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HIV in Clinical Practice: Screening, Treatment, and Patient Support

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Section 1: Introduction

In the early 1980s, the medical community was on high alert. Many previously healthy people were seeking medical care for severe illness, and the number of rare types of pneumonia, cancer, and other infections was being diagnosed at an alarming rate. In 1981, the condition was referred to as Gay-Related Immune Deficiency (GRID) because scientists thought the condition only affected men who had sex with men. By the end of that year, the medical community realized this condition could be spread in other ways, as intravenous drug users began to be diagnosed. In 1982, the disease was more appropriately renamed Acquired Immune Deficiency Syndrome (AIDS). At this time, scientists were aware that the condition could spread through sexual contact and blood transfusions. In 1983, it was discovered that women who had sex with men were also contracting the disease (CANFAR, 2023) and that the disease was caused by a virus called human immunodeficiency virus (HIV) (Swinkels et al., 2024). In 1986, it was established that the disease could spread from mother to child through breastfeeding. In just a decade, this disease had progressed from a mysterious cluster of rare illnesses to an understanding that AIDS is caused by HIV. By 1990, it was estimated that 8-10 million people worldwide were living with HIV (CANFAR, 2023). Currently, it is estimated that 40.8 million people are living with HIV (WHO, 2025a).

Though HIV research and treatment have come a long way in the past 45 years, HIV remains a major public health issue. Transmission is still active in every country worldwide, with approximately 1.3 million people acquiring the virus and an estimated 630,000 people dying from HIV-related causes in 2024 alone (WHO, 2025a). Nurses and other members of the healthcare team continue to encounter patients who are living with HIV in every clinical setting. Nurses need to be able to articulate what HIV is and how it is spread. They should be able to describe the signs and symptoms of HIV, identify the associated risk factors, apply knowledge regarding best practices for screening, diagnosis, treatment, and monitoring

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methods, support rationale for patient support interventions, and prioritize interventions that reduce the risk of HIV transmission in the healthcare setting.

Section 1 Personal Reflection

Consider the very early days of the COVID-19 pandemic, when science had not yet determined the transmission method or microorganism causing severe and often fatal respiratory illness. How do you think that time was likely similar to the early days of the HIV epidemic? In what ways do you think it may have been different? How do you think the early days of the HIV epidemic would have been affected if social media and internet access were available at that time?

Section 2: What is HIV?

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HIV is the common abbreviation for human immunodeficiency virus. A virus is a microscopic parasite that contains either an RNA or a DNA genome surrounded by a protective protein coating, called a capsid. Viruses transfer their genetic material to the host cell, leading to replication and spread of the virus. HIV is one of two lentiviruses that affect humans. Lentiviruses are part of the *Retroviridae* family (Swinkels et al., 2024). Lentivirus is a genus of viruses with a long incubation period, sometimes up to a year. These viruses have a flexible genome and are widely known as optimal vectors for gene transfer (Mestrovic, 2023). Retroviruses are a group of viruses that use RNA, rather than DNA, as their genomic material. The virus takes over the infected cell, causing the host cell to convert the retroviral RNA into DNA, which is then inserted into the cell's DNA. In addition to HIV, retroviruses are also associated with some types of cancer (Ganguly, 2025).

HIV suppresses the immune system by targeting CD4+ T-lymphocyte helper cells (Swinkels et al., 2024). Different types of CD4+ T cells are all involved in

coordinating the body's immune response when a pathogen is identified. When HIV binds to a CD4+ T cell, it takes over the function of the cell and uses the cell to replicate itself. The CD4+ cells infected with HIV and other immune system cells are destroyed in the replication process. As a result, the immune system is weakened and less able to defend against infections (Sherrell, 2023).

The number of CD4+ T cells in the body is a valuable indicator when monitoring HIV. Typically, the CD4+ T cell count is 500-1500 cells/mm3. When the number of cells falls below 200 cells/mm3, the criteria for diagnosing AIDS is reached. While HIV targets CD4+ T cells, there can be other causes for a lowered CD4+ T cell count, including infection or certain medications (Sherrell, 2023).

There are two main types of HIV, including HIV-1 and HIV-2. The two types have similar structures but vary in severity, transmissibility, and prognosis. HIV-1 is responsible for most HIV infections, though both types target CD4+ T cells (Swinkels et al., 2024). The source of HIV-1 was likely chimpanzees, while the source of HIV-2 is thought to be from sooty mangabey monkeys (Melhuish & Lewthwaite, 2022). Both versions of the virus weaken the immune system, but HIV-2 develops more slowly and is less likely to be transmitted from one person to another. Since HIV-1 is by far the most prevalent version of the virus, with approximately 95% of HIV infections being caused by this version of the virus, treatment research has been primarily focused on that version of the virus. HIV-2 is resistant to some of the treatment medications used for HIV-1. HIV-1 is found worldwide, while HIV-2 is primarily present in West Africa, though cases are slowly increasing in the United States, Europe, and India. While both viruses are called HIV, their genome has only a 55% similarity, making them two distinct viruses (Burgess, 2024).

Research indicates that HIV has likely been around for over a century. The first known human infection was traced to 1959 in an adult man in Kinshasa,

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Democratic Republic of Congo. This finding was confirmed with a plasma specimen. Molecular sequencing research suggests the virus likely began in central Africa in the early 1900s. It is theorized that hunting practices facilitated the movement of multiple simian lentiviruses from primates to humans (Melhuish & Lewthwaite, 2022).

Nurses and other healthcare workers need to understand how HIV is spread, as well as how it is not spread. HIV is spread through body fluids, including blood, amniotic fluid, breast milk, semen, pre-seminal fluid, rectal fluids, and vaginal fluids. The virus can be transmitted through sexual contact, pregnancy and delivery, and through some objects, such as contaminated syringes (Swinkels et al., 2024). In order to spread to another individual, the HIV contained in an infected individual's bodily fluid must be transmitted to the other person's bloodstream (HIV.gov, 2025a). The virus can enter the body through the mouth, anus, penis, vagina, or broken skin. Rarely, HIV can be spread through deep kissing if both participants have open sores in their mouths or bleeding gums. The most common way to acquire HIV is through unprotected sexual contact and sharing needles for drug use. HIV is not spread through touching, hugging, using public bathrooms, or swimming in a pool with someone who is infected. It is not spread by sharing cups, utensils, or phones. It also does not spread through bug bites (Cleveland Clinic, 2022). Research has found that most cases of HIV worldwide are spread through sexual contact (Swinkels et al., 2024).

Children can acquire HIV. As of the end of 2023, an estimated 1.4 million children worldwide ages 0-14 years were living with HIV (WHO, 2025b). Most commonly, this occurs through vertical transmission, also called perinatal transmission, during pregnancy, childbirth, or breastfeeding. The use of medications to reduce viral load has lowered the rate of HIV perinatal transmission of HIV to 1% or less in the United States and Europe (HIVinfo, 2024). However, transmission continues in countries where access to prenatal care and HIV testing is limited (WHO, 2025b).

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HIV replicates rapidly with many errors in reverse transcription, contributing to its genomic diversity. This diversity makes the virus difficult to treat and makes it difficult to predict the severity of the disease. Within two days of exposure to the virus, HIV can be detected in the surrounding lymph node tissue and in plasma fluid in another three days. After the initial phase of infection, replication begins to slow as the immune system begins to respond, though not very effectively (Swinkels et al., 2024).

Due to advances in screening and prevention, the global rate of HIV has decreased, especially where it is most prevalent in eastern and southern Africa. In some regions, however, the incidence of HIV has increased in the last decade. This includes the Middle East and North Africa; however, this area had a historically low prevalence, so the increase in incidence continues to be a relatively low number, of approximately 16,000 people in 2022. Though a relatively small number, the incidence in this area has increased by 49% since 2010. Screening, prevention, and treatment efforts are hindered due to complex legal environments, human rights violations, and military conflicts (Swinkels et al., 2024).

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Case Study

Amber is precepting a student nurse, Don, in the emergency department. Mr. Simpson, a patient known to the ED staff, is triaged. Don is reviewing Mr. Simpson's electronic medical record and sees that Mr. Simpson has HIV. Don tells Amber that he is not comfortable caring for Mr. Simpson because he does not want to catch HIV.

How can Amber best respond to Don's concerns? Select all that apply.

A. Agree with Don and request that the charge nurse care for the patient

B. Reassure Don that, with the use of standard precautions, the risk of HIV transmission is very low.

C. Remind Don of interventions that nurses use in every setting to reduce the transmission of all bloodborne pathogens, including safety techniques with sharps and effective hand hygiene.

D. Provide Don with evidence-based information regarding HIV transmission and prevention.

E. Care for Mr. Simpson without Don

F. Help Don understand his role in reducing stigma and discrimination associated with HIV.

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Section 2 Personal Reflection

How does HIV affect human cells? Why is it important that healthcare workers understand the difference between HIV-1 and HIV-2? How is HIV spread? How is HIV not spread? How have you experienced misconceptions about HIV in your clinical practice? What has contributed to the global decrease in the rate of HIV?

Section 3: What are the risk factors?

Anyone who is exposed to HIV is at risk of acquiring the virus. Some populations, however, are more often affected by HIV than others. These include individuals who are gay, bisexual, men who have sex with men, Black or Hispanic individuals, and those who pay or receive money for sexual acts (Cleveland Clinic, 2022). These populations are not necessarily more susceptible to the virus itself. However, the disparities that affect their ability to access preventative care, HIV testing, and comprehensive treatment make them more likely to acquire the virus.

There is a social stigma regarding HIV that continues to create a barrier for access to high-quality healthcare related to HIV (Cleveland Clinic, 2022).

An individual's risk for becoming infected with HIV can depend on the community in which they live. If someone lives in a community where the prevalence of HIV is high, they are more likely to be exposed to the virus. Subpopulations within these communities are also at increased risk, as 68% of new HIV diagnoses in the United States occur in gay and bisexual men. People who inject drugs are also a subcommunity at increased risk for infection (HIV.gov, 2025b).

Certain behaviors can increase the risk of becoming infected with HIV. In the United States, HIV is most often spread through vaginal or anal sex or sharing needles with someone who is HIV-positive (HIV.gov, 2025b). Anal sex is the highest-risk behavior associated with HIV transmission. Specifically, receptive anal sex has the highest risk associated with infection, though either partner can become infected during anal sex. The risk is further increased if there are cuts or sores on the penis (CDC, 2024b).

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Risk is increased for individuals who have more than one sexual partner. Having a sexually transmitted infection (STI) can also increase risk, as many STIs can cause open sores on the genitals, creating an entry point for the virus to enter the body (Mayo Clinic, 2024). Other behaviors that increase risk include having anal or vaginal sex without a condom, the use of alcohol or drugs at the time of sexual behavior, receiving unsafe injections, blood transfusions, or tissue transplantation, or through a medical procedure that involves unsterile cutting or piercing, as well as accidental needle stick injuries (WHO, 2025a). The excessive use of alcohol or drugs increases risk because it can impair decision-making and cause someone to engage in sex when they otherwise may not or choose not to use a condom during sex when they typically would (NICHHD, 2021). Sharing contaminated needles, syringes, or drug solutions can increase the risk of becoming infected

with HIV (WHO, 2025a). Although infections from oral sex are rare, engaging in this activity can raise the risk of HIV transmission through ejaculation in the mouth, especially if there are oral ulcers, bleeding gums, or genital sores, making this mode of transmission possible (CDC, 2024b). Male circumcision has been found to reduce the risk of acquiring HIV (Mayo Clinic, 2024).

Babies born to mothers who have HIV are at risk for becoming infected themselves before or during birth, or through breastfeeding. Medical advancements have nearly eliminated the risk of this form of transmission (NICHHD, 2021). Perinatal transmission, or transmission of HIV related to pregnancy and birth, is the most common way children become infected with HIV (CDC, 2024b).

Viral load affects the risk level of acquiring HIV. Viral load is the amount of the virus in the blood of someone infected with HIV. The higher the viral load, the more likely that person is to transmit HIV to someone else. Viral load is highest during the acute phase of infection due to the rapid replication that occurs before the immune system can respond (CDC, 2024b). As a result, HIV has the highest risk for transmission during the acute phase, when an individual may not realize they are infected with HIV (HIVinfo, 2025a).

Occupational HIV is when transmission occurs in the workplace. This can happen when a contaminated needle or other sharp object causes injury to a healthcare worker. Standard precautions are implemented to protect patients and health care workers from this transmission (CDC, 2024b). Occupational transmission is incredibly rare, with only 58 cases of confirmed HIV transmission being reported in the United States. Some exposures present more risk than others. A splash with contaminated body fluids carries a near-zero percent risk, even when the fluids contain blood. The risk is also extremely low when contaminated fluid splashes

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intact skin or a mucus membrane. Needle-stick injuries present a 1% risk of infection (CDC, 2024a).

