New computer study shows AIDS could wipe out U.S.

Physicist Jonathan Tennenbaum introduces the first run of a new epidemiological computer model, the first ever designed to study a human slow-acting retrovirus.

Last October, Lyndon LaRouche commissioned a new series of computer-aided studies of the AIDS pandemic now sweeping the United States and much of the world. Results of a first-generation computer model, just released by an *EIR* task force in Wiesbaden, West Germany, corroborate estimates of LaRouche and leading medical authorities, that AIDS is "species-threatening." The first slow retrovirus epidemic ever known to strike humans, AIDS has the potential, unless stopped soon, to literally wipe out the human race. The new model shows how the rapid spread of infection by "fast track" routes among so-called risk groups, is now "igniting" a vast AIDS epidemic in the general population.

Basic facts

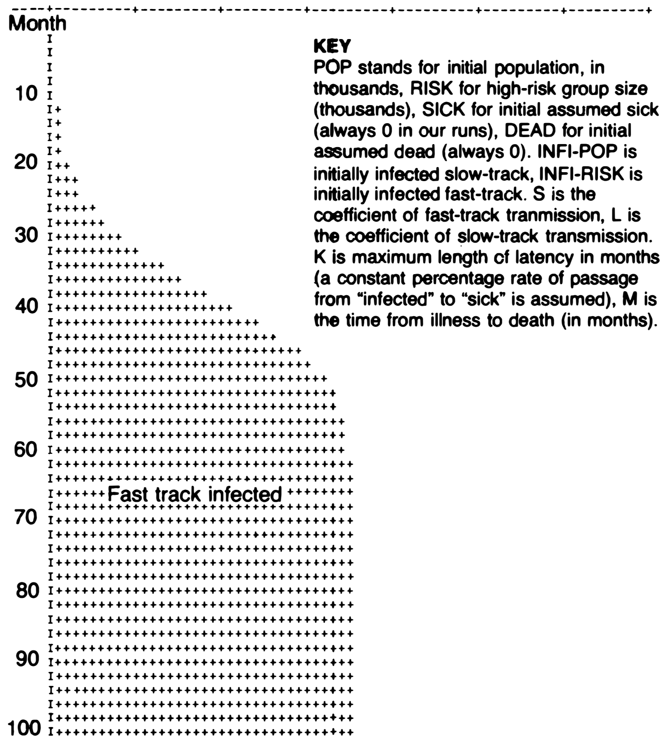
The first-generation model does little more than "play out" consequences of the most basic facts known about the AIDS disease and its spread to date:

1) The AIDS-associated virus HIV is a retrovirus; it integrates its genetic material into infected cells in such a way, that infected persons remain virus carriers for life.

2) AIDS is a "slow virus" disease. Once installed in its victim, the AIDS infection "smolders" for up to 10 years or more, during which latency period the infected person can transmit the disease to many other persons, without his or her showing any sign of illness.

3) A large percentage of AIDS-infected persons, probably near 100%, eventually come down with incurable clinical disease syndromes. Barring a major medical breakthrough, all of these are doomed to die within a few years of emergence of acute symptoms.

FIGURE 1
S-curve



POP = 1,000 RISK = 400 SICK = 0 DEAD = 0
INFI-POP = 0 INFI-RISK = 1
S = .17 L = 0 R = 0 K = 100,000 M = 100,000
R-steps/month 1. Every 2 months one line
Full width of scale = 800,000

