

SESSION 2: BACKGROUND TO HIV AND AIDS

Aim of the session:

Session 2 aims to reinforce participants' prior knowledge of HIV transmission, to provide an overview of the context of the epidemic and to review the progression of HIV infection to AIDS.

LEARNING OUTCOMES:

By the end of Session 2, participants should be able to:

- ✧ Describe HIV transmission routes
- ✧ Discuss the extent of the epidemic globally and in South Africa
- ✧ List the main categories of determinants of the epidemic
- ✧ Describe disease progression from HIV to AIDS
- ✧ Discuss AIDS symptoms & signs

SESSION CONTENTS:

- ✧ HIV transmission
- ✧ The context of the HIV and AIDS epidemic
- ✧ HIV infection progression

READING:

- ✧ Department of Health (2003) National HIV and Syphilis antenatal sero-prevalence survey. Pretoria
- ✧ Department of Health (2000) HIV/AIDS/STD Strategic Plan for South Africa 2000-2005. Pretoria

2.1 HIV transmission

HIV (Human Immunodeficiency Virus) is a virus that affects the body by destroying the immune system. The immune system is the body's defence mechanism against infection by micro-organisms that cause disease.

HIV infects many types of cells, but two immune system cells, the CD4 cells and CD8 cells, are critical to the eventual effect of the virus. HIV destroys these cells, resulting over time in a progressive reduction in the number of the CD4 and CD8 cells. This results in the infected person becoming susceptible to infections and cancers.

HIV is a weak virus that cannot survive outside the body. It is only present in sufficient concentrations to cause infection in the following body fluids:

- ✧ blood
- ✧ sexual fluids (semen and vaginal secretions)
- ✧ breast milk

HIV can only be transmitted from an infected person to another person through:

- ✧ sexual intercourse (vaginal, anal or oral) – most common mode of transmission
- ✧ transfer of blood
- ✧ transfer from an infected mother to her child during pregnancy, during birth or through breast feeding

There are two types of HIV:

- ✧ HIV-1, the most common type in Southern Africa
- ✧ HIV-2, found mostly in West Africa, Europe and America

HIV-1 and HIV-2 are both transmitted in the same ways, although there is evidence that HIV-2 is less easily transmitted through sexual and mother-to-child routes than HIV-1.

HIV can still be transmitted by people who are receiving antiretroviral therapy, even if they have undetectable viral loads. It is therefore essential that all those infected with HIV exercise preventative measures at all times.

The approximate risk of transmission from a single exposure event is as follows:

Exposure	Approximate risk
Vaginal intercourse	0.1%
Anal intercourse	1.0%
Percutaneous exposure (e.g. needle stick) – health care worker	0.3%
Needle-sharing – intravenous drug user	1.0%
Blood transfusion	100.0%

Source: Course in HIV Management, 2004; The Foundation for Professional Development/Southern Africa HIV clinicians' society

The risk of mother-to-child transmission (including the total risk of exposure in-utero, during birth and during breastfeeding) is 20% to 40%.

Unprotected sexual intercourse between a male and a female, or between males, accounts for 75% to 80% of HIV infections in adults. HIV transmission through sexual intercourse is more likely when one or both partners have another sexually transmitted infection (STI).

Note: HIV is also an STI.

The presence of an STI, particularly one that causes genital ulcers, significantly increases the risk of both transmitting and acquiring HIV. Example scenario: one partner has a genital ulcer; the other partner does not have an ulcer, but is infected with HIV; the partner with the ulcer will more easily be infected with HIV than if no ulcer were present.

Furthermore, the presence of HIV infection in a person with a STI may result in the STI condition being more severe and treatment being less effective.

Early treatment of STIs is one of the most important strategies for preventing HIV transmission. STIs are treated through what is known as the "syndromic approach", or in other words, any patient presenting with symptoms and signs of an STI will be treated without waiting for confirmation from laboratory tests.

2.2 The context of the HIV and AIDS epidemic

HIV and AIDS Worldwide

By December 2004, an estimated 39.4 million people were living with HIV/AIDS world-wide, 4.9 million were newly infected and 3.1 million had died during that year. Of those living with HIV and AIDS, newly infected or who had died, 25.4 million, 3.1 million and 2.3 million respectively, were from Sub Saharan Africa.² Sub Saharan Africa is home to more than 60% of all people living with HIV and AIDS.

² UNAIDS (2004): AIDS Epidemic Update: 2004, Geneva.