Some risk factors specifically affect youth who engage in sex. Those who have not received adequate education about engaging in safe sex and those who have an older sexual partner are at increased risk. Adolescents are less likely to take prophylactic medication to reduce their risk of HIV infection (NICHHD, 2021).

Patient education should be part of HIV prevention in the healthcare setting. Individuals should be educated on ways to reduce their risk, including the use of latex condoms for any sexual activity and refraining from using condoms made from animal products. Only one condom should be used at a time, so a male condom and an internal condom should not be used together. Individuals should be advised to use water-based lubricants, never share needles for injecting drugs, get routinely tested for other STIs, as the presence of an STI increases risk for acquiring HIV, and avoid getting drunk or high, as intoxication can affect decision-making and increase risk (Cleveland Clinic, 2022).

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Case Study

Don is now a new graduate nurse working in an urgent care facility. He is assigned to care for Michael, a Hispanic 19-year-old male. In the urgent care, Michael is diagnosed with herpes simplex virus. What information from Don's interview with Michael indicates that he is likely at increased risk for HIV? Select all that apply.

A. Diagnosis of an STI

B. Hispanic race

C. Michael states he works in a shipping warehouse

D. Michael says he has had multiple male and female sexual partners

E. Michael smokes cigarettes, but has not used illegal drugs

F. Michael states he only uses condoms when he has sex with women

G. Michael did not receive his flu vaccination last year

Section 3 Personal Reflection

What populations are at increased risk for becoming infected with HIV? How can certain behaviors increase risk? Why does viral load matter in relation to HIV transmission? What are some patient education points that help to reduce the risk of transmitting or acquiring HIV?

Section 4: Signs and Symptoms of HIV

Patients with HIV may be asymptomatic or have many symptoms. Recognizing the signs and symptoms of HIV is essential in recognizing the potential presence of HIV infection and to determine what stage of infection the patient is experiencing (Swinkels et al., 2024). HIV is categorized into three phases, which are determined through laboratory results and symptoms. These phases are acute HIV, chronic or asymptomatic HIV, and AIDS (Swinkels et al., 2024).

In the acute HIV phase, approximately 90% of patients experience at least one symptom in the first four weeks following the initial HIV infection. Typically, the symptoms experienced are nonspecific, mild, and self-limited, much like many other viral illnesses. Sometimes patients can experience more severe symptoms. This is called acute retroviral syndrome or seroconversion illness. Symptoms of acute HIV infection include fever, fatigue, muscle pain, skin rash, headache, sore throat, swollen lymph nodes, joint pain, night sweats, and diarrhea. Symptoms usually begin within 2-4 weeks of infection and last an average of 18 days. Symptoms resolve once viral replication has reached its set-point, which occurs

approximately thirty days after infection. A more intense illness during the acute phase is often indicative of a poor prognosis if HIV is left untreated (Swinkels et al., 2024).

One characteristic feature of acute HIV is mucocutaneous ulceration. These are shallow, sharply demarcated ulcers with a white base surrounded by a thin region of erythema. These ulcers may be located on the oral, anal, penile, or esophageal mucosa, depending on the mode of transmission. Acute aseptic meningoencephalitis is also a known condition that occurs with acute HIV-1 (Swinkels et al., 2024).

Approximately thirty days following initial infection and once the viral set point has been established, patients begin the chronic phase of HIV infection (Swinkels et al., 2024). This phase may also be referred to as clinical latency (CDC, 2025a). During the chronic phase, most patients remain asymptomatic, though some may report nonspecific fatigue or persistent generalized lymphadenopathy. These patients may also experience opportunistic infections, such as oropharyngeal candidiasis, recurrent vulvovaginal candidiasis, oral hairy leukoplakia, disseminated cutaneous herpes simplex virus, and cervical dysplasia or cervical carcinoma in situ. These patients may also experience dermatological conditions, including seborrheic dermatitis, bacillary angiomatosis, varicella-zoster virus reactivation, and molluscum contagiosum infections. These infections are commonly experienced and tend to be severe for those with chronic HIV (Swinkels et al., 2024). While individuals may be asymptomatic during this phase, they are still able to transmit HIV to others. Individuals who adhere to their prescribed treatment regimen may never progress past the chronic phase. When not treated with appropriate medications, this phase can last a decade or longer (CDC, 2025a).

HIV progresses to AIDS when it is left untreated or inadequately treated (Swinkels et al., 2024). AIDS is the most severe phase of an HIV infection (CDC, 2025a). AIDS

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is diagnosed when specific AIDS-defining conditions are identified. AIDS-defining conditions include candidiasis of the digestive tract (not including thrush), candidiasis of the pulmonary tract, invasive cervical cancer, extrapulmonary or disseminated coccidioidomycosis, histoplasmosis, or cryptococcosis, including cryptococcal meningitis. Other AIDS-defining conditions include chronic intestinal cryptosporidiosis or isosporiasis, cytomegalovirus retinitis, Kaposi sarcoma, HIV encephalitis and HIV-associated neurocognitive disorder, tuberculosis, primary lymphoma of the brain, non-Hodgkin lymphoma, Burkitt lymphoma, mycobacterial infections, Pneumocystis jirovecii pneumonia, progressive multifocal leukoencephalopathy, Salmonella septicemia, and HIV-associated wasting syndrome. An AIDS diagnosis is not dependent upon CD4+ count, though it most frequently occurs when the CD4+ cell count is less than 200 cells/mm3. (Swinkels et al., 2024). Individuals with AIDS have a high viral load and can easily transmit the virus to others. The life expectancy once HIV has progressed to AIDS is three years (CDC, 2025a).

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Children who are vertically infected with HIV first become symptomatic any time before age eight. However, 57% of children who have experienced vertical transmission become symptomatic within their first year of life (Rivera, 2025). In children, mildly symptomatic conditions include lymphadenopathy, hepatomegaly, splenomegaly, dermatitis, parotitis, and recurrent or persistent upper respiratory tract infection, sinus infection, or otitis media. A child is considered to be moderately symptomatic when they experience anemia, neutropenia, thrombocytopenia, bacterial meningitis, pneumonia, a single episode of sepsis, thrush persisting for more than two months in children over six months old, cardiomyopathy, CMV infection before one month of age, recurrent or chronic diarrhea, hepatitis, recurrent HSV stomatitis, HSV bronchitis, pneumonitis, or esophagitis before age one month, two episode of shingles or one episode of shingles that involves two dermatomes, leiomyosarcoma, lymphoid interstitial

pneumonia, nephropathy, nocardiosis, persistent fever lasting more than a month, toxoplasmosis onset before one month of age, or disseminated varicella. AIDS defining conditions in children include multiple or recurrent bacterial infections, candidiasis of bronchi, trachea, lungs, or esophagus, invasive cervical cancer, disseminated or extrapulmonary coccidioidomycosis, extrapulmonary cryptococcosis, chronic intestinal cryptosporidiosis, CMV disease other than liver, spleen, or lymph nodes, occurring after one month of age, CMV retinitis with loss of vision, HIV encephalopathy, chronic ulcers, bronchitis, pneumonitis, or esophagitis after age one month due to HSV, disseminated or extrapulmonary histoplasmosis, chronic intestinal isosporiasis, Kaposi sarcoma, Burkitt lymphoma, immunoblastic lymphoma, primary lymphoma of the brain, disseminated or extrapulmonary mycobacterium avium complex, mycobacterium tuberculosis of any site, disseminated or extrapulmonary mycobacterium, pneumocystis jirovecii pneumonia, recurrent pneumonia, progressive multifocal leukoencephalopathy, recurrent salmonella septicemia, toxoplasmosis of the brain after age one month, and HIV wasting syndrome (HIVinfo, 2022).

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Due to increased risk for complications due to HIV or its treatment, patients with HIV should be routinely screened for AIDS-defining illness and for HIV- and medication-related complications. Complications directly related to HIV include HIV-associated neurocognitive disorders and psychiatric complications when certain medications are used, HIV-associated lipodystrophy, HIV-associated distal symmetric polyneuropathy, mitochondrial toxicity due to medication, HIV-associated Kaposi sarcoma inflammatory cytokine syndrome and multicentric Castleman disease, and hematological malignancies, including primary effusion, follicular, non-Hodgkin, Burkitt, and diffuse large B-cell lymphomas. HIV wasting syndrome is defined as unexplained weight loss greater than 10% body weight, accompanied by either unexplained chronic diarrhea or unexplained fever for more than one month (Swinkels et al., 2024).

While medications have increased the life expectancy for those diagnosed with HIV, they have also increased the risk for cardiovascular disease and mortality in this population. The prevalence of dyslipidemia in patients with HIV, glucose intolerance or diabetes, which occurs more frequently in patients on some treatment regimens, and weight gain due to medications are all associated with increased cardiovascular risk. It is not well understood why some treatment regimens contribute to weight gain and why some individuals gain more weight than others (Swinkels et al., 2024).

Case Study

Don asks Michael about recent illnesses. Michael states that he thinks he had the flu about three months ago, but he has felt ok since then, other than urogenital symptoms from HSV. He has had some odd skin rashes. Michael states he is sometimes more tired than usual but attributes fatigue to working overtime. Upon assessment, it appears Michael has what appears to be thrush on his tongue. His vital signs are within normal limits. Michael's breath sounds are clear. Michael has never had an HIV test. What factors from Michael's history and physical assessment indicate he should be tested for HIV? Select all that apply.

A. A history of flu-like symptoms

B. Report of abnormal skin rashes

C. Fatigue

D. Working overtime

E. Presence of oral thrush

F. Normal vital signs

G. Clear breath sounds

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H. No history of an HIV test

Section 4 Personal Reflection

What symptoms may be present in someone with acute HIV? Why can the healthcare team not assume a patient does not have HIV if they are asymptomatic? Why is the risk of transmission significant during the chronic phase? What are AIDS-defining conditions? What is HIV wasting syndrome?

Section 5: Screening

Nurses and other healthcare professionals use screening tools for many healthcare conditions to determine if laboratory testing is necessary for many healthcare conditions. This is not the case for HIV. The Centers for Disease Control and Prevention recommends that providers offer HIV testing to all patients, which can help to foster discussions regarding HIV and eliminate stigma associated with HIV testing (CDC, 2025b). HIV testing is vital because up to 40% of cases of HIV transmission occur due to an individual not being aware that they have HIV. In the United States, it is estimated that 15% of individuals with HIV are unaware they have the virus. Early detection of HIV can lead to early treatment, which reduces the risk of HIV-related illness and promotes optimal outcomes (HIVinfo, 2025b).

There are specific screening guidelines for infants born to mothers who have a known diagnosis of HIV. These infants should be tested by two months of age, during breastfeeding, and at the conclusion of breastfeeding, since HIV can be spread through breastmilk. Adolescents may experience barriers to testing, as laws in some regions require parental consent for testing (WHO, 2025b). Children infected with HIV through sexual abuse or drug use may be brought in for medical

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care because of HIV symptoms, though they have not been previously diagnosed with HIV (Rivera, 2025).

An HIV risk assessment should be included in all routine primary care visits for all sexually active patients, though this should not determine who is offered an HIV test. For those who test negative for HIV but engage in high-risk behaviors, prevention counseling can be beneficial. Individuals who are receiving treatment for hepatitis, tuberculosis, or an STI are more likely to acquire HIV and should be tested. An increase in heroin use in recent years and the opioid epidemic have contributed to new outbreaks of HIV. Patients who have substance use disorders should also be tested for HIV. Routine testing provides an opportunity to identify patients who may be at increased risk but are reluctant to discuss or disclose risk factors (CDC, 2025b).

When risk-based screening is implemented, people who should be tested for HIV may not be identified. Women, members of minority races/ethnicities, nonurban dwellers in low-incidence areas, and people under age 20 are often missed when it comes to HIV screening. Heterosexual men and women may not be aware of their likelihood of acquiring HIV. When risk-based screening fails to identify those who do have HIV, the disease has the opportunity to progress and may not be identified until the patient has symptoms of advanced HIV or AIDS. Routine, opt-out testing is recommended because it removes the stigma associated with HIV testing, supports earlier diagnosis and treatment, reduces the chances of transmission, and is a cost-effective strategy. Patients should be informed that HIV testing is part of standard preventative screening tests, but they are allowed to decline the test if they wish. A person's decision to decline HIV testing should be noted in the medical record. The provider is not required to provide HIV prevention counseling in order to test for HIV. Different states have different laws related to HIV testing. In some states, all healthcare providers are required to offer opt-out HIV testing. All states also have laws and regulations regarding HIV test

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reporting. Some states require that any partners of the patient who is diagnosed with HIV be notified of the patient's HIV diagnosis, and thus, their own potential exposure (CDC, 2025b).

