

Fact Sheet 1 HIV/AIDS: the infection

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• **Introduction: What is HIV/AIDS?**

In 1983 the virus that caused AIDS was discovered by scientists in France and the routes of transmission were confirmed. The virus eventually became known as the human immunodeficiency virus (HIV). There are 2 different types of HIV:

HIV-1 the most common type found worldwide, and
HIV-2 found mostly in West Africa.

HIV infection affects the immune system. The immune system is the body's defense against infections by microorganisms (such as very small bacteria or viruses) that get past the skin and mucous membranes and cause disease. The immune system produces special cells called antibodies to fight off or kill these microorganisms. A special weakness of the immune system is called an immunodeficiency. Human immunodeficiency virus (HIV) infects, and eventually destroys, special cells



Nurses and midwives in Ghana participate in HIV/AIDS Awareness Days by developing key messages for the public. (Credit: JHU/CCP)

in the immune system called lymphocytes and monocytes.

These cells carry the CD4 antigen on their surface (CD4+ lymphocytes). HIV recognizes the CD4 antigen and enters and infects CD4+ lymphocytes. The result is the killing of many CD4+ lymphocytes. This slowly leads to a persistent, progressive and profound impairment of the immune system, making an individual susceptible to infections and conditions such as cancer. HIV is the beginning stage of infection and can be detected by a blood test (described in this Fact Sheet). When the immune system becomes very affected, the illness progresses to AIDS. Blood tests (described in this Fact Sheet), or the appearance of certain infections (see Fact Sheets 4 & 5), indicate that the infection has progressed to AIDS.

• HIV transmission

HIV can be transmitted by:

Sexual intercourse (vaginal, anal and oral) or through contact with infected blood, semen, or cervical and vaginal fluids. This is the most frequent mode of transmission of HIV world wide, and can be transmitted from any infected person to his or her sexual partner (man to woman, woman to man, man to man and, but less likely, woman to woman). The presence of other sexually transmitted diseases (STDs) (especially those causing genital ulcers) increase the risk of HIV transmission because more mucous membrane is exposed to the virus (See Fact Sheet 12).

Blood transfusion or transfusion of blood products (eg. obtained from donor blood infected by HIV) (see Fact Sheet 12).

Injecting equipment such as needles or syringes, or skin-piercing equipment, contaminated with HIV (see Fact Sheet 11).

Mother to infant transmission of HIV/AIDS can occur during pregnancy, labour, and delivery or as a result of breast feeding (see Fact Sheet 10).

HIV can NOT be transmitted by:

Coughing or sneezing
Insect bites
Touching or hugging
Water or food
Kissing
Public baths

Handshakes
Work or school contact
Using telephones
Swimming pools
Sharing cups, glasses, plates, and other utensils

• Natural history of HIV infection

Acute HIV infection

Most people infected with HIV do not know that they have become infected. HIV infected persons develop antibodies to HIV antigens usually 6 weeks to 3 months after being infected. In some

individuals, the test for the presence of these antigens may not be positive until 6 months or longer (although this would be considered unusual). This time -- during which people can be highly infectious and yet unaware of their condition -- is known as the "the window period" (see Fact Sheet 12).

Seroconversion is when a person recently infected with HIV first tests sero-positive for HIV antibodies. Some people have a "glandular fever" like illness (fever, rash, joint pains and enlarged lymph nodes) at the time of seroconversion. Occasionally acute infections of the nervous system (eg. aseptic meningitis, peripheral neuropathies, encephalitis and myelitis) may occur.

HIV infection before the onset of symptoms

In adults, there is often a long, silent period of HIV infection before the disease progresses to "full blown" AIDS. A person infected with HIV may have no symptoms for up to 10 years or more. The vast majority of HIV-infected children are infected in the peri-natal period, that is, during pregnancy and childbirth (see Fact Sheets 5 & 10). The period without symptoms is shorter in children, with only a few infants becoming ill in the first few weeks of life. Most children start to become ill before 2 years; however, a few remain well for several years (see Fact Sheet 5).

Progression from HIV infection to HIV-related disease and AIDS

Almost all (if not all) HIV-infected people will ultimately develop HIV-related disease and AIDS. This progression depends on the type and strain of the virus and certain host characteristics. Factors that may cause faster progression include age less than 5 years, or over 40 years, other infections, and possibly genetic (hereditary) factors. HIV infects both the central and the peripheral nervous system early in the course of infection. This causes a variety of neurological and neuropsychiatric conditions. As HIV infection progresses and immunity declines, people become more susceptible to opportunistic infections.