Figure 2.1: Adults and children estimated to be living with HIV as of end 2004



Source: UNAIDS: AIDS epidemic update December 2004

Table 2.1:

Regional HIV and AIDS statistics and features, end 2002 and 2004				
	Adults and children living with HIV	Adults and children newly infected with HIV	Adult prevalence (%)*	Adult and child deaths due to AIDS
Sub-Saharan Africa				
2004	25.4 million [23.4–28.4 million]	3.1 million [2.7–3.8 million]	7.4 [6.9–8.3]	2.3 million [2.1–2.6 million]
2002	24.4 million [22.5–27.3 million]	2.9 million [2.6–3.6 million]	7.5 [7.0–8.4]	2.1 million [1.9–2.3 million]
North Africa and Middle East				
2004	540 000 [230 000–1.5 million]	92 000 [34 000–350 000]	0.3 [0.1–0.7]	28 000 [12 000–72 000]
2002	430 000 [180 000–1.2 million]	73 000 [21 000–300 000]	0.2 [0.1–0.6]	20 000 [8300–53 000]
South and South-East Asia				
2004	7.1 million [4.4–10.6 million]	890 000 [480 000–2.0 million]	0.6 [0.4–0.9]	490 000 [300 000–750 000]
2002	6.4 million [3.9–9.7 million]	820 000 [430 000–2.0 million]	0.6 [0.4–0.9]	430 000 [260 000–650 000]
East Asia				
2004	1.1 million [560 000–1.8 million]	290 000 [84 000–830 000]	0.1 [0.1–0.2]	51 000 [25 000–86 000]
2002	760 000 [380 000–1.2 million]	120 000 [36 000–360 000]	0.1 [0.1–0.2]	37 000 [18 000–63 000]
Oceania				
2004	35 000 [25 000–48 000]	5000 [2100–13 000]	0.2 [0.1–0.3]	700 [<1700]
2002	28 000 [22 000–38 000]	3200 [1000–9600]	0.2 [0.1–0.3]	500 [<1000]
Latin America				
2004	1.7 million [1.3–2.2 million]	240 000 [170 000–430 000]	0.6 [0.5–0.8]	95 000 [73 000–120 000]
2002	1.5 million [1.1–2.0 million]	190 000 [140 000–320 000]	0.6 [0.4–0.7]	74 000 [58 000–96 000]
Caribbean				
2004	440 000 [270 000–780 000]	53 000 [27 000–140 000]	2.3 [1.5–4.1]	36 000 [24 000–61 000]
2002	420 000 [260 000–740 000]	52 000 [26 000–140 000]	2.3 [1.4–4.0]	33 000 [22 000–57 000]
Eastern Europe and Central Asia				
2004	1.4 million [920 000–2.1 million]	210 000 [110 000–480 000]	0.8 [0.5–1.2]	60 000 [39 000–87 000]
2002	1.0 million [670 000–1.5 million]	190 000 [94 000–440 000]	0.6 [0.4–0.8]	40 000 [27 000–58 000]
Western and Central Europe				
2004	610 000 [480 000–760 000]	21 000 [14 000–38 000]	0.3 [0.2–0.3]	6500 [<8500]
2002	600 000 [470 000–750 000]	18 000 [13 000–35 000]	0.3 [0.2–0.3]	6000 [<8000]
North America				
2004	1.0 million [540 000–1.6 million]	44 000 [16 000–120 000]	0.6 [0.3–1.0]	16 000 [8400–25 000]
2002	970 000 [500 000–1.6 million]	44 000 [16 000–120 000]	0.6 [0.3–1.0]	16 000 [8400–25 000]
TOTAL				
2004	39.4 million [35.9–44.3 million]	4.9 million [4.3–6.4 million]	1.1 [1.0–1.3]	3.1 million [2.8–3.5 million]
2002	36.6 million [33.3–41.1 million]	4.5 million [3.9–6.2 million]	1.1 [1.0–1.2]	2.7 million [2.5–3.1 million]

