

Understanding Epidemics Section 2: HIV/AIDS

PART D: Geography

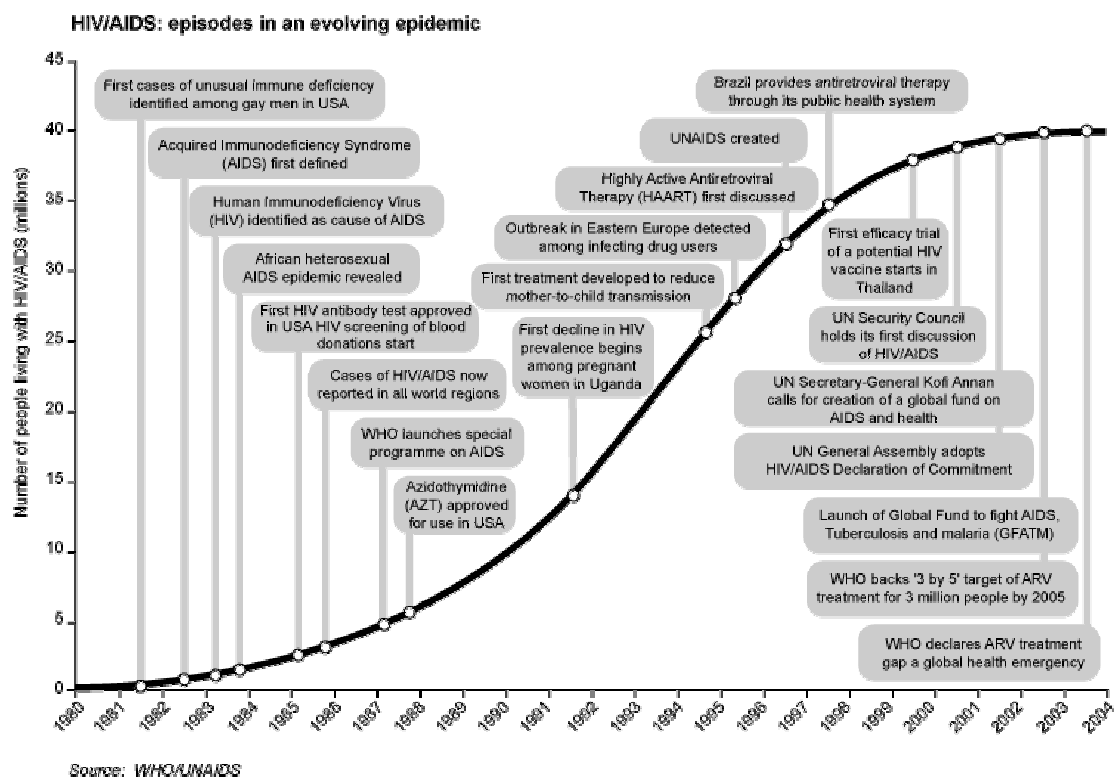
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Global variations

The epidemic wave (or curve) for HIV/AIDS at the global scale is shown below.

It shows the numbers of people estimated to be HIV+ and to have AIDS up to 2003. This is not the same across the world, and varies by country.



The graph traces the development of the HIV/AIDS pandemic.

The growth seems to follow the classic epidemic curve: slow growth at first, reaching 5 million by 1987. However, this was 15 million by about 1990. There was then continuous rapid growth in the 1990s and into the 21st century.

The number of recorded cases between 1998 and 2003 then seems to moderately slow down and plateau. However, the prospects globally into the 21st century are for further increases in Asia, especially in India and China. Because of this, the classic epidemic curve which would suggest a drop off in the number of cases does not seem to be imminent.

This global curve also hides the differences between different countries. These differences are both in terms of prevalence (how many people have the disease) and mortality (how quickly people die from the disease).

Differences between developed and developing countries

In developed countries, the patterns of spread have been very different to developing countries. The differences are partly due to the much lower overall prevalence, the epidemic being more clearly restricted to members of vulnerable groups.

