

# Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS)



## Section 1:

## ABOUT THE DISEASE

### A. Etiologic Agent

The human immunodeficiency virus (HIV) is a retrovirus. Retroviruses, like all viruses, replicate only inside cells, commandeering the cell's machinery to reproduce.

### B. Clinical Description

Many people do not have any symptoms when they first become infected with HIV. Some people however have a flu-like illness within a month or two after exposure to the virus. This illness may include fever, headache, fatigue, enlarged lymph nodes, or a rash. These symptoms usually disappear within a week to a month and are often mistaken for those of another viral infection. During this period, people are very infectious, and HIV is present in large quantities in the blood and in genital fluids.

**More persistent or severe symptoms may not appear for ten years or more after HIV first enters the body in adults, or within two years in children born with HIV infection. This period of "asymptomatic" infection is highly individual. Some people may begin to have symptoms within months, while others may be symptom-free for more than ten years.**

Even during the asymptomatic period, the virus is actively multiplying, infecting, and killing cells of the immune system. The most obvious effect of HIV infection is a decline in the number of CD4+ T cells (also called T4 or T-helper cells). These cells are key infection fighters, and a decline in their number weakens the immune system.

As the immune system weakens, a variety of complications start to appear. Symptoms that may be experienced months to years before the onset of Acquired Immunodeficiency Syndrome (AIDS) include:

- ◆ Lack of energy,
- ◆ Weight loss,
- ◆ Frequent fevers and sweats,
- ◆ Persistent or frequent yeast infections (oral or vaginal),
- ◆ Persistent skin rashes or flaky skin,
- ◆ Pelvic inflammatory disease that does not respond to treatment (in women), and
- ◆ Short-term memory loss.

Some people develop frequent and severe herpes infections that cause oral, genital, or anal sores. Some people develop shingles. In addition, children may grow more slowly or be sick more frequently than usual.

The term AIDS applies to the most advanced stages of HIV infection. The Centers for Disease Control and Prevention (CDC) has developed official criteria for the definition of AIDS and is responsible for tracking AIDS in the U.S. The definition has been expanded to include all human immunodeficiency virus (HIV)-infected adolescents and adults aged  $\geq 13$  years who have either: a)  $< 200$  CD4+ T-lymphocytes/uL; b) a CD4+ T-lymphocyte percentage of total lymphocytes  $< 14\%$ ; or c) any of the following three clinical conditions: pulmonary tuberculosis, recurrent pneumonia, or invasive cervical cancer. The expanded definition also retains 23 additional clinical conditions that affect people with advanced HIV disease. In people with AIDS, these infections are often severe and sometimes fatal because the immune system is so ravaged by HIV infection that the body cannot fight off certain bacteria, viruses, fungi, parasites, and other microbes.

Symptoms of opportunistic infections common in people with AIDS include:

- ◆ Coughing and shortness of breath,
- ◆ Seizures and lack of coordination,
- ◆ Difficult or painful swallowing,
- ◆ Mental symptoms such as confusion and forgetfulness,
- ◆ Severe diarrhea,
- ◆ Fever,
- ◆ Vision loss,
- ◆ Nausea, abdominal cramps, and vomiting,
- ◆ Weight loss and extreme fatigue, and
- ◆ Severe headaches.

Children with AIDS may get the same opportunistic infections as adults with advanced HIV disease. In addition, they can have more severity with infections common to all children, such as conjunctivitis (pink eye), ear infections, and tonsillitis.

People with AIDS are particularly prone to developing various cancers, especially those associated with viral infections, such as Kaposi's sarcoma and cervical cancer or cancers of the immune system known as lymphomas. Signs of Kaposi's sarcoma are brown, reddish, or purple spots that develop on the skin or in the mouth.

During the course of HIV infection, most people experience a gradual decline in the number of CD4+ T cells; although some may have abrupt and dramatic drops in their CD4+ T cell count. A person with CD4+ T cells above 200 may experience some of the early symptoms of HIV disease. Others may have no symptoms even though their CD4+ T cell count is below 200.

Many people are so debilitated by the symptoms of advanced HIV infection that it is difficult for them to maintain steady employment or do household chores. Other people with advanced HIV disease may experience phases of intense life-threatening illness followed by phases in which they are able to function normally.

### C. Vectors and Reservoirs

Humans are the only natural host.

### D. Modes of Transmission

HIV is spread through sexual contact with an infected person, by sharing needles and/or syringes (primarily for drug injection) with a person who is infected with HIV, or less commonly (and now very rarely in countries where blood is screened for evidence of HIV infection), through transfusions of infected blood or blood clotting factors. Infants born to HIV-infected women may become infected before or during birth, or through breastfeeding after birth.

In the health care setting, workers have been infected with HIV after being injured with needles containing HIV-infected blood, or less frequently, after infected blood gets into an open cut or on a mucous membrane (for example, the eyes or inside of the nose). There has been only one documented instance of a patient being infected by a health care worker in the U.S. This involved HIV transmission from one infected dentist to six patients. Investigations have been completed involving more than 22,000 patients of 63 HIV-infected physicians, surgeons, and dentists, and no other cases of this type of transmission have been identified in the U.S.