HIV testing is recommended for everyone at least once between the ages of 13 and 64, though individuals with higher risk should be tested more frequently. Some individuals should be tested at least annually, including men who have had sex with other men, individuals who have had any sexual contact with someone who has HIV, people who have had more than one sex partner since their last HIV test, individuals who have shared needles, syringes, or other supplies used for injecting drugs, individuals who have exchanged sex for money, individuals who have been diagnosed with or treated for and STI, hepatitis, or tuberculosis, and individuals who have had sex with someone who has engaged in high risk behavior or whose sexual history is unknown. It is recommended that gay or bisexual men be tested every 3-6 months for HIV if they or their partner has had multiple sexual partners since the last test. Pregnant women should be tested for HIV with each pregnancy in order to prevent transmission to the fetus if HIV is detected (CDC, 2025c).

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Routine testing is only the first step in the approach to prevent HIV and provide effective healthcare for those living with HIV. To experience improved health outcomes, patients must have access to the full continuum of HIV prevention and care. Patients must be linked to prevention and care services, and barriers to accessing these services should be assessed. Even when a patient has a negative test result for HIV, they should be linked to preventative care, especially if they are at increased risk for acquiring HIV. Prevention strategies may include pre-exposure prophylaxis (PrEP), access to condoms, and risk-reduction counseling. Prevention services should be ongoing, and re-testing for HIV should occur for as long as the patient continues to have increased risk factors. Patients and healthcare providers must understand that HIV prevention is a lifelong process (CDC, 2025b).

HIV transmission by someone who is not aware they have HIV is increasing. Despite the medical advances made to give the ability for those with known HIV to achieve viral suppression to the level of undetectability, there was only a 7% overall decrease in transmission between 2014 and 2018. Routine HIV testing is recommended for all individuals at least once, regardless of sex or sexual orientation, with repeated testing for individuals who inject drugs, have multiple sexual partners, exchange sex for money or drugs, or are diagnosed with a sexually transmitted infection. These individuals who are at higher risk for HIV infection should be tested at least annually. The CDC found through surveillance that over 75% of people who are considered high risk were not offered an HIV test by their primary care provider within the past year. Research has found that "opt-out" testing policies have been effective in identifying HIV infections in various healthcare settings, including emergency departments and primary care clinics. Routine testing has also been found to be cost-effective in the emergency department, eliminating a potential barrier for identifying individuals who have HIV but are not aware (Saag, 2021).

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The United States initiated the "Ending the HIV Endemic" plan in 2019 to reduce the number of new HIV infections by 75% by 2025 and by 90% by 2030. There are four components to this plan, including identifying all people infected with HIV as early as possible, successfully treating them with evidence-based antiretroviral therapy (ART), preventing new infections, and responding quickly when outbreaks occur. The responsibility of identifying people with HIV and early implementation of ART lies with the healthcare community. Through minimization of gaps in diagnosis, improved access and linkage to care, rapid ART initiation, and retention in follow-up care to maintain viral suppression make up the key foundation for the healthcare system's role in reducing incidence of HIV (Saag, 2021).

Case Study

Michael asks Don why the provider wants to test for HIV if he does not feel sick and he has not had sex with anyone who is sick. How can Don best explain the rationale behind testing to Michael? Select all that apply.

A. Michael has increased risk factors for HIV.

B. Michael has never been tested for HIV, and testing is recommended for anyone who is sexually active.

C. HIV testing is often included in routine testing

D. Sexual partners can unknowingly transmit HIV if they do not know they are infected and do not use condoms during sex.

E. Individuals with HIV may not have symptoms after the initial acute phase.

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Section 5 Personal Reflection

How does early detection of HIV improve outcomes? Why aren't screening tools used for HIV testing? What are the potential issues related to risk-based testing? Why should everyone who is sexually active be tested for HIV at least once? Why is it important for those at increased risk to be tested more frequently? What is opt-out testing, and how can it affect HIV transmission rates?

Section 6: Diagnosis

HIV diagnosis is dependent upon testing. Multiple tests are used for HIV screening and diagnosis, including antibody, antigen-antibody, and nucleic acid amplification tests. Antigen tests detect viral proteins and can be used beginning 13-20 days after infection (Swinkels et al., 2024). Antibody tests done with a sample obtained

from a blood draw can detect HIV sooner than tests that utilize saliva or a fingerstick blood sample (Cleveland Clinic, 2022).

Nucleic acid amplification tests detect HIV RNA in the blood 6-8 days after infection and can be used to detect HIV up to 30 days after infection (Swinkels et al., 2024). This test is typically used only when there has been a high-risk exposure or when individuals have early symptoms of HIV, but have tested negative with antibody or antigen/antibody tests (CDC, 2025c). If the nucleic acid test is positive, more lab tests should be considered, including a complete blood count, viral hepatitis screening, chest x-ray, pap smear, CD4+ cell count, and tests for tuberculosis (Cleveland Clinic, 2022).

The most commonly used screening and diagnostic tests for HIV are the combination antigen/antibody tests. They are readily available in most commercial labs and hospitals and are becoming increasingly available worldwide. Antigen-antibody tests detect viral proteins, anti-HIV immunoglobulin M (IgM), and immunoglobulin G (IgG) antibodies (Swinkels et al., 2024). Antigen/antibody tests are typically able to detect the presence of HIV beginning 18-45 days after exposure. This test is often performed with a blood draw, but there is a rapid antigen/antibody test available that uses only a fingerstick to collect a blood sample for testing. The rapid test must be taken at least 18 days after exposure and may take up to 90 days after the exposure to be accurate (Cleveland Clinic, 2022). Fourth-generation versions of this test can detect HIV-1 and HIV-2 antibodies and the HIV-1 p24 antigen (Swinkels et al., 2024). The p24 antigen is a marker on the surface of HIV. The test looks for chemicals the body produces when the testing agent reacts with the markers (Cleveland Clinic, 2022). If the test used is unable to identify the type of HIV present, an antibody immunoassay is required. If the results are positive, a second HIV test is used to confirm the diagnosis. While false positives can occur, they are very rare in third- and fourth-generation antigen/antibody tests. If the test is negative, the test does not need to

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be repeated unless the HIV exposure was too recent for p24 antigen levels to become detectable (Swinkels et al., 2024).

No test can detect HIV in the initial phase of infection (Swinkels et al., 2024). It takes time for the virus to replicate to the point that the test can detect HIV in the body. During this period, testing cannot detect HIV, even if an infection is present (CDC, 2025c). This period can last up to twenty days and is known as the window or eclipse period (Swinkels et al., 2024). The window period varies between different types of HIV tests. The window period for the Nucleic Acid Test is the shortest, followed by the antigen/antibody laboratory-based test and the rapid antigen/antibody test. The antibody test for HIV has a more extended window period of 23-90 days. If a negative test result is obtained in the window period, it should be repeated after the healthcare team is confident that the window period has passed (CDC, 2025c).

The selection of which test to use for HIV testing often depends on when the exposure occurred and which test is most likely to identify a positive result if the patient is infected with HIV. While nucleic acid amplification tests can identify an HIV infection very early, they are expensive, so the standard test used is the combination antibody/antigen test. An algorithm is available that helps healthcare providers choose the most appropriate HIV test for their patient (Saag, 2021).

Self-tests for HIV are available and can be completed in as little as 20 minutes. Individuals should be advised to follow the manufacturer's instructions for the test. A positive result should be confirmed in a medical clinic (CDC, 2025c). In the United States, HIV tests are covered by insurance with no co-pay. For individuals without insurance, many charitable organizations provide access to HIV testing for free or at a low cost. Finances should not be a barrier to HIV screening, and nurses and other healthcare workers can help connect patients to resources for HIV testing when cost is an issue (CDC, 2025c).

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Point-of-care, or rapid, tests are available through two different techniques called lateral flow or flow-through. In this test, antibodies bind to antigens, and they are detected by an indicator. Rapid tests may use whole blood from a fingerstick or an oral swab specimen as the testing sample. The sensitivity and specificity of these rapid tests are quite high, at 98% or greater, but laboratory-based tests continue to be more accurate, especially for detecting an early infection (Saag, 2021). While at home, point-of-care, and rapid tests can be used for HIV screening, a positive result should be confirmed using standard laboratory immunoassays (Swinkels et al., 2024).

If the clinician suspects an HIV infection, but the antigen/antibody test is negative, an HIV-1 nucleic acid amplification test is used to detect HIV RNA. A positive nucleic acid amplification test can be used to diagnose HIV when there is a recent negative screening immunoassay result, a positive antigen-antibody immunoassay result with a negative antibody-only immunoassay, or a nonreactive or indeterminate HIV-1 and HIV -1 specific antibody assay after a positive screening assay. If testing results are negative, but HIV continues to be suspected, testing should be repeated in 1-3 weeks (Swinkels et al., 2024). If an HIV test is negative, the individual has not had a possible exposure within the last three months, and the test was completed with a blood draw, then no further testing is suggested. If there has been an exposure in the last three months or testing is done during the window period, a repeat test should be completed to confirm the negative result (Cleveland Clinic, 2022).

A thorough assessment is a crucial piece of the diagnostic process for patients with confirmed or suspected HIV. This assessment should include a complete review of systems and an in-depth history. A detailed history should include a review of behaviors that could increase risk for HIV, including drug use, blood transfusions, and sexual contacts and behaviors. It is also important to gather information regarding the number of partners, sexual practices, frequency, barrier

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protections used, and past incidences of sexually transmitted infections. The interview should also include asking about the HIV status of past or current partners, if it is known to the patient. When gathering information regarding drug history, it is important to note the type and frequency of drug use, how drugs are administered, the source of the drugs, and if any materials involved in drug use are shared. A thorough history must also include a mental health assessment and immunization history (Swinkels et al., 2024).

An in-depth social history is essential when assessing a patient with confirmed or suspected HIV. This information can help the healthcare team understand the patient's perceptions and ability to adhere to treatment regimens. It can also help to identify any barriers the patient may have in accessing healthcare services. The social history should include information regarding the patient's living situation, income, insurance status, social support, experiences of stigma, coping strategies, and exposure to violence (Swinkels et al., 2024). The interviewer should also inquire about the patient's understanding of how HIV is transmitted, as knowledge regarding transmission may vary among different regions, religions, socioeconomic groups, cultures, and demographics. Historical stigmatization may cause some beliefs about how HIV is transmitted not to be rooted in evidence-based science (Karimi et al., 2025). Clarifying for the patient how HIV is transmitted can be a vital part of the diagnostic process.

When HIV is confirmed, staging systems are used to rate the progression of the disease and to monitor the HIV prevalence in a community. This information can help healthcare leaders plan for prevention and care and evaluate current interventions. Stage 0 is defined by a positive HIV test result within 180 days of having a negative or indeterminate test result, a negative initial immunoassay result followed by a positive nucleic acid amplification test result, which confirms acute infection, or a positive nucleic acid amplification test result following a positive antigen or antigen-antibody test result that has not been confirmed by a

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second test. Stage 0 is also considered the primary HIV infection. During this stage, patients have one or more symptoms of acute HIV or symptoms consistent with acute retroviral syndrome. Stages 1-3 are based on the CD4+ cell count and are used to stage disease in individuals aged six and older. There are other criteria used for younger children. Stage 1 is defined as having a CD4+ cell count of 500 or more cells/mm3. In stage 1, patients are typically asymptomatic or may have generalized lymphadenopathy. In stage 2, the patient has 200-499 CD4+ cells/ mm3, accompanied by moderate unexplained weight loss, recurrent respiratory infections, herpes zoster exacerbations, angular cheilitis, recurrent oral ulcerations, papular pruritic eruptions, seborrheic dermatitis, or fungal fingernail infection. In stage 3, the patient has a CD4+ cell count of less than 200 cells/mm3. They experience severe weight loss, defined as greater than 10% of their body weight, unexplained chronic diarrhea, persistent fever, oral candidiasis, oral hairy leukoplakia, pulmonary tuberculosis, or severe invasive bacterial infections, like pneumonia, empyema, osteomyelitis, meningitis, and bacteriemia. They may also have acute necrotizing ulcerative stomatitis, gingivitis or periodontitis, unexplained anemia, neutropenia, or thrombocytopenia for over a month. Stage 4 HIV is when the viral infection has progressed to AIDS. Patients in stage 4 may develop HIV wasting syndrome, pneumocystis pneumonia, chronic herpes simplex infection, esophageal candidiasis, extrapulmonary tuberculosis, Kaposi sarcoma, toxoplasmosis, HIV encephalopathy, extrapulmonary cryptococcus infections, disseminated non-tuberculosis mycobacterial infections, progressive multifocal leukoencephalopathy, pulmonary candidiasis, cryptosporidiosis, isosporiasis, cytomegalovirus retinitis located outside the liver, spleen or lymph nodes, disseminated mycoses, such as histoplasmosis, coccidioidomycosis, and penicilliosis, recurrent salmonella septicemia, lymphoma, invasive cervical carcinoma, or visceral leishmaniasis (Swinkels et al., 2024).

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In younger children, staging is also based on CD4+ cell count; however, the cell count levels used for staging differ from those used for individuals six and older. In infants under one year old, stage 1 is defined as a CD4+ cell count greater than 1,500 cells/mm3. Stage 2 is defined as having a CD4+ cell count of 750-1,499 cells/mm3. Stage 3 occurs when the CD4+ cell count falls below 750 cells/mm3. In children ages 1-6 years old, stage 1 is defined as more than 1000 CD4+ cells/mm3. Stage 2 is when the patient has 500-999 cells/mm3, and stage 3 occurs when the CD4+ falls below 500 cells/mm3 (HIVinfo, 2022).

Case Study

Michael states that he had flu-like symptoms a few months ago. He recalls having unprotected sex approximately 120-90 days ago. Which test is most appropriate to test for HIV?

A. Antibody test
B. Antigen-antibody test
C. Nucleic acid amplification test
D. Any test. Michael is likely past the window where the tests would be unable to detect an HIV infection.

Michael's HIV test is positive. What information will be needed to assess what stage of infection Michael has?

A. CD4+ cell count
B. Viral load
C. Temperature
D. Number of sexual partners

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Michael has a CD4+ cell count of 600 cells/m3. Which stage of HIV is he in?

A. Stage 1

B. Stage 2

C. Stage 3

D. Stage 4

Section 6 Personal Reflection

How could testing for HIV 2-3 days after exposure fail to provide accurate results? What is a window period? Why are antigen/antibody tests most commonly used for HIV testing? Why do you think a positive self-test should be repeated by a healthcare provider? What is the value of staging and HIV infection?

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Section 7: Treatment

The goal of HIV treatment is to reduce viral load, which prevents the virus from effectively attacking the immune system (CDC, 2024c). All individuals who test positive for HIV should be referred for rapid initiation of antiretroviral therapy (ART) and long-term follow-up care. It is estimated that only 78% of patients in 2018 who tested positive for HIV were linked to HIV-related healthcare within 30 days of their diagnosis. This was also associated with only 55-60% of people with known HIV having sustained viral suppression through ART and regular follow-up care. Research has found that the sooner a patient is scheduled for follow-up care after an HIV diagnosis, the more likely they are to attend the follow-up appointment. In the United States, it is recommended that ART be initiated within one week of diagnosis. Studies have found that follow-up care has a higher retention rate when treatment is initiated at the first clinic visit. Adherence to

follow-up care is also improved when the healthcare team establishes an active relationship with the patient, provides assistance in scheduling the first follow-up appointment, maintains contact with the patient until their first appointment, and addresses any barriers that may exist for attending the first appointment, such as transportation or childcare (Saag, 2021).

At the first appointment after HIV diagnosis, a complete history and physical exam should occur. The clinician should inquire about any individuals who may have been exposed to HIV through the patient, as well as questions regarding the patient's sexual health, ongoing use of substances, and mental health history. The clinician should evaluate for signs of advanced HIV infection, including symptoms of thrush, vaginal candidiasis, herpes simplex virus infection, Kaposi sarcoma, lymphadenopathy, retinopathy, alterations in mental status, and wasting syndrome. Counseling is essential so that the patient can understand the implications of an HIV diagnosis, the importance of establishing an emotional support system, and disclosing the information to their sexual partners. Potential barriers, such as lack of housing, food insecurity, interpersonal violence, or unreliable transportation, should be identified to determine any potential issues that would keep the patient from accessing follow-up care. Initial counseling should also include prevention strategies, including the routine use of condoms and not sharing needles or other supplies associated with intravenous drug use (Saag, 2021).

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Post-Diagnosis Testing

Laboratory tests involved in an HIV evaluation include a quantitative CD4+ T-lymphocyte cell count, quantitative plasma HIV-1 RNA viral load, complete blood count, glucose, blood urea nitrogen, creatinine, liver enzymes, bilirubin, urinalysis, serum lipids, and serology for hepatitis A, B, and C. An HLAb*5701 test is

necessary if abacavir is being considered for treatment. Genotypic drug-resistance assessment is completed for patients previously treated with ART. The provider may order other laboratory tests as indicated by the history and physical examination. These tests may include tests for sexually transmitted infections, opportunistic infections, or cancer. The initial sample for CD4+ cell count must be drawn before beginning ART, but it is not necessary to wait for the results of this test before initiating treatment (Swinkels et al., 2024).

Antiretroviral Therapy (ART)

HIV-1 treatment is focused on sustained virologic suppression using antiretroviral (ART) medications. ART should be initiated as soon as the blood sample is collected to determine the initial CD4+ count, the diagnosis has been confirmed through testing, and the initial evaluation has been completed (Swinkels et al., 2024). ART is taken daily for the rest of the patient's life (WHO, 2024).

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There are six main classes of medications used to treat HIV, and all are considered antiretroviral drugs. The classes differ in their mechanism of action at different stages of the viral lifecycle to prevent replication. It is common practice to use two or even three medications from different classes for a multifocal attack on the virus. Some drugs are even combined for ease of use by the patient. Of the six antiretroviral classes, most people are prescribed medications from four of the classes, all of which target one of three viral proteins that are essential to the HIV lifecycle. These proteins include reverse transcriptase, integrase, and protease (Pebody, 2024).

Nucleoside/nucleotide reverse transcriptase inhibitors (NRTIs) work by interrupting the replication process. NRTIs block reverse transcriptase, an enzyme required for HIV to replicate (HIVinfo, 2025c). Typically, when HIV releases its RNA into the cell, reverse transcriptase converts the viral RNA to DNA. NRTIs interrupt

the construction of the new piece of viral DNA. Since the viral DNA cannot be built, the virus cannot take over the cell and replicate. NRTIs are often called the backbone of HIV treatment (Pebody, 2024). These medications include abacavir (Ziagen), emtricitabine (Emtriva), lamivudine (Epivir), tenofovir disoproxil fumarate (Viread), tenofovir alafenamide (Vemlidy), and zidovudine (Retrovir), also commonly known as AZT (HIVinfo, 2025c).

Non-nucleoside Reverse Transcriptase Inhibitors (NNRTIs) also work by blocking reverse transcriptase, but in a different way. NNRTIs bind directly with the reverse transcriptase enzyme, which blocks the reverse transcription process, halting the process that leads to the integration of viral DNA into the cell's genome (Pebody, 2024). Medications in this drug class include doravirine (Pifeltro), etravirine (Intelence), and rilpivirine (Edurant and Edurant PED). Efavirenz (Sustiva) and nevirapine (Viramune) are previously used NNRTIs that have been discontinued (HIVinfo, 2025c).

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Integrase strand transfer inhibitors (INSTIs) block HIV integrase, an enzyme necessary for HIV replication. During the HIV lifecycle, integrase is the enzyme responsible for inserting the viral DNA into the host chromosome. The integrase enzyme works by binding to the host cell's DNA, preparing an area on the viral DNA for integration, and then transferring the strand into the host cell's genetic material. While the virus may still be able to produce DNA from its RNA genome, the viral DNA is blocked from entering the host cell's DNA (Pebody, 2024). Medications in this drug class include cabotegravir injection (Apretude), cabotegravir tablet (Vocabria), dolutegravir (Tivicay and Tivicay PD), and Raltegravir (Isentress and Isentress HD) (HIVinfo, 2025c).

Protease inhibitors block HIV protease, the enzyme necessary for HIV to break up large polyproteins into smaller pieces. These smaller protein groups are required to assemble new viral particles. With protease inhibitors, HIV can still replicate,

but the products of replication, or virions, are immature and unable to infect new cells, rendering them ineffective (Pebody, 2024). Protease inhibitors include atazanavir (Reyataz), darunavir (Prezista), ritonavir (Norvir), and tipranavir (Aptivus). Fosamprenavir (Lexiva) is also in this drug class, but was discontinued. Ritonavir is often used as a pharmacokinetic booster (HIVinfo, 2025c).

Fusion inhibitors block HIV from entering the CD4 T lymphocytes by interrupting the fusion of the HIV envelope protein with the CD4 cell (Pebody, 2024). The only drug in this class, enfuvirtide (Fuzeon), was discontinued (HIVinfo, 2025c).

CCR5 antagonists block CCR5 coreceptors on the surface of specific immune cells that are necessary for HIV to enter cells. Typically, HIV must bind to two separate receptors on the cell's surface, called the CD4 receptor and a co-receptor, which can be either CCR5 or CXCR4. When HIV binds to both receptors, the viral envelope can fuse with the host cell membrane and release its viral components into the host cell. CCR5 inhibitors block HIV from using the CCR5 co-receptor. As a result, the virus is blocked from entering the host cell (Pebody, 2024). This drug class includes maraviroc (Selzentry) (HIVinfo, 2025c).

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Attachment inhibitors bind to the gp120 protein on the outer surface of HIV, which prevents it from entering CD4 cells (HIVinfo, 2025c). These inhibitors bind at a very specific point, as the gp120 portion of the HIV envelope protein is located on the spikes of the virus's surface. When the attachment inhibitors bind to this protein, the virus cannot attach to the CD4 receptor T cells and other immune cells used to gain entry into the host cell (Pebody, 2024). Currently, fostemsavir (Rukobia) is the only medication in this drug class (HIVinfo, 2025c).

Post-attachment inhibitors block CD4 receptors on the surface of specific immune cells required for HIV to enter the cells (HIVinfo, 2025c). They also prevent the HIV gp120 protein from changing its shape, a process that is necessary for the virus to engage with co-receptors once it has bound itself to the CD4 receptor (Pebody,

2024). Ibalizumab-uiyk (Trogarzo) is the only medication in this drug class (HIVinfo, 2025c).

Capsid inhibitors interfere with the HIV capsid, the protein shell that protects HIV's genetic material and enzymes needed for replication (HIVinfo, 2025c). These medications work by interfering with multiple points in the HIV lifecycle. The HIV capsid is shaped like a cone and is the container for the viral proteins and enzymes. When the virus enters the host cell, the capsid opens in a set sequence that allows HIV proteins to integrate genetic information into the host cell DNA. Capsid inhibitors block the process of opening the capsid and the release of the materials contained within. This prevents the virus from infecting the cell and blocks the assembly of new capsids (Pebody, 2024). Lenacapavir is the only medication in this drug class. However, it is available in two forms. Sunlenca is the brand name of the form used for the treatment of someone diagnosed with HIV, and is a long-term medication given as an injection. Yeztugo is approved as a medication for HIV pre-exposure prophylaxis (PrEP) (HIVinfo, 2025c).

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Pharmacokinetic enhancers, also known as boosters, are used with HIV medications to increase the effectiveness of the treatment regimen. Cobicistat (Tybost) is an enhancer (HIVinfo, 2025c). Ritonavir is also used as a booster drug. These medications enhance the actions of other antiretroviral medications by slowing the process of hepatic metabolism, causing the drug to be broken down at a slower rate. This results in the drug staying active in the body for longer or at increased therapeutic levels. Many ART medications manufactured with a booster would be ineffective without the agent that can potentiate their effect (Pebody, 2024).

In recent years, long-acting medications used to treat HIV have been developed. This reduces the need for daily oral medications. Long-acting antiretroviral medications are injected by a healthcare provider and are given at intervals

depending on the medication, every 2 weeks or up to 6 months. The most used long-acting HIV medications are a combination of cabotegravir and rilpivirine (Cabenuva), lenacapavir (Sunlenca), and ibalizumab (Trogarzo). Other long-acting medications are intended only for PrEP. These include lenacapavir (Yeztugo) and cabotegravir (Apretude).

Long-acting HIV medications are able to maintain stable concentrations in the body for a much longer period than oral pills. As a result, the injections are taken much less frequently than oral ART. Cabenuva is given every 1-2 months. Sunlenca is given every six months, and Trogarzo is administered every two weeks. These medications must be given by appointment with a healthcare provider, but can benefit those struggling with medication adherence. Some long-acting HIV medications must be supplemented with daily oral medications. Research continues to explore new long-acting medications (HIVinfo, 2025d).

