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AIDS

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DR. ROBERT R. REDFIELD, JR.: What I would like to do is make three different points: (1) give a perspective on the spectrum of disease caused by the AIDS virus; (2) discuss the methods of transmission and what efficiency we know about them, so you can use that in terms of understanding the impact that this virus will have on our society; and (3) give you an idea of what we know about the extent of the epidemic today.

When I first got involved in AIDS, in 1983, it was still a mysterious syndrome. It was an aggregate of signs and symptoms without an etiology and yet it had been there since 1981, when it was first recognized as sort of a unique medical curiosity. And despite that and despite substantial scientific advances, it's

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clear now that the AIDS virus is probably the most significant national crisis in the United States and will probably be worldwide. And how did that happen despite an amazing amount of scientific advancement within an unprecedented shortened period of time?

We actually discovered that it was caused by a virus in 1984. We developed all the tools to remove our focus from AIDS, which basically is the end stage of this epidemic, to its cause -- the virus. Yet, I apologize for this on behalf of the medical community, because I think it's unprecedented in the practice of medicine of public health, we failed to embrace the scientific advancement in either our practice of medicine or in the practice of public health. Since 1984, we have been able to diagnose an individual who's infected with the virus that causes AIDS, and yet still throughout our country at least, the majority of people that are infected with the AIDS virus unfortunately don't even know it. Many physicians even question whether or not it's within the standards of medical practice to diagnose the presence of the virus.

The other important thing about the retrovirus that you have to understand is that when a retrovirus infects an individual (and it's going to make a major impact as you try to decide how rapid this epidemic will spread throughout the world) in order for the virus to replicate, it actually becomes part of the genetic information of the individual it infects. It's a very powerful virus. Once it infects an individual, that individual is infected for life. That's the very nature of the virus.

In terms of the progression, I think one of the reasons the life insurance industry and many people in society have had a poor understanding of this disease is that they relied on an old diagnosis of AIDS or AIDS-related complex (ARC). "I have the AIDS antibody but I don't have AIDS." Many studies over time have looked at the progression of AIDS. In a two-year study, maybe 5% of the infected individuals developed AIDS. For a study that was carried for three years it may be 10%, four years it may be up to 20%, five years it may be up to 35%, and for seven years it may be up to 40%.

I think we've begun to understand two very important principles about this virus. The disease is caused by a virus, and the principal thing that this virus does is it destroys the immune system. Clearly it has other effects, but it

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destroys the immune system in a very predictable way. The central cell it destroys, the conductor of the immune system, the quarterback of the immune system, the commander in chief of the immune system, whatever you want to call it, is in fact the T helper cell.

We developed and published a system in the *New England Journal of Medicine* a long time ago. I'm not going to go into it other than to say that you can reduce the AIDS virus into very predictable stages of infection. The six stages are really dependent upon the integrity of the immune system in the individual. The number of T helper cells being destroyed or the body's ability to have an intact response that we defined in terms of delayed hypersensitivity, or the development of opportunistic infections on the mucous membranes in the form of thrush, or systemic in the form of opportunistic infections. But the AIDS virus infection in the human host can be reduced to these six stages with progressive destruction of the T helper cell system and there will then be a gradual development of opportunistic infections and complications.

What is the course of infection? What percentage of people infected will go on to die prematurely as a consequence of this infection? It's been very clear, as we presented in 1985 at the first international AIDS meeting but it was met with great skepticism, that this was a progressive infection. At the second international AIDS meeting, 90% of our cohort progressed and at the third international AIDS meeting, 90% of our cohort also progressed. I think many people now understand that, given time, this is a progressive infection in the human host.

This is a very slow disease and despite prolonged periods of an asymptomatic state, the individual does have a progressive illness. One gentleman got infected in the summer of 1980. We know that for a fact. He was presented to us again in June 1983 when he had 300 T cells per cubic millimeter, normal being around 800 to 1,200. At that time he would have what we would call Stage 3 disease. Gradually, he developed an inability for a skin test to work, which put him in Stage 4 of the disease by our system and his T cells gradually fell more. He developed complete anergy and thrush and then finally, 42 months later, he developed an opportunistic infection, which you would call AIDS.

Up to 76 months from the time he got infected, this man felt healthy, was running five miles a day and was told that he was "the healthy carrier." But if

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you looked at him subtly, he really had the progressive disease. And we now know that it's the rule as opposed to the exception, that the individual from the time of infection to the time of death is going to be alive on the order of say seven to ten plus years.

In our own cohort, 62 patients that were entered in 1984 and they were a unique group; 50% were married, 20% or so were women, and all risk groups were recognized. All of them in Stage 6 disease lived at least 18 months and then died. These were the long-term survivors for AIDS by opportunistic infection and they all died in the follow-up period. There were 23 in Stage 5 disease, and all 23 developed Stage 6 disease and actually, up through this summer, 20 have died. The same happened with Stage 4 disease and Stage 3 disease -- all have progressed. In the Stage 2 disease, which is the individual that just had adenopathy and the virus, 15 of the 20 have progressed into different stages. Of the five that haven't progressed, their mean T cell counts have gone from 875 to 550.

So the conclusion that we have from this cohort is that the AIDS virus in the human host is a progressive infection in the majority of individuals infected. That data and that evidence has been available for a long time. I think many other cohorts are now beginning to substantiate that and I think it's now becoming clear that this virus which infects man is a fatal infectious disease in the absence of a scientific solution.

If you look at it the other way, how did they enter the cohort? Did the Stage 2s develop AIDS in the follow-up period? Well, only 10% did, and only 5% died. But at the start of Stage 3, 29% developed AIDS, and 14% died. If they entered the study at Stage 4, 71% actually developed AIDS in the follow-up period and 57% died. And if they entered in Stage 5, 100% developed AIDS, with 87% dying. This is a continuum and I would argue that based on the study, I know the natural history of Stage 5 disease because it becomes Stage 6.

So from our perspective as physicians and scientists, and I think from yours, we know the natural history of this disease. It's a progressive infection in at least 90% of individuals infected with the virus today.

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The other point that I want to emphasize is how it's transmitted. That makes a big difference and the bidirectional sexual transmission, the parental transmission, and the perinatal transmission are the major modes of how this virus is transmitted. But in terms of our society and the impact it's going to have, it is the sexual transmission that is going to be the major player. Many people try to now say it's the drug abuse community that's really going to be the major link. The fact is it's sexual transmission that is the major mode of transmission in society today. Heterosexual transmission actually is the major mode of transmission in the world today and it's unfortunate, but in the absence of scientific solution, it will be the major mode of transmission in North America also.

I'll talk about heterosexual transmission because there may still be some disbelievers. Fifty percent of my patients at Walter Reed with AIDS and ARC were married, all through the epidemic, and a lot of people didn't understand that. We saw a different population. In that group I could study its transmission among spouses. Of the initial spouse couples that we looked at, if the husband had end stage disease, which we would call Stage 5 or 6, 44% of the spouses were infected. If their wives had end stage disease, transfusion-related end stage disease, we would find, in fact, that 43% or 3 out of 7 of the husbands were infected. It didn't prove which way it went but it shows that if your partner is infected and has an acquired immunodeficiency from the virus, you're likely to be infected.

On the other hand, I think Margaret Fischl's study really proves it. She follows 29 men for 6 to 18 months that have opportunistic defined AIDS, what we would call Walter Reed Stage 6. Their wives aren't affected at the time. Eleven become infected prospectively, practicing safