

EIR Science & Technology

Is the AIDS disease really environment-based?

The address of the Miami Institute of Tropical Medicine's Dr. Mark Whiteside was delivered at a conference on AIDS in Bangkok, Thailand.

This speech was given at a conference jointly sponsored by EIR and the Lions Clubs of Bangkok on July 9.

My name is Mark Whiteside. I would like to be here in person to address you, but in my absence I have asked Dr. John Grauerholz to deliver my message. For several years I have been involved in a scientific debate with officials of the Centers for Disease Control [CDC], concerning the role of environmental factors in the AIDS epidemic. I do not believe CDC pronouncements that AIDS is caused by a single virus, HIV, that travels exclusively by blood or sexual contact. I strongly disagree with CDC conclusions about transmission of AIDS in South Florida, the area where I live and work. Since the CDC has refused to release certain information we requested under the Freedom of Information Act [FOIA], we are seeking a court order to compel them to give us this data. Our pending court date is the reason I am unable to be here today.

There is a great need to examine CDC's data; if this data supports environmental transmission of AIDS, then this conclusion will have vast implications for our understanding and eventual control of this disease. When hundreds of cases of AIDS and tuberculosis cluster in the poorest environmental areas of South Florida, something must be done to combat this public health emergency. Disease spread exclusively by sexual contact or contaminated needles does not confine itself to poor neighborhoods. Any educational program to control

AIDS that does not incorporate environmental improvements and basic public health measures is doomed to fail. In the United States, we have failed to develop comprehensive programs that will prevent the spread of AIDS and related diseases. I hope and pray that health officials in tropical regions of the world will not make the same mistakes.

Allow me to share with you my perspective. I am a medical doctor, M.D., with training in internal medicine, infectious, and tropical diseases. Together with my partner, Dr. Caroline MacLeod, and through the private, nonprofit (and fully independent) Institute of Tropical Medicine, Miami, Florida, I have done clinical work and research (including field studies) on AIDS since 1982. Over the past few years, I have seen and treated hundreds of persons with AIDS, and done field studies in the highest risk areas for AIDS in the United States. For three years (1984-87), I worked as a consulting physician with the Palm Beach County Health Department in Belle Glade, Florida. I have worked with all the so-called "risk groups" for AIDS, and as many heterosexual or "no identifiable risk" cases as anyone in the country. My view of AIDS as a tropical and environmental-based disease has been shaped by this experience.

I believe that AIDS is an environmental-based, probably insect-transmitted disease, with secondary transmission by other blood mechanisms, i.e., blood introduced directly, dirty needles, and sexual practices that break the skin or lining of the skin (mucosa). It should be evident that AIDS is a blood-



"Any educational program to control AIDS that does not incorporate environmental improvements and basic public health measures is doomed to fail." (A scene in the nation's capital, Washington, D.C.)

transmitted disease that satisfies none of the classic criteria for a strictly sexually transmitted (or venereal) disease. Environmental blood means of transmission—for example, massive exposure to blood-sucking insects, open sores, and crowded living conditions, etc.—have unfortunately been overlooked, sidestepped, or purposely ignored.

Why has the environment been so sorely neglected? Why have studies designed to prove (or disprove) environmental transmission of AIDS not been carried out? This is a subject for speculation. Surely, the identification of environmental factors is not "frightening," in the sense that once it is recognized, much more can be done about it. At the very least, the concept that AIDS is completely the result of "behavior" (shooting drugs, or promiscuity) represents a narrow-minded and prejudiced attitude of the officials making current policy. At the worst, it represents a callous and cynical "write-off" of the poorest and most disadvantaged populations that AIDS hits the hardest.

AIDS is slowly becoming a worldwide disease, with the greatest number of cases in Africa (Central Africa, with some spread to East and West), the Caribbean, South America (especially Brazil), and of course, North America and Europe. Already, the disease is one of the general population, men, women, and children, in Africa. In the United States, we are accustomed to think of AIDS in "risk groups," with the majority of our cases concentrated in homosexual men, bisexual men, and intravenous drug users. This type of thinking has not curbed the epidemic, and no doubt led to discrimination, misdirected research efforts, and a complacency on the part of the public. While all along we have had a few

cases in recipients of contaminated blood products, infants born of mothers at risk for AIDS, or heterosexual partners of persons with (or exposed to) AIDS, it is clear to the careful observer that the disease is gradually spreading to the general population. Homosexual men and IV drug users might well be considered "sentinel populations" where the disease was first concentrated.

Countries of the world where the AIDS epidemic is still "young" (this includes many countries in Asia) have the chance to benefit from the knowledge accumulated to date, and also from the mistakes of the past.

How does AIDS spread?

How does AIDS spread from person to person? Sexual practices that are apt to break the skin, such as rectal intercourse, allow infected body fluids, for example, semen, to enter the lymphatics and blood stream. Male-to-female transmission occurs when infected body fluids enter vaginal, rectal, or, less commonly, oral mucosa. Female-to-male transmission of AIDS is shown to occur primarily when both partners have sores or openings in the genital area. The partner receiving infected fluid, male or female, is more likely to become infected.

Sexual practices that break the skin and allow blood contamination are considered an "indirect parenteral route," the same as the way in which hepatitis B can be transmitted. Shared needles, transfusion of contaminated blood products, and transplacental (or perinatal) transfer of virus from mother to fetus or infant are more obvious direct means of blood transmission.

Most of the person-to-person means of transmission are at least potentially preventable; i.e., "safe sex," or no sex between individuals when one is exposed, screening, avoidance of exposure to contaminated blood products, and avoidance of pregnancy and/or early abortion in infected mothers of child-bearing age.

Here we must pause for an "aside" about AIDS prevention. Education, safe sex, and condoms are currently promoted as our only salvation against the spread of AIDS. Education, unfortunately, has never stopped a killing epidemic in the history of the world. Some clarification of these educational guidelines is in order. "Safe sex" means no exchange of bodily secretions. Obviously, the best protection is to avoid any sexual contact with an infected individual. "If there is any doubt, don't do it."

The truth is that a good latex condom is at best only 80-90% effective, if one partner is already infected. It seems to me that to promote condom use, without this type of clarification, is ridiculous and irresponsible. There is no choice for IV drug users except to stop, if it is not already too late. Although the subject is currently being debated in the United States, it is my view that to hand out clean needles to drug addicts is to condone murder. Ultimately, the campaign for safe sex, no sex, and clean needles, no needles is necessary but insufficient to control the AIDS epidemic. I think that promoting this message (as we have done in the United States) is a most unfortunate kind of "wishful thinking" that will inevitably lead us down the road to disaster.

What about 'heterosexual' AIDS?

The coming debate is over how much AIDS will be transferred between men and women. Heterosexual AIDS accounts for a small but growing percentage of cases in the United States; however, in the tropics, it accounts for a significant (or even majority) percentage of cases. In South Florida (subtropical environment), already 20-30% of AIDS occurs in heterosexuals without another risk factor for the disease. In the United States, as a whole, so-called "heterosexual" AIDS (including many reclassified from unknown categories), shows an overwhelming concentration in poor, black, and Hispanic populations on the Eastern and Southern coasts of the country. The "Hispanic" label usually means Puerto Rican or origin in another Caribbean country.

While heterosexual transmission of AIDS is now established, I think it is relatively less efficient than, for example, by homosexual practice, and more readily occurs from men to women than from women to men. Since there is a nearly equal sex ratio of AIDS in Africa, the disease would have to be transmitted in both directions to explain all the cases. This observation is not supported by the obvious anatomical differences between men and women, by the low levels of virus in cervical secretions, by the five-to-one female-to-male heterosexual AIDS cases in the United States, and by the low number of men known to have been infected by female part-

ners.

I think the studies implicating heterosexual transmission as a major means of transmission of AIDS in tropical areas have been flawed by overwhelming bias, inadequate controls, and lack of perspective information. In these studies, if a person had sex with another person at risk for AIDS, that was assumed to be the mode of transmission, to the virtual exclusion of any other means of transmission. We have spoken before of the importance of genital ulcers as a predisposing factor for heterosexual transmission of AIDS. If you believe that AIDS is, first and foremost, a heterosexually transmitted or venereal disease in Africa, then the conclusion must be twofold: 1) all Africans with AIDS are sexually promiscuous; 2) all men with AIDS in Africa have sores on their penises.

In the absence of better data, the conviction that AIDS can be explained by sexual habits or by promiscuity among poor people in the tropics or by poor black and Hispanic populations in the United States seems to me a narrow and racist attitude.

The role of the environment

Now, let us move on to the role of the environment. AIDS corresponds to the insect belt in many parts of the world. Such tropical tumors as Kaposi's sarcoma and Burkitt's lymphoma were always linked to such environmental conditions as climate, rainfall, and altitude. The distribution of these tumors correlated with high rates of malaria and insect-borne virus (arbovirus) infections. Woodall et al. showed a correlation between Kaposi's sarcoma and antibody to Bunyamwera (insect-borne virus) in 1962. Some recent studies show correlation between antibodies to falciparum malaria and antibodies to retroviruses, for example, HIV.