Some people fear that HIV might be transmitted in other ways; however, there is no scientific evidence to support any of these fears. If HIV were transmitted through other routes (such as through air, water, or insects), the pattern of reported HIV/AIDS cases would be very different from what has been observed. For example, if mosquitoes could transmit HIV infection, many more young children and pre-adolescents would have been diagnosed with HIV/AIDS.

**All reported cases suggesting new or potentially unknown routes of transmission are thoroughly investigated by state and local health departments with assistance, guidance, and laboratory support from the CDC.**

### E. Incubation Period

Among patients enrolled in large epidemiologic studies, the median time from infection with HIV to the development of AIDS-related symptoms has been approximately 10–12 years in the absence of anti-retroviral therapy. However, researchers have observed a wide variation in disease progression. Approximately 10% of HIV-infected people in these studies have progressed to AIDS within the first 2–3 years following infection, while up to 5% of individuals in studies have stable CD4+ T cell counts and no symptoms even after 12 or more years.

### F. Period of Communicability or Infectious Period

Infectiousness with HIV may be variable; anyone with a positive test for HIV antibody and/or detectable HIV in the blood should be considered infectious. The degree of correlation between quantity of circulating virus and infectiousness is not clearly established, although lower viral counts appear to reduce the risk of transmission. HIV is a chronic infection and persons with HIV remain infectious indefinitely.

## G. Epidemiology

### *HIV/AIDS Worldwide*

1. At the end of 2003, an estimated 37.8 million people worldwide (35.7 million adults and 2.1 million children younger than 15 years old) were living with HIV/AIDS. Approximately two-thirds of these people (25.0 million) live in Sub-Saharan Africa; another 20 percent (7.4 million) live in Asia and the Pacific Islands.
2. Worldwide, approximately 11 of every 1000 adults aged 15–49 are HIV-infected. In Sub-Saharan Africa, about 7.5% of all adults in this age group are HIV-infected. Women account for nearly half of all people worldwide living with HIV/AIDS.
3. An estimated 4.8 million new HIV infections occurred worldwide during 2003; that is, about 14,000 infections each day. More than 95% of these new infections occurred in developing countries.
4. In 2003, approximately 1,700 children under the age of 15 years and 6,000 young people aged 15–24 years became infected with HIV each day.
5. More than 20 million people with HIV/AIDS have died since the first AIDS cases were identified in 1981.
6. In 2003 alone, HIV/AIDS-associated illnesses caused the deaths of approximately 2.9 million people worldwide, including an estimated 490,000 children younger than 15 years.

### *HIV/AIDS in the U.S.*

1. The CDC estimates that 850,000–950,000 U.S. residents are living with HIV infection, one-quarter of whom are unaware of their infection.
2. Approximately 40,000 new HIV infections occur each year in the U.S., about 70% among men and 30% among women. Of these newly infected people, half are younger than 25 years of age.
3. Among new infections in men in the U.S., the CDC estimates that approximately 60% of men were infected through sexual contact with other men, 25% through injection drug use, and 15% through heterosexual sex. Of newly infected men, approximately 50% are black, 30% are white, 20% are Hispanic, and a small percentage are members of other racial/ethnic groups.
4. Among new infections in women in the U.S., the CDC estimates that approximately 75% of women were infected through heterosexual sex and 25% through injection drug use. Of newly infected women, approximately 64% are black, 18% are white, 18% are Hispanic, and a small percentage are members of other racial/ethnic groups.
5. The estimated number of AIDS diagnoses through 2002 in the U.S. is 886,575. Adult and adolescent AIDS cases total 877,275—with 718,002 cases in males and 159,271 cases in females. Through the same time period, 9,300 AIDS cases were estimated in children under age 13 years.
6. The estimated number of new adult/adolescent AIDS diagnoses in the U.S. was 43,225 in 1998; 41,134 in 1999; 42,239 in 2000; 41,227 in 2001; and 42,136 in 2002.
7. The estimated number of new pediatric AIDS cases (cases among individuals younger than age thirteen years) in the U.S. fell from 952 in 1992 to 92 in 2002.
8. The estimated rate of adult/adolescent AIDS diagnoses in the U.S. in 2002 (per 100,000 population) was 76.4 among blacks, 26.0 among Hispanics, 11.2 among American Indians/Alaska Natives, 7.0 among whites, and 4.9 among Asians/Pacific Islanders.
9. From 1985–2002, the proportion of adult/adolescent AIDS cases in the U.S. reported in women increased from 7% to 26%.
10. As of the end of 2002, an estimated 384,906 people in the U.S. were living with AIDS.

11. As of December 31, 2002, an estimated 501,669 people with AIDS in the U.S. had died.
12. The estimated annual number of AIDS-related deaths in the U.S. fell approximately 14% from 1998–2002, from 19,005 deaths in 1998 to 16,371 deaths in 2002.
13. Of the estimated 16,371 AIDS-related deaths in the U.S. in 2002, approximately 52% were among blacks, 28% among whites, 19% among Hispanics, and <1% among Asians/Pacific Islanders and American Indians/Alaska Natives.