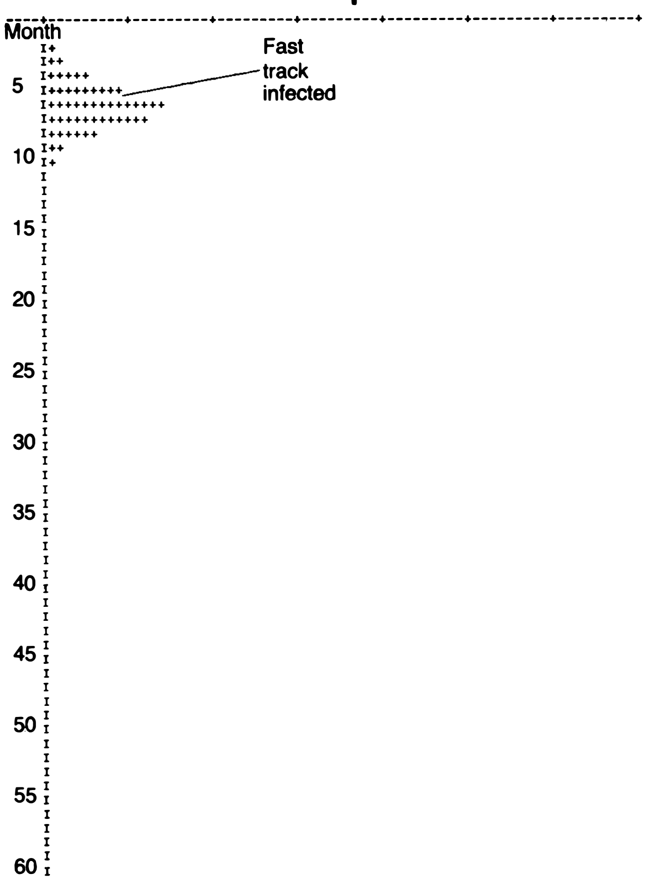
4) The spread of AIDS infection in most localities of the United States and Western Europe has been characterized so far by two successive phases. Initially, infection spreads by "fast routes" such as contaminated hypodermic needles and anal sexual activities, at rates corresponding to a doubling of "fast-track" infected population every seven to eight months. Once a substantial reservoir of virus carriers is established by "fast-track" routes, infection spreads by a variety of "slow-track" routes into general population. Conservative estimates indicate that at present, "slow-track" infected persons already make up an average of at least 6-10% of the total reservoir of virus carriers in the United States. In France, newly released studies of the WHO indicate that more than 18% of all infected persons fall into the "slow-track" group.

5) So far, no serious measures have been instituted to limit either fast-track or slow-track transmission of AIDS.

While incorporating these facts, the first-generation computer model omits certain "nonlinear factors of the second order," which accelerate the spread of AIDS in every densely populated locality where the density of AIDS carriers surpasses a few percent. These include possible cumulative effects of multiple exposure to AIDS-related viruses, enhanced role of long-range environmental vectors such as insects, and, most importantly, autocatalytic interactions between AIDS and other diseases such as tuberculosis. In fact, such factors are already playing a major role in such advanced epidemic areas as Belle Glade, Florida. A second-generation model, now in preparation, will correct for the omission of these second-order nonlinearities, applying a mathematical approach similar to that employed in the treatment of complex "autocatalytic reactions" in biochemistry.

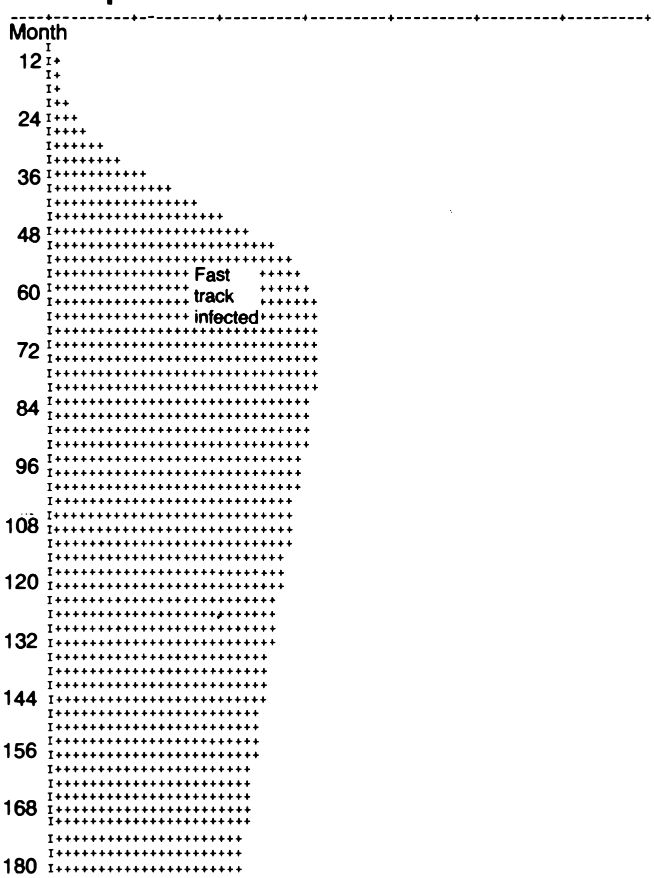
The *EIR* computer model runs described here were completed in Wiesbaden, West Germany, under the author's direction, with collaboration of Ralf Schauerhammer and Bernd Schulz. Mr. Schulz, an engineer with experience in computer modeling of chemical reaction dynamics, supplied

