HIV: Make the Diagnosis and Take the Next Step

Julie G. Stewart  
*Sacred Heart University*, stewartj1270@sacredheart.edu

Amy R. Weinberg

Follow this and additional works at: [http://digitalcommons.sacredheart.edu/nurs_fac](http://digitalcommons.sacredheart.edu/nurs_fac)  
Part of the [Diagnosis Commons](http://digitalcommons.sacredheart.edu/nurs_fac), [Immune System Diseases Commons](http://digitalcommons.sacredheart.edu/nurs_fac), and the [Nursing Commons](http://digitalcommons.sacredheart.edu/nurs_fac)

**Recommended Citation**  

This Article is brought to you for free and open access by the College of Nursing at DigitalCommons@SHU. It has been accepted for inclusion in Nursing Faculty Publications by an authorized administrator of DigitalCommons@SHU. For more information, please contact ferribyp@sacredheart.edu, lysobeyb@sacredheart.edu.
The CDC estimates that with more than 40,000 new infections annually, more than 1.2 million people in the United States are living with HIV—and 24% to 27% may not be aware of their infection status.1 Studies have shown that HIV is often diagnosed late in the disease process, when the individual has already developed AIDS, which typically occurs 8 to 11 years after HIV infection.2 Research also points to missed opportunities to offer HIV testing and diagnose the infection before AIDS develops, which would enable the newly diagnosed individuals to employ precautions to protect their partners from becoming infected.3,4 Almost half of HIV transmissions studied by Brenner et al were attributed to transmission by newly infected persons.5

In response to these issues, the CDC put forth revised recommendations for HIV testing that encourage screening for patients in all healthcare settings after the person is notified that testing will be performed, unless he or she declines (opt-out screening).4 Primary-care providers need a better understanding of trends in HIV infection and what to do when an HIV test is positive. In a recent survey of 1,165 primary-care providers, 54% of the respondents reported treating HIV-positive individuals, with 43% indicating an “increased” or a “dramatically increased” caseload over the past year.6

**HIV viral dynamics**

HIV is classified as a retrovirus that is completely dependent on CD4 T cells for copying...
and surviving. The virus enters the CD4 T cell by binding onto receptors and fusing with the lipid outer layer. The virus then converts its ribonucleic acid (RNA) to deoxyribonucleic acid (DNA) through the enzyme reverse transcriptase. The enzyme integrase helps the virus to become part of the human DNA in the cell’s nucleus. During transcription and translation, enzymes assist the HIV genes by converting them into messenger RNA, which then leaves the nucleus with the HIV codes within. The enzyme protease makes smaller pieces of the long strands of protein; these pieces become mature viral cores. The new virions bud from the CD4 T cell and go on to infect other cells and repeat the process. HIV can replicate itself billions of times each day.

**Signs and symptoms of HIV infection**

Acute retroviral syndrome (ARS) occurs early in the new infection. Approximately 50%–70% of HIV-positive persons will experience an influenza-like illness that may consist of one symptom or a constellation of symptoms including fever, rash, pharyngitis, lymphadenopathy, and myalgias. Because these symptoms are nonspecific and frequently resolve on their own, without a high index of suspicion clinicians may not consider HIV infection in the differential diagnosis. An exposed individual usually becomes symptomatic two to four weeks after transmission and will have a markedly high HIV viral load (amount of virus in the serum).

The asymptomatic period of HIV infection can last from a few months to up to 15 years. This varies from person to person and is usually associated with the level of HIV viral load—typically, those with higher viral loads deteriorate faster than those with lower loads. During this time, the CD4 T cells usually decline at an average rate of approximately 50 cells/µL/year. The CDC defines AIDS as persons with both documented HIV infection and CD4 T cells <200/mm³ whether other AIDS-defining conditions are present or not, or the presence of an AIDS-defining condition (Table 1).

Many patients will be asymptomatic during the clinical latency period, but various nonspecific findings on physical examination and in lab tests are associated with HIV. Generalized nontender lymphadenopathy involving the cervical, occipital, and/or axillary nodal chains is very common and can persist beyond primary infection. The presence of unexplained fevers, weight loss, night sweats, dementia, and neuropathy help rule in HIV infection. Skin lesions may be suggestive of HIV infection. Seborrheic dermatitis, psoriasis, molluscum contagiosum, and extensive

