

AIDS in Africa

Africa is the part of the world most severely affected by the AIDS epidemic. At least two million Africans are probably already infected with the virus that causes the disease

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THE COMPLETE history of AIDS will probably remain a mystery. What we do know about AIDS in Africa began in Europe in 1982 and 1983. In France and Belgium, physicians noticed that some of the people with AIDS were black Africans. There were none of the "classic" risk factors—male homosexuality and intravenous drug use—in these Africans, in stark contrast to AIDS patients in Europe and the US. From a clinical viewpoint, African patients suffered from the same symptoms as AIDS patients from Haiti, especially chronic diarrhoea, fever and loss of weight. On the basis of these and other observations, Jean-Baptiste Brunet in France and Nathan Clumeck in Belgium suggested that AIDS might be endemic in central Africa.

These reports caught the attention of several medical researchers with previous interest and personal involvement with central Africa, including Peter Piot and Philippe Van de Perre in Belgium and Joseph McCormick in the US. Their interest and personal contacts with health authorities in Rwanda and Zaire led to investigations in Kinshasa, the capital of Zaire and Kigali, in Rwanda, towards the end of 1983.

The researchers identified 38 patients with AIDS in Kinshasa and 26 AIDS patients in Kigali. They came to several key conclusions. First, they discovered that the disease AIDS, involving the same virus found in the US and Europe, was clearly occurring among Africans who had never travelled outside their country. Secondly, while the AIDS virus in Africans caused the same imbalance in the immune system of patients in Africa, the US and Europe, AIDS victims in Africa suffered from different clinical symptoms. Thirdly, roughly half of the African cases were women, compared with fewer than 10 per cent of cases in the US and Europe. It seems that heterosexual transmission was important in the spread of the virus in Africa. The lack of homosexual behaviour or use of intravenous drugs among AIDS patients, and the clusters of infections involving both men and women, all suggested this heterosexual link.

Once these results became known, the search began for signs of the virus that causes AIDS, called the human immunodeficiency virus (HIV), in samples of blood stored for several years after investigations into other diseases. Unfortunately, this "sero-archaeology" was a flawed endeavour, for several reasons.

To begin with, the early techniques for detecting antibodies to HIV were less accurate than the tests now available. These early tests often wrongly identified antibodies to HIV in blood samples, so-called "false positive" results. Another problem in testing old blood samples is that "false positives" can also occur, if, for example, the frozen blood has thawed and then been refrozen. To make the situation even more complex, many Africans probably have relatively high levels of antibodies, proteins that signal the body's attempt to fight the disease, in their blood, as a result of having other infections, such as malaria. These numerous antibodies tend to bond to one another and cause blood samples to become "sticky", which may lead to false positive results with some tests. For all these reasons, scientists now believe that some of the early estimates of the prevalence of HIV in Africa are inaccurate. For example, one claimed that in 1972-73 two-thirds of Ugandan children were infected with HIV.

Nevertheless, some data are more reliable. For example, two of the best techniques of testing blood samples for antibodies to the HIV showed that a sample of blood taken from

central Africa in 1959 contained antibodies to HIV. Also, in 1976 a Danish surgeon who worked in Africa in 1972-75 developed a disease that clinicians now think was AIDS.

Researchers combed medical records of Europeans who had lived in or visited Africa, as well as medical records in African countries, seeking evidence of old cases of AIDS. They found few if any cases diagnosed before 1978. Then suddenly, about 1978, an epidemic of illness apparently began to occur in Africa. Physicians in several countries realised almost immediately that something had changed. For example, in Kigali, Rwanda, doctors found in 1983 a marked increase in fungal infections of the oesophagus, called candidal oesophagitis. This kind of infection is typical of AIDS patients and is otherwise unusual.

To take another example, a Belgian researcher and several Zairese colleagues looked for cases of cryptococcal meningitis, a fungal infection of the coverings of the brain. This disease is also important because it is highly suggestive of AIDS. Their work started before 1960 and continues to the present day. These researchers found that there was a sudden epidemic of cryptococcal meningitis in 1978, and what is more, the epidemic paralleled the spread of HIV.