Also important is the very different patterns of mobility of these groups. They tend to live in large urban centres rather small towns or rural areas, and to travel by train or by air between major cities. The diffusion pattern had been shown to be strongly hierarchical in the USA, focussed on the major cities, with San Francisco and New York as the prime foci for the diffusion.

Eastern Europe and Russia

The prevalence of HIV/AIDS is growing rapidly in Eastern Europe and Russia. In fact the greatest rises at the present time are in Eastern Europe and Russia.

Here the main cause is the high growth of intravenous drug use with shared needles in relatively unsanitary conditions of growing poverty and declining health services. These increases are also partly associated with a steep rise in tuberculosis in these regions.

Asia

It seems that the biggest threat from the growth of HIV/AIDS in the future is likely to be in Asia.

Overall levels of HIV/AIDS at the moment are much lower in all countries in Asia than in Africa, however they are growing rapidly.

Thailand, has the highest prevalence in Asia (2%), however Thailand has had a successful public campaign for safe sex and condom use that seems to have kept the epidemic under control.

India has the largest number of infected persons of any country in the world, though this is only just over 1% of adults, and it is here where there are major concerns for further growth.

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There are also concerns about the growth of the prevalence of HIV/AIDS in China. There is much less public awareness and discussion of the possible growth of the problem in China.

In these two giants (India and China), there is a potential for rapid further growth, but it is thought unlikely to reach African levels.

National variations

It isn't just between countries that there are differences in the prevalence of HIV/AIDS, there are differences between different areas and different groups of people within the same country.

The earliest epidemics were among:

- homosexual men in the developed world (mainly North America, Europe and Australasia)
- heterosexual men and women in Africa.

These epidemics have followed very different patterns over their 20-year history.

Developed countries

The changes in the spread of HIV/AIDS in developed countries have mainly been due to a change in the groups of people who are susceptible to the disease.

Originally, HIV/AIDS in the developed world was associated with homosexual men.

