EPIDEMIOLOGY

Much of what we know about AIDS today is the result of epidemiological research. Epidemiology is a statistical study of the way disease is transmitted and progresses in a population. The statistical tools that are used are very sophisticated and highly accurate. It is through this study that we know that AIDS can be sexually transmitted, or spread through contaminated blood; that semen can transmit the virus, but that saliva almost certainly does not. Even though epidemiology is based on statistics and probabilities, it does not mean it is any less "real" than information that is gathered in the laboratory.

Many callers will try to dismiss epidemiological evidence on the grounds that it is not conclusive, or that the fact that some evidence was not found does not mean it doesn't exist. They will say, "You can't prove that it is 100% safe." Of course, it is impossible to be 100% sure about anything. We can't absolutely prove that cancer is not casually transmitted, but based on the statistics involving millions of people who have had cancer, we can safely and assuredly conclude that it is not casually transmitted. No self-respecting scientist or researcher is going to proclaim something 100% sure, but that is not a good definition for knowing whether or not some fact is real or not.

Most people do not understand the concept of relative risk, and confuse probability with possibility. For most people, the concept of risk is tied to a 50-50 model: it either is or it isn't. If the risk is greater than 50-50, it will happen; if the risk is less that 50-50, it won't happen. This represents no understanding of risk at all. A seventy percent risk means that, <u>given a large enough sample,</u> the phenomenon in question will occur seventy percent of the time. With a smaller sample, the incidence will vary from seventy percent. The chance of coming up heads on a coin flip is fifty percent. But, of course, it is quite common to get two or more heads in a row, or two or more tails. It is only when the sample becomes sufficiently large that the risk and the reality are in synch. Thus, it is a meaningless question when someone asks: "If the chances of such-and-such happening are ten percent, does that mean it won't happen to me?" It might happen or it might not, but that is different from the relative risk of it happening, which remains at ten percent.

There is also confusion between the meanings of "possible" and "probable". Anything might be possible in the universe, but that does not mean it is probable. The sun may not rise tomorrow morning, but it is not probable that this will happen. Similarly, it is possible that someone may bleed on you in the elevator just after you have gashed your arm on the door, but it not probable.

Epidemiology has shown us that the picture of AIDS differs in different parts of the world. In San Francisco, AIDS occurs almost exclusively (96%) among gay and bisexual men, most of them white. Nationally, gay and bisexual men account for only 72% of all AIDS

cases, and a greater percentage of these cases are among non-whites. Nationally, we also see a larger presence of IV drug users (17%) and other groups, including heterosexuals (4%).

The statistics in Europe look very much like the U.S. statistics, but the picture in Africa is very different. There, the cases of AIDS are almost evenly split between male and female heterosexuals, with the assumption that the disease is spread through sexual transmission. There is some good evidence to support this theory. There is a strong link with prostitution in the African cases (unlike the U.S. or Europe) and it is more likely for either the men or women to have had genital abrasions or lesions from other STDs, which would make passage of the virus into the blood stream easier, or cofactors such as poor nutrition and health care. On the other side is the argument that the cases could be explained by the use of non-sterile needles in medical settings, as is common in many parts of Africa. This would be essentially the same mode of transmission that occurs among IV drug users in the U.S. Only by conducting well designed epidemiological studies will we ever be able to conclude which is the most common route of transmission.

There are several epidemiological studies that illustrate important points, and that are useful to refer to during hotline calls.

HEALTH CARE WORKER/NEEDLE STICK STUDY

A study of 1700 health care workers has been underway for several years to assess the risk of close exposure to people with AIDS. 800 of these workers had a needle stick accident with a needle that had been used on a PWA. The rest had some sort of mucous membrane exposure, such as being splashed in the face with blood or vomit. Of all these people only two show signs of being infected with the AIDS virus (as determined by Ab test). One was a nurse who had multiple needle stick accidents, including one where she tripped and fell on a syringe filled with blood she was carrying ,and the plunger was depressed after the needle had stuck her. The other was a lab worker who was working with a test tube of infected blood which broke and cut his finger, exposing the infected blood to his bloodstream. This study shows that AIDS is a difficult disease to get, and even the intimate exposure of these health care workers was not enough to infect them except in the most extreme cases.

HOUSEHOLD CONTACTS

Three studies of household contacts, in the U.S., Europe and Africa, have shown that AIDS is not causually transmitted by normal activities, even when people are in close living arrangements. All the studies examined households where someone had AIDS to see if any of the other members in that household had become infected. Many of these households included a small child as the one who has AIDS. These children continued to play with siblings in the manner that

children play: wrestling, fighting, spitting, sharing food and clothes and many other intimate activities. No other member of any of the households shows any sign of being infected. This study shows that AIDS is a difficult disease to get, and that even the intimate exposure common among small children living together is not sufficient to transmit the virus.

HETEROSEXUAL TRANSMISSION

It is evident, from epidemiological studies as well as common sense, that AIDS can be transmitted sexually between men. It can also be shown that sexual transmission is possible between men and women. Several studies, usually with the female partners of hemophiliacs who have been infected, show that male to female sexual transmission does occur. This is supported by the statistics of women who have AIDS, whose only risk factor was sex with a man with AIDS or a man at risk for AIDS. Female to male sexual transmission seems to be less efficient, but it certainly does occur. Again, we can examine the statistics of who has contracted AIDS, and find men whose only risk factor was sex with a woman who had AIDS or was at risk for AIDS. The lesser efficiency of female to male transmission is somewhat explained by the clinical finding that the AIDS virus can be found in vaginal and cervical secretions, but in much lower quantities than sperm or blood.

SALIVA

Many people will call and be worried about the possibility of saliva transmitting the AIDS virus. We do not believe that the virus is transmitted by saliva. There is a great deal of evidence to support this supposition, and it grows stronger every day. In a recent study of 79 men with AIDS, the virus could be found in the saliva of only one. This man has PCP, thrush and other mouth and throat lesions. Even in this man, the level of virus found in his saliva was 10,000 times less than the level in his blood. To this study we can add the evidence of the countless numbers of people who have had saliva contact with PWAs or others who have been infected. This contact has occurred through kissing, food sharing, sharing joints and many other means. We can find no evidence of these activities transmitting the virus even a single time. One local researcher illustrates this by pointing out that, if you could find saliva that contained the virus, you would have to inject over a quart of it directly into your veins in order for you to become infected.

Callers often become obsessed with statistics. It is easy to understand why. We are all taught of the power of science and numbers, and somehow knowing the numbers makes people feel like they are in control, but it is definitely a double-edged sword. Concentrating on the numbers leads people away from an understanding of the issues that are important. Instead of concentrating on the fact that they are at no discernible risk,

they will worry about the one in a million chance of a piano dropping on their head that has just been played by a PWA. Sometimes it is very appropriate to quote statistics, but most of the time it is better to explain the resons behind some of our beliefs than to fall back on the numbers. Many people will also become confused with too many numbers. They will mix up the studies and only remember that there is a seventy percent chance of their getting AIDS from having sex while receiving a blood transfusion. If the caller goes away with a clear conceptual picture of AIDS transmission, then the numbers will not be important. They will be in a good position to interpret new information they read in the newspaper, and not worry unnecessarily about how many times they drank from a public drinking fountain. Present things in a context of common sense. This will usually bring people back from the edge of absurdity and cause them to reexamine their strange assumptions and fears.

QUESTIONS ON EPIDEMIOLOGY:

1. What is epidemiology?

2. Which study demonstrates that AIDS is hard to catch?

3. Why should you not rely too heavily on statistics?

4. Can you get AIDS from saliva?