Parenthetically, a CDC study disputes this. Quinn (*JAMA* 257, p. 2617, 1987) hypothesized that multiple infections in Africa served as "co-factors" to activate T-lymphocytes and allow more ready penetration of HIV. Interestingly, the infections he mentions as co-factors (malaria, filariasis, leishmaniasis, and trypanosomiasis) are all insect-transmitted! Many of the opportunistic infections in AIDS are known to have a reservoir in the environment, for example, pneumocystis carinii in rats, toxoplasmosis in cats, cryptosporidium in fecal material from animals, etc.

Many scientists accept hepatitis B (serum-hepatitis) as a model for the transmission of AIDS. Several studies have implicated environmental means, for example, needles, blood-sucking insects, and open sores in the transmission of hepatitis B in highly endemic areas. The high rates of hepatitis B among children in some parts of the tropics is not explained solely by perinatal mechanisms, and therefore, environmental mechanisms must be invoked. The significant percentage (15-20%) of AIDS in Africa occurs in children, only 50-60% of whom have seropositive mothers; how do you explain the remaining 40 or so percent? The CDC and

WHO ascribe the remaining 40% to contaminated blood and to unsterilized needles. Surely this does play a role, but here again, they haven't looked at other environmental factors. So-called "risk groups" in the United States and Europe have high rates of exposure to hepatitis B, presumably acquired by the same direct and indirect blood mechanisms discussed earlier.

Arboviruses and AIDS

For several years, Dr. MacLeod and I have been studying the role of certain arthropod-borne viruses (arboviruses) in relation to AIDS. The introduction of AIDS into the Caribbean in the late 1970s corresponds with epidemics of insect-borne viral diseases. Dengue type I (from Africa) was introduced for the first time in the Western Hemisphere in 1977, causing disease throughout the Caribbean; and dengue hemorrhagic fever occurred for the first time in 1981-82. Other new viral agents were probably introduced at the same time, but many remained undetected.

We became fascinated with concurrent epidemics of arboviruses and AIDS associated with deteriorated public health conditions in Africa, the Caribbean, Latin America, and parts

of the United States. We were surprised to find a "tropical link" between our early AIDS patients, most of whom either traveled to the tropics (for example, Caribbean), or had sexual contact with persons from these areas.

We have postulated that repeated exposures to certain arboviruses silently destroys the immune system, allowing HIV and other opportunistic infections to cause more severe disease. The variable incubation of AIDS could be explained by the phenomenon of immunologic enhancement of infection, in which repeated exposure to closely related viruses leads to worse disease. Dengue hemorrhagic fever is the *in vivo* model of immunologic enhancement of infection, where low (sub-neutralizing) concentration of antibody to one dengue subtype makes infection with a second dengue subtype over time potentially much more lethal.

Certain arboviruses are known to destroy reticuloendothelial and neurologic tissue. Prodromal symptoms, hematologic changes (lymphopenia, monocytosis, thrombocytopenia) and immunologic abnormalities (B-cell activation, hypergammaglobulinemia, immune complexes, elevation of monocyte lysosomal enzyme, anti-T-cell antibodies, etc.) are similar between AIDS and arbovirus infections. Arboviruses

'Do not accept the policies of the WHO'

The following message was sent to the Bangkok AIDS conference by Dr. John Seale, a member of the Royal College of Physicians, from London, England July 6.

I regret that I have been obliged to cancel my visit to Thailand. I would like to relay this message to the people of Thailand:

Do not accept the policies for controlling AIDS advocated by the World Health Organization without first considering the following facts most carefully:

1) WHO claims to be taking action on a global scale to contain the AIDS epidemic. It states that the only effective action available is education, and the key defensive weapon is the rubber condom.

2) The modes of transmission of the AIDS virus are very similar to those of Hepatitis B virus, but most people in Southeast Asia are infected with hepatitis B virus as children, before they become sexually active. Consequently, WHO's faith in the condom seems to be misplaced.

3) Official World Health Organization policy rejects any restriction on the international movement of people

infected with the AIDS virus.

4) Official WHO policy rejects the testing of people for the AIDS virus as a requirement before entering a country in which AIDS is not yet epidemic.

5) Doctors from the Soviet Union for the last 10 years have held the key positions within WHO responsible for the control of viral diseases worldwide.

6) Contrary to WHO policy, the Soviet government compulsorily tests people for the AIDS virus before they enter the Soviet Union. It promptly deports all foreigners found to be positive, and segregates its own infected citizens from the rest of the population.

7) Agencies of the Soviet government have stated repeatedly since October 1985, that the AIDS virus was developed artificially, as a weapon of biological war, by injecting lethal viruses from other animals into humans used as guinea pigs. The Soviet statement about the origins of the human AIDS virus is scientifically possible, but the claim that American war scientists started the epidemic by infecting the American population by mistake is not credible.

Conclusion: Serious consideration must be given to the possibility that the Soviet government's actions within the Soviet Union are designed to minimize the spread of AIDS in the U.S.S.R, but that Soviet policy, as expressed through WHO, is aimed at maximizing dissemination of the virus throughout the populations of the rest of the world.

can be transmitted by a blood transfusion, sexually from male to female, perinatally, and by direct contact with infected material. Arboviruses are known to activate animal retroviruses.

We are currently looking at Bunyamwera serogroup arboviruses, as co-factors in AIDS. Of the 20 members of this group worldwide, there are seven in North America, seven in South America, five in Africa, and only one (batai) in Asia. This group of viruses exchanges genetic material (RNA pieces) to form new and potentially more virulent agents. They show the same phenomenon of immunologic enhancement of infection demonstrated for dengue and other group-B flaviviruses. We have shown that the majority (80-90%) of our patients with AIDS in South Florida have antibodies to Maguari, the Bunyamwera virus native to the Caribbean and South America. Arbovirus antigen has been found in intestinal tissue of patients with AIDS by electron microscopy, and we have tentatively identified this antigen as Tensaw/Maguari complex by a fluorescent antibody method.

Most scientists now believe that AIDS is caused by a retrovirus called the human immunodeficiency virus, HIV. It should be pointed out that this virus (while the most important marker for exposure to the disease) has not been proved to be the cause of AIDS, and retroviruses are actually expected opportunistic agents in this setting. In the test tube, HIV must be "switched on," or activated from its normally latent state before it will enter cells and cause disease.

While HIV is considered to be exogenous and horizontally transmitted (through a blood mechanism), many animal retroviruses are simply inherited as a provirus form (sequence of DNA) and genetic material. Veterinarians have known for a long time that the closest relatives to HIV in animals are transmitted "mechanically" (that is, on the mouth parts) by blood-sucking insects in conditions of crowding and abundant insect populations. These viruses include the lentivirus, equine infectious anemia (in horses), and also bovine leukemia (in cows). Researchers at the Pasteur Institute in France have identified HIV antigen in the genetic material of several different blood-sucking arthropods captured in Central Africa. Researchers in the United States, including ourselves, and also elsewhere, have demonstrated survival of HIV for 24-48 hours in a variety of insects, including mosquitoes, ticks, and bedbugs.

The scientific "proof" of arthropod transmission of HIV and AIDS lacks only human and animal studies, which either haven't been done or can't be done because they would be unethical.

Putting pins in the map

It would seem that we have forgotten many of the lessons learned from fighting epidemics in the past. One of the first steps of the epidemiologist is to "put pins in the map," or to locate new cases of the disease. Mapping AIDS and tuber-

culosis in South Florida (a similar pattern has been found in New York) has shown an overwhelming concentration of these two diseases in poor neighborhoods with declining or collapsed public health conditions. We found that our Haitian patients with AIDS came from poor conditions in their own country to poor conditions in the United States. We visited the homes of our patients in Little Haiti (in Miami) and documented serious public health problems, including inadequate housing (usually caused by overutilization of resources), overcrowding, open waste, and high rat and urban mosquito populations. We conducted our first environmental surveys here, and brought this technique with us to Belle Glade, Florida.

Belle Glade is an isolated, rural, agricultural community in western Palm Beach County, Florida. Belle Glade is the best example of the "tropical pattern" of AIDS in the United States, and singlehandedly proves that abject poverty and squalor in the subtropical setting help to generate and sustain deadly epidemics. Belle Glade has the highest rate of AIDS in the United States (8 per 1,000). Over 50% of AIDS cases do not fall into an established "risk group," and, finally, all persons with AIDS lived in one of two central, economically depressed, i.e., slum, neighborhoods. Belle Glade has an extremely high rate of tuberculosis confined to the same poor neighborhoods.

I will again state my contention that strictly sexually transmitted diseases do not confine themselves to geographic regions or to a single poor neighborhood. Certain environmental and insect-borne diseases do cluster at times, due to the high level of exposure to environmental hazards and vectors of disease.