Source: UNAIDS Epidemic Update 2004

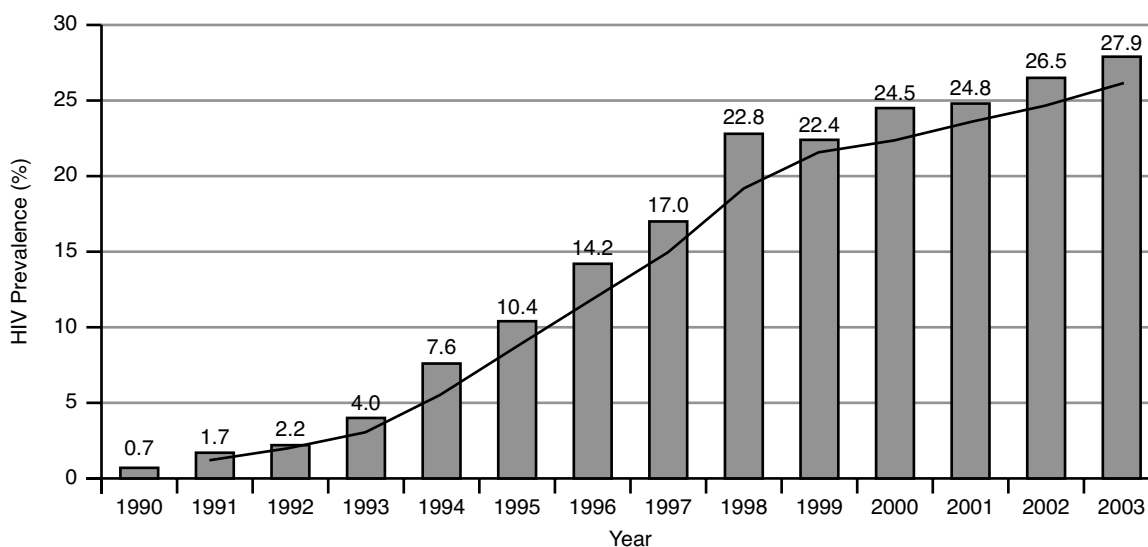
HIV and AIDS in South Africa

South Africa accounts for 13% of all people in the world living with HIV and has the highest number of people living with HIV: an estimated 5.3 million at the end of 2003.²

National sentinel surveillance surveys of antenatal clinic clients have been conducted annually in South Africa since 1990 to track the prevalence of HIV and syphilis. Between 1990 and 1998, there was an exponential increase in HIV prevalence. From 1993 to 2003 prevalence continued to increase, but the rate of increase slowed down (as can be seen in the graph), suggesting **stabilisation** of the epidemic.³ (Refer to Figure 2.2)

There is considerable variation in HIV prevalence among provinces in South Africa. (Refer to Figure 2.3.) Geographic variations in HIV prevalence may be related to a complex interaction of factors: trucking and smuggling routes, numbers of migrant workers, vicinity to international borders, variations in sexual practices (e.g. resistance to or acceptance of condoms), prevalence of other STIs, and poor quality of health services are some of these factors. A low prevalence may reflect an early stage of the epidemic, or it may reflect smaller vulnerable groups and/or on average less risky sexual behaviour, or it may reflect the fact that more HIV positive people have died.

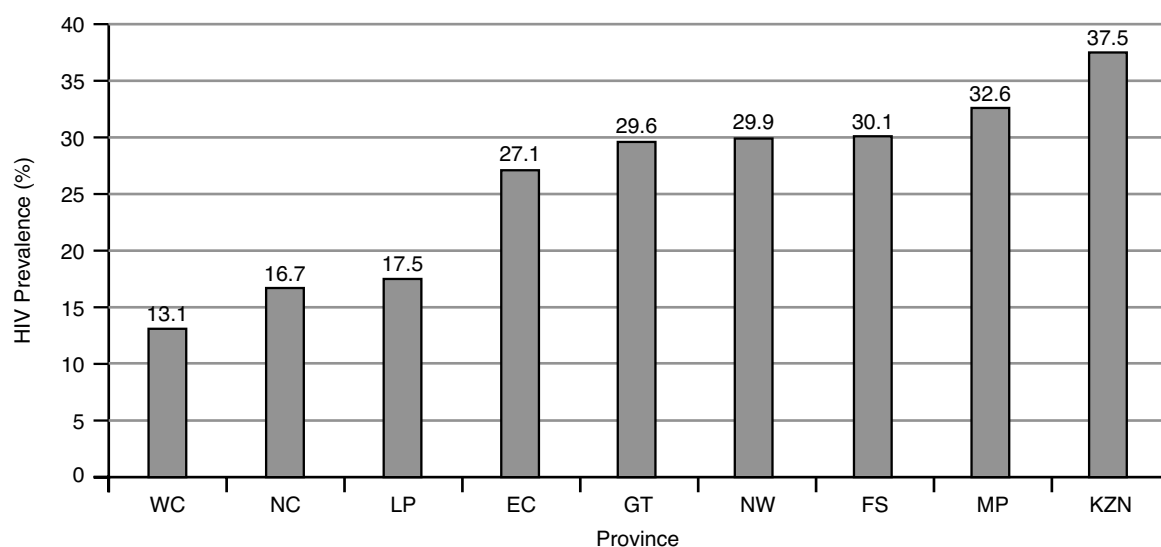
Figure 2.2: HIV Prevalence trends among antenatal clinic clients in South Africa 1990-2003