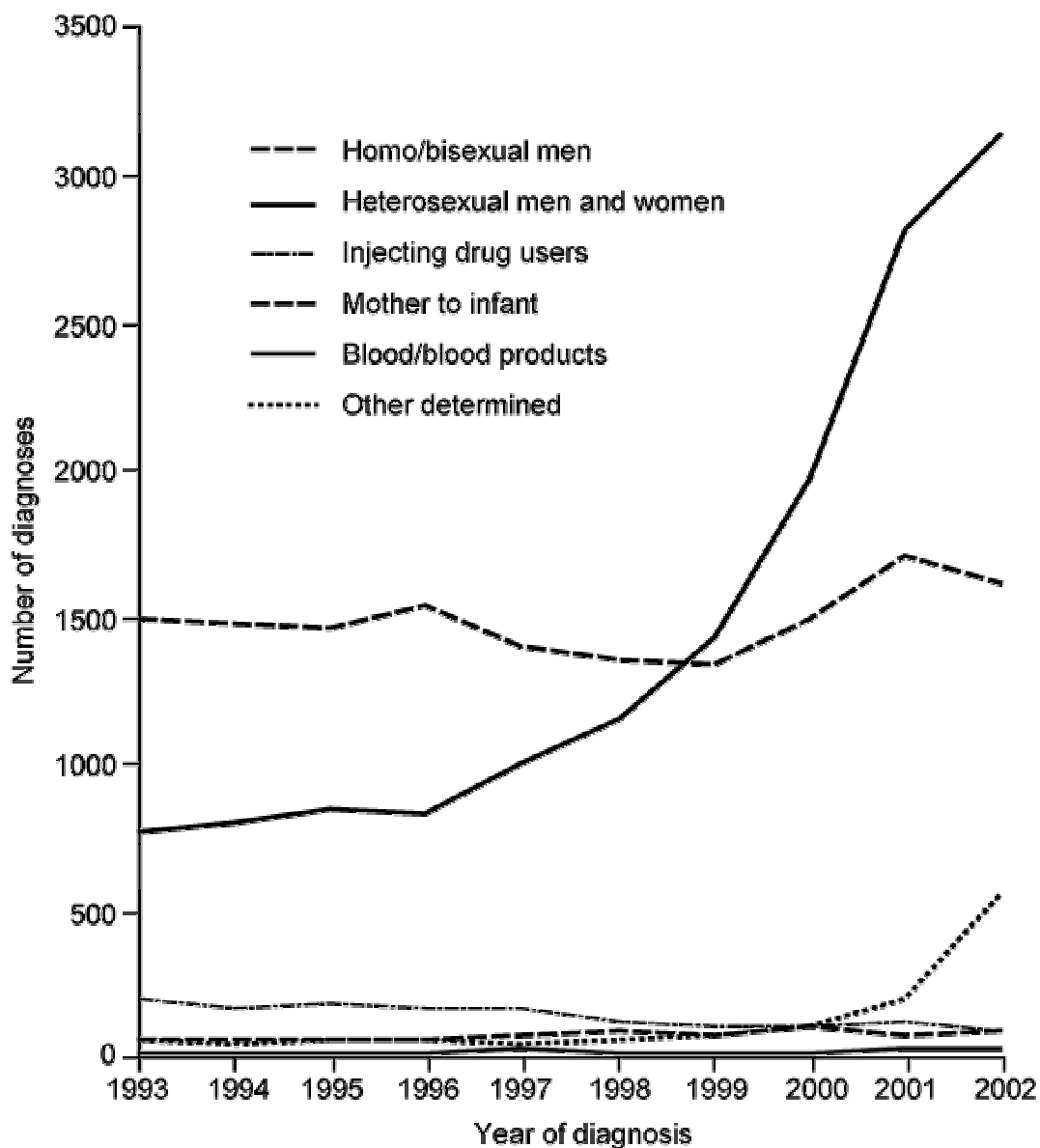
In the early years of the disease, over 90% of cases were in homosexual men. As a result, in the 1980s, HIV/AIDS was often described as 'the gay plague'.

Because of this, the early education campaigns which focussed on safe sex were targeted at gay men and these have been successful in reducing the transmission rate amongst this population.

In developed countries, the number of new cases of HIV/AIDS as a result of unprotected homosexual sex have fallen. This does not mean that the spread of HIV/AIDS is falling, and the disease is increasingly spread through unprotected heterosexual sex.

The graph below shows the change in the different ways in which HIV/AIDS is transmitted in the UK. Note the difference in the trend between homosexual transmission and heterosexual transmission.