FIGURE 2
Simulation of fast virus epidemic



POP = 240,000 RISK = 20,000 SICK = 0 DEAD = 0
INFI-POP = 0 INFI-RISK = 100
S = 2 L = .00005 R = 0 K = 1.5 M = 2
R-steps/month 1. Every 1 month one line
Full width of scale = 40,000

FIGURE 3
AIDS spread in 'fast-track' mode



POP = 5,000 RISK = 1666 SICK = 0 DEAD = 0
INFI-POP = 0 INFI-RISK = 10
S = .14 L = .016 R = .008 K = 300 M = 24
R-steps/month 1. Every 3 months one line
Full width of scale = 3,332

the initial equation scheme which was the point of departure for developing the first-generation model.

The dynamics of a slow retrovirus epidemic

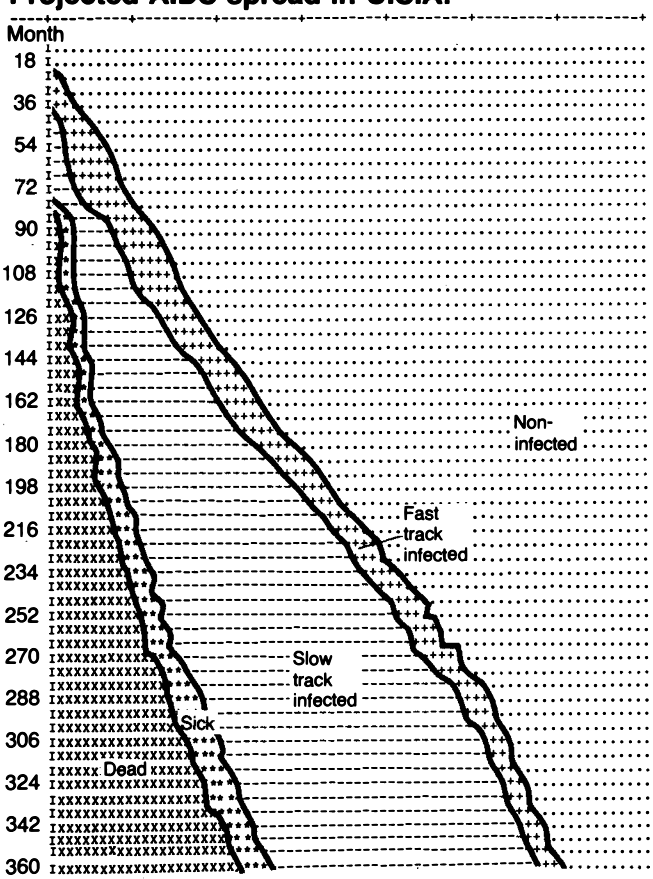
The first-generation model underlines very clearly the dramatic difference between the AIDS epidemic and every other known epidemic in human history.