Source: Department of Health 2003 Antenatal survey results

2 UNAIDS (2004): AIDS Epidemic Update: 2004, Geneva
 3 Antenatal survey results, 2003, Department of Health

Figure 2.3: HIV Prevalence rate by provinces among antenatal clinic clients in South Africa 2003



Source: Department of Health 2003 Antenatal survey results

The “3 in 1” Epidemic

The HIV and AIDS pandemic is a “3 in 1” epidemic involving the following:

1. The HIV epidemic (with increased morbidity but relatively low mortality): the first wave of the overall epidemic which started in the early 1980s.
2. The AIDS epidemic with high morbidity and mortality, unless treatment and care are available: the second wave of the overall epidemic which follows the first HIV wave with an 8-10 year lag period. Countries in Eastern Africa were hit by this wave in the early/mid 1990s. Countries in Southern Africa were hit by this wave from the late 1990s, and death rates are soaring despite efforts in some of the countries to expand treatment.
3. The orphans epidemic: the third wave of the overall epidemic, where the numbers of orphans are increasing rapidly as a result of increased deaths among young adults (parents) Large numbers of orphans and other vulnerable children are in turn vulnerable to sexual exploitation and abuse that might lead to new HIV infections.

Southern African countries are witnessing the second wave of the epidemic through rapidly increasing numbers of people developing AIDS or dying. The orphans phase has also started, but the full social impact of the epidemic will come in the next 5-10 years. Whereas relatively wealthy and well-organised countries are working very hard to address the epidemic and mitigate its impact, there are growing problems in countries ravaged by war or political and economic turmoil. In the long run, all countries in the region must control the epidemic in order for the region to succeed. The HIV virus does not respect borders.

Determinants of the Epidemic

The HIV and AIDS pandemic has three main determinants for its continued spread:

- a) Medical risk (e.g. presence of STIs and TB),
- b) Behavioural risk (e.g. unprotected sex outside a monogamous relationship),
- c) Vulnerability (i.e. an individual's or community's inability to control their risk of infection due to factors beyond their control, e.g. poverty, illiteracy, sexual violence, refugee status.)

The response of all countries to the HIV and AIDS epidemic has to focus on all three determinants of the epidemic, as well as addressing the health and social impacts. A multi-sectoral response is fundamental to the success of an HIV and AIDS programme. This multi-sectoral response should focus on:

- ✧ Promoting safe and healthy sexual behaviour
- ✧ Reducing the number of new HIV infections (especially among youth)
- ✧ Reducing the impact of HIV/AIDS on individuals, families and communities.
- ✧ Providing adequate treatment, care and support services in communities

2.3 HIV infection progression

Infection progression steps

1. Window Period

After HIV has entered the blood stream, it quickly penetrates certain white blood cells known as 'CD4' cells or 'T4 helper lymphocytes'. After entering these cells, the virus starts multiplying but it is undetectable using common antibody testing methods. This period is known as the 'window period' and may last for six to twelve weeks.

2. Sero-conversion

Following the window period of six to 12 weeks, some people will develop a flu-like illness. This occurs because some of the infected white cells are dying, the virus is being released into the blood again and for the first time the body is working hard to make the correct antibodies to fight HIV. At this stage the antibody test will usually become positive. This phenomenon of converting from being negative to positive is called 'sero-conversion'.

3. Latent infection phase

After sero-conversion, everything settles down as the body temporarily wins the fight. The person from now on tests positive on antibody tests but usually feels physically healthy. This period varies from person to person but can be longer or shorter for some individuals. It is evident that those who 'live positively', have good nutrition and are not exposed to other infectious diseases such as Tuberculosis (including being re-infected with HIV) tend to remain healthy for longer.

4. Early disease progression

After the latent phase, a person with HIV may start to develop minor skin rashes and enlargement of glands in the neck and armpits. As the immune system continues to deteriorate, more serious problems may start to appear, e.g. boils, warts, oral thrush.

5. AIDS

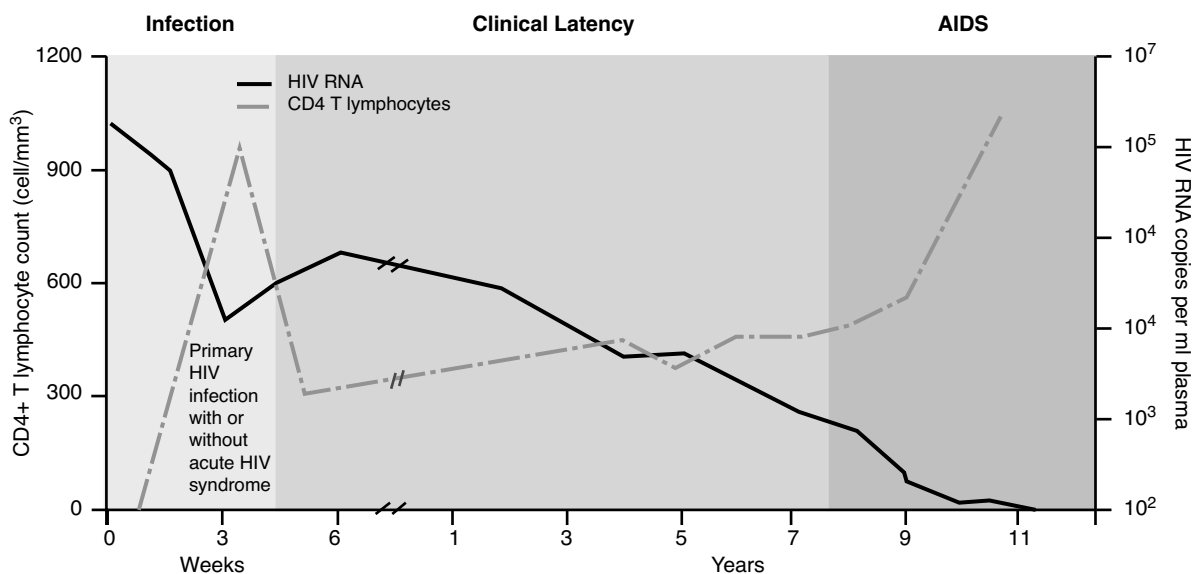
AIDS (Acquired Immune Deficiency Syndrome) is the final and most serious stage of the progression of HIV infection. AIDS develops when the immune system (the body's 'defence force') is seriously damaged and no longer able to fend off infections and cancers that are normally controlled in a healthy person. Such infections are called "opportunistic infections" because they take advantage of the body's weakened defence system. Certain cancers are also more likely to develop. Apart from the effects of HIV on the immune system, the virus itself also affects the brain and the body's mechanism of converting food into energy and other body building blocks.

The progression of HIV to AIDS may be viewed in three ways:

- Clinical progression (symptoms and signs resulting from effects of the virus)
- Immunologic progression (decrease in CD4 count)
- Virologic progression (increase in viral load – HIV RNA)

Figure 2.4 illustrates the above classification of HIV infection progression.

Figure 2.4: Progression of HIV infection to AIDS.



Source: UNAIDS: December 2004

It should be noted that the situation depicted in the above diagram may not necessarily be observed in South Africa due to number of factors including the dominant HIV subtype.

Causes of the symptoms and signs

The main symptoms and signs of AIDS occur as a result of opportunistic infections and cancers as well as the direct effects of the virus on the body. The term "syndrome" is used to reflect the variety of symptoms and signs that may arise.

The **direct effects of the virus** include dementia and wasting ("slimming" disease).

Common opportunistic infections and cancers include:

Body Part	Symptoms/Signs	Infection/Cancer
Head	Headache, confusion, meningitis, coma	Toxoplasmosis Cryptococcal meningitis
Lungs	Coughing, pneumonia	Pneumocystis carinii pneumonia (PCP) Tuberculosis (TB)
Gut	Diarrhoea	Cytomegalovirus (CMV) Cryptosporidiosis Mycobacterium avium complex (MAC)
Skin and other body surfaces	Rashes, shingles	Herpes simplex Herpes zoster Kaposi's sarcoma (KS) Fungal infections (yeasts)
Genitalia	Sores, abnormal discharge, growths	Genital herpes Human papillomavirus (HPV) Vaginal candidiasis (yeast) Other STIs

HAST

HAST stands for HIV and AIDS, sexually transmitted infections (STIs) and tuberculosis (TB).

As HIV and AIDS, STIs and TB are linked epidemics, there is a growing recognition that these three disease categories must be viewed in relation to each other and that prevention and management of one should include the possibility that the other two may also be present.

Tuberculosis and HIV and AIDS

The TB epidemic is fuelled by HIV infection. TB is one of the most common opportunistic infections and is the most frequent cause of death in people living with HIV. In South Africa, 40-50% of TB patients are infected with HIV.⁴

Sexually Transmitted Infections

STIs are recognised as a major determinant of HIV transmission. Approximately 11 million STI episodes are treated annually in South Africa.³ Even without the HIV epidemic, STIs represent an important public health problem in their own right.

⁴ Department of Health, Republic of South Africa. (2000) HIV/AIDS/STD Strategic Plan for South Africa 2000-2005.