Exposure category of HIV infections diagnosed in the UK, 1992-2002



Source: HIV/AIDS reports

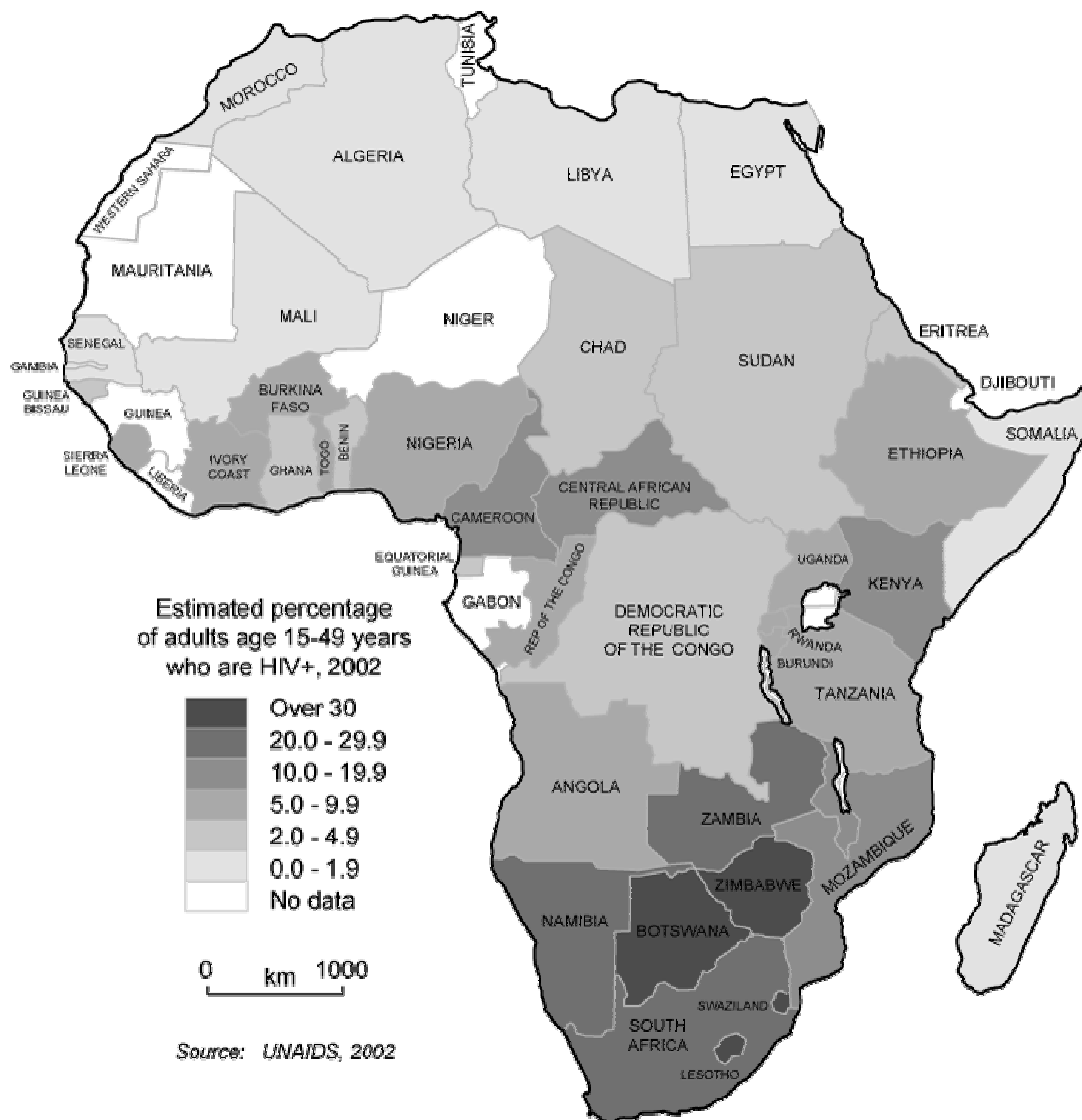
National variations: Africa

The picture in Africa is very different to that in developed countries.

Rates of HIV prevalence and AIDS deaths have risen relentlessly in most countries in Africa, but more so in some countries than others.

The map below shows the HIV prevalence rate for adults in Africa by country for 2003.

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It is clear that there is an AIDS belt within Africa, from Ethiopia southwards to South Africa.

In this belt, national rates of HIV/AIDS are all over 5%, and rise to over 35% in two southern African countries – Botswana and Swaziland.

This is in contrast to the rest of Africa where rates are all below 10%, and below 5% in many countries of the interior of West Africa and in North Africa.

It is clear from the contrasts between Eastern/Southern Africa and West Africa that there are real differences in the spread of HIV/AIDS.

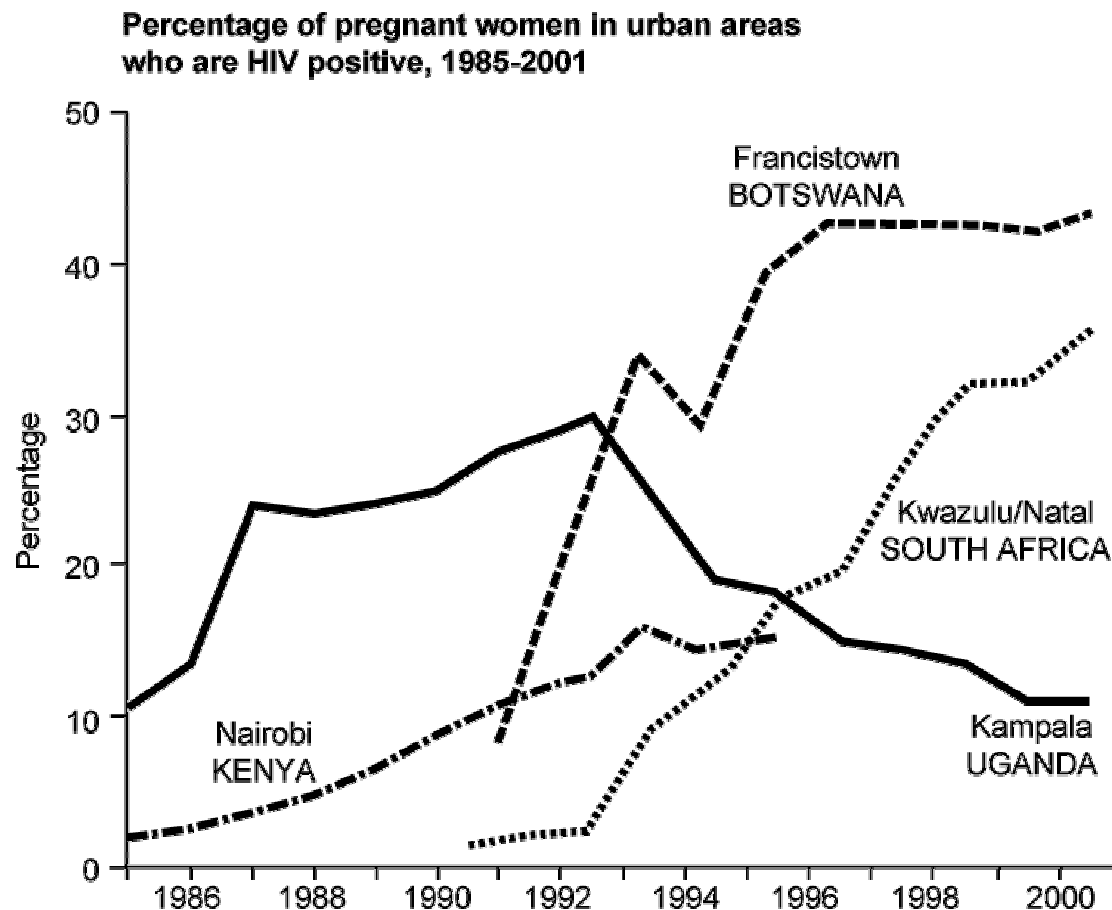
The geographical differences in HIV infection rates may be due to long established social and cultural differences. For example, these differences could be because of different attitudes to sex and faithful sexual relationships, both monogamous (with only one partner) and polygamous (with multiple partners).

Change over time

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The pattern on the map hasn't always been like this. The difference between the rates of HIV/AIDS in different African countries has changed over time.

The graph below shows the rates of infection over time for four African countries. Each of the curves show a very different pattern.



Source: US Census Bureau, International Programs Center, HIV/AIDS Surveillance Data Base (2002 release)

By 2003 the countries of southern Africa had the highest rates by far, and they seemed to be increasing. But this isn't necessarily the same for all countries and from the graph above, it's clear to see the differences between the countries.

The graph shows data on the percentage of pregnant women who are HIV+ for the capital cities of Kenya (Nairobi) and Uganda (Kampala) and for Francistown (the second city of Botswana) and for Kwazulu/Natal the most affected province of South Africa. These are representative of overall trends in these countries.

Differences and reasons for these differences

One of the most obvious differences is between Uganda (where rates have fallen) and the other three countries where rates are still increasing.

