The Washington Post
September 4, 1985, Wednesday, Final Edition
SECTION: First Section; A1

AIDS: A Menace Beyond 'Risk Groups'; Research Raises New Fears About Disease's Scope and Virulence

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AIDS, the dreaded new disease of the 1980s, has breached the confines of the few risk groups most often associated with it -- male homosexuals, drug abusers, and those infected by contaminated blood or blood products.

Of the more than 12,000 U.S. cases to date, there are now nearly a thousand victims in the United States alone who fit none of the chief risk groups.

New research suggests that AIDS may be transmitted in more ways than originally thought, and that it may infect more tissues in the body than previously realized. Moreover, earlier assumptions that only about 10 percent of those exposed to the AIDS virus would contract the fatal disease are now being questioned. Some researchers now worry about an AIDS time bomb -- that after many years, a substantially higher portion of those exposed could become ill.

However, there is some good news from the laboratories where AIDS is being studied. Researchers are testing on monkeys a prototype vaccine for which they have high hopes; if ultimately successful in humans, it could prevent future infections of AIDS virus, though it will do no good for the hundreds of thousands -- perhaps millions -- already infected.

One thing is clear, researchers say: AIDS is not just a disease of male homosexuals. It is simply a sexually transmitted disease -- the only one that is almost invariably fatal.

AIDS was first identified among American homosexual men, whose sexual activities encouraged rapid spread. For them, one New York physician said, it is already a "catastrophe" that will decimate their numbers. But they were never the only victims.

Now it is clear that in other countries, chiefly in Africa, it is a heterosexual disease; about half the victims are women. In several African nations it appears to be spreading rapidly, as it is here, although precise figures are not known. Contact with prostitutes is a common factor in many African cases.

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In the United States -- as in Europe -- the number of cases of AIDS is doubling every year. Government experts expect this rate of growth to continue, which would mean about 17,000 new American cases in 1986, bringing the total here to about 35,000 by the end of next year.

But those suffering from AIDS itself are only the tip of an iceberg. For every victim, there are 5 to 10 more people who suffer from a less severe form of the disease that is not fatal, and 50 to 100 more who have been infected with the AIDS virus but show no symptoms -- 600,000 to 1.2 million in this country, by some calculations.

No one knows how far or fast the epidemic will spread.

"I think that, given enough time and enough heterosexual contact with infected people, that this virus is going to move gradually and steadily into all parts of the population if we don't do something about it. I believe that very strongly," says Dr. Robert Gallo, a National Cancer Institute researcher who was a discoverer of the AIDS virus.

"I think we're going to see a gradual increase by heterosexual spread but by no means as rampant in society as we now have it in homosexual men," argues Dr. Anthony Fauci, head of the National Institute of Allergy and Infectious Diseases. But for the groups at highest risk, "it is already as serious and devastating a scourge as I can name in memory," he says. "You couldn't design a virus more diabolical than this one," Fauci added. "It knocks off the very cells that are supposed to protect you from it."

"I consider it a terrible threat. It's a staggering problem for society," says Department of Health and Human Services Secretary Margaret Heckler, who pronounced AIDS America's number-one public health problem.

Virus of Uncertain Origin

Before inroads against AIDS can be made, medical researchers must learn much more about the nature and behavior of the cause of acquired immune deficiency syndrome: a bizarre new virus of uncertain origin. The search for this knowledge confronts researchers with one of modern biology's most urgent challenges.

Thus far, scientists are unsure just how the AIDS virus works, why it targets the white blood cells, known as T4 lymphocytes, that are the one indispensible element of the body's immune system. Ultimately, a victim of AIDS is left vulnerable to an array of life-threatening infections and cancers.

Further complicating the search are recent findings that AIDS may sometimes show itself first as a disease attacking the brain and nervous system, perhaps even damaging the brains of unborn babies who become infected. The virus has

now been found in brain cells. New molecular probes have also found it in the epithelial cells that line the eyes and eyelids. Some fear the virus, known primarily for its highly targeted attack on the immune system, may eventually play a role in still more diseases.