---

**TABLE 1. CDC list of AIDS-defining conditions**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacterial infections, multiple or recurrent*</td>
<td></td>
</tr>
<tr>
<td>Candidiasis of bronchi, trachea, or lungs</td>
<td></td>
</tr>
<tr>
<td>Candidiasis of esophagus</td>
<td></td>
</tr>
<tr>
<td>Cervical cancer, invasive†</td>
<td></td>
</tr>
<tr>
<td>Coccidiodomycosis, disseminated or extrapulmonary</td>
<td></td>
</tr>
<tr>
<td>Cryptococcosis, extrapulmonary</td>
<td></td>
</tr>
<tr>
<td>Cryptosporidiosis, chronic intestinal (more than one month’s duration)</td>
<td></td>
</tr>
<tr>
<td>Cytomegalovirus disease (other than liver, spleen, or nodes), onset at age &gt;1 month</td>
<td></td>
</tr>
<tr>
<td>Cytomegalovirus retinitis (with loss of vision)‡</td>
<td></td>
</tr>
<tr>
<td>Encephalopathy, HIV-related</td>
<td></td>
</tr>
<tr>
<td>Herpes simplex: chronic ulcers more than one month’s duration) or bronchitis, pneumonitis, or esophagitis (onset at age &gt;1 month)</td>
<td></td>
</tr>
<tr>
<td>Histoplasmosis, disseminated or extrapulmonary</td>
<td></td>
</tr>
<tr>
<td>Isosporiasis, chronic intestinal (more than one month’s duration)</td>
<td></td>
</tr>
<tr>
<td>Kaposi sarcoma</td>
<td></td>
</tr>
<tr>
<td>Lymphoid interstitial pneumonia or pulmonary lymphoid hyperplasia complex‡</td>
<td></td>
</tr>
<tr>
<td>Lymphoma, Burkitt (or equivalent term)</td>
<td></td>
</tr>
<tr>
<td>Lymphoma, immunoblastic (or equivalent term)</td>
<td></td>
</tr>
<tr>
<td>Lymphoma, primary, of brain</td>
<td></td>
</tr>
<tr>
<td>Mycobacterium avium complex or Mycobacterium kansasii, disseminated or extrapulmonary†</td>
<td></td>
</tr>
<tr>
<td>Mycobacterium tuberculosis of any site, pulmonary, disseminated; or extrapulmonary†</td>
<td></td>
</tr>
<tr>
<td>Mycobacterium, other species or unidentified species, disseminated† or extrapulmonary†</td>
<td></td>
</tr>
<tr>
<td>Pneumocystis jiroveci pneumonia‡</td>
<td></td>
</tr>
<tr>
<td>Pneumonia, recurrent§</td>
<td></td>
</tr>
<tr>
<td>Progressive multifocal leukoencephalopathy</td>
<td></td>
</tr>
<tr>
<td>Salmonella sepsisemia, recurrent</td>
<td></td>
</tr>
<tr>
<td>Toxoplasmosis of brain, onset at age &gt;1 month‡</td>
<td></td>
</tr>
<tr>
<td>Wasting syndrome attributed to HIV</td>
<td></td>
</tr>
<tr>
<td>* Only among adults and adolescents aged ≥13 years</td>
<td></td>
</tr>
<tr>
<td>† Condition that might be diagnosed presumptively</td>
<td></td>
</tr>
<tr>
<td>‡ Only among adults and adolescents aged ≥13 years</td>
<td></td>
</tr>
<tr>
<td>†§ Condition that might be diagnosed in adults and adolescents aged ≥13 years or extrapulmonary</td>
<td></td>
</tr>
</tbody>
</table>
People with HIV are living longer and developing chronic diseases common to aging such as diabetes, cardiovascular disease, and osteoporosis.

condyloma are all diagnoses associated with HIV infection. Oral candidiasis (thrush) and oral hairy leukoplakia may be seen when CD4 T cells fall to less than 500/mm³. Recurrent or severe herpetic lesions and chronic vaginal candidiasis should prompt consideration of HIV testing. Unexplained anemia, neutropenia, leukopenia, and an elevated protein level are all commonly seen laboratory abnormalities caused by HIV infection.

**Diagnosis of HIV infection**
During ARS, the viral load is very high—often >100,000 copies/mL. The standard test to detect ARS is the reverse transcriptase-polymerase chain reaction (RT-PCR). False-positive HIV viral loads do occur. If ARS is suspected, viral loads of <10,000 copies/mL should be repeated as this result may be a false positive or can indicate that the patient has had chronic HIV. Practitioners should note that the standard test for diagnosing HIV is the enzyme-linked immunosorbent assay (ELISA), which is confirmed with a Western blot. During ARS, the ELISA will likely be negative; the Western blot may be negative or indeterminate. These findings are consistent with the time needed for seroconversion—the development of antibodies to HIV. Seroconversion can take three to six months after infection.

**After the diagnosis**
Morbidity and mortality from HIV/AIDS has decreased significantly and people with HIV are living longer and developing chronic diseases common to aging such as diabetes, cardiovascular disease, and osteoporosis. This shift is attributable to the introduction of highly active antiretroviral therapy (HAART). Antiretroviral agents can be classified into six basic categories:

- nuceloside reverse transcriptase inhibitors
- non-nucleoside reverse transcriptase inhibitors
- protease inhibitors
- entry inhibitors
- fusion inhibitors
- integrase inhibitors.

Some of these drugs are manufactured in combination forms. Current recommendations suggest that if a patient is ready to start therapy, a three-drug regimen is preferable. (See aidsinfo.nih.gov/contentfiles/AdultandAdolescentGL.pdf [accessed June 10, 2010] for current guidelines on the use of antiretroviral agents in persons with HIV infection.)