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Uganda was the most affected country up till about 1993, but since then it has been overtaken by most of the countries to the south.

Uganda is the only country in Africa where prevalence rates have fallen. The 2003 rate for Uganda is about 7%. This is much lower than the rates in the 1990s.

There are many reasons why Uganda is unique in having falling HIV rates, but the most important factor is the political leadership shown by President Museveni.

President Museveni regularly and colourfully encouraged open discussion of the problem of AIDS and the need for behavioural change - fewer sexual partners and 'safe sex' and abstinence.

This stands in great contrast to South Africa where rates were much lower than in Uganda or Kenya until about 1992. Up till 2003 there was political denial about the growing prevalence of AIDS at the highest levels of government, notably by President Thabo Mbeki.

Most recent data suggest that the African epidemic may be plateauing at the national scale, in Eastern and Southern Africa, and we can see this on the graph in the case of Botswana. The line for Botswana seems to be levelling off.

Data for 2002 (the most recently comparable data available) do not show large increases over previous data. However, no other countries have experienced the declines indicated above for Uganda.

Local variations

Because the main way in which HIV/AIDS is spread is through unprotected sex, there is a local pattern of spread that follows individual patterns of sexual partners.

Clearly long-term partners of those who are infected (such as husbands, wives, boyfriends, girlfriends) are likely to both become infected if adequate precautions aren't taken.

HIV/AIDS will spread into the population at large when people have multiple sexual partners. This can occur within their own local areas, but sexual infidelity is more likely where the couple are separated and alternative sexual opportunities are either sought or become available.

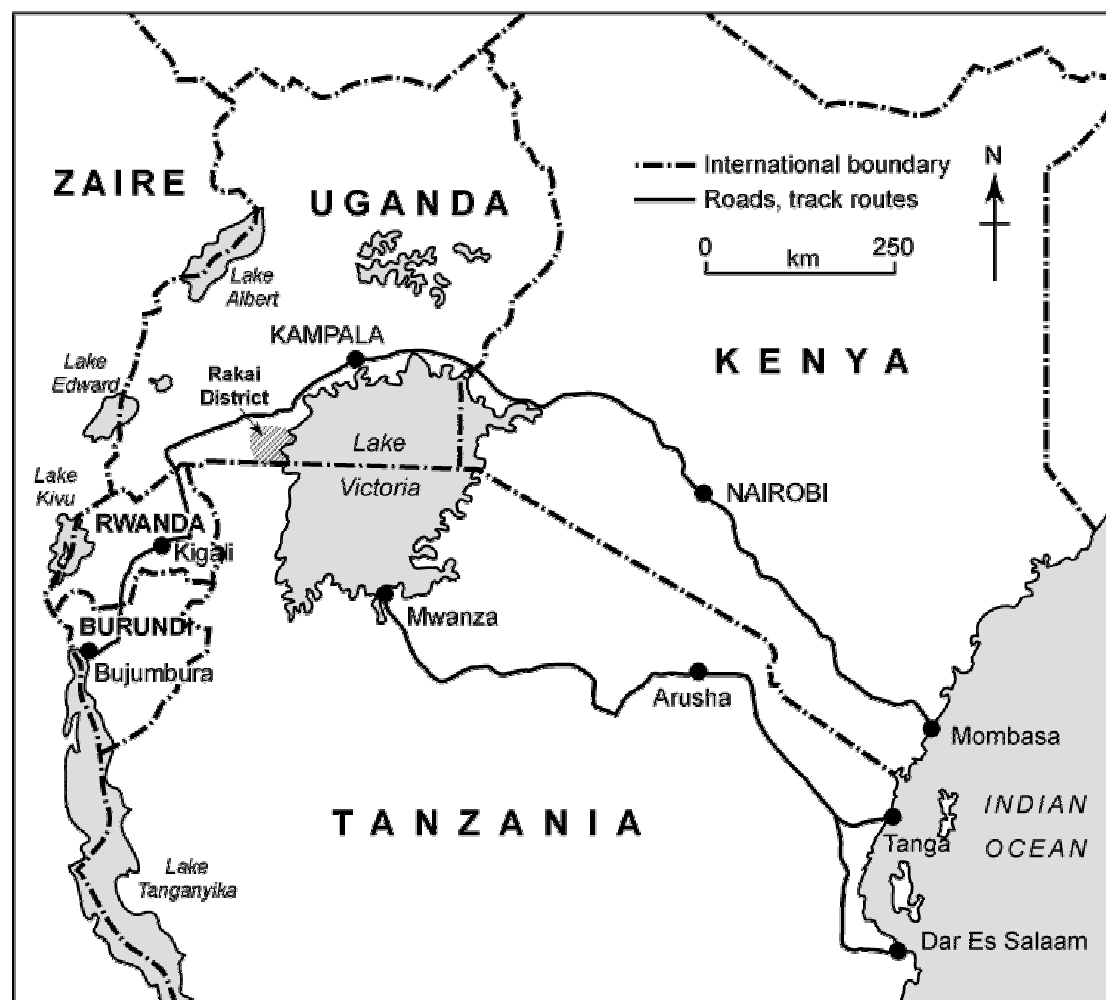
The spread of HIV/AIDS has therefore been strongly associated with population movements, and migrants are among the most vulnerable groups.

