in HIV treatment and prevention. One important change that's emerged in

The HIV life cycle

In the life cycle of HIV, the virus merges with the T lymphocyte's cell membrane and injects its RNA into the cytoplasm, where, in a reverse of the usual process, new DNA is synthesized from RNA. This new HIV DNA is incorporated into the DNA of the T lymphocyte nucleus. The infected T lymphocyte then synthesizes new HIV RNA, which buds from the cell membrane as a new HIV virus, after which the infected T lymphocyte dies.



Source: McConnell TH. *The Nature of Disease: Pathology for the Health Professions*. 2nd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2013.

recent years is preexposure prophylaxis (PrEP). Used for the prevention of HIV, PrEP is a critical component in the fight to reduce the rate of HIV transmission. The proper use of PrEP can dramatically reduce HIV transmission.

This article provides an overview of HIV pathophysiology, transmission, staging, and testing; treatment advancements; prevention, including the role of PrEP for at-risk populations; and nursing considerations.

Pathophysiology

The HIV life cycle begins with the binding of HIV to receptor cites on the CD4 cell (see *The HIV life cycle*). The envelope of the HIV cell fuses with the membrane of the CD4 cell, allowing for HIV to release its RNA into the host cell. An HIV enzyme called reverse transcriptase is released and helps convert HIV RNA to HIV DNA. With the help of the enzyme integrase, the newly formed HIV DNA enters the nucleus of the host cell and integrates with the genetic material. HIV can hide in this inactive state for years. When the host cell gets activated, it then begins to make long protein chains, which are the building blocks for more HIV.

Another enzyme called protease cuts these long proteins so a new virus can be assembled. This leads to the final stage, the making and budding of the mature, infectious HIV virus. The new copies of HIV can now move out of the host cell and infect other cells. Antiretroviral

therapy (ART) can be used to interrupt the virus from replicating.

Transmission

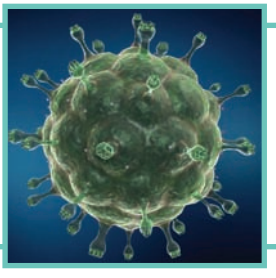
Any break in the skin or mucosa that comes in contact with the HIV virus can result in HIV. The virus is found in seminal and vaginal fluid, blood, and breast milk. HIV is transmitted via unprotected anal and vaginal sex; I.V. drug use; and during pregnancy, birth, and the postpartum period via breastfeeding.

Another important factor is the HIV viral load, or how much virus is detected in the blood. The higher the viral load, the higher the risk of transmission.

The second stage is chronic HIV infection. A person infected with HIV can remain in this stage for many years. The CD4 cell value in the second stage usually remains between 200 and 499 cells/mm^3. In this prolonged, chronic stage, patients may feel well and report few signs and symptoms, if any. It may take up to 8 to 10 years for complications to develop.

Once the CD4 cell count drops to less than 200 cells/mm^3, the patient will be in the third stage and have an AIDS diagnosis. This stage is characterized by severe immune suppression; patients are at risk for many opportunistic infections. Signs and symptoms include respiratory distress, wasting syndrome (involuntary weight loss), loss of appetite, nausea, diarrhea, and neurologic manifestations such as memory loss and decreased attention span. Advances in HIV treatment, testing, and linkage to care have reduced the number of HIV patients advancing to AIDS.

An HIV viral load is considered suppressed when it's less than 200 copies/mL, according to the CDC.



The goal of HIV treatment is to maintain viral load suppression (less than 200 copies/mL).

Staging

The CD4 cell count is used to stage HIV. The first stage begins with acute infection or exposure to the development of HIV antibodies. At this stage, individuals may complain of flu-like symptoms, such as sore throat, fatigue, body aches, and lymphadenopathy. The patient may also be asymptomatic. These vague signs and symptoms make it possible for HIV to be overlooked. The person will test HIV negative at this stage due to the lack of antibody development. The viral load at the acute stage is very high, usually greater than 100,000 copies/mL. Therefore, HIV transmission at this stage is of great concern. The CD4 cell count in the acute phase is usually greater than 500 cells/mm^3.

Testing

Educating patients on the importance of HIV testing is an important role for nurses. HIV testing is the first step in making individuals aware of their HIV status, allowing for earlier intervention and leading to better patient outcomes. Fifteen percent of people with HIV have the virus for 2 to 3 years before being diagnosed, according to the CDC. This statistic can have a large impact on HIV transmission.

The CDC reports that routine testing should be provided to people ages 13 to 64

and be done annually for at-risk individuals, such as men having sex with men, I.V. drug users, and those having unprotected vaginal or anal sex with multiple partners. A person who's potentially been exposed to HIV should be tested at baseline (time of exposure) and then again in 3 to 6 months to confirm a negative result.

