

ACQUIRED IMMUNE DEFICIENCY SYNDROME:
A Brief Overview

The epidemic of acquired immune deficiency syndrome (AIDS) has reached global proportions. It has become vitally important for people to have a clear understanding of this disease. It is especially important for people working and living in developing countries to fully understand the potentially devastating effects of AIDS not only on health, but also on the social, economic, and political sectors of these countries.

This overview of AIDS presents the current medical knowledge about AIDS, especially with regard to less developed countries. Knowledge about AIDS is changing very rapidly. What is accepted today may be disproved tomorrow. In view of almost daily advances and changes, CDIE will update this review and add citations on a regular basis.

What is AIDS?

The acquired immune deficiency syndrome (AIDS) is a fatal virus-caused disease, characterized by a weakening of the immune system which permits infection by opportunistic diseases. The virus which causes AIDS is the human immunodeficiency virus (HIV). The clinical diagnosis of AIDS is made by the presence of certain diseases indicative of a suppressed immune system in conjunction with the presence of HIV antibodies (19,23). The diseases which are used for a diagnosis of AIDS vary in different areas of the world (3,24). The Centers for Disease Control (CDC) and the World Health Organization (WHO) have established criteria for the diagnosis of AIDS (3,22,26).

Course of the disease:

Unlike most viral infections or the "plagues" of the past, AIDS is a disease with a long time period from infection to manifestation of the disease and to death. Because of the long time frames involved, the number of people with AIDS is thought to represent only 2% of the total number infected with HIV.

Once a person is infected with the virus it appears to take from 2 to 8 weeks for the HIV antibodies to be detected in the blood (19). In contrast to many diseases, the presence of the antibody to HIV does not indicate protection against infection with HIV, but rather indicates the presence of an HIV infection which will be lifelong. Sometimes the initial infection is accompanied by a mononucleosis-type illness and sometimes it is totally asymptomatic (4,16). It is estimated that in the first five years after infection occurs, 10% to 30% of HIV positives will develop clinical AIDS. Because of the long incubation time of this virus it is likely an even larger percentage will develop AIDS over time. Estimates range from 30% to 50% or more (19). Because we have only recognized AIDS in the past 6 years, there are few longitudinal data from which to judge. Factors such as other sexually transmitted diseases, repeat exposures to HIV and poor health or nutrition

theoretically could precipitate the onset of clinical AIDS (21), but the only clearly indentified risk factor for progression from asymptomatic to symptomatic HIV infection is the passage of time. In the United States, the time from exposure to the virus to onset of clinical AIDS varies from 18 months to more than 5 years. The average survival period with clinical AIDS is 2 years and few survive longer than 3 years (7).

From the beginning of the infection, even though the infected person may show no outward signs of disease, the virus can be transmitted to sexual partners or through the blood. The long period during which a carrier is infectious presents the greatest problem to public health. Asymptomatic carriers are estimated to number between 5 and 10 million world-wide and their numbers are increasing. WHO projects that by 1991, 50 to 100 million people will be infected with HIV.

The four categories of the disease recognized by the CDC are:

- I. Initial infection with the virus and development of antibodies - may be accompanied by initial flu-like illness or asymptomatic.
- II. Asymptomatic carrier state - can pass the virus to others, but exhibits no symptoms.
- III. Persistent generalized lymphadenopathy - has specific symptoms or AIDS related complex (ARC).
- IV. Clinical AIDS or other HIV-related diseases - this stage is uniformly fatal.

There is no way to eliminate HIV infection. Once an individual is infected, he or she remains a carrier and a potential spreader of the infection for life.

Testing:

Testing and screening is done not for the disease complex of AIDS, but for signs of infection with HIV (19). When people are infected with HIV, their blood produces antibodies to the virus. It is these antibodies which the tests identify, both in blood screening and in "personnel" testing. The virus itself can be detected by growing it in special cultures, but the procedures necessary for that are difficult and expensive (15). The common tests for HIV antibodies are the ELISA and Western blot tests. A positive test for HIV antibodies does not mean the person has AIDS, only that he or she is infected with HIV.

Transmission:

Researchers have verified three means of HIV transmission.

1. Sexual contact, either heterosexual or homosexual. The virus is transmitted via semen or vaginal secretions through mucous membranes or breaks in the skin in the receiving partner. These breaks can be microscopic in size or open lesions. The need for penetration of the skin by the virus explains why it is more easily transmitted when accompanied by other diseases which

cause open sores and through sexual practices, such as anal intercourse, which may stretch or tear the skin (2,23). Transmission through vaginal intercourse is well documented and seems, as with most sexually transmitted diseases, to be easier from male to female than from female to male (19). There have also been a few cases of women being infected through artificial insemination with semen from an infected donor (19).

2. Blood transmission. HIV can be present in blood used for transfusions. In most Western countries blood is now routinely screened for the HIV antibodies. In less developed countries this process is expensive and rarely used. The choice between using possibly-infected blood or forgoing a life-saving transfusion is a dilemma being faced by many hospitals in developing countries (14). One of the most prevalent uses of transfusions in Africa is to treat malaria-induced anemia.