In first approximation, the spread of virus infection in a population initially follows the "S-curve" familiar in the study of reaction-rates in chemistry (see **Figure 1**). While the concentration of infected persons is still small, transmission is very efficient, since infected persons primarily come into contact with noninfected ones. The rate of increase of infected persons, increases, up to the point where half the population is infected.

From that point on, the process begins to "saturate," as most contacts involve already infected persons. Fortunately, however, most deadly epidemics are "damped out" before they attain more than a small fraction of the population. This is because infected persons rapidly drop out of the pool of potential virus transmitters, either by recovery (eliminating the reproduction of virus in their bodies), or by death. **Figure 2** illustrates the typical form of a "fast virus" epidemic.

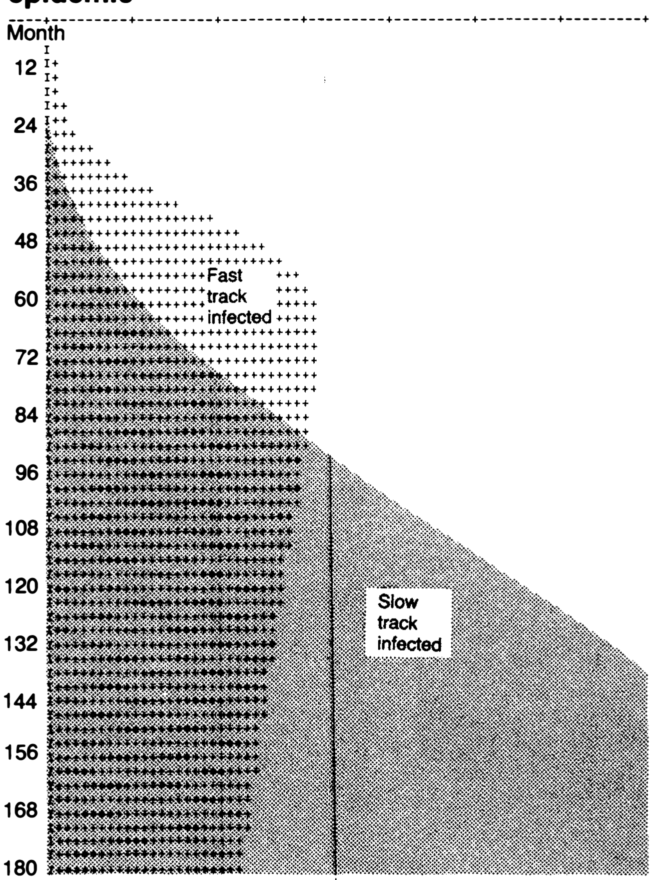
AIDS works differently. Due to the very long latency period of the disease, the pool of infectuous persons without symptoms ("asymptomatic carriers") accumulates much faster than it is depleted by illness and death. **Figure 3** shows the propagation of AIDS infection in a hypothetical "fast-track" group of 1.6 million persons. The number infected increases in a classical "S-curve," growing from a few thousand infected to 90% saturation within only five years. This all occurs before attrition by death has much effect. Only later, after nearly the entire group has been infected, does the figure of carriers slowly begin to drop. Exactly this type of curve is observed among pockets of "high-risk" persons in some U.S. cities. Once the AIDS epidemic gets started in the general

FIGURE 4
Projected AIDS spread in U.S.A.



POP=240,000 RISK=20,000 SICK=0 DEAD=0
INFI-POP=0 INFI-RISK=100
S=.14 L=.016 R=.008 K=300 M=24
R-steps/month 1. Every 6 months one line
Full width of scale=240,000
Today=month 28 (approx.)

FIGURE 5
Close-up of initial phases of U.S. AIDS epidemic



POP=240,000 RISK=20,000 SICK=0 DEAD=0
INFI-POP=0 INFI-RISK=100
S=.14 L=.016 R=.008 K=300 M
R-steps/month 1. Every 3 months one line
Full width of scale=40,000

population, the same "S-curve" dynamic sets in, only at a slower rate of growth.