Migration and HIV/AIDS

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In Africa the early spread of HIV/AIDS was associated with long distance trucking routes and the role of truck drivers having relationships with commercial sex workers along the routes at truck stops.

The map below shows the area around Lake Victoria, highlighting the main transport routes.



The main Mombasa/Nairobi/Kampala/Rwanda/Congo highway shown in the map became a main highway of early transmission of HIV/AIDS.

The towns and small truck stops along this and other major routes quickly became areas of high HIV prevalence.

This was the focus of the spread of the epidemic in the early years, however subsequent diffusion has been away from these main roads and large towns.

More generally, migrants tend to go to towns to do business and to look for jobs, where they may have sexual encounters with infected persons.

In Africa, migrant labourers are highly vulnerable to HIV/AIDS.

This is especially important in southern Africa where the long-established contract migrant labour system keeps migrants away from home for the many months of their contracts, typically at mines, where they have access to commercial sex workers, mostly carriers of the virus.

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One important factor which has aided the spread of HIV/AIDS in Africa is that migration is often circulatory rather than permanent - i.e. people move away for a short time and then move back home again.

Because of this, when the migrants return home, they bring back not only money and goods acquired away from home, but may also return HIV+ and then infect their partners.

The picture below shows migrant workers getting on the bus in Kenya to go to find work in the capital: Nairobi.



The bus has also just dropped people off who are returning from Nairobi.

One of the main causes of the spread of HIV/AIDS to rural areas is circular migration - people move to the cities to work, become infected and then return to rural areas bringing the disease with them.

Rural / Urban variation

The spread of HIV/AIDS is most rapid in urban areas (towns and cities). In the early period in Africa urban areas typically had more than twice the prevalence rates of rural areas.

The graph below shows the difference in HIV/AIDS prevalence between different geographical settings and identified rural and urban areas.

This graph is based on data which come from blood tests on ante-natal women taken at a range of clinics and hospitals in Zimbabwe.