Combination medications to treat HIV contain two or more ART medications from different drug classes. Currently, there are several of these medications approved for the treatment of HIV. These medications include abacavir-dolutegravir-lamivudine (Triumeq, Triumeq PD), atazanavir-cobicistat (Evotaz), bictegravir-emtricitabine-tenofovir alafenamide (Biktarvy), cabotegravir-rilpivirine (Cabenuva), darunavir-cobicistat (Prezcobix), darunavir-cobicistat-emtricitabine-tenofovir alafenamide (Symtuza), dolutegravir-lamivudine (Dovato), dolutergravir-rilpivirine (Juluca), doravirine-lamivudine-tenofovir disproxil fumarate (Delstrigo), efavirenz-lamivudine-tenofovir disoproxil fumarate (Symfi), elvitegravir-cobicistat-emtricitabine-tenofovir alafenamide (Genvoya), elvitegravir-cobicistat-emtricitabine-tenofovir disoproxil (Stribild), emtricitabine-rilpivirine-tenofovir alafenamide (Odefsey), emtricitabine-rilpivirine-tenofovir disoproxil fumarate (Complera), emtricitabine-tenofovir disoproxil fumarate (Truvada), lamivudine-tenofovir disoproxil fumarate (Cimduo), and lopinavir-ritonavir (Kaletra). One

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benefit of combination medications is that they reduce the number of pills a patient must take each day (HIVinfo, 2025c).

Due to the importance of rapid initiation of ART, a medication regimen is often prescribed before receiving the baseline laboratory results (Saag, 2021). Currently, the recommended initial therapy for a new diagnosis of HIV is INSTI-based therapy along with dual use of NRTIs (Swinkels et al., 2024). This type of treatment is known as triple therapy (Pebody, 2024). This regimen is most often bictegravir with a fixed-dose combination of emtricitabine-tenofovir alafenamide fumarate or dolutegravir with a fixed-dose combination of either tenofovir disoproxil fumarate and emtricitabine, tenofovir disoproxil fumarate and lamivudine, or tenofovir alafenamide fumarate and emtricitabine. These medication regimens are recommended because they are known to be effective, have an acceptable side-effect profile, are also active against the hepatitis B virus, and have less likelihood of developing resistance (Saag, 2021). The regimen can be adjusted once the initial lab results are received (Saag, 2021).

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For patients whose lab results show the HIV RNA level is less than 500,000 copies/mL, hepatitis B infection is not present, and there is no genotypic resistance identified, a two-drug regimen using dolutegravir and lamivudine is considered first-line treatment, simplifying the medication regimen. Tenofovir plus lamivudine or emtricitabine are typically the preferred NRTIs used, and bictegravir and dolutegravir are usually the preferred INSTIs. Drug preference is determined by the drug's effectiveness, adverse effects, rate at which it can achieve viral suppression, and lower propensity for development of drug resistance. Abacavir is no longer used as a first-line treatment for initial therapy due to the risk of cardiovascular disease, hypersensitivity, and the need for HLA B*5701 testing prior to use (Swinkels et al., 2024).

Treatment for ART Resistance

Treatment can become complicated when viral suppression is inadequate, contributing to mutations that create resistance to antiretroviral treatments. Virological failure is considered when the viral load is greater than 1000 copies/mL on two separate blood tests three months apart and when the patient has been on their current medication regimen for six months or more. When this occurs, it is considered a recurrence of severe immunodeficiency when the treatment had been successful for six months or more prior to failure. When clinical treatment failure occurs and the patient has been adhering to their medication regimen, drug resistance should be considered. The nature of the HIV RNA genome makes it prone to mutations, quickly adapting to selection pressure and creating resistance against medications (Swinkels et al., 2024).

If the viral load is incidentally 20-200 copies/mL, it is considered a “blip”. This finding should not prompt a change in ART. These blips are common with some HIV tests and should not be alarming (Gandhi et al., 2025). Patients can also have persistent low-level viremia (20-200 copies/mL) even when they have adhered to the ART and there are no concerns for drug interactions. This may be due to a large HIV reservoir, long-lived CD4+ cells with latent HIV, or an impaired immune response to the virus. These individuals may have more adverse outcomes than those who do not have low-level viremia, though they also do not typically benefit from intensified ART. Evidence has also not been found that supports changing therapies for those with low-level viremia if the patient is already receiving an ART that has a high barrier to resistance (Gandhi et al., 2025).

The most common cause of virologic failure is ART adherence problems. When virologic failure occurs, the provider should assess for potential causes of nonadherence and order genotype testing to determine if drug resistance has developed. However, drug resistance is a less likely cause. In addition to

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transitioning to an injectable long-acting ART, intense case management and adherence support may be necessary for individuals who are unable to take oral ART consistently despite clinical support, have a high risk of HIV disease progression, and whose virus is susceptible to both cabotegravir and rilpivirine. When appropriate, these patients should also be linked to substance use disorder treatment or mental health care (Gandhi et al., 2025).

As patients become more exposed to treatments for HIV, a wider range of medications must be used due to the increased likelihood of developing multidrug-resistant HIV. Even when an HIV infection becomes resistant to a medication regimen, there can be success in using second-line medications to achieve viral suppression. These medications may include second-line NNRTIs, capsid inhibitors, pharmacologically boosted protease inhibitors, and later-generation integrase inhibitors. If these medications fail, third-line therapy may be used, though it should be used cautiously. When the infection is resistant to all available treatments, the patient should be prescribed the regimen that is best tolerated and can provide some degree of maintained viral suppression. New antiretroviral agents, such as capsid or attachment inhibitors, should only be considered when all conventional treatment regimens have failed (Swinkels et al., 2024).

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Treatment of HIV-2

Since the genome of HIV-2 is different from that of HIV-1, medications used to treat HIV-1 are not always effective against HIV-2 (Burgess, 2024). Most studies focus on the treatment of HIV-1, and fewer treatments have been studied for HIV-2 (Swinkels et al., 2024). As a result, treatment of HIV-2 is primarily based on single-arm or observational studies (Burgess, 2024). Initial treatment for HIV-2 includes two NRTIs and a second-generation INSTI or a ritonavir-boosted protease

inhibitor. The preferred NRTIs for treatment of HIV-2 are tenofovir disoproxil fumarate and emtricitabine. Dolutegravir is typically used as the INSTI. If a protease inhibitor is used, darunavir and lopinavir are preferred because they are more active against HIV-2 than other protease inhibitors (Swinkels et al., 2024). While ART differs between HIV-1 and HIV-2, follow-up care is the same, with continued monitoring of viral load and CD4+ cell count, as well as assessing for signs that the immune system is significantly compromised (Burgess, 2024).

There is limited data regarding the treatment of drug-resistant HIV-2, even though this version of the virus is more likely to develop resistance (Swinkels et al., 2024). It is known that HIV-2 is resistant to non-nucleoside reverse transcriptase inhibitors and enfuvirtide (Burgess, 2024). Typically, INSTIs are used to treat drug-resistant HIV-2, since once the virus becomes resistant to one protease inhibitor, it also becomes resistant to other protease inhibitors. While INSTIs are commonly used to treat drug-resistant HIV-2, there is still little research regarding the mutations that make HIV-2 more resistant to treatment (Swinkels et al., 2024).

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Special Populations

The selection of specific medications for HIV ART is dependent upon comorbid conditions. Some medications may be contraindicated, and some may have additional benefits of use. When an individual is infected with both HIV and hepatitis B, Tenofovir-containing ART is used because this medication can also suppress hepatitis B replication. Medications that use lamivudine or emtricitabine without tenofovir are not used, as they can rapidly lead to the emergence of resistant hepatitis B virus. Patients who have osteoporosis are typically prescribed tenofovir alafenamide, as it is associated with less bone loss. Tenofovir disoproxil fumarate is avoided in patients with renal dysfunction because it is associated with proximal tubular dysfunction. Tenofovir alafenamide can be used if the

patient does not have reduced renal function and is not on dialysis. No medication containing tenofovir should be used for patients requiring dialysis. Atazanavir should also not be used for patients with renal dysfunction. The preferred ART regimen for these patients is dolutegravir plus lamivudine, with dosages adjusted for renal function (Swinkels et al., 2024). ART can be initiated immediately for patients newly diagnosed with cancer, though special attention to drug-drug interactions is necessary to prevent complications (Gandhi et al., 2025).

In individuals with active tuberculosis who do not have evidence of tuberculosis meningitis, treatment for tuberculosis should be initiated immediately, followed by ART initiation within two weeks, especially when the patient's CD4+ remains below 50 cells/mm3. If the patient does have tuberculosis meningitis, high-dose corticosteroids and tuberculosis treatment should be initiated at the time of diagnosis, and ART should be initiated once tuberculosis meningitis is controlled, as evidenced by clinical improvement and progress towards normal CSF parameters, typically after 2-4 weeks of treatment (Gandhi et al., 2025).

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ART should be initiated immediately for patients who are diagnosed during pregnancy to prevent perinatal and sexual transmission, as well as to protect maternal health. For treatment of HIV during pregnancy, tenofovir alafenamide-emtricitabine, plus dolutegravir, is recommended. If tenofovir alafenamide is unavailable, tenofovir disoproxil fumarate-emtricitabine, plus dolutegravir, is a suitable alternative. When dolutegravir is not an option, pregnant patients can take 600mg Darunavir plus 100mg ritonavir, with both medications taken twice daily, along with either tenofovir alafenamide-emtricitabine or tenofovir disoproxil fumarate-emtricitabine. Individuals who have previously taken long-acting cabotegravir for PrEP should also follow this regimen. Another option for ART during pregnancy is bictegravir-tenofovir alafenamide-emtricitabine (Biktarvy), though there is less evidence to support this recommendation than previous recommendations. However, individuals who are already taking this regimen and

then discover they are pregnant should continue with this regimen. While not ideal, other options can be used for ART during pregnancy if dolutegravir, darunavir, and bictegravir are not available. If a patient becomes pregnant while taking long-acting cabotegravir plus long-acting rilpivirine, it is recommended that they switch to an oral triple-drug regimen. There is inadequate data to support the use of doravirine-containing regimens, long-acting cabotegravir plus long-acting Rilpivirine, dolutegravir-lamivudine (Dovato), and dolutegravir-rilpivirine (Juluca) for use during pregnancy. If a patient is stable with viral suppression while taking a doravirine-containing regimen, dolutegravir-lamivudine (Dovato), or dolutegravir-rilpivirine (Juluca, and wants to continue their usual regimen during pregnancy, they should be advised that there has not been sufficient research to determine the safety and efficacy of these regimens during pregnancy. However, viral load should be monitored more frequently if they do not want to transition to another ART. Cobicistat-containing ART should not be used during pregnancy due to inadequate drug levels (Gandhi et al., 2025).

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HIV treatment can be particularly challenging in children. Problems with medication adherence can occur for many reasons. Some children may refuse to take oral HIV medications due to the unpleasant taste. Parents may be busy and struggle to make sure the HIV medications are taken on time each day. The child may experience side effects from their medication regimen, which also contributes to nonadherence. Social issues within the family, such as physical or mental illness, unstable housing, or substance abuse, can create challenges. The cost of medications can be a barrier. The child's growth and developmental age can also contribute to poor adherence to ART. Children receive weight-based medication dosing, so as they grow, dosages must be adjusted (HIVinfo, 2024). Adolescents are less likely to adhere to their treatment regimen, though peer-driven, adolescent-friendly services that are integrated with the psychosocial

interventions have been found to improve health outcomes for this population (WHO, 2025b).

Treating Opportunistic Infections

Prevention of opportunistic infections is an important part of HIV treatment. Treatment is selected based on the level of immunosuppression, which determines the risk of the patient developing an opportunistic infection. Individuals with symptoms of thrush, a CD4+ cell count less than 200 cells/mm3, or who have a CD4+ cell count of less than 14% should be prophylactically treated against Pneumocystis jirovecii. Patients with a CD4+ cell count less than 100 cells/mm3 and a positive serum cryptococcal antigen test result should be prophylactically treated against Cryptococcus neoformans and Cryptococcus gattii. In areas where histoplasmosis is endemic and when the patient has a CD4+ cell count of less than 150 cells/mm3, prophylactic treatment for Histoplasma capsulatum should be implemented. Prophylaxis against Mycobacterium avium complex is not always required if the patient rapidly begins ART; however, patients with a CD4+ cell count less than 50 cells/mm3 who have not received ART should receive prophylactic treatment. Chemoprophylaxis against Toxoplasma gondii is required for patients with a CD4+ cell count less than 100 cells/mm3 who also have positive test results for Toxoplasma antibodies (Swinkels et al., 2024).