Although spread of the virus is most often linked to intimate contact involving transfer of blood or semen -- anal intercourse is believed the most efficient mode of transmission -- it is now clear the virus is present in saliva, tears and urine. No one knows how often these fluids lead to human infection.

For now, experts can only reassure unaffected individuals that they are unlikely to get the virus through casual transmission -- a sneeze, handshake or proximity. These assurances are based on American studies of health workers and family members who care for or live with AIDS victims.

The disease does not yet seem to have spread to the general U.S. population in a significant way. Instead, those most likely to be infectious are still overwhelmingly in the few well-defined risk groups who have the far more intimate contact that spreads the AIDS virus:

*Homosexual men: Account for 73 percent of adult cases. AIDS is the leading killer of single men between 25 and 44 years of age in New York City and San Francisco. Blood samples taken in 1978 and frozen show that only 4.5 percent of the homosexual men visiting a San Francisco venereal disease clinic were infected with the virus then. By 1984, about two-thirds were infected, most without symptoms. A recent study done in the San Francisco gay community showed one-third are infected. Other cities report 20 percent or more of homosexual men are infected.

*Intravenous drug abusers: 17 percent of adult cases. Blood tests of street addicts in New York and New Jersey show 80 to 90 percent are infected.

Blood transfusion recipients: Nearly 2 percent of adult cases. A new blood test that can screen for signs of infection by the AIDS virus should eliminate this means of transmitting the disease, but many people already infected by transfusions of infected blood will develop AIDS in years to come.

*Hemophiliacs: Almost 1 percent of adult cases. The blood test and a heat treatment for blood products used by hemophiliacs should stop further transmission, but 80 to 90 percent of severe hemophiliacs may already be infected.

*Heterosexual men and women: About 1 percent of adult cases. Probably contracted by sexual contact with infected bisexuals and heroin addicts.

*Children: Tallied separately from adults are about 180 children, 70 percent of

whom were born with AIDS or were infected with it as newborns by their mothers. Another 20 percent received the virus in blood products.

*Other: About 6 percent of adult cases and 10 percent of childhood cases are in people who fit none of the known risk groups.

Much of the current concern focuses on heterosexual transmission in the United States, but researchers caution that it may take several years for a clear trend to emerge. A key link may be prostitutes, who are often drug abusers and therefore at risk for AIDS.

Nearly one-third of a sample of some 80 male AIDS patients classified as being in the "no known risk" group admitted to prostitute contact. Walter Reed Army Institute of Research studies of American military personnel with AIDS also implicate prostitutes, as do studies of African and Haitian AIDS patients.

At the same time, some believe the threat to the heterosexual population is currently being overdramatized for political reasons. "A lot of funding decisions are being made based on risk to the straight world," says one government official.

Many experts believe the risk to the heterosexual population will increase over the next 5 to 10 years, with those who have many sexual partners in greatest danger.

A new study by the New York City Health Department's Dr. Charles Rabkin found that 3 percent of heterosexual men attending a venereal disease clinic -- presumably very active sexually in a city where AIDS is relatively widespread -- were infected with the AIDS virus. This may not sound high, but it is close to the level found among homosexual men in San Francisco in blood samples taken in 1978 -- an early stage of the AIDS epidemic, before the disease had even been formally identified.

The virus may spread next to other sexually active populations, such as college students, perhaps infecting, as one researcher put it, "the Ivy League college girl whose boyfriend has had sex with a prostitute two years earlier."

First Recognized in 1981

The first cases of AIDS were recognized in the spring of 1981 among homosexual men in Los Angeles. Soon, doctors began asking whether AIDS was a new disease or one that had existed all along in another form or another place. Only recently, however, have pieces of an answer begun to fit together.

The most popular hypothesis now is that AIDS is indeed a fairly new disease, one that originated during the 1960s in central Africa as an evolutionary

descendant of a monkey virus.