The federal Centers for Disease Control (CDC) recently completed their own study of AIDS in Belle Glade, Florida. They concluded (*Science* 239, p. 193, 1988) that AIDS in this area could be explained by the usual risk factors, plus an increase in bi-directional heterosexual transmission. CDC officials set out to "prove," once and for all, that AIDS can be explained by "dirty needles," with no relation to poverty or the environment.

Unfortunately, these investigators violated basic principles of epidemiology by attempting to draw conclusions about cause and effect from a cross-sectional survey. In the CDC study, shared needles or sexual contact with anyone at risk for AIDS, were considered the primary means of transmission, to the exclusion of any other (i.e., environmental) means of transmission. The single concession to look for an environmental factor was a survey in which CDC failed to find a correlation between persons with antibodies to HIV and persons with antibodies to certain insect-borne viruses. In that particular survey, data omitted the following: 1) It was at our urging that the survey was done; 2) Antibodies to HIV were tested by ELISA and Western Blot, whereas antibodies to arboviruses were tested by neutralization (many patients with

AIDS don't have neutralizing antibodies to HIV); 3) The survey showed a remarkably high percentage of this population with antibodies to one or more arboviruses, indicating massive levels of exposure to blood-sucking arthropods.

The CDC stressed the absence of antibody to HIV in children in their survey. Lack of disease in children is *not* a valid argument against environmental transmission of AIDS. First of all, the CDC study simply did not include enough children from the impoverished neighborhoods to draw any conclusions. It has been found that many children have HIV antigen, but no detectable antibody. School-aged children have fewer infections than adults in this setting, and are less likely to have activated cells to permit viral replication. It is well known that by virtue of their tender age, children have less accumulated environmental exposure than adults, and thus, a small percentage of children, compared to adults, would have antibodies to such viruses as yellow fever, or to such parasites as malaria, in endemic areas.

I have mentioned that children are already affected with AIDS in Africa, and it may only be a matter of time in other parts of the world. There is a growing caseload of infants born to mothers with AIDS in the United States, and most of these infants are doomed to live in poor conditions that will accelerate their disease.

I hope this overview has given you a better appreciation of the role of the environment in the AIDS epidemic. Since there is no definitive treatment for AIDS, the major emphasis should be on early detection, behavioral changes, and elimination of exposure. Our best chance to begin to control AIDS on a worldwide basis is by prevention and public education. A major part of "prevention," in my book, includes basic public health measures, maintenance of infrastructure, decent housing, sanitation, and control of urban rat and mosquito populations. Most of you already know the key to control of urban vectors, such as *Aedes aegypti*, involves environmental control measures, elimination of open waste and containers that collect water and breed these mosquitoes.

These measures involve community education and will be expensive, but they will be necessary, and are prudent measures that will prevent future epidemics. In the long run, programs that prevent disease will save untold billions of dollars, since treatment alone will not stop the epidemic and is proving to be an endless drain on resources.

The risk of infecting others by sexual intercourse (possibly including oral-genital contact), sharing of needles, and contaminated blood products has already been discussed. Toothbrushes, razors, and other implements that could be contaminated with blood, should not be shared. Surfaces contaminated with blood should be cleaned with household bleach, freshly diluted one-to-ten in water. Health care workers should employ the same blood precautions with AIDS as they do with hepatitis B, and should wear gloves when handling any body secretions. High-risk mothers and their sexual

partners should be screened for AIDS. Women exposed to HIV should understand the high risk of transmitting this infection to the infant and should avoid pregnancy. Pregnant women may be particularly susceptible to manifestations of AIDS and HIV infection.

Many countries in Asia have not yet experienced a large caseload of AIDS. The most effective programs will aggressively prevent AIDS from establishing initial foothold, since a "critical mass" of infected individuals may be necessary to propagate the disease and allow expanded means of transmission to occur. The entire population, men, women, and children, must be educated and told the truth about this disease.

I hope and pray for your sake that you do not "buy" the CDC-WHO line, that AIDS can be totally explained by "sex and dirty needles." This viewpoint could prove fatal to you and your loved ones. Millions of lives hang in the balance of our decisions about AIDS today. Continued destruction of the environment, social upheaval, and/or displaced populations, impede our ability to fight disease. I don't think we can control AIDS in the developed countries if we cannot control AIDS in the tropical and developing countries of the world. Humanity must overcome its differences and use every resource available to control the spread of this disease.

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