Individuals diagnosed with cryptococcal meningitis can begin ART 2-4 weeks after the initiation of antifungal medications, as long as they can be closely monitored and treated for incidences of increased intracranial pressure and immune reconstitution inflammatory syndrome. ART can be initiated at 2 weeks after initiating antifungal medications when there has been significant clinical improvement, controlled intracranial pressure, negative CSF cultures, and the patient can be closely monitored. For those who do not meet this improvement

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criterion, ART should be initiated four weeks after starting antifungal treatment. Individuals who have not previously taken ART and who have asymptomatic cryptococcal antigenemia and a negative lumbar puncture can begin ART immediately, and preemptive fluconazole should be prescribed (Gandhi et al., 2025).

If a patient with a severe opportunistic infection is rapidly started on ART, they can experience immune reconstitution inflammatory syndrome (IRIS) (Swinkels et al., 2024). This syndrome is a hyperinflammatory response that can occur when the CD4+ cell count improves, though the mechanism of how the syndrome occurs is not well understood. Microorganisms most commonly associated with this syndrome include cytomegalovirus, mycobacterium, cryptococcus, Epstein-Barr virus, pneumocystis, JC virus, and hepatitis B and C, and the clinical presentation depends on the microorganism involved (Thapa & Shrestha, 2023). In order to decrease the risk of this syndrome, it is recommended that the opportunistic infection be treated prior to initiating ART. For most opportunistic infections, ART can be implemented within two weeks of initiating treatment for the acute opportunistic infection (Swinkels et al., 2024).

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The selection of medication for prophylaxis or treatment of opportunistic infections depends on the level of immunosuppression the patient is experiencing and the causative pathogen. Low-dose trimethoprim/sulfamethoxazole is the recommended prophylactic treatment for Pneumocystis jirovecii, as it protects against cerebral toxoplasmosis, bacterial infections, and malaria in regions where the disease is endemic. Ideally, if someone has an allergy to sulfur, desensitization is attempted, but when this is not possible, inhaled pentamidine, dapsone, or atovaquone can be used. In patients receiving pentamidine, blood glucose monitoring should be initiated, as this medication increases the risk for hypoglycemia. Patients should be assessed for G6PD deficiency before beginning dapsone. Atovaquone can be used for treatment, but it is generally considered

less effective. Once the CD4+ cell count rises about 200 cells/mm3 for three months or more and the patient is on ART, prophylactic treatment for Pneumocystis jirovecii can be discontinued. If a patient becomes infected with Pneumocystis jirovecii, a weight-based dosage course of 21 days of trimethoprim/sulfamethoxazole and high-dose steroids is recommended to treat and prevent respiratory complications. Alternatively, primaquine with clindamycin, along with intravenous pentamidine, can be given for 21 days to treat this infection. Low-dose trimethoprim/sulfamethoxazole is also used for prophylaxis against toxoplasmosis. For patients with a non-severe sulfur allergy, dapsone with pyrimethamine and calcium folinate are used for treatment. Prophylaxis against toxoplasmosis can be discontinued when the patient is stable on ART and the CD4+ cell count is greater than 200 cells/mm3. Patients with HIV should continue to receive regular vaccinations to prevent complications or mortality due to influenza, pneumococcal, meningococcal pneumonia, and other blood-borne viral infections (Swinkels et al., 2024).

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Individuals with HIV are more likely to experience substance use disorder than the general population, though only a small number of these patients are referred for or receive treatment for their substance use disorder. Harm reduction services, including access to naloxone (Narcan), safe injection education, fentanyl and xylazine drug test strips, and referral to syringe exchange programs and safe injection sites, should be offered to all individuals who report substance use disorder. Individuals with HIV and substance use disorder should also be referred for treatment for opioid, alcohol, or tobacco use disorders. Individuals with HIV and substance use disorder can be supported through peer/patient support staff, telehealth, extended clinic hours, mobile clinics, mobile pharmacies, pharmacy delivery services, and walk-in clinics. The risk for drug-drug interactions between ART drugs and those used to treat opioid use disorder and alcohol use disorder is low, and treatment for these substance abuse disorders can have a positive effect

on ART adherence. Currently, there are no FDA-approved medications to treat stimulant use disorders. However, contingency management, a behavioral form of incentivized treatment, is currently accepted as the most efficacious treatment. In cases of incentivized treatment, the patient may receive financial incentives for periods of recovery from stimulants. Tobacco use is also common among individuals diagnosed with HIV, increasing the risk for cardiovascular disease. Interventions that support tobacco cessation, including medications that support cessation, are recommended (Gandhi et al., 2025).

Adverse Effects of Medications

Antiretrovirals can be challenging to prescribe, as they are known to have many drug-drug interactions, toxicities, and other adverse effects. Pharmacologists play an important role in determining appropriate ART, as they can guide the healthcare team and consider the patient's specific pharmacological needs. The prescriber must be able to consider the benefits of viral suppression, stewardship of antiviral drugs to reduce resistance, and balance these factors with patient tolerance and concern for long-term effects. When patients are comfortable taking their ART medication, they are more likely to adhere to treatment, providing the best chance for viral suppression (Swinkels et al., 2024).

It is important to educate patients regarding the potential side effects of ART. Common side effects of ART also include rash, nausea, vomiting, diarrhea, headache, dizziness, dry mouth, fatigue, and difficulty sleeping. Patients should also be informed that while they can take birth control while taking ART, hormone-based birth control may become less effective. Most HIV medications can be taken with medications used to provide gender-affirming or menopausal hormone therapy or testosterone replacement therapy. Some people receiving these treatments may experience side effects (CDC, 2024c).

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Long-acting HIV medications are considered safe for most people, but there is a risk for adverse effects. The most common adverse effects include diarrhea, dizziness, fatigue, fever, headache, nausea, rash, sleep difficulties, and injection site reactions. Though less common, long-acting HIV medications can also cause depression or hepatic dysfunction. Safety of use of long-acting HIV medications has not been established for pregnancy or breastfeeding (HIVinfo, 2025d).

Nucleoside/Nucleotide Reverse Transcriptase Inhibitors should be prescribed with special considerations. Abacavir is contraindicated for patients who are positive for the HLA-B*5701 allele because there is a risk for hypersensitivity reactions. Patients must be pretested for this allele before beginning therapy that includes abacavir. This medication may not be ideal for patients with cardiovascular comorbidities, as there is increased cardiovascular risk with this medication. Tenofovir alafenamide is associated with increased lipid levels and weight gain. This medication can also lead to decreased bone density. Emtricitabine carries a risk for hyperpigmentation of the palms and soles. Lamivudine may be prescribed cautiously, as it has been associated with pancreatitis, though this is a rare occurrence (Swinkels et al., 2024).

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Non-nucleoside reverse transcriptase inhibitors also have risks for drug interactions and adverse events. There is potential for cytochrome P450 (CYP) enzyme drug interactions with doravirine, efavirenz, and rilpivirine. Efavirenz is also associated with dyslipidemia, rash, and prolonged QTc intervals. This drug has been associated with short- and long-term psychiatric complications, suicidal ideation, catatonia, and late-onset ataxia and encephalopathy. Rilpivirine is also known to cause QTc interval prolongation, though not as severely as efavirenz. Rilpivirine is less commonly associated with rashes and psychiatric problems than efavirenz (Swinkels et al., 2024).

Integrase strand transfer inhibitors are known to cause more weight gain when compared to other ART drug classes. Several drugs in this class are known to inhibit creatinine excretion. Because bictegravir is a substrate for the CYP3A4 and UGT1A1 enzymes, there is potential for drug-drug interactions with its use. Bictegravir should be administered two hours before or six hours after aluminum- and magnesium-based antacids, as well as rifampicin, which is a potent CYP3A inducer. At one time, dolutegravir use during early pregnancy was associated with neural tube defects; however, recent research has found that there is no increased risk compared to those not taking dolutegravir. Raltegravir is known to increase creatinine kinase and can occasionally lead to myopathy and rhabdomyolysis. Raltegravir is also associated with severe hypersensitivity reactions, including Stevens-Johnson syndrome and toxic epidermal necrosis, and the potential for drug-drug interactions. Raltegravir is associated, though rarely, with depression and suicidal ideation in patients who have preexisting psychiatric conditions. Cobicistat is associated with drug-drug interactions, as it strongly inhibits CYP3A4. This medication should not be used for patients with severe hepatic dysfunction (Swinkels et al., 2024).

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Protease inhibitors can be associated with increased risk, including adverse cardiovascular events. Atazanavir and darunavir both have potential for drug interactions. When atazanavir is combined with another drug, like cobicistat or ritonavir, it can lead to hyperbilirubinemia, nephrolithiasis, cholelithiasis, nephrotoxicity, and adverse gastrointestinal symptoms. When Darunavir is combined with other drugs, it can cause skin rash, gastrointestinal adverse effects, and hepatotoxicity, especially for patients who already have liver disease (Swinkels et al., 2024).

Adverse effects due to maraviroc, a CCR5 inhibitor, are uncommon, but the medication can cause gastrointestinal upset and fever. The only adverse effects noted in studies of capsid inhibitors were injection site reactions and

gastrointestinal symptoms, though testing is not yet extensive. Mild adverse gastrointestinal effects have been noted in clinical trials of fostemsavir, an attachment inhibitor. However, studies have been small, and more research is needed to fully understand the risk for adverse effects (Swinkels et al., 2024).

Prophylaxis

Post-exposure prophylaxis (PEP) is a treatment method that is utilized when someone has been exposed to HIV. Medications commonly used to treat HIV are used when patients who do not have HIV or whose status is unknown think they may have been exposed to HIV through consensual sex, sexual assault, shared needles, or in the workplace. PEP should be initiated within 72 hours of exposure, and medication is taken daily for 28 days. PEP is intended as an emergency treatment and should not be relied upon for prevention in place of usual prevention methods, like condom use (Cleveland Clinic, 2022).

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There are therapies available to reduce the risk of transmission to sexual partners before contact occurs. Individuals who do not have HIV, but are at high risk of becoming infected, should take pre-exposure prophylaxis (PrEP) (Cleveland Clinic, 2022). Before initiating PrEP, an individual must be tested for HIV. While using PrEP, an HIV test should be taken every three months for individuals taking oral PrEP and before every injection for individuals taking injected PrEP medication. An infectious disease or liver specialist should evaluate individuals who have hepatitis B before beginning prophylactic treatment with PrEP (Mayo Clinic, 2024). People who do not have HIV, but have a sexual partner with HIV, have not consistently used a condom, or have been diagnosed with an STI in the last six months, should take PrEP. Individuals who do not have HIV, but are intravenous drug users who either inject drugs with a partner who has HIV or who share needles or other equipment related to intravenous drug use, should also take PrEP (Cleveland

Clinic, 2022). PrEP should be offered to all sexually active patients and anyone requesting it, even without specific risk criteria or use of screening tools (Gandhi et al., 2025).

PrEP can be taken by mouth or as an injection. Two oral medications are available: emtricitabine-tenofovir disoproxil fumarate (Truvada) and emtricitabine-tenofovir alafenamide fumarate (Descovy). However, Descovy has not been studied in individuals who have receptive vaginal sex. The injected PrEP medication is cabotegravir (Apretude). Apretude is utilized when a patient has a very high risk of becoming infected with HIV. This medication is administered by a healthcare professional and is given every two months after an initiation phase of two once-monthly shots. Apretude is given in place of oral PrEP and not in addition to other PrEP medications (Mayo Clinic, 2024). Another long-acting injectable PrEP medication is lenacapavir (WHO, 2024).

When taken correctly, PrEP can reduce the risk of acquiring HIV through sexual contact by approximately 99% and by at least 74% for those engaging in intravenous drug use (Mayo Clinic, 2024). Scientists have studied the transmission rate among couples whose viral load was stably suppressed using ART, with a viral load of less than 200 copies/mL. In a large systematic review that included 7,762 couples, there were no documented cases of HIV transmission when the partner with HIV was taking ART and had a viral load of less than 200 copies/mL. In fact, the risk was almost zero for individuals with a viral load of less than 1000 copies/mL. This data is not only important to help those with HIV understand the importance of ART, but also can help to destigmatize HIV and encourage funding for viral load testing for at-risk populations and in places that may have difficulty accessing this type of healthcare (Broyles et al., 2023). In monogamous sexual relationships where the individual with HIV is stable on ART with viral suppression below 200 copies/mL, it is reasonable to defer PrEP; however, if the patient requests PrEP, it should still be prescribed, due to the risk of undisclosed HIV

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exposures (Gandhi et al., 2025). Individuals taking PrEP should continue to implement prevention measures, such as condom use and avoiding sharing needles (Cleveland Clinic, 2022).

