Sex and Needles, Not Insects and Pigs, Spread AIDS in Florida Town

A major study in a town with one of the highest incidences of AIDS in the United States supports the prevailing view about spread of the disease, but uncertainties persist

EIGHTEEN months ago, the town of Belle Glade, Florida, was placed firmly on the epidemiological map of AIDS in the United States. Mark Whiteside and Caroline MacLeod, codirectors of the Institute of Tropical Medicine in Miami, reported at an international meeting in Atlanta in April 1985 that Belle Glade had a large and growing number of AIDS cases that did not seem to fit the prevailing model of how the disease is spread.

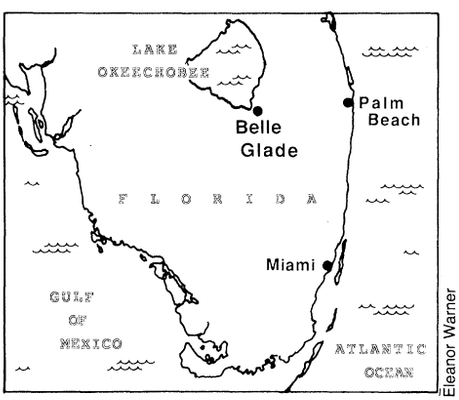
Since then, epidemiologists and other researchers have poured into the area to investigate the spread of AIDS in a town that is just 40 miles, but a whole world, away from affluent Palm Beach. So far, 79 cases have been confirmed, mostly among poor blacks living in the slums of Belle Glade and two other poverty-stricken agricultural communities near the shores of Lake Okeechobee in western Palm Beach County. This makes the incidence, at 295 cases per 100,000 people, comparable to that in San Francisco (316 per 100,000) and Manhattan (270 per 100,000).

In early October, the Centers for Disease Control, which is conducting a major epidemiological study in conjunction with the state of Florida, announced its preliminary findings.* AIDS is being spread in Belle Glade largely through contaminated needles and sexual intercourse, CDC has concluded. In other words, "Transmission [of the disease] in Belle Glade is the same as elsewhere," says Harold Jaffe, head of epidemiology at CDC.

The disease pattern in the Belle Glade area is, however, markedly different from the national pattern. According to the way CDC classifies the cases, intravenous drug use and sexual transmission among heterosexuals account for a much higher proportion of cases in Belle Glade than in the nation as a whole, while homosexual and bisexual men constitute a relatively small share of the Belle Glade cases (see table).

*Centers for Disease Control, *Morbidity and Mortality Weekly Report* **35**, 609 (3 October 1986).

The study found that 19 of the 59 adult AIDS patients in Belle Glade itself were directly linked to each other by sharing needles for intravenous injections of drugs, or by sexual intercourse, or both. Moreover, five of the ten women patients were prostitutes, four of whom were also intravenous drug users. Jaffe argues that similar patterns of transmission are probably occurring in other cities in the United States, although the overall picture tends to be dominated by the numbers of homosexual patients.



Eleanor Warner

There is, however, an uncertainty in the Belle Glade data that is likely to spark some controversy: how to classify 17 patients who have no documented risk factors other than the fact that they were born in Haiti. Because these patients account for some 22% of the cases in western Palm Beach County, the way they are classified has a major impact on the overall disease pattern in the area.

The problem of classifying AIDS patients who have recently come to the United States from countries where the disease is relatively widespread is not confined to Belle Glade. In the early days of the AIDS epidemic, all Haitian patients with no known risk factors were classified in a risk group of their own. But in April 1985, CDC decided that this classification did not reflect what was known about transmission of the disease and unfairly stigmatized poor immigrants who were already having a tough enough time making their way in the United States. CDC then simply placed them into a general category whose members had no identifiable risk factors.

Recently, however, CDC decided that this classification is also misleading. In July, the agency changed the reporting system again, shifting Haitians and recent immigrants from central Africa who have no known risk factors into the suspected heterosexual transmission category.

Kenneth Castro, a CDC epidemiologist who is heading the Belle Glade study, defends the change on the grounds that "recent studies in Haiti and the United States have consistently shown that transmission of this retrovirus [HTLV-III/LAV] among Haitians seems to take place through heterosexual contact." He notes that many patients have admitted to contacts with prostitutes and many have a history of treatment for sexually transmitted diseases. "To continue to report them as having no known risk factors is misleading," he says.

Warren Johnson, an epidemiologist at Cornell University Medical College who, in collaboration with Haitian colleagues, has conducted studies in Haiti, agrees that the shift is justified. He says that over the past 3 years the proportion of AIDS patients in Haiti whose risk factors can be traced to homosexual sex, blood transfusions, or intravenous drug abuse has plummeted from 71 to 11%. "We are currently finding that heterosexual transmission is the predominant factor," he says.

The change in classification has had a distinct, but not dramatic, impact on the national pattern of AIDS cases. It has raised the fraction of cases in which heterosexual transmission is the suspected route of infection from 1.7 to 3.7% of the total, and reduced the portion of cases with no known risk factor from 5.1 to 3.0%.