These include:

Tuberculosis (see Fact Sheet 13)
Other sexually transmitted diseases
Septicaemia
Pneumonia (usually pneumocystis carinii)
Recurrent fungal infections of the skin, mouth and throat
Unexplained fever
Meningitis

Other Conditions:

Other skin diseases
Chronic diarrhoea with weight loss (often known as "slim disease")
Other diseases such as cancers (eg. Kaposi sarcoma)

Any blood test used to detect HIV infection must have a high degree of sensitivity (the probability that the test will be positive if the patient is infected) and specificity (the probability that the test will be negative if the patient is uninfected). Unfortunately, no antibody test is ever 100 % sensitive and specific. Therefore, if available, all positive test results should be confirmed by retesting, preferably by a different test method. HIV antibody tests usually become positive within 3 months of the individual being infected with the virus (the window period). In some individuals, the test may not

be positive until 6 months or longer (considered unusual). In some countries, home testing kits are available. These tests are not very reliable, and support such as pre and post test counselling (Fact Sheet 7) is not available.

• Testing for HIV antibodies

Tests for HIV detect the presence of antibodies to HIV, not the virus itself. Although these tests are very sensitive, there is a "window period." This is the period between the onset of infection with HIV and the appearance of detectable antibodies to the virus. In the case of the most sensitive anti-HIV tests currently recommended, the window period is about three weeks. This period may be longer if less sensitive tests are used.

The three main objectives for which HIV antibody testing is performed are:

- *screening of donated blood (see Fact Sheet 12)*
- *epidemiological surveillance of HIV prevalence (see Fact Sheet 2)*
- *diagnosis of infection in individuals (see Fact Sheets 4 & 5)*

Screening of donated blood accounts for the majority of HIV tests performed worldwide. It is a highly cost effective preventive intervention as the transmission of HIV through infected blood is at least 95%.

At the beginning of the HIV epidemic, HIV testing was used mostly for clinical confirmation of suspected HIV disease. More recently, people have been encouraged to attend voluntary counselling and testing (VCT) services to find out their HIV status (see Fact Sheet 7). It is hoped that if people know their HIV status and are seronegative, they will adopt preventive measures to prevent future infection (see Fact Sheet 12). If the person is seropositive, it is hoped that they will learn to live positively, accessing care and support at an earlier stage (Fact Sheet 3), learning to prevent transmission to sexual partners (Fact Sheet 12) and planning for their own and their family's future (Fact Sheet 8).

Antibody tests

Traditionally, HIV testing has been done using ELISA (Enzyme Linked ImmunoSorbent Assay). However, there are various essential requirements for ELISAs to be performed accurately:

- *Laboratory equipment (eg. pipettes, microtiter trays, incubators, washers, and ELISA readers) must be available*
- *Constant supply of electricity, and regular maintenance of equipment*
- *Skilled technicians*
- *Accurate storage and testing temperatures*

Recent advances in technology have led to various simple rapid tests being developed. Most of these tests come in a kit and require no reagent, equipment, training, or specified temperature controls, and tests can be performed at any time. These tests are as accurate as ELISA and results can be obtained within hours. In some countries, over 50% of people do not return for their test results. With these rapid tests, people can wait for their results. Although the costs of these simple rapid tests are higher than ELISA they will be useful in STD clinics, antenatal clinics, and counselling centres, because of the ease of use. In some countries, home testing kits are also available. These tests are not very reliable, and support such as pre and post test counselling (Fact Sheet 7) is not available.

False positive result

HIV tests have been developed to be especially sensitive and, consequently, a positive result will sometimes be obtained even when there are no HIV antibodies in the blood. This is known as a false positive, and because of this, all positive results must be confirmed by another test method. A confirmed positive result from the second test method means that the individual is infected with HIV.

False negative result

A false negative result occurs when the blood tested gives a negative result for HIV antibodies when in fact the person is infected, and the result should have been positive. The likelihood of a false negative test result must be discussed with patients if their history suggests that they have engaged in behaviour which was likely to put them at risk of HIV infection. In this situation, repeated testing over time may be necessary before they can be reassured that they are not infected with HIV. The most frequent reason for a false negative test result is that the individual is newly infected (ie. the window period) and is not yet producing HIV antibodies. However, it is important to remember that someone who has tested negative because they are not infected with HIV can become infected the following day!

• Informed consent and confidentiality

All people taking an HIV test must give informed consent prior to being tested. (Issues related to pre and post-test counselling and informed consent are covered in Fact Sheet 7.) The results of the test must be kept absolutely confidential. However, shared confidentiality is encouraged. Shared confidentiality refers to confidentiality that is shared with others. These others might include family members, loved ones, care givers, and trusted friends. This shared confidentiality is at the discretion of the person who will be tested. Although the result of the HIV test should be kept confidential, other professionals such as counsellors and health and social service workers, might also need to be aware of the person's HIV status in order to provide appropriate care.

Questions for Reflection and Discussion

Why is it important that nurses/midwives educate people about how HIV is and is not transmitted?

What role can nurses/midwives take in promoting HIV

prevention?

Why is it important to understand the danger of HIV transmission during the "window period"?

Why is informed consent essential?

What role can nurses/midwives play in promoting shared confidentiality?

What are the dangers of receiving a false negative result? What should be done if a person's test is sero-negative?

References

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