PrEP can be initiated rapidly. If there is a negative HIV test result within the past seven days, PrEP can be initiated before other diagnostic and safety assessments are completed. If there is no recent HIV test, testing should be conducted, and PrEP can be initiated once a negative result is received. It is recommended that individuals who require PEP be transitioned to PrEP if there has been a substantial HIV exposure (Gandhi et al., 2025).

Another prevention method is referred to as treatment as prevention (TasP). If someone is known to have HIV, they can prevent their partner from becoming infected by taking medications as prescribed and through regular testing. Once the viral load is undetectable, the virus cannot be transmitted, though precautions should continue to be used (Mayo Clinic, 2024).

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If someone becomes infected with HIV while taking PrEP with Tenofovir alafenamide-emtricitabine (Descovy) or tenofovir disoproxil fumarate-emtricitabine (Truvada), a blood sample for genotyping should be drawn prior to initiating ART. If ART is to be initiated prior to receiving the laboratory results, a three-drug regimen, specifically dolutegravir or bictegravir plus tenofovir combined with either emtricitabine or lamivudine, is recommended for initial treatment (Gandhi et al., 2025).

Individuals who acquire an HIV infection using cabotegravir for PrEP should have a blood sample drawn for INSTI genotyping prior to beginning ART. If the provider wants to initiate ART prior to receiving these results, or if INSTI resistance is present or suspected, ritonavir- or cobicistat-boosted darunavir and tenofovir combined with either emtricitabine or lamivudine should be used for initial treatment (Gandhi et al., 2025).

Prognosis

In patients with HIV, viral suppression is the primary determinant of prognosis. Patients who achieve viral suppression for at least three years and have immunologic recovery have the most optimal outcomes. Prompt treatment after diagnosis is associated with improved outcomes and immune system recovery. It is not recommended to delay treatment until the CD4+ falls to less than 200 cells/mm3 because it decreases the likelihood of immunologic recovery. This can increase an individual's risk for AIDS and non-AIDS-related morbidity and mortality. Prognosis is also affected by older age, lower CD4+ cell count, and extended length of time from initiating ART to achieving viral suppression (Swinkels et al., 2024).

Immunological recovery is the term that describes when a patient who has had a CD4+ cell count of less than 250 cells/mm3 while on ART recovers to a CD4+ count of 500 cells/mm3 or greater, though this is not common among those receiving ART. Immunological recovery can depend on adherence, baseline CD4+ cell count, age, and sex of the patient, the types of medications initiated at diagnosis, any delays in treatment, and the patient's functional status. Often, the cause is multifactorial. Immunological recovery typically takes months to years and varies among the different classes of ART, baseline functional status, and medication regimen adherence. Patients who do not respond to treatment are at increased risk for serious medical events and death (Swinkels et al., 2024).

Life expectancy for individuals who adhere to treatment and who are able to reach an undetectable viral load within the first year of treatment is very similar to that of individuals without HIV. If an individual has a low CD4+ cell count or a detectable viral load within a year of initiating ART, life expectancy may be 10-20 years less than what is typically expected for individuals without HIV. Left untreated, HIV may take approximately ten years to progress to AIDS (Cleveland

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Clinic, 2022). Without treatment, AIDS is usually fatal within three years (CDC, 2025a). This timeline is shorter when HIV goes untreated in children (WHO, 2025b).

New Treatment Developments

New antiretroviral drugs are being studied, including a once-weekly combination of islatravir-lenacapavir and exploratory studies of long-acting broadly neutralizing antibodies given every six months that help maintain viral load suppression in those discontinuing oral ART. A single daily pill of lenacapavir-bictegravir is being trialed for individuals with multidrug-resistant HIV without known integrase resistance (Gandhi et al., 2025).

Clinical trials also relate to PrEP, including a nucleoside reverse transcriptase translocation inhibitor (Gandhi et al., 2025). One study found that a twice-yearly lenacapavir injection was effective in preventing cisgender women from acquiring HIV. A twice-yearly injection could help eliminate adherence issues for high-risk populations, especially those who struggle with treatment adherence (Bekker et al., 2024). The dapivirine vaginal ring has been introduced as a PrEP method (WHO, 2024). Though it is not yet approved for use in the United States, this once-monthly vaginal ring could potentially be combined with hormonal contraception in the same device. A vaginal ring containing tenofovir is also being explored (Gandhi et al., 2025). An intramuscular version of long-acting cabotegravir administered once every four months is also currently being studied in clinical trials (Gandhi et al., 2025).

Case Study

Don is helping to coordinate Michael's first post-diagnosis appointment. What should Don do to promote an optimal outcome? Select all that apply.

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A. Ask for the soonest available appointment at the HIV clinic

B. Instruct Michael to return to the urgent care clinic for follow-up care

C. Emphasize the importance of attending the first HIV clinic appointment

D. Assess for any barriers that would prevent Michael from attending the appointment

At Michael's first HIV clinic appointment, he asks the nurse, Cam, what to expect. What should Cam tell Michael? Select all that apply

A. Baseline labs

B. A thorough history and physical exam

C. Identification of support systems

D. Information about resources for people with HIV

E. An appointment in six months to discuss starting ART

F. Prescriptions for ART

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What ART is most likely to be prescribed?

A. One INSTI and two NRTIs

B. PrEP medication

C. A protease inhibitor

D. Abacavir

What education should Cam provide regarding Michael's medications? Select all that apply.

A. ART must be taken for the rest of Michael's life

B. Adherence to ART is vital to have the best prognosis

C. If Michael has adverse effects from the medications, he can stop taking them

D. Michael's medication regimen will never have to be changed

E. Michael will need ongoing monitoring to ensure his medications are effective

What should Cam teach Michael about PrEP? Select all that apply.

A. When PrEP is taken correctly by a sexual partner, their risk for acquiring HIV is significantly reduced.

B. PrEP is only taken after exposure to HIV.

C. In addition to PrEP, when Michael adheres to his ART regimen, his risk of transmitting HIV is reduced.

D. People who take PrEP do not need to use condoms during sex.

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What factors affect Michael's long-term prognosis? Select all that apply.

A. Adherence to the ART regimen

B. Follow-up care retention

C. Reaching viral suppression

D. Number of sexual partners in the past

E. Baseline functional status

Section 7 Personal Reflection

What is the goal of HIV treatment? Why do you think it is important to identify potential barriers to accessing healthcare in a patient newly diagnosed with HIV? What is ART? What are some ways ART medications interrupt the lifecycle of HIV? What is treatment resistance? What medications may be used to treat someone experiencing treatment resistance? How can pregnant women reduce the risk of HIV transmission to their child? What are some reasons medication adherence can be challenging for children? Why is it important for a patient to understand the importance of reporting adverse medication effects to their provider rather than just stopping taking the medication? What is the role of PrEP in HIV prevention? How does ART medication adherence affect long-term prognosis?

Section 8: Monitoring

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After beginning ART, viral load is the most important indicator of how the patient's body is responding to treatment. Some medications and treatment regimens are less effective when the baseline viral load is high. Viral load should be regularly assessed. CD4+ cell counts should also be monitored regularly, as this result is the best indicator of current immune function, disease progression, and prognosis. This lab result can also guide the healthcare team regarding when to implement prophylactic treatment for opportunistic infections (Swinkels et al., 2024).

Once ART has been initiated, the patient's viral load should be monitored after 2-4 weeks and then every 4-8 weeks to ensure levels continue to decline (Swinkels et al., 2024). Viral load should also be tested approximately 2-8 weeks after changing any ART medication (CDC, 2024c). The virus is considered suppressed to the point of being undetectable when the HIV RNA level is less than 200 copies/mL. This can take up to six months of continuous therapy. If the HIV RNA level has not declined significantly within 12 weeks and the patient has adhered to the treatment

regimen, they should be evaluated for resistance with genotype testing for the patient's medication regimen. This testing should also be done if the patient is unable to achieve virologic suppression (Swinkels et al., 2024). Laboratory studies to determine viral load should occur every three months until viral suppression has been achieved. Viral load monitoring can then be conducted every six months. A CD4+ cell count should be completed every six months until there are more than 250 cells/mm3 for a year, then this testing does not need to be repeated unless there is virologic failure. Patients stable on ART should continue to have age-appropriate cancer screenings and laboratory tests to assess lipid profiles and to screen for co-infection (Gandhi et al., 2025). The patient should also continue to be monitored for obesity, diabetes mellitus, metabolic disorders, cancer, cardiovascular, renal, and hepatic disease. These complications are more frequent in patients who have been successful in HIV suppression (Saag, 2021).

At each clinic visit, the healthcare team should assess the patient's adherence to the ART regimen, and a discussion of any adverse side effects should be conducted. Any barriers or difficulties with the regimen should be addressed, and the provider may need to consider changing the regimen to improve adherence. The ongoing assessment should include laboratory tests, evaluation for sexually transmitted infections, assessment of ongoing substance use, including alcohol, screening of mental health status, and identifying any barriers that affect the patient's ability to maintain health. Laboratory results may suggest that the medication regimen should be changed if there are any new renal, hepatic, or hematologic abnormalities. If the patient has a new or recurring mental health disorder, they should be connected with counseling. Adherence to mental health counseling services is improved when the patient is able to see a mental health counselor in the same care facility as their HIV clinic appointment (Saag, 2021).

Patients receiving ART should be monitored for cardiometabolic problems. Due to the side effect of weight gain with some ART medications, the patient's weight

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and body mass index baseline should be established and documented every six months. Blood pressure should be monitored at each clinic visit to screen for hypertension (Gandhi et al., 2025). Patients receiving ART should be routinely screened for glucose intolerance, diabetes, and hyperlipidemia (Swinkels et al., 2024). It is not recommended that an ART regimen be changed due to weight gain, hypertension, or insulin resistance. Individuals who are at high risk for cardiovascular disease and who are taking an abacavir-containing ART should switch to a regimen that does not contain abacavir, if possible (Gandhi et al., 2025). Weight gain due to ART is more likely to occur in women and black individuals, and most often occurs during the first year following ART initiation or medication change. Studies are underway to determine the cause of ART-related weight gain and how weight can be managed for people on ART (Gandhi et al., 2025).

All patients on ART should be educated regarding lifestyle changes, such as diet and exercise, that can reduce their risk for cardiometabolic complications. Some individuals with HIV who are at risk for myocardial infarction, stroke, or death due to atherosclerotic cardiovascular disease should be prescribed a moderate-intensity statin (Gandhi et al., 2025). Evidence suggests that individuals who have a higher risk for major adverse cardiovascular events can benefit from taking a high-intensity statin to reduce risk (Gandhi et al., 2025).

Clinical care for HIV is typically provided in a specialty clinic. However, after a year of stable viral suppression, the care of these patients can be transitioned to the primary care provider. While HIV considerations will always need to be addressed, if HIV remains suppressed, the focus of HIV during primary care visits becomes secondary. Some healthcare systems will have the patient receive HIV care and primary care in separate clinics, while others will transition the patient's primary care to the HIV clinic until viral suppression has stabilized (Saag, 2021).

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Case Study

Michael comes back to the HIV clinic three weeks after his initial appointment. What information or testing is important to gather during this appointment? Select all that apply.

A. Recent income

B. Viral load testing

C. CD4+ cell count testing

D. Physical assessment, including blood pressure

E. How many people he knows with HIV

F. If there have been any challenges adhering to ART

Michael's CD4+ count has risen since his last appointment, and his viral load has decreased. Michael asks Cam what this means. What should Cam tell Michael?

A. They only mean Michael's HIV is not yet cured

B. Michael's HIV disease is worsening

C. The ART medications seem to be working

D. Michael cannot become infected with other viruses

What type of ongoing monitoring can Michael expect? Select all that apply.

A. Regular CD4+ cell count testing

B. Regular viral load testing

C. Regular CT scans

D. Monitoring for cardiometabolic problems

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E. Assessment for barriers to accessing care

Section 8 Personal Reflection

What is the most important indicator of how a patient's body is responding to ART? Why is regular laboratory monitoring necessary? How is it possible to eventually stop checking CD4+ cell counts as long as viral load remains undetectable? Why is it important to monitor patients on ART for cardiometabolic diseases? Why is it important to discuss treatment adherence at each clinic visit?

Section 9: Patient Support

Patient support is a significant focus of holistic HIV care. Patients newly diagnosed with HIV should be reassured by the healthcare team that, with proper treatment, they can expect a near-normal life span and no risk for transmission to partners once viral suppression has been achieved (Saag, 2021).