How AIDS spreads from 'fast-track' groups into the general population

In the first-generation *EIR* model, the transmission processes are grouped into two categories, fast- and slow-track, with the corresponding infection probability parameters determined to fit available statistics on the actual epidemic in various areas. These statistics imply the estimate, that the present total infection probability (per exposure) of combined "slow-track" routes, amounts to about one-tenth of the corresponding probability for "fast-track" routes. Remember, the present model does not take account of nonlinear increases in "slow-track" parameters as the epidemic progresses.

Figure 4 presents the results of a model run for the United States, assuming a "high-risk" population of about 20 million (U.S. Public Health Service estimate). **Figure 5** is a close-up of the initial phases of the epidemic, showing the extremely rapid spread in the "fast-track" group, reaching maximum saturation three years from now! At that point, virtually all of the "high-risk" group is infected. The second, superimposed curve shows initial spread into the "slow-track" groups, which begins in earnest as soon as the infected "fast-track" pool reaches 1 million, and accelerates rapidly thereafter. Five years from now, more people are infected in the general population than in the "high-risk" group. By the year 2014, more than 80% of the U.S. population is either infected, sick, or dead! Dismal as it may appear, this scenario errs on the conservative side, omitting nonlinear factors of acceleration.

Figure 6 illustrates the folly of proposals to curb the epidemic by "safer sex." Here we have assumed that the spread of AIDS in the "fast-track" group is *stopped completely* within the coming 12 months (a very optimistic assumption, given open admissions by "safer sex" proponents, that their campaign has had little or no effect on AIDS spread in

FIGURE 6
U.S.A. 'safer sex,' after 36 months

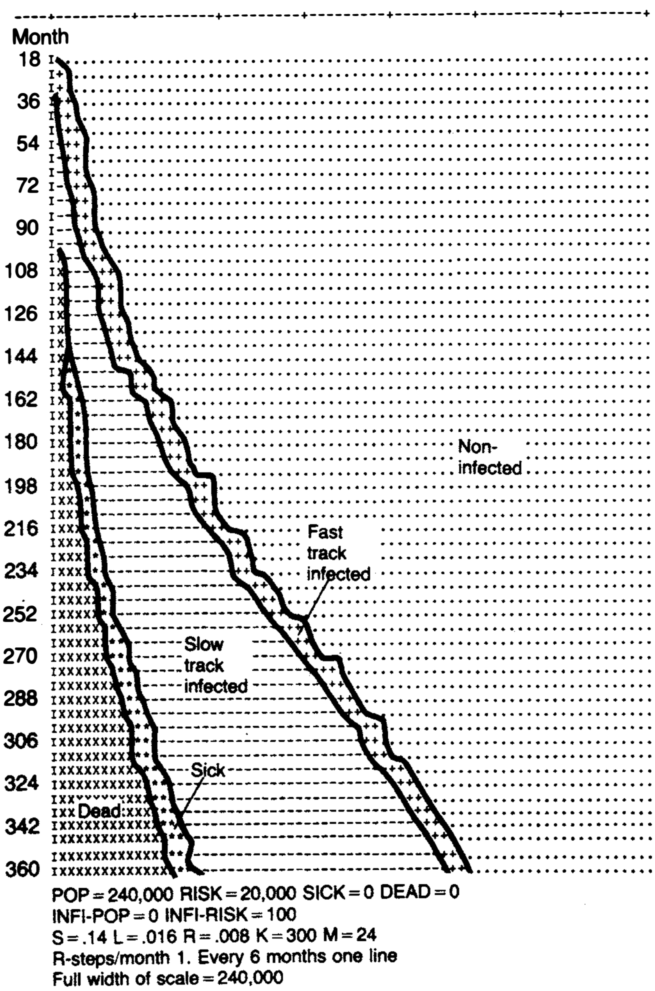
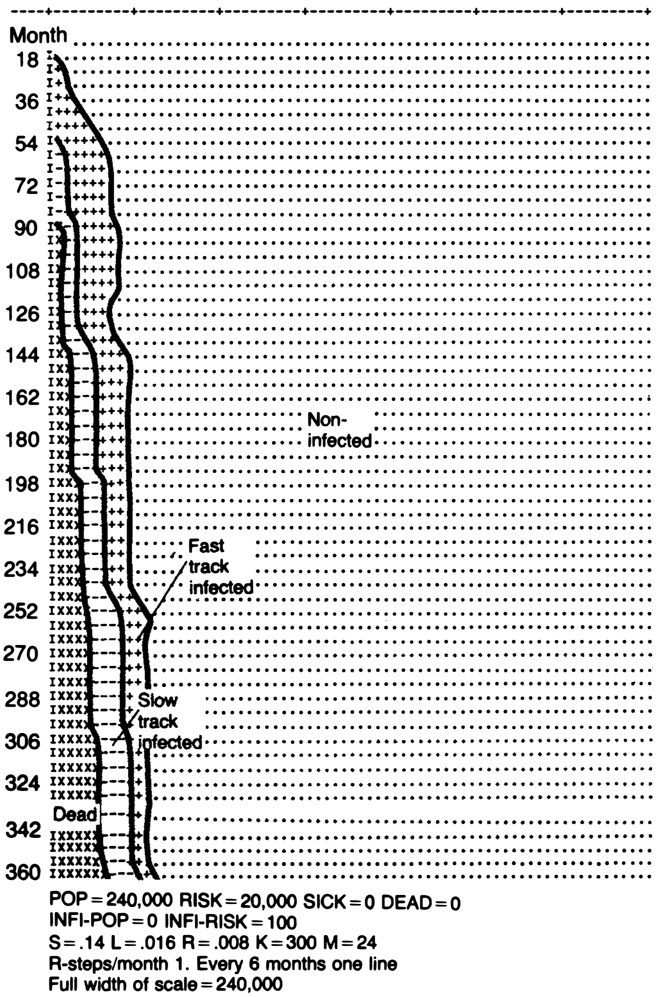