But the change has had a major impact on the Belle Glade findings. Suspected heterosexual transmission cases jumped from 12.7% of the total to 34.2% when the

Patterns of AIDS epidemic.

Risk group	Nationwide		Western Palm Beach County	
	Number	%	Number	%
Homosexual and bisexual men	18,587*	72.5	10	12.7
Intravenous drug users	4,322	16.8	24	30.4
Hemophiliacs	215	0.8	0	0.0
Transfusion recipients	436	1.7	2	2.5
Children	354	1.4	3	3.8
Heterosexuals	959†	3.7	27‡	34.2
No known risk factors	777	3.0	13§	16.5
Total	25,650		79	

*Includes 4322 who are also intravenous drug users. †Includes 534 people who had no other known risks but were born in countries where heterosexual transmission is believed to be the predominant means of transmission. ‡Includes 17 people born in Haiti who have no known risk factors. §Includes 10 people who died before epidemiological study was completed.

Haitian cases were reclassified. At the same time, the portion of cases with no known risk factors dropped from 38 to 16.5%.

This still leaves a relatively large fraction of patients with no known risk factors—13 of the 79 cases. The CDC study notes, however, that ten of these patients died before an epidemiological case study was completed and suggests that risk factors for many of them might have been ascertained with further questioning. To support this suggestion, CDC notes that 73% of AIDS patients nationwide who were initially reported to have no known risk factors were recently reclassified when follow-up interviews were conducted.

Not surprisingly, the uncertainties in the classifications have provided fertile ground for criticism of the Belle Glade study. Whiteside and MacLeod, for example, accuse CDC of arriving at "unscientific" and "irresponsible" conclusions.

As a general point of criticism, Whiteside argues that the total number of AIDS cases in western Palm Beach County is much higher than the figure reported to the CDC. He suggests that the true figure is perhaps three times the official count, with many cases going unreported because patients died before AIDS was diagnosed.

Michael Wilder, the acting state epidemiologist in Florida's Department of Health and Rehabilitative Services, disagrees. Although he concedes that some cases may have been missed, "we are not talking about numbers in Belle Glade in the hundreds," he says. "It is far more likely for a case of typhoid fever to go unreported in Miami than for a case of AIDS to go unreported in Belle Glade," Wilder argues.

Whiteside is particularly upset by the way CDC has classified many of the reported cases. "It is just too bad that CDC has focused on AIDS as a sexual disease to the exclusion of everything else," he says, accusing the researchers of "having their minds made up before they came down here."

From the start, Whiteside and MacLeod have proposed that insects, particularly mosquitoes, may play a role in spreading AIDS in Belle Glade. There is, however, indirect evidence that argues against environmental factors in the transmission of the disease in the area. The evidence comes from a study of blood samples drawn from residents of Belle Glade's poor neighborhoods to determine the prevalence of antibodies to HTLV-III/LAV, the virus widely believed to be the cause of AIDS.

According to preliminary results, 3.1% of 959 blood samples tested had detectable antibodies, indicating infection with the virus. The highest rates were found in people aged 18 to 29, among whom 8.9% were found to have been infected, but no children under the age of 11 and nobody over the age of 60 had detectable antibodies. (The three children with confirmed cases of AIDS in Belle Glade were born to mothers infected with HTLV-III/LAV, and they are believed to have been infected in utero.) These findings suggest that people are getting infected during their sexually active years. In addition, the study found no clustering of HTLV-III/LAV antibodies among household members, except for two pairs of sexual partners. This also argues against casual transmission of the virus.

If mosquitoes are involved in transmitting HTLV-III/LAV, some clues may be found by looking in the serum samples for antibodies to several different arboviruses—viruses transmitted by specific types of mosquitoes. However, CDC researchers found no correlation between infection with these viruses and infection with HTLV-III/LAV, which provides at least a rough indication that transmission of HTLV-III/LAV is not linked to exposure to any particular type of mosquito.

Whiteside is not convinced. He says his own studies indicate that there is a strong correlation between infection with Maguari virus and HTLV-III/LAV, and he argues that arboviruses may be cofactors in the development of AIDS. Wilder responds to this by suggesting, "The basis of doing science is to put forward a testable hypothesis. I invite him to put forward a testable hypothesis."

Arboviruses are not the only organisms that have been proposed as cofactors in the Belle Glade AIDS epidemic. In May, two Boston researchers, Jane Teas of the Human Ecology Association and John Beldekas, then with Boston University, believed they had found an important clue in a herd of sick pigs in the sugarcane fields just outside Belle Glade. Both researchers had previously suggested that African swine fever virus (ASFV), which causes a devastating illness in pigs, may be associated with AIDS, and they thought they had stumbled on an important link between the two diseases in the Belle Glade pigs.

Their belief was strengthened when Beldekas subsequently found evidence of ASFV infection in serum drawn from the pigs and from some AIDS patients in Belle Glade. However, researchers from the U.S. Department of Agriculture could find no evidence of African swine fever in the herd, and attempts by others to confirm Beldekas's findings proved negative.