Finally, "slim disease" in Uganda—the name recalls the wasting away of AIDS patients in Africa—seems to have started in the early 1980s. An epidemic of an atypical and aggressive form of Kaposi's sarcoma, a malignancy often linked with AIDS, started in 1982 in Zambia.

All this suggests that the AIDS epidemic seems to have started in Africa in the late 1970s and early 1980s. This is the same time that epidemics began in the US and Haiti. We will probably never know whether cases of AIDS cases were occurring in the early 1970s or before, and, if so, where and to what extent.

Focus on Central Africa

The discovery of AIDS in central Africa stimulated a series of research projects involving national and international teams. For example, in May 1984 the Zairese government invited researchers from Belgium's Institute of Tropical Medicine in Antwerp and the US's Centers for Disease Control and National Institute of Allergy and Infectious Diseases to establish a long-term AIDS project in collaboration with local physicians and scientists. The research became known as "Projet SIDA" (SIDA is French for AIDS). This is just one of many research projects in more than a dozen African countries, most notably in Kenya, Tanzania, Uganda, the Central African Republic, Zambia, the Congo and Rwanda. These projects have provided the basis for what we now know about AIDS in Africa.

In Zaire, where I worked on Projet SIDA, I was impressed by the foresight of the Zairese government in establishing a research project on AIDS. It was a courageous decision because Zaire was the first African country to permit research on AIDS on such a large scale. In fact, this willingness had a disadvantage; for some time, the media thought that Zaire was the centre of the AIDS epidemic in Africa, or at least the most severely affected area. This mistake arose simply because of good research from the Zairese project produced so many scientific publications.

It is difficult to gauge the spread and the seriousness of AIDS in Africa. African countries lack diagnostic equipment and testing facilities. Systems for reporting AIDS cases are in the early stages of development. In some instances,



Africans with AIDS often develop slim disease, which can be confused with malnutrition. Yeta is 24, and has had "slim" for two years

authorities were reluctant to report new cases of AIDS. This was understandable given that nearly as soon as AIDS was discovered in Africa, some scientists in the West started to tell the press that AIDS started in Africa.

"Finger pointing" like this is typical of many aspects of the AIDS epidemic. Everyone seems to want to claim that the disease affects only "others", and came from "elsewhere". Some Western scientists fuelled the climate by exaggerating the sexual habits of Africans. Understandably, this combination of accusation and misinformed perception created considerable anger and resentment in Africa. Imagine, if you will, that a prominent German researcher announced in the media that the virus started in Britain and spread due to the bizarre sexual habits of the British.

What we know at the moment is that the AIDS epidemic is worse in Central, Eastern and parts of Southern Africa. During the past year, researchers have found new retroviruses similar to HIV in West Africa, at least some of which appear to be associated with clinical illness indistinguishable from AIDS. In any event, West Africa does not seem to have the same level of AIDS as other parts of Africa.

The number of AIDS cases turns out to be a much less useful measure of the severity of the problem than the proportion of persons infected with HIV in the population. The disease AIDS has a long incubation period and, therefore, may not appear until years after infection with the virus, HIV. So testing blood for antibodies to the virus is the best way to gauge how far the virus has spread.

Published studies of this kind on healthy adults in several African countries show that the virus has infected between 1 to 15 per cent, perhaps even more, of these people. For example, of a sample of 1273 people in surveys of families living in the Cameroon, 1 per cent of these people had antibodies to HIV, that is, they were "seropositive"; of 1263 persons from randomly selected households in Bangui, Central African

Republic, 4 per cent had HIV antibodies in their blood. In Uganda, 11 per cent of 370 blood donors in Kampala were seropositive. Finally, 17 per cent of 125 healthy persons in Lusaka, Zambia, proved to be positive for HIV antibodies. These figures indicate that, at least in some areas, a substantial proportion of currently healthy people are already infected with HIV virus. While direct comparisons with studies in other parts of the world may be somewhat misleading, only 0.04 per cent of over a million blood donors in the US and 0.15 per cent of 308 078 applicants for military service in the US had antibodies to the virus.