Despite its benefits, HAART may be a lifelong regimen, and has short- and long-term implications that need to be considered when initiating therapy. Viruses can become resistant to certain antiretrovirals, and resistant virus can be transmitted to others in the same ways wild-type virus is transmitted (via blood or breast milk, sexually, or perinatally). Genotype resistance testing can be done to try to identify mutations that confer drug resistance.

Additionally, many of the HIV medications interact with commonly prescribed drugs. One study has estimated that HIV-positive individuals have an average life span 21 years shorter than their HIV-negative counterparts. This is why after being diagnosed as HIV-positive, the patient should undergo a full history and physical examination to detect additional health issues that may be exacerbated by HIV and therapy. Initial labs must include an HIV viral load and CD4 T cell count, which will inform prognosis and determine the degree of urgency for initiating prophylaxis for opportunistic infections and HAART. Opportunistic infection can manifest at any CD4 T cell level; however, risk increases once CD4 T cell count drops below 200 cells/mm³. Accepted thresholds of 200, 100, and 50 cells/mm³ have been established, signifying risk of *Pneumocystis jiroveci*, *Mycobacterium avium*, and *Toxoplasma gondii* complex.
HIV DIAGNOSIS

AT A GLANCE
● In one survey, 54% of primary-care providers reported treating HIV-positive individuals.
● The asymptomatic period of HIV infection can last from a few months to up to 15 years.
● Decreased morbidity and mortality from HIV/AIDS is attributable to highly active antiretroviral therapy.
● After diagnosis, HIV-positive patients should undergo a full history and physical examination.

infections, respectively; primary prophylaxis is recommend

at these points.8 Standard recommended initial laboratory
workup is summarized in Table 2. Recommendations for
prophylaxis of opportunistic infections can be found on the
CDC Web site (www.cdc.gov/mmwr/preview/mmwrhtml/rr5804a1.htm; accessed June 10, 2010).

Referral to an HIV specialist is preferred, although initial
laboratory workup can be done prior to the consultation to
foster a more thorough discussion of the patient’s options.
Research has shown that quality of care for HIV patients is
improved when the provider is an HIV specialist;9 often the
specialists are nurse practitioners or physician assistants.

In most cases, CD4 T cell levels and HIV viral load are
checked every three months, with monitoring for CBC,
metabolic panels, and lipid profiles every three to six months.
Yearly tuberculosis testing (PPD), RPR testing, ophthalmo-
logic and dental exams, gynecology exams (possibly necessary
every six months if CD4 T cell count is low and/or dysplasia
is present) should be done. Routine health maintenance
screenings as per the general population include mam-
mography, prostate-specific antigen screening, colonoscopy,
electrocardiograms, and stress testing.

Conclusion
Compassionate, knowledgeable health-care providers can
improve the likelihood that persons newly diagnosed with
HIV infection will obtain the appropriate information to
make good choices, prevent spread of the disease, and improve
their own morbidity and mortality risks.

In summary, primary-care practitioners should:
• Verify presence of HIV infection with Western blot.
• Obtain baseline labs and perform a comprehensive physi-
cal assessment.
• Consult with an HIV specialist for plan of care.
• Reassure patient that with 100 % adherence to therapy,
  life expectancy is much longer than it was when HIV

infection first came to the forefront when medication
options were limited.

Dr. Stewart is assistant professor, Sacred Heart University Nursing
Program, in Fairfield, Conn. Dr. Weinberg is a family nurse practitio-
nern specializing in HIV at Stamford Hospital in Stamford, Conn.

References
1. Glynn M, Rhodes P. Estimated HIV prevalence in the United States
at the end of 2003. Abstract T1-B1101, presented at the National HIV
2. Centers for Disease Control and Prevention. Advancing HIV preven-
MMWR. 2003;52:329-332. Available at www.cdc.gov/mmwr/preview
/mmwrhtml/rr5215a1.htm.
4. Branson BM, Handsfield HH, Lampe MA, et al. Revised recommenda-
tions for HIV testing of adults, adolescents, and pregnant women in health-
/mmwr/preview/mmwrhtml/rr5514a1.htm.
5. Brenner BG, Roger M, Routy J-P, et al. High rates of forward transmis-
6. HealthHIV. HealthHIV state of primary care survey. HealthHIV.org. May
12, 2010. Available at www.healthhiv.org/modules/info/healthhiv_news_
releases.html.
based on national HIV surveillance data from 25 states, United States. J
treatment of opportunistic infections in HIV-infected adults and adoles-
cents: recommendations from CDC, the National Institutes of Health,
and the HIV Medicine Association of the Infectious Diseases Society of
/mmwr/preview/mmwrhtml/rr5804a1.htm.
vided by nurse practitioners, physician assistants, and physicians. Ann Intern


What do you think?
Add your comments to this article —
or any article — by going to
www.clinicaladvisor.com. You will also
see what your colleagues are saying.