## H. Bioterrorist Potential

This pathogen is not considered to be of risk for use in bioterrorism.



### Section 2:

## REPORTING CRITERIA AND LABORATORY TESTING

### A. What to Report to the Massachusetts Department of Public Health (MDPH)

#### *Infection with Human Immunodeficiency Virus (HIV)*

HIV infection, as determined by a laboratory test diagnostic of HIV infection, shall be reported directly to the MDPH by **health care providers** (as defined in *M.G.L. c. 111, I*) or other officials designated by the MDPH, in a form and manner designated by the MDPH. HIV is reported using a non-name reporting system as defined in *105 CMR 300.020*.

#### *Acquired Immunodeficiency Syndrome (AIDS)*

AIDS, as defined by a CD4+ T cell count of <200 cells/uL or <14% total lymphocytes, or by the diagnosis of any of 26 AIDS indicator opportunistic illnesses (OIs) as defined by the CDC, shall be reported by name directly to the MDPH by physicians, other health care providers, laboratories, and other officials designated by the MDPH via telephone, in writing, or through other electronic means deemed acceptable by the MDPH.

### B. Laboratory Testing Services Available

The MDPH State Laboratory Institute (SLI) does not provide routine HIV antibody testing except for state-funded HIV counseling and testing programs. Testing is generally conducted through hospital and commercial laboratories.



### Section 3:

## REPORTING RESPONSIBILITIES AND CASE INVESTIGATION

### A. Purpose of Surveillance and Reporting

- ◆ To determine the prevalence and incidence of HIV infection and AIDS in specific populations and geographic locations to inform HIV/AIDS prevention and service activities.

## B. Laboratory and Health Care Provider Reporting Requirements

HIV infection and AIDS are reportable to the MDPH. The MDPH requests that health care providers immediately report all confirmed or suspect cases of HIV infection or AIDS, as defined by the reporting criteria in Section 2A.

Laboratories performing examinations on any specimens derived from Massachusetts residents that yield evidence of HIV infection or AIDS shall report such evidence of infection directly to the MDPH within 24 hours. Any laboratory that performs testing on Massachusetts residents that yields evidence of HIV infection or AIDS shall report this to the MDPH without patient identifiers but with the identity of the clinical provider who ordered the test.

## C. Local Board of Health (LBOH) Reporting and Follow-up Responsibilities

### *Reporting Requirements*

Local boards of health (LBOH) are not responsible for reporting or follow-up of new diagnoses or new identification of HIV/AIDS. Reporting is directly to MDPH by physicians, health care providers, and laboratories.



## Section 4:

# CONTROLLING FURTHER SPREAD

## A. Isolation and Quarantine Requirements (*105 CMR 300.200*)

### *Minimum Period of Isolation of Patient*

- ◆ AIDS: No restrictions except for appropriate exclusion from blood and organ donation. Case shall receive counseling to modify sexual and other activities with the risk of transmitting HIV.
- ◆ HIV infection: No restrictions except for appropriate exclusion from blood and organ donation. Case shall receive counseling to modify sexual and other activities with the risk of transmitting HIV.

### *Minimum Period of Quarantine of Contacts*

- ◆ AIDS: For sexual contacts, counseling to modify sexual and other high-risk activities. Otherwise, contact health authorities for latest information.
- ◆ HIV infection: For sexual contacts, counseling to modify sexual and other high-risk activities. Otherwise, contact health authorities for latest information.

## B. Protection of Contacts of a Case

Contacts of cases should be referred to partner services provided through the MDPH HIV/AIDS Bureau (visit the website at [www.mass.gov/dph/aids/programs/partner\\_notification.htm](http://www.mass.gov/dph/aids/programs/partner_notification.htm) for more information) and the MDPH Division of STD Prevention (visit the website at [www.mass.gov/dph/cdc/std/services/hivpn.htm](http://www.mass.gov/dph/cdc/std/services/hivpn.htm) for more information).

## C. Managing Special Situations

There are no specific regulations regarding HIV infection in daycare, school, or community residential programs. HIV is not spread via casual contact or through food or water. As long as standard precautions are maintained, HIV will not be spread to others in these settings. No one who is HIV-infected should be excluded from attending or working in any of these settings on the basis of his/her HIV infection.

## D. Preventive Measures

Because there is no vaccine to prevent HIV infection, the only way to prevent infection is to avoid behaviors that put a person at risk for infection, such as sharing needles and having unprotected sex.

**Many people infected with HIV have no symptoms, and therefore, there is no way of knowing whether a sexual or needle-sharing partner is infected unless he/she has repeatedly tested negative for the virus and has not engaged in any risky behavior.**

People should either abstain from having sex or use male latex condoms or female polyurethane condoms, which may offer partial protection, during oral, anal, or vaginal sex. Only water-based lubricants should be used with male condoms. For persons who inject drugs, needles should not be shared, or if sharing is unavoidable, needles and works previously used by someone else should be cleaned thoroughly.

The risk of HIV transmission from a pregnant woman to her baby is significantly reduced if the mother takes zidovudine or other anti-retroviral agents during pregnancy, labor, and delivery, and if her baby is treated for the first six weeks of life.



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