Among African adults, the highest proportions of infected persons were between 16 and 29 years of age. In some published studies, among women, about 10 per cent of 16- to 19-year-olds had HIV antibodies, compared with about 4 per cent of men. However, among persons 50 years of age and older, more men than women were seropositive—5 per cent, as against 1.6 per cent. Children from 1 to 14 years old in Kinshasa were much less likely to be infected, with a prevalence of about 1 per cent.

In another African country, we learnt another key lesson from research projects studying sexually transmitted diseases. The projects showed that in 1980-81, 4 per cent of a group of female prostitutes, and none of the pregnant women in the survey, were seropositive for antibodies to HIV. However, by 1985-86 infections with HIV among female prostitutes had increased to 59 per cent, while the virus had now infected 2 per cent of pregnant women. This shows how quickly HIV can spread.

In Africa, the virus infects men and women nearly equally. However, men with AIDS disease tend to be older than women, with one study showing average ages of 37.4 and 30 years, respectively.

The most important AIDS research conducted in Africa between 1984 and 1985 involved studying the way in which

the virus is transmitted. This information is vital if we are to prevent the spread of the virus. Many rumours were current at this time about AIDS in Africa: Could it be spread by shaking hands? Or being bitten by a mosquito? Or by caring for AIDS patients in the hospital? In other words, Africans were asking the same questions as Europeans and Americans when faced with this new and fatal infectious disease.

Heterosexual contact accounts for approximately 75 per cent of infections of HIV among adults in Africa. Evidence from individual interviews and surveys among prostitutes indicates that "regular" (penis in vagina) sex transmits HIV. There is no need for "unusual" or "bizarre" forms of sexual contact for the virus to spread. One theory of great interest suggests that men or women who have sexually transmitted diseases such as gonorrhoea, syphilis or chancroid may be more likely to catch HIV from an infected partner, due to the presence of sores or inflammations of the genitals. In the same way, a person already infected with the virus who then develops another sexually transmitted disease may be more likely to spread HIV.

Contaminated blood

Blood transfusions are another important route for the spread of the virus in Africa. The reason is simple: in areas where 10 per cent of the healthy adult population is infected, about the same proportion of blood donors are also likely to be infected. The spread of HIV by contaminated blood transfusions is a tremendous problem in Africa, which could be eliminated if the infrastructure and financial means existed to test blood for antibodies to HIV. In the West, governments have spent a great deal on screening blood and protecting blood recipients from a risk estimated to be 1 in 100 000 of catching HIV from a blood transfusion. In Africa today, the risk of blood recipients may be as high as 1 in 10, yet in many areas blood is still not screened.

The spread of HIV in Africa obeyed the same basic biological laws which seemed to cause the spread of the virus in Europe and the US. In Africa, however, the dominant form of transmission is heterosexual, from infected women to their male sex partners and from infected men to their female

partners. There is plenty of evidence to support this. Male homosexual behaviour is apparently rare among people infected with the virus. Clusters of AIDS cases are linked by sexual contact involving both female-to-male and male-to-female spread. Men with AIDS report having had more sex with prostitutes than men not infected with HIV. People with other sexually transmitted diseases appear more likely to be infected with HIV. Some expatriate men (European, American, or Asian) who lived in or visited Africa have become infected with HIV, and report no other risk factor except having had sex with female prostitutes in areas of Africa where AIDS is endemic. Finally, studies of female prostitutes in several African countries demonstrate that these women are up to five times more likely to be infected with HIV than other women in the same area.

A distressing example of how HIV is blood-borne comes from a study of children between 1 and 24 months old and infected with the virus but whose mothers are not infected. The babies must, therefore, have become infected after birth. Compared with uninfected children of the same age, the infected children had received an average of 44 medical injections (vaccinations not included) compared with an average of 23 medical injections for uninfected children. The relatively large number of injections that even uninfected, healthy children in Africa have led to a small study of 50 mothers. Eighty-four per cent of these mothers believed that medication by injection was more effective than oral medication. Virtually all the women wanted their children to receive injections rather than pills. These attitudes, along with possible overreliance on injections by health workers, and combined with the high incidence of malaria, other fevers and diarrhoea among infants and young children in Africa, have led to children in Africa receiving large numbers of injections. For many reasons, often financial, health workers may not sterilise or discard needles and syringes after use. This is true especially in small or isolated clinics. The stage is set for injections to help the spread of HIV in Africa.