FIGURE 7
Proposition 64 after 36 months



the so-called risk groups). Whether or not such measures ever could have had an effect, it is too late now. The epidemic has already been launched in the general population, and the general epidemic curve remains essentially identical to Figure 4.

Quite different is the potential effect of public health measures of mass testing and quarantine, as necessary, to radically reduce transmission in the general population. **Figure 7** shows the projected effect of public health measures implemented within the next 12 months, on the assumption that these measures succeed in reducing the "slow-track" parameter by a factor of 6. This would correspond to a situation where the number of potentially infectious contacts between infected and noninfected persons is reduced by about 80%.

In that case the epidemic is massively slowed, though not completely stopped.

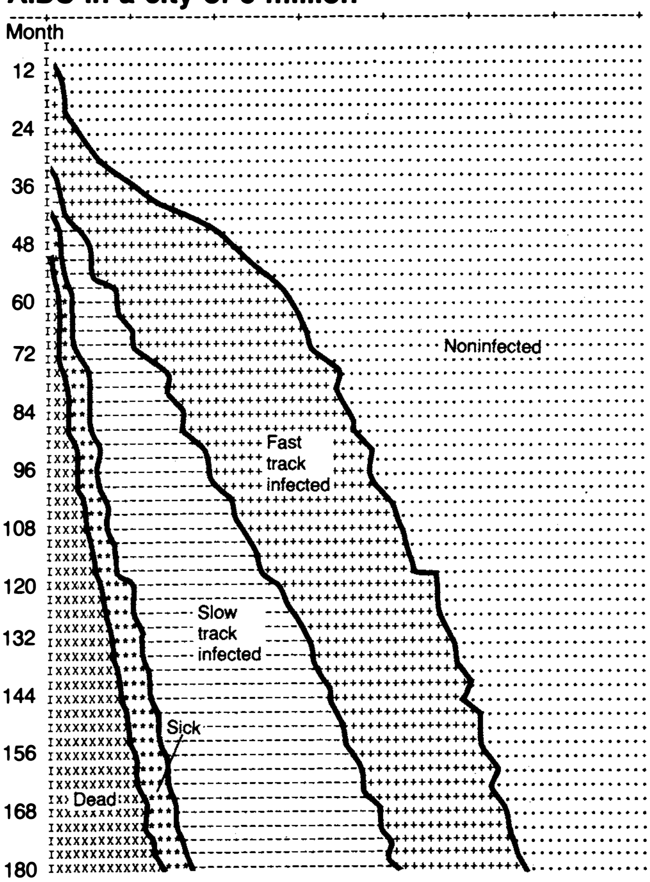
Another source of excessively low estimates, in the nationwide computer runs just discussed, is the fact that "fast-track" transmission is distributed unevenly in the United States, with concentrations in major cities such as New York and San Francisco. In such areas the breakout of infection into the general population is much faster than in less dense areas. **Figure 8** shows the devastating effect of AIDS in a hypothetical city of 5 million inhabitants, in which about one-third of the population is assumed to be subject to "fast-track" transmission. Within 15 years, the epidemic grows from a mere 10,000 infected, to infect or kill some 80% of the population.