Belgian scientists have found many cases of AIDS among the people of Zaire and nearby Rwanda and Burundi, as well as in Uganda, Tanzania and Kenya. Two Harvard scientists, Max Essex and Phyllis J. Kanki, have found that a species known as the African green monkey, which lives in the same region as people who have since contracted the disease, carries a virus very similar to the AIDS virus. Tests of its molecular structure show that it differs only slightly from the AIDS virus, named "HTLV-3" by NCI's Gallo and "LAV" by French researchers.

It is not known whether the virus makes these African monkeys sick, but the same virus has been found in several species of monkeys in primate research colonies in the United States, sometimes causing an AIDS-like disease. It is called SAIDS, for simian, or monkey, AIDS.

Reports from Zaire suggest that some Africans butcher and eat monkeys. Contact with monkey blood, some speculate, may have been the first infection of human beings.

The monkey virus and AIDS virus are so similar it may have required only a minor mutation to produce one from the other, making it capable of invading human cells.

It is thought that the mutation may have happened during the 1960s because frozen blood specimens taken from Zairians around 1970 were found positive for AIDS. Similar samples from around 1960 show no evidence of AIDS.

Whenever the AIDS virus arose, it has clearly been spreading in Africa longer than in the United States. The virus appears to have infected a far larger percentage of Africans than Americans. Reports from Zaire suggest it is transmitted primarily through heterosexual contact among people who have many sex partners.

AIDS is also thought to have appeared in Haiti before reaching the United States, and many epidemiologists suspect that American homosexuals picked up AIDS while vacationing in Haiti, long a favored resort among gay men. Despite the speculation, they still cannot show how AIDS traveled from Africa to the Caribbean.

Centers for Disease Control researchers say it appears that the first infections of homosexual men in the United States occurred in the mid-1970s. But unlike many other deadly infectious diseases, which strike quickly and kill within hours or weeks, the AIDS virus attacked slowly, imperceptibly at first, with symptoms not evident for years.

While the first cases were not recognized until 1981, doctors have since traced cases back to 1978, mainly in New York City. The roughly 200 cases reported in 1981 had mushroomed to 12,736 adult and child cases by last week.

The Deadliest Plague?

Epidemiologists tracking AIDS found that while it spread more slowly than the fearsome plagues of the past, it was perhaps the deadliest ever. Bubonic plague or cholera killed about half their untreated victims, smallpox as many as 40 percent.

The death rate for all AIDS cases to date is 50 percent -- 6,376 deaths. But the disease takes years to kill its victims. Among those from the early years of reporting, the death rate approaches 100 percent. No one has been cured.

"Once you get the disease it is essentially, uniformly fatal. That's unprecedented," says Fauci.

CDC officials were alarmed at the rapid spread, but reassured -- at least at first -- that the disease appeared to be transmitted only through sexual transfer of semen or blood, through sharing hypodermic needles, transfusion of blood products or to an unborn child during gestation or just after birth. In contrast, the great plagues of the past had swept indiscriminately through whole populations, spread by air, water, insects and poor sanitation.

But the slower pace of the AIDS epidemic is offset by a potentially more frightening uncertainty about who is infected and what may happen to them.

The government's best estimates suggest that 5 to 10 percent of those infected will come down with AIDS in five years. Some 25 percent will develop a syndrome, also over a five-year period, known as ARC or AIDS-related complex, which causes vague symptoms such as fatigue, low-grade fever, swollen lymph nodes, diarrhea and weight loss. More limited follow-up suggests that anywhere from 5 to 20 percent of ARC cases may go on to get AIDS, but for the rest the symptoms of ARC may persist, according to Dr. Harold Jaffe, chief of epidemiology of the CDC's AIDS branch.

Because AIDS is so new, researchers have also tended to underestimate its incubation period. Blood-tranfusion cases now average about 2 1/2 years from exposure to development of disease, but some can take more than five years. A mathematical model developed by the CDC's Dale Lawrence that takes into account slower-developing cases projects that the average incubation may lengthen to more than 5 years, with some lasting beyond 12 years.

And because the virus may insert itself into the host's own genes, the effects of the dormant AIDS virus, some experts speculate, may not show up for decades,

perhaps not until old age when the immune system normally weakens.