There are three types of HIV tests available: HIV antibody (detects antibodies to the HIV virus), HIV antigen/antibody (detects the p24 antigen and the HIV antibody), and the nucleic acid test (looks for actual virus in the blood). According to AIDSinfo.gov, it can take from a few days to a few weeks to get the results of a lab HIV test. Some rapid tests can give results within 30 minutes.

HIV antibodies can take from 3 to 12 weeks to develop. They develop as an immunologic response to the HIV antigen. The antigen/antibody test is more commonly used in the United States. It can take 2 to 6 weeks for the body to develop antigen and antibodies for HIV. Nucleic acid testing takes 7 to 28 days after exposure to HIV to produce a result, which is read as positive/negative or viral load. It isn't routinely used due to being expensive, but it may be ordered for a case of high-risk exposure.

Even if the test result is negative, counseling the patient on prevention and the importance of retesting in 3 months is important. If the test is a positive result, linkage to care, counseling services, and family/friend support will be required. The provider ordering the HIV test, or his or her representative, must give the final diagnostic results to the patient and provide information about follow-up care. All facilities should have a protocol in place to provide results. The state department of health can assist with locating the patient if the facility is unable to locate him or her to give the results.

It's always encouraged that an HIV-positive individual provides a contact for partners at risk. The state department of health provides a safe partner notification program. HIV information is shared with the department of health for statistical purposes.

Treatments

HIV medications are classified according to their effect on a specific phase in the HIV life cycle. In other words, where they stop the HIV virus from replicating. Medications are binding or fusion inhibitors, nucleoside or nonnucleoside reverse transcriptase inhibitors (NRTIs), integrase inhibitors, and protease inhibitors. Current treatment guidelines recommend the use of an integrase inhibitor and a dual NRTI regimen (see *HIV treatment guidelines for adults* and *Pediatric considerations*).

ART consists of a group of antiviral medications that stops the virus at different points in the HIV life cycle. At least three types of antivirals are used to stop the virus. NRTI interferes with the transformation of RNA to DNA, and integrase inhibitors prevent the virus from integrating into the host's DNA. This regimen will delay replication of the virus and lead to an undetectable viral load.

According to the CDC, treatment with ART should begin as soon as possible on the first visit with the healthcare provider. Previously, treatment was started after the lab results of genotyping, viral load, and CD4 cell count were evaluated. It's also recommended to begin ART regardless of the CD4 cell count. Studies have shown better outcomes with an earlier start of ART.

HIV treatment guidelines for adults

Current US Department of Health and Human Services treatment guidelines include initiating ART regardless of CD4 count as soon as possible. ART entails the use of three active drugs from two or more drug classes. Monotherapy shouldn't be used. In addition, adherence to the continuum of care and working together with the multidisciplinary team are recommended.

Resistance testing, called genotyping, is done at baseline and when there's a rise in the HIV viral load to indicate which medication regimen will be most effective for the patient. It's important for the healthcare provider to examine the effectiveness of treatment; therefore, lab confirmation of viral load and CD4 cell count is done every 4 to 6 months or as deemed necessary.

Many advancements in treatment have been made over the years. One factor that hasn't changed is the importance of adherence. Medication nonadherence will lead to medication resistance in which the HIV virus doesn't respond to the treatment regimen. Treatment for HIV requires a 95% adherence rate to maintain viral load suppression.

Patients often require assistance with barriers that can interfere with treatment. These barriers include psychosocial, housing, psychological, financial, and legal issues. Nurses play an important role in identifying barriers and educating patients on adherence with medical appointments and the treatment regimen, as well as providing emotional support. The nurse may also initiate care coordination, such as team discussions with the infectious disease physician, physician assistant, and case manager. Care coordination, including peer support, has been proven effective in achieving viral load suppression.

Prevention

Prevention of HIV transmission is of the upmost importance in educating people living with HIV. Developing a rapport with patients will facilitate a safe environment so they'll be more comfortable while conveying information regarding their sexual and medical history. Prevention of HIV infection is achieved via education, motivation, and support. Nurses can provide education regarding strategies to protect against HIV transmission. Some of these strategies are reducing the number of sexual partners, proper use of latex condoms, never sharing needles, routine HIV testing, and adherence to ART.

The concept of treatment as prevention is used to describe that an HIV patient who's virally suppressed won't transmit the virus. The US Department of Health and Human Services and the CDC state that "people living with HIV who take medicine as prescribed and get and keep an undetectable viral load have effectively no risk of transmitting HIV to their HIV-negative partners." This is referred to as U = U (undetectable = untransmittable). It's important that patients infected with the HIV virus maintain an undetectable viral load not only to decrease HIV sexual transmission, but also to maintain an optimal level of health.