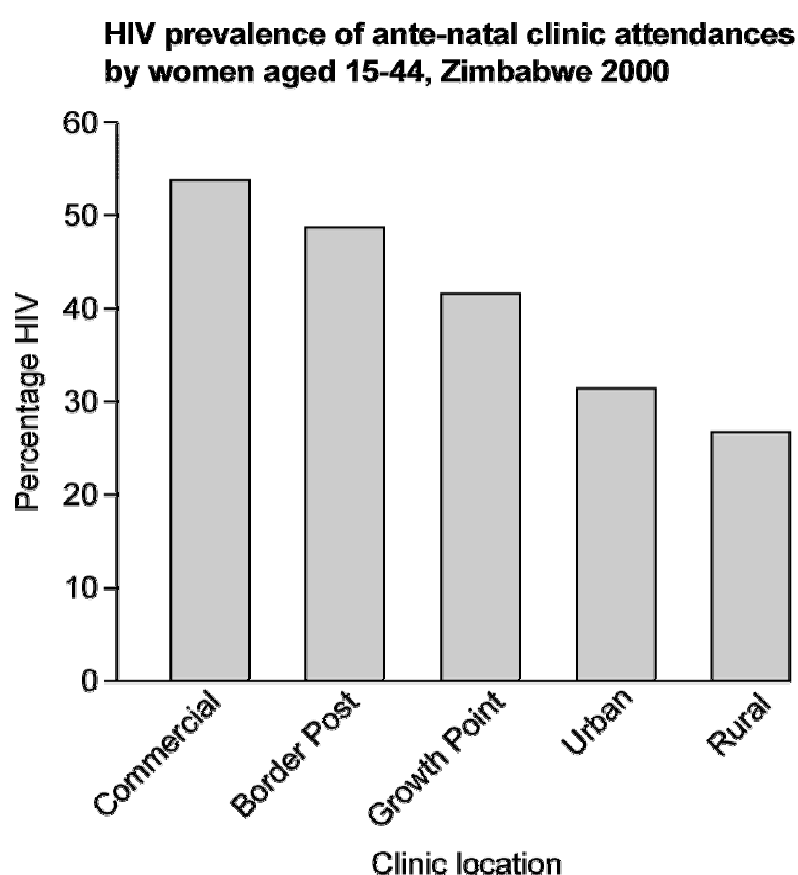
Highest prevalences, over 40%, are at clinics located in the major commercial centres, at border-crossing posts and at designated 'growth points'. These are all areas of greatest in-migration and population movement, the focus of major trucking routes and commercial sex workers.

Clinics in urban areas generally, including small towns, have rates of 32%, but clinics in rural areas record the lowest rates of 28%.

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Though the rates are higher in Zimbabwe than they are in most African countries, the gradation from large town to rural areas is typical. Rates are lowest in rural areas because the pool of infectives has been smaller, and traditional faithful marital relationships more likely. In urban areas, there are a large number of unmarried young people and higher numbers of sexual partners who are more likely to be HIV+.

However, in Zimbabwe, as elsewhere in Africa, the gap between rural and urban prevalence rates has been narrowing over time. Urban migrants, characteristically circular migrants, will regularly return to their rural home areas having experienced high risk sexual behaviour in town, and may then infect their spouses who remain behind, as well as others. Thus the pool of infectives in rural areas is likely to be growing more rapidly than in towns.



Source: Ministry of Health, Zimbabwe, 2002

Summary of graph:

There are several possible reasons for the difference between rural and urban areas:

- urban areas have the greatest concentration of migrants, separated from their families and traditional constraints on behaviour.
- in urban areas commercial sex workers are most active and have greatest demand for their services.

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- it is in urban areas that new relationships will be formed, especially among young migrants who are experiencing new social freedom.
- in urban areas, people tend to be in less stable relationships and have more sexual partners.

As well as it mainly being people in urban areas who contracted HIV/AIDS, in Africa, it was typically the educated elite that was affected.

Those who are educated tend to have looser ties to traditional family and community structures and so are more likely to have multiple sexual partners.

Control

While HIV/AIDS was originally higher in urban areas in Africa, infection rates have stabilised or even fallen in many urban areas. This is due to two main reasons:

1. Education campaigns have had most success in urban areas, especially among the educated. Changing behaviour to safe sex and having fewer partners has reduced urban rates and narrowed, but not eliminated, the rural-urban gap.
2. People in urban areas have much better access to ARV drugs. This is because those who are wealthy can afford the drugs, and because people in urban areas are likely to be closer to a hospital where they can receive the treatment than are people in rural areas.