Studies have not implicated childhood immunisations, as opposed to injections to treat diseases, as a source of HIV infection among children. However, in theory, there is a risk

Why mosquitoes do not spread AIDS

PROBABLY the most commonly asked question about AIDS in Africa is whether the virus spreads through mosquitoes or other blood-sucking insects. Fortunately, the answer is no. However, because so much has already been written about this subject, it is worth looking at the question in some detail. In theory, there are two ways in which a mosquito or other insect could transmit HIV, the virus that causes AIDS; biologically or mechanically.

Malaria is biologically transmitted when the malaria parasite enters the mosquito, thrives and then makes its way to the insect's salivary glands, from which it is injected into another person. This sequence of events is unlikely for HIV because the virus appears to replicate in a narrow range of mammalian cells.

The second hypothesis is mechanical transmission, with the virus spreading on the insect's mouthparts which might become contaminated with blood containing HIV. If a mosquito bit a person infected with the virus and was then disturbed, so that it interrupted its feeding, the insect could then fly off to bite another person and perhaps the virus on its mouth parts could be injected into the second person. According to this theory, the insect would then operate like a very tiny

contaminated needle.

The evidence against mechanical transmission comes from several sources. First, the age and sex distribution of people infected with HIV in Africa is typical of a sexually transmitted disease. If insects spread HIV, there should be just as much, possible more, infection among young children and old people as among people between 20 and 40 years old. Thus, for example, malaria is common among infants and young children in these areas.

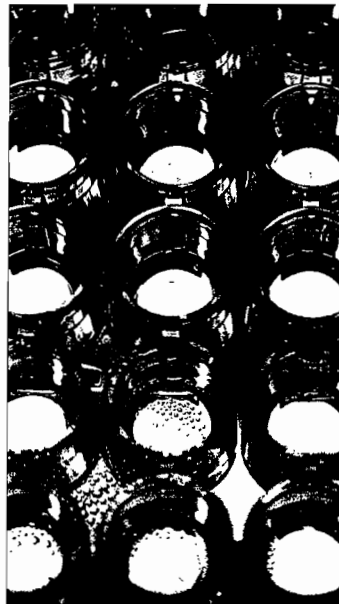
Several studies among families of AIDS patients in Africa show that people who live in the same household as AIDS patients were no more likely to be infected with HIV than members of households without an AIDS patient. The exception to this was if they were the sexual partner (spouse) or child of the AIDS patient. Thus, in Africa as in the US and Europe, researchers have not found that the virus spreads among people living together, except for sexual partners and transmission between mothers and children. If mosquitoes, bedbugs, lice or other insects living in a crowded African home could spread the virus, we would have expected to find more infected people in the households of AIDS patients.

Another reason why transmission by

insects is unlikely is the tiny amount of blood on an insect's mouthparts, together with the small quantity of the HIV that seems to be present in the blood of infected persons. These combine to make mechanical transmission even less likely. Also, we know of no expatriates who became infected with the virus while in Africa and whose route of exposure (usually sexual contact) could not be identified.

Finally, we must ask what evidence we require to refute the mosquito hypothesis. It is impossible to prove that something cannot ever happen. During the two years I lived with my wife and three young children in Zaire, we received many insect bites and one child contracted malaria. And yet we were justified in never worrying about infection with HIV virus.

The studies of families of people with AIDS also allow us to discount theories about casual spread of AIDS by contact. Also, studies of hospital workers showed that HIV was no more contagious from hospital patients to hospital staff in Africa than in the Western world. All the evidence leads us to conclude that the virus is transmitted everywhere in the world in the same basic ways (sex, blood and mother-to-child), although there are important geographical and social variations. □



Blood tests in Africa: yellow samples are negative, the rest positive. Babies of AIDS carriers have a bleak future

of HIV spreading with any injection given with non-sterile equipment. Luckily, the programme to immunise children in Africa has stressed the need for sterile equipment for years, well before AIDS became a problem.