Perhaps one of the most promising recent developments in HIV is PrEP, a daily prophylactic medication used to prevent an HIV-negative person from being infected with HIV. A thorough screening needs to be done to assess who's at risk and who will benefit from this medication. Individuals who may benefit from PrEP are men having sex with men, those

Pediatric considerations

Women who are pregnant and HIV positive need to be adherent to the ART regimen to reduce mother-to-child transmission. Babies born to HIV-positive mothers receive HIV medications 4 to 6 weeks after birth to reduce the risk of infection. Because HIV is in breast milk, mothers infected with HIV shouldn't breastfeed. If the HIV-positive mother is adherent to the ART regimen and the baby is treated after birth, the risk of mother-to-child transmission is lowered to 2% or less, according to AIDSinfo.gov.

According to the CDC, teenagers and young adults ages 13 to 24 make up 21% of newly diagnosed HIV cases in the United States. Most of these new diagnoses were gay or bisexual males. At the end of 2015, 60,300 young Americans were living with HIV and 31,000 were unaware of their status. Youth challenges include inadequate school sexual health education, low condom usage, low rate of HIV testing, and an increased number of partners. Stigma, lack of information, and misconceptions can negatively affect the health and well-being of young people. Prevention campaigns actively help educate young adults and decrease stigma.

having unprotected sex with an HIV-positive person, I.V. drug users who report sharing needles, and those who continually engage in unprotected sexual activity.

Individuals considering PrEP will need to have an HIV test done to confirm their HIV-negative status. They also need to understand that adherence is imperative, as well as medical follow-up to ensure HIV-negative status and monitor creatinine levels because PrEP can be nephrotoxic. Patients on PrEP should be tested for HIV every 3 months. Confirmation of negative status should be confirmed before refilling prescriptions. Pregnancy testing, sexually transmitted infection testing, and a basic metabolic panel should also be monitored every 3 months. Nurses also need to educate the HIV-positive partner to maintain adherence to his or her medication to further ensure decreased transmission risk.

It's imperative that nurses be familiar with PrEP because it can be initiated in all areas of nursing, especially in the ED and urgent care settings. PrEP was developed in 2012, but there's been a reluctance to prescribe it, perhaps due to lack of awareness and comfort level with discussing risk factors for HIV. There's an effort to initiate PrEP in a variety of healthcare settings. Nearly 500,000 men who have sex with men and 1.2 million American adults would benefit from PrEP, but only 80,000 individuals are thought to be taking it. Nursing can be at the forefront of this effort.

consider this

RB is a 27-year-old man being seen at his primary care provider's office for an annual physical. RB asks you to explain about PrEP. While reviewing his history, RB states that he tested negative for HIV 6 months ago. He states that he's a homosexual male and has been with his HIV-positive partner for 5 years. RB reports that he's concerned because "we've had unprotected sex a few times." You realize that RB would benefit from PrEP. You explain the medication and the importance of adherence and medical follow-up. HIV testing; a basic metabolic panel; and testing for syphilis, chlamydia, and gonorrhea are performed. A prescription is given and a 3-month follow-up appointment is scheduled.

At the follow-up appointment, RB is HIV negative and all labs are within normal limits. RB states he's adherent with the medication and reports no adverse reactions. RB also indicates that his partner of 5 years has an undetectable viral load. Safe sex education is provided.

Nursing considerations

Nurses should encourage patients to know their CD4 cell count, viral load, and medications. Patients should bring a list of their medications and pertinent medical history to appointments. Utilizing a medication reconciliation form that contains the patient's medical history can be useful.

HIV can affect many body systems, especially for those who've had it for many years. Patients with HIV are dealing with many issues, such as aging, cardiovascular disease, diabetes, hypertension, renal insufficiency, and psychosocial issues. Therefore, many of these patients have multiple healthcare providers.

Nurses can help the patient verbalize feelings and identify resources for support in relation to his or her HIV diagnosis. Many patients aren't only dealing with the HIV diagnosis, but also the stigma that's associated with it. This stigma can result in negative coping, depression, isolation, and poor social support. Nurses can encourage patients to maintain contact with family and friends, and use national and local support groups and hotlines. Peer support groups are effective, an important adjunct to clinical care, and can improve social interaction.

At the forefront

From the early days of HIV when it was considered a death sentence, nursing has played an integral role in caring for this patient population. Nurses can continue to be a part of the movement to reduce new cases of HIV. We have the opportunity to educate patients, identify those at

risk, initiate interventions for prevention, and provide a referral to a healthcare provider to retain patients in care. It's important that nurses have an understanding of HIV to deliver safe, effective care to their patients. As nurses, we're at the forefront of further reducing HIV rates. ■

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HIV update: Where are we now?

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- If you prefer to submit your test by mail, record your answers in the test answer section of the CE enrollment form on page 56. You may make copies of the form. Each question has only one correct answer. There is no minimum passing score required.
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