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Patients diagnosed with HIV require education to understand their disease. They must be informed of the necessity for regular lab work and follow-up appointments. The value of follow-up appointments should be emphasized, and an open rapport with the healthcare team should be encouraged. The patient should feel that they can openly discuss adverse symptoms, barriers to treatment, and other health concerns. Patient education does not only occur with diagnosis, but should be an ongoing process, as continued patient education can improve adherence to ART medications and thus, more optimal outcomes (Swinkels et al., 2024).

The healthcare team must educate the patient regarding their medications and clearly explain why medication adherence is important. These patients should understand that viral load begins to increase within just a few weeks of stopping

their HIV medications and that they are more likely to develop drug resistance, experience complications of HIV, or have an increased risk of transmitting the virus to another person when they are not consistent in taking their ART medications. When a patient cannot adhere to the medication regimen, the healthcare team should explore the cause of nonadherence. Interventions that improve adherence include patient support through counseling, support groups, and consistent communication with the healthcare team. Other interventions that can improve adherence are visits from home health nurses, blister pack packaging of medications, and automated medication reminders (Swinkels et al., 2024).

Patients should be educated regarding the signs and symptoms of medication toxicity and what actions they should take if these symptoms are present. They should be advised to seek immediate medical care if they experience symptoms of liver or kidney dysfunction. Patients should be aware of the potential for drug-drug interactions and involve their pharmacist when taking any new medications (Swinkels et al., 2024).

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Patients should also be educated regarding the prevention of transmission of HIV. Most patients with HIV are highly motivated to prevent transmission, especially when their partner is not infected with HIV. Statistics have found that viral suppression is a successful method in reducing new cases of HIV due to the decreased risk of transmission. Patients and their partners should understand that when HIV is undetectable in their system, it is also untransmittable. Patients should also be advised that there are options for treatment and prevention of transmission during pregnancy. Planning for pregnancy can be especially effective as these treatments can be implemented in a timely manner. Even when a patient has an undetectable viral load, they should continue to take precautions to protect others from HIV. They should consistently and correctly use condoms, choose sexual activities that have lower risk for transmission, encourage their partners to take preexposure prophylaxis, and not share materials used for

intravenous drug injection. In some areas, it is legally required that those with HIV disclose their HIV status to healthcare providers (Swinkels et al., 2024).

One goal of patient support is to reduce transmission within the community. Due to the number of new cases of HIV that are transmitted by individuals who are unaware they are infected with HIV, there needs to be implementation of effective strategies for the identification of people with HIV and strategies for care retention. Successful strategies include centralized care, the use of bilingual and bicultural care teams, clinic-based buprenorphine treatment for patients who also have an opioid use disorder, specialized services for individuals transitioning from incarceration to the medical clinic, behavioral interventions, and the use of navigator programs. More research is needed to identify best practices in this area. One of the most effective ways to maintain retention is to call patients when they have not shown up for a scheduled appointment. Interventions that include brochures, posters, and short verbal messages about the importance of continued follow-up care for HIV are associated with a higher incidence of return than when no interventions are implemented (Saag, 2021).

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Patients may require support related to disclosing their HIV status to sexual partners or those they have shared injection supplies with. This can be anxiety-provoking and uncomfortable. They may develop a fear of infecting others and begin to self-isolate. The healthcare team should refer patients to a psychologist, social worker, HIV nurse, public health agency, other healthcare team member, or support groups when they have trouble coping. Patients should be encouraged that there are benefits to sharing their HIV status with certain friends and family members (Swinkels et al., 2024).

Patients diagnosed with HIV face stigma, discrimination, and mental health concerns. A diagnosis of any chronic illness can cause stress for individuals, challenge their sense of well-being, or complicate existing mental health

conditions. Patients may experience a wide variety of emotions, including sadness, hopelessness, or anger. Patients can even experience self-stigma. Self-stigma is especially harmful to the patient, as they internalize the stigma and discrimination they experience from others. They form negative opinions of themselves, may believe only certain kinds of people have HIV, or that they deserve their diagnosis (Swinkels et al., 2024).

Unfortunately, individuals living with HIV can experience discrimination in the healthcare setting, too. This may happen when a provider or clinic refuses to treat a patient due to their HIV status, use of stigmatizing language, and the absence of appropriate services, resources, or tools. Healthcare workers can support patients by reducing stigma and discrimination. Using non-stigmatizing language within and outside the healthcare setting can help to combat outdated fears of the virus (Swinkels et al., 2024).

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Patients are best supported through a team-based and patient-centered care approach. When care is centered on the patient, factors that can affect health outcomes, like socioeconomic barriers, can be addressed, and stigma can be minimized. Patients who are at high risk for barriers to treatment access or who have a substance abuse disorder can be identified, as these are associated with nonadherence to treatment (Swinkels et al., 2024). Improving the care of individuals with HIV who have a substance use disorder and who experience HIV care disparities continues to be a challenge and is a high priority for research and advancement in the HIV healthcare community (Gandhi et al., 2025).

Nurses and nutritionists can help to support patients by monitoring weight, ensuring medication regimen adherence, providing education, promoting adequate nutrition and hydration, and helping to minimize cardiovascular risk by educating the patient on beneficial lifestyle changes. Pharmacists are essential in providing support by helping the patient understand the effects of their

medications, how to minimize drug interactions, and advising the patient on when to seek help if they are experiencing treatment complications. The pharmacist can also help the patient with strategies to minimize the risk of incorrect dosing and improve adherence. Community health workers, peer support, and social workers can also support patients. These individuals can help connect the patient to care. They can also help identify resources for transportation, childcare support, assistance with mental health services, or resources that can help with the financial burden of paying for ART. Stigma-free health services and home-based healthcare can also help support the patient and improve their access to care (Swinkels et al., 2024).

Patients who have been diagnosed with HIV must understand that the diagnosis does not have to define who they are. Many people are familiar with the panic associated with the AIDS epidemic in the 1980s. However, science has advanced considerably since that time. People who have HIV are still able to have meaningful careers, active social lives, families, and pursue fulfilling relationships. Patients should be reminded that there are organizations that are ready to assist them with support resources and that support, compassion, and high-quality healthcare should continue to be expected throughout their treatment (Cleveland Clinic, 2022).

With the drastic improvement in life expectancy for those with HIV in the last few decades, the population of people living with HIV is growing. In the United States, more than half of patients who are treated for HIV are older than 50 years of age. It is estimated that 18% of those patients are older than 60. Older adults with HIV are at higher risk for poor health outcomes than adults of the same age without HIV. Cardiovascular, renal, neurocognitive, and mental health disorders also tend to occur at younger ages for those with HIV than for those who do not have HIV. Older patients are more likely to experience poorer outcomes due to

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polypharmacy, frailty, social isolation, and stigma. More research is needed to guide the care and support of aging adults with HIV (Saag, 2021).

Case Study

Michael shares with Cam that he is having a really tough time coping with the HIV diagnosis. He has not shared the information with anyone and is depressed that he will not be able to have physical intimacy with a partner anymore. He states he does not know anybody with HIV, and only really promiscuous people get HIV. What information should Michael share with Cam to provide support? Select all that apply.

A. It is best to keep his HIV diagnosis a secret.

B. Sharing his diagnosis with a few trusted friends or family can help provide support and reduce the stigma associated with HIV.

C. It is still possible to share physical intimacy with others using protection and adhering to medication regimens.

D. It is illegal for Cam to have sex

E. Michael's feelings are common and valid

F. There are support groups and resources available for individuals living with HIV.

G. Mental health care is an important aspect of HIV care

H. Michael has nothing to be worried about. He is going to be totally fine.

How can Cam continue to support Michael when he is seen in the HIV clinic? Select all that apply.

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A. Using non-stigmatizing language

B. Providing education

C. Discourage counseling with a licensed therapist

D. Reminding Michael of the available community resources

E. Minimize Michael's concerns and tell him not to worry

Section 9 Personal Reflection

What patient education is a necessary part of HIV care? Why is it important for healthcare workers to identify any barriers the patient may experience in adhering to their ART regimen? What do you think contributes to discrimination and stigma related to HIV and AIDS? How do different members of the healthcare team support patients with HIV? Why is patient-centered care necessary?

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Section 10: HIV Prevention in Healthcare Settings

Since the implementation of rigorous infection prevention guidelines in healthcare settings, there have been significant decreases in occupationally and iatrogenically transmitted HIV. Many regions have benefitted from policy changes, such as eliminating reusable needles, syringes, and other medical equipment that can transmit HIV. Standard precautions, also known as universal precautions, are vital to prevent the transmission of HIV in the healthcare setting. It must be assumed that any bodily fluid can potentially spread HIV or other infections, and the level of infection prevention strategy is based on the level of anticipated contact with all patients (Swinkels et al., 2024).

Hand hygiene is the most important intervention to prevent the transmission of bloodborne pathogens, including HIV. Healthcare workers should wash their hands

with soap and water for at least 40-60 seconds when visibly soiled, after using the restroom, or when exposed to spore-forming organisms. Alcohol-based hand sanitizers can also be used when hand washing is not explicitly indicated. Hand hygiene should be completed between patients, immediately after removing gloves, and before and after direct patient contact or any contact with invasive devices, body fluids, secretions, mucous membranes, or nonintact skin. When fluid splashing is anticipated, the nurse should wear gloves, mask, goggles, eye visors, face shield, or gown when appropriate. Care should be taken with needles, and sharps should be disposed of immediately after use in an appropriate puncture-resistant sharps container (Swinkels et al., 2024).

If a nurse or other healthcare worker experiences an accidental exposure in the workplace, post-exposure prophylaxis should be implemented to reduce the risk of acquiring HIV. When the exposure is known to have been contaminated with HIV, the exposed individual should receive at least three antiretroviral medications for 28 days. This regimen should be initiated within 72 hours of exposure. Those exposed to HIV in the workplace should receive counseling, HIV testing at baseline, subsequent follow-up testing, and monitoring for toxicity (Swinkels et al., 2024). All cases of occupational HIV exposure must be reported to the state health department and CDC staff for surveillance (CDC, 2024a).

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Case Study

After four years of adhering to the ART regimen and attending follow-up appointments, Michael had an undetectable viral load at his appointment three months ago, and his last CD4+ cell count was within normal range. While drawing blood for regular lab work, the phlebotomist experiences an accidental needle stick with the needle she used to draw Michael's blood.

What is the first step the phlebotomist should take?

A. Leave work for the day

B. Immediately go to the occupational health clinic

C. Blame Michael for the exposure

D. Wait and see if she develops flu-like symptoms

At the occupational health clinic, the phlebotomist does not understand why she should be started on post-exposure prophylaxis if Michael's viral load is undetectable. What education should the occupational health nurse share with the phlebotomist? Select all that apply.

A. There may have been changes in Michael's viral load since his last labwork was done.

B. Post-exposure prophylaxis is an important element of preventing HIV infection after exposure.

C. Insurance will not cover PEP medications, and the pharmacy wants to make money.

D. ART medications will only need to be taken for a week

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Section 10 Personal Reflection

Why are interventions to reduce the risk of HIV in the healthcare setting important? How has the development of disposable medical equipment, such as plastic syringes, contributed to a decline in HIV transmission? How do standard precautions prevent HIV? When would a healthcare worker need to wear a gown, gloves, and a face shield when caring for someone with HIV? Why do you think follow-up care after HIV exposure is essential?

Section 11: Conclusion

Although there has been a 39% reduction in new HIV diagnoses globally, new infections continue to rise in Eastern Europe, Central Asia, Latin America, the Middle East, and North Africa. HIV health disparities persist. In the United States, HIV disproportionately affects Hispanic and Black individuals, people who live in the Southern United States, cisgender gay and bisexual men, transgender individuals, and those who use drugs. Individuals born outside the United States have a higher prevalence of HIV than those born in the United States, and are more likely to present to the healthcare setting with more advanced disease. Lack of adequate decline in HIV transmission is affected by inadequate rollout of PrEP and disparities in PrEP utilization. Challenges with accessibility to long-acting cabotegravir for PrEP, including its cost and complexity of implementation, are likely to contribute to increased disparities related to HIV in the coming years. It is estimated that 2.4 million individuals in middle-income countries will benefit from long-acting cabotegravir, but will not have access to it. Initiatives that support universal access to injectable PrEP are crucial for health equity and a significant reduction in HIV transmission rates (Gandhi et al., 2025).

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Healthcare workers can help reduce transmission of HIV and improve outcomes for those living with HIV. Nurses who can articulate what HIV is and how it is spread, describe signs and symptoms, identify risk factors, apply knowledge of ART and monitoring methods to their clinical practice, support rationale for patient support interventions, and prioritize interventions that reduce the risk of HIV transmission in the healthcare setting are well-equipped to improve outcomes and positively impact the global struggle against HIV.

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