A major uncertainty in the study is how to classify 17 Haitians who have no documented risk factors.

According to Jaffe of CDC, researchers at CDC tested serum from 33 patients with AIDS and people who had been infected with HTLV-III/LAV but showed no symptoms of disease. They attempted to culture ASFV, but "could not find any evidence of presence of virus," he said. Attempts to find evidence of infection in pig serum also turned up nothing. Beldekas, who is now with the Massachusetts Department of Health, says, however, that he believes the testing system used by CDC differs from his and the results may not be comparable. "I am not wedded to this theory," he says, "but I want to see it properly tested."

The next stage in the Belle Glade study will be to try to identify risk factors among those who have antibodies to HTLV-III/LAV. This analysis, which Castro says could take another 6 to 8 weeks, should help clear up some of the uncertainties in the epidemiology.

The serum sampling has, however, already provided a worrisome indication of the potential course of the epidemic in Belle Glade. The high rates of infection, especially among young adults, are many times greater than the national average and approach the levels found in some central African countries where AIDS is widespread. Although it is uncertain how many of those who have been infected with the virus will eventually develop disease symptoms, there are already signs that the AIDS caseload is increasing. According to estimates by Whiteside, some 200 people in western Palm Beach County may have AIDS-related complex.

A serious potential for continued spread of infection also exists in Belle Glade. Researchers generally agree that people who have HTLV-III/LAV antibodies should be considered capable of transmitting the virus, and thus the high seroprevalence rates provide a strong reason for a major public health effort to cut down the spread of infection. The state of Florida, with a grant of some $300,000 from CDC, is about to step up its efforts in this area.

According to Spencer Lieb, an epidemiologist working on the Belle Glade study, the effort will be targeted at high-risk groups, with the message that unsafe sex and dirty needles are spreading the disease. Asked whether the effort is a little late, Lieb noted that it was important to evaluate the alternative hypotheses about how the disease was spreading to lay the groundwork for an education campaign.

Castro is more explicit. "We have an epidemic on our hands, and we have to curtail it," he says. "The unfortunate fact is that we have to change people's behavior. To continue to focus on mosquitoes misses the point." ■ COLIN NORMAN

French R&D: à la Reagan With Dash of De Gaulle

New budget figures show boost in military and basic research, cuts in civilian R&D; but some central control of research is maintained

Paris

At first glance, the science policy developed by France's new conservative government bears several resemblances to the one pursued by the Reagan Administration.

A commitment to maintain research as an important government priority is reflected in the detailed budget figures for 1987 released in Paris on 9 October. They show an overall planned increase of 8.1% in government-funded R&D over 1986, with basic research growing even faster. At a time of sharp constraints elsewhere, the R&D budget will rise from 7.2 to 7.6% of total public spending.

As in the United States, this growth is largely the result of a significant increase of 19% being proposed for military R&D, to be spent on projects ranging from the modernization of France's nuclear weapons to the development of space-based military technologies. The volume of government-funded civilian R&D is planned to fall by 2.3% from the level in 1985—the last full year in power of the socialist government.

In contrast to the United States, however, the new government continues to support the idea that clear leadership from the center is necessary if France is to maintain a strong and well-balanced research effort. While increasing its indirect support for research—for example by raising tax credits to industry—it remains faithful to the postwar vision of science and technology as state responsibilities, as developed by President Charles de Gaulle in the 1960's. The need "is not for less, or more, but *better* state [control]," the minister for research and higher education, Alain Devaquet, said in a speech in Paris last week.

In line with this philosophy, Devaquet explained the government's decision not to split up the Centre Nationale de la Recherche Scientifique (CNRS), the main government-sponsored research agency which currently employs 10,000 scientists and 15,000 technicians and support staff.

Embassy of France

Alain Devaquet. *Not less, but better, state control of science is needed.*

During the election campaign last year, the CNRS was strongly criticized by various right-wing groups—including some prominent members of the academic community—on the grounds that it had become over politicized and excessively bureaucratic. They also complained that the dominant role of the CNRS in the support of French science had often been at the expense of universities.

Devaquet says that in the recent past "too much has been asked of the CNRS," and that these demands have led to an "inflation of administrative structures" that have tended to isolate the agency's policy-makers from the scientific community. He says it is now necessary to redefine a "hierarchy of tasks" for the organization, and to refocus its activities around support for basic research.

But to operate effectively, he adds, the CNRS must stay as a single unit, embracing not only the natural sciences but also the social sciences. "The unity of the CNRS is an essential condition for many disciplines to develop, particularly because it is often at the frontiers between different disciplines that real progress is made in science," he says.

However, Devaquet outlined reforms intended to meet some of the criticisms leveled at CNRS. For example, the expanded role in decision-making, which the previous government had given to junior research staff and technicians through increased labor union representation on CNRS committees, will be cut back.

In addition, Devaquet and CNRS's new director, Serge Feneuille, have proposed various measures designed to make the internal operations of the CNRS more flexible, for example by reducing the number of committees in the different scientific directorates and loosening requirements for promotion and recruitment.