When the virus infects a pregnant woman, it seems that her child has a roughly 50 per cent chance of also becoming infected with the virus. Most researchers believe that the virus is transmitted both during pregnancy, *in utero*, and during birth itself. Transmission during birth could occur, as it does with the hepatitis B virus, when the baby comes into contact with the mother's blood and other body fluids. Important studies are already under way in at least three African countries to learn just how many infants of mothers with HIV are infected and how they became infected.

In Africa, AIDS in children is already a serious problem. For example, studies in some areas show that between 2 to 10 per cent of pregnant women are infected with HIV. Thus, half of the children born to these mothers in these areas may be infected with the virus from birth. This seeding of the newborn population with HIV threatens to undermine the health gains made in these areas through immunisations, reduction in death from diarrhoea and other important health programmes.

At this time, Africa is the part of the world that appears to be most severely affected by the AIDS pandemic. The World Health Organisation (WHO) estimates that 2 million or more Africans may already be infected with the virus, out of possibly 5 to 10 million worldwide. In some hospitals in Central, Eastern and Southern Africa, many of the patients in adult medical wards have AIDS or related diseases. The effects of HIV in weakening the immune system of infected persons, also makes epidemics of other, already endemic diseases such as tuberculosis and possibly malaria, more likely. AIDS also threatens the economic and social development of Africa because it affects young people between 20 and 30 years old, the age group that does most to help a country's economy. The AIDS epidemic in Africa touches children and mothers. The epidemic shows signs both of spreading to previously unaffected areas as well as becoming even more serious in the areas already affected. To this already dramatic situation, we must add the recent discovery of new retroviruses in West Africa that also cause AIDS.

We already know how HIV spreads, so we can prevent the further spread of AIDS in Africa. The WHO's strategy involves the formation of a National AIDS Prevention and Control Programme in each country, starting with a committee of people from the fields of health and social services, education and women's issues. The committee first determines the level of infection in a country and assesses the resources available in that country to tackle the problem.

Curtailling the spread of AIDS requires information and

education. There are those who claim that sexual habits will never change, but history disproves them. Sexual habits, like all aspects of personal and social life, are strongly influenced by real dangers. People may look upon a condom to prevent pregnancy in an entirely different way to using a condom to save their lives.

We do not minimise the complexity and the difficulty of preventing the spread of AIDS. However, by using the techniques and lessons derived from public health education, the WHO can assist countries that are developing their own educational programmes.

Prevention of transmission through blood transfusions requires donated blood to be screened throughout Africa. There is a need for a simpler, reliable, cheap and heat-stable test for antibodies to HIV which is adapted to countries where electricity may be intermittent, cold storage unreliable, supplies difficult to obtain and equipment hard to maintain.

All this, and our limited knowledge about sexual practices in particular, and about human behaviour in general, limits our ability to combat AIDS. This lack of information is not an African phenomenon; Western countries know less about sexual practices and other behaviours that increase the risk of spreading AIDS than is desirable to combat the disease.

One occasionally hears criticism that African countries have moved slowly in dealing with the threat of AIDS. From my viewpoint, given that AIDS was recognised in Africa only toward the end of 1983, the willingness of most African governments to undertake preventive measures speaks for itself. Indeed, the response of Western governments to AIDS has not always been as prompt or well reasoned.

With the same commitment that resulted in the eradication of smallpox a decade ago, the WHO is now dedicating itself to the more urgent, more complex and more difficult task of global prevention and control of AIDS around the world. We are at an historic moment, at the beginning of a worldwide epidemic. We know that action now will have more impact than action later on. The WHO's special programme on AIDS will work not only in Africa, but in South America, Asia and throughout the world. In contrast to many important public health problems, AIDS affects the industrialised world as severely as the developing world. The work to be done is vast, the resources we need are considerable, and the pace at which the disease spreads is daunting. Yet, increasing public awareness of the importance of the AIDS pandemic, the confidence we have in international scientific research and the global scale on which we are trying to prevent and control AIDS, give reasons for tempered optimism. □

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