"One of the most disturbing things about it is that you don't know someone is ever safe once they have been infected. You could develop AIDS at any time from now on," Jaffe says. "We have to assume that anybody who is truly positive [on the blood test] is potentially infectious to others."

But the deciding factor as to who may be vulnerable to infection may be a person's state of health, says Fauci. Most people in the hardest-hit groups already have infections from other sexually transmitted viruses, such as hepatitis B virus and the Epstein-Barr virus that causes mononucleosis. These groups include not only homosexual men and needle-sharing heroin addicts but the African victims as well. The relative absence of these other infections among heterosexual Americans may put them at much lower risk of getting AIDS.

Experiments in Gallo's lab have shown that AIDS-infected T4 cells growing in a test tube can live indefinitely, dying only when exposed to some unrelated foreign protein that stimulates them into action. Gallo says it is possible that a human infected with the virus could at least postpone the onset of AIDS if he avoided ordinary infections.

Many healthy but infected people may still be contagious, shedding viruses into their blood and virtually all other bodily fluids. No one knows how easily viruses in such fluids can infect other people but both Gallo and Fauci say that intimate kissing, in which saliva is exchanged, could well transmit the disease if the uninfected person has any cuts, sores or bleeding gums in the mouth.

One of the more puzzling new findings suggests such access routes to the bloodstream may not be necessary. Gallo's lab's finding that AIDS virus can infect epithelial cells lining the eyes raises the possibility that the AIDS virus may also be able to infect similar cells that line most surfaces of the body. But there is no evidence that the virus can enter the body through such cells. These findings were discussed at a recent scientific meeting but their significance is not fully understood.

In the meantime, better understanding of the virus is helping scientists design drugs to interfere with its survival and, ultimately, a vaccine that would protect those not yet exposed.

The Search for a Vaccine

Researchers from three centers in the United States and others in Sweden and Scotland are collaborating on a prototype vaccine that has been given to rhesus monkeys at Duke University. The monkeys, which produced antibodies after receiving the vaccine, have recently been infected with the AIDS virus and researchers are waiting to see whether the antibodies prevent the virus from

invading monkey cells.

Earlier experiments showed that while the AIDS virus does not cause disease in the monkeys, it does reproduce in their cells, which then dump quantities of new virus into the blood. If the vaccine works, it should prevent this viral replication.

One potential problem is the fact that the AIDS virus exists in many slightly different forms, the result of minor mutations that altered the precise molecular structure of the virus's protein coat. It has just been found, however, that one part of the protein-coat molecule is the same in all forms. Researchers hope that antibodies to this non-variable part will be enough to prevent all forms of the virus from infecting cells.

The prototype vaccine is made from a specially engineered version of the coat protein containing the non-variable part. Monkeys immunized with the vaccine are being deliberately infected with widely different variants of AIDS virus.

"If this works, we'll have the start of a vaccine that could be purified and tested for toxicity before we can use it on people," says Dani Bolognesi, of Duke's cancer research center. "By the turn of the year, we may know whether we have something."

Vaccine development normally takes several years after proof of effectiveness in animals. "But," says Bolognesi, "I have a feeling they'll speed this up as much as they can. There might be a real vaccine in one or two years." Other vaccine experts caution that unforeseen problems often crop up.

Looking at the record to date, Gallo emphasizes that "there has probably been more rapid progress in understanding the cause of AIDS from the moment that it was recognized as a new disease than any other disease."

In the meantime, health officials urge the public to reduce the risk of spread by changing sexual behavior, particularly by avoiding multiple sexual partners.

"I think that we have to look at the scientific advances in two ways," says CDC's Jaffe. "We have to marvel at how quickly the cause was found and how quickly a blood test was developed. All of that makes us optimistic.

"But," he adds, "looking at the practical problems ahead, we can't count on a vaccine or an effective drug in the next several years. Despite the remarkable accomplishments in AIDS, science isn't going to save us at this point. We have to save ourselves."