The virus can also be present in syringes and needles used by or on an infected patient. In Western countries this problem arises mainly in connection with intravenous drug abuse. There also have been a few cases of HIV infection caused by accidental needlestick injuries of health-care workers (24). In developing countries, inadequate sterilization procedures and shortages of supplies bring the problem into the health care system. The frequent use of injections in treating illness in developing countries increases the opportunities for infection (11,13). The risk of infection associated with scarification or tattooing remains to be analyzed. As yet, there are no documented cases of AIDS caused by vaccination programs but there is growing concern in this area. Programs in developing countries must continue to increase needle, syringe, and sterilization equipment supplies and upgrade training and monitoring to ensure adequate sterilization.

3. Perinatal transmission from mother to newborn. HIV can be transmitted by the mother to her child during pregnancy and childbirth regardless of the method of delivery (vaginal or cesarean) (19). It is estimated that 20% to 50% of HIV-infected pregnant women transmit the infection to their newborns. It is possible that HIV can be transmitted by breast milk. There has been one case reported of an infant who developed HIV infection while nursing (27). The child's mother was noninfected at the time of the child's birth, but acquired the infection from a blood transfusion shortly after birth. This mode of transmission is not well documented, and there is consensus among WHO and other organizations that, for the present, the benefit of breastfeeding for developing country children greatly outweighs the theoretical risk of HIV transmission.

HIV is NOT transmitted through the air, through insect bites, through water, or in the workplace (18). Families of AIDS patients have not been infected except through sexual contact. Sharing towels, dishes, toothbrushes or hugs does not transmit the virus (19,23).

Research on cures and on vaccines:

There is presently no cure for AIDS and no way for HIV-infected persons to eliminate HIV infection. There are three main thrusts in treatment and vaccine research at the present. As time goes on, scientists will explore more ways to combat this deadly virus.

1. Drugs to kill or inhibit the virus. Currently available drugs (such as AZT) are not able to kill the virus already present in the system. AZT does prevent the virus from replicating, holding the level of infection constant, reducing symptoms and prolonging life. AZT is toxic in large doses and is very expensive. Because it does not affect the HIV already in the system, it has to be taken for life. Other drugs with lower toxicity are being tested. However, these drugs, like AZT, provide only a stopgap measure and are not a cure for AIDS.

2. Drugs to help the immune system. Research continues on materials such as gamma interferon and interleukin-2, to determine if they affect the course of AIDS by increasing the responsiveness of the immune system. Test results so far are inconclusive.

3. Vaccine. Vaccines against human retroviruses (HIV is a retrovirus) have not been developed and a vaccine for AIDS is estimated to be years away. Some of the problems to overcome are: a) HIV antibodies are "neutralizing antibodies" (they kill the virus in a test tube), but they don't help an infected person; b) the HIV virus mutates rapidly (even more so than influenza viruses), and any vaccine will have to cover all mutations; c) there is no animal which contracts human AIDS, making vaccine testing difficult.

Even if a vaccine does become available, the expense and logistics of inoculating a large enough portion of the world population to affect the spread of the disease will be a mammoth task.

Prevention:

If AIDS can't be cured or prevented by vaccination, how can it be controlled? Prevention of the spread of AIDS is based on the prevention of the transmission of HIV. Each of the means of transmission given above can be prevented.

1. Sexual contact. Abstinence from all sexual contacts is the only definitive way of avoiding sexual transmission of AIDS. A monogamous relation with another HIV negative person will also avoid sexual transmission, provided neither partner is exposed to blood transmission. Condoms, used correctly, can prevent HIV from being transmitted. Spermicides may also be able to partially inhibit the transmission of the virus.

2. Blood transmission. The screening of all blood used for transfusions (as is being done in the US and in most European countries) would eliminate this method of transmission. However, screening is costly and may not be possible in all developing countries.

Adequate sterilization procedures can prevent transmission by needles and syringes. WHO recommends the use of non-disposable syringes because they can be sterilized. Injectionists and traditional health practitioners in developing countries must be trained in proper sterilization techniques. Injections are used in many developing countries much more frequently than in developed countries, especially in treating children. Needlestick injuries can only be prevented by intensified care by those handling syringes containing the bodily fluids of AIDS patients. The rate of infection from needlestick injuries is very low - only 4 cases from over 400 injuries have been reported.

3. Perinatal transmission. At present there is no way to prevent the transmission of HIV from a pregnant woman to her fetus. In some areas HIV-infected women of child-bearing age are being urged not to conceive.

According to most estimates, AIDS will remain a serious health problem for the rest of the century and beyond, both in the developed and in the developing world. This disease presents a formidable challenge to all people involved in health care anywhere in the world. AIDS' larger effects on social, political, and economic development can only be hypothesized from our present limited knowledge, but given that most affected persons are in the highly productive 20- to 49-year age range, the effects are likely to be substantial.

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April 1987

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