Effects of multiple exposure

One of the crucial factors omitted from the first-generation model described above, is the effect of repeated exposure to AIDS viruses and other viruses in areas of high infection—

FIGURE 8

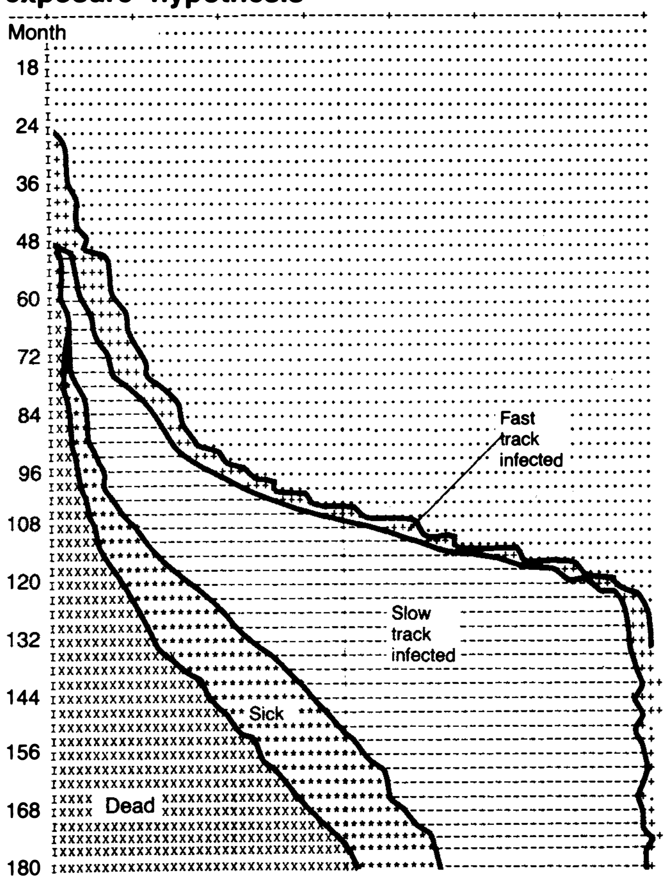
AIDS in a city of 5 million



POP=5,000 RISK=1666 SICK=0 DEAD=0
INFI-POP=0 INFI-RISK=10
S=.14 L=.016 R=.008 K=300 M=24
R-steps/month 1. Every 3 months one line
Full width of scale=5,000

FIGURE 9

AIDS epidemic on 'repeated or multiple exposure' hypothesis



POP=240,000 RISK=20,000 SICK=0 DEAD=0
INFI-POP=0 INFI-RISK=100
S=.14 L=.0000016 R=0 K=76 M=24
R-steps/month 1. Every 3 months one line
Full width of scale=240,000

especially when compounded with environmental cofactors such as poverty, crowding, and insect infestation. Dr. Mark Whiteside of Miami, Florida, has compiled massive documentation of these effects in such areas as the famous Belle Glade.

In a preliminary study, the author and his collaborators investigated the dynamics of "repeated and multiple exposure tracks." This study involved modifying the model equations according to the simplified assumption, that the AIDS infection probability (per exposure) is significantly higher for those persons exposed repeatedly within a given fixed time period. It is easy to see, that repeated exposures are highly infrequent, as long as the density of infected persons remains low. But, for higher densities, the probability of multiple exposure increases rapidly, and the "repeated exposure track" may become even faster than the "fast-track" transmission in the so-called risk groups.

While cumulative effects of exposure to AIDS virus alone have not been sufficiently researched, there is considerable evidence that infection by certain viruses (particularly insect-borne viruses) increases susceptibility to infection by AIDS, and vice versa. The probabilities of *multiple* exposure to *different viruses,* and of *repeated* exposure to a *single* virus, increase in a similar fashion as a function of density. Hence, similar threshold effects will occur in both cases.

Preliminary computer runs confirm this threshold phenomenon: When the density of infected persons is low, the "multiple exposure track" is damped out by the slow death rate in the infectious pool. But, as soon as the infected density exceeds a certain limit, the rate of infection explodes, out of control, at a nonlinearly accelerating rate (see **Figure 9**). Unfortunately, this effect is destined to play a major role in the great population centers of the United States, unless we stop the AIDS epidemic in time.

U.K., France seek joint action to stop AIDS

At her meeting with French government leaders in Paris Nov. 21, British Prime Minister Margaret Thatcher won an agreement to put AIDS on the agenda at the summit of European prime ministers in London on Dec. 5.

Emerging from a meeting with French President François Mitterrand, Mrs. Thatcher told the press that "we would be discussing AIDS" at the Dec. 5 meeting, since "you can't discuss drugs without AIDS," and drugs is a top agenda item for that meeting.

According to a Nov. 22 London *Daily Express* account, "Mrs. Thatcher convinced [Mitterrand] that AIDS is the greatest current threat to Western civilization," and insisted that AIDS be made the number-one agenda item for the prime ministers' meeting, the last under Britain's tenure as president of the 12-nation European Community.

On Nov. 20, British cabinet ministers received a terrifying appraisal of the AIDS crisis in the United Kingdom from experts, who told them that AIDS infection is doubling every 10 months in the United Kingdom.

On Nov. 21, the House of Commons held its first-ever debate on AIDS. The British government announced it will raise spending on AIDS from only £5 million, to at least £20 million over the next year. British Secretary of State for Social Services Norman Fowler said that the increased spending would be earmarked for: creation within the National Health Service of a Special Health Authority to deal with AIDS, directly accountable to Parliament; more money for clinics treating sexually transmitted diseases; upgraded British involvement in international research efforts to combat AIDS and find a cure.

At a Paris press conference Nov. 27, French Health Minister Michele Barzach announced on behalf of the French government, a series of exceptional measures against the spread of AIDS. The daily *Le Figaro* headlined the next day: "Against AIDS, a planetary crusade." Interviewed on national television, Mrs. Barzach stated: "AIDS does not just concern 'risk groups.' Every day a baby is born infected with AIDS. Fifteen persons a day are contaminated by the disease. It is no longer a disease of marginal people. . . . This is why the government decided to declare AIDS 'a great national cause' like cancer or tuberculosis."

She added at her press conference: "Frenchmen must understand that we have reached a turning point in the spread of the disease. Among the new declared cases in the last quarter, 43% were heterosexuals."

The French government made a series of important decisions for the anti-AIDS campaign. A foundation will be created on the model proposed by Prof. Luc Montagnier of the Pasteur Institute in a recent interview to *Le Monde*. The foundation, to be "operational within two years," will bring together in one place treatment units and a research center. It will be financed by public and private funds. The government will help finance detection and prevention programs, picking up the full costs of the Elisa and Western Blott tests.

It is reported in France that Prime Minister Chirac and President Reagan recently exchanged letters on the subject of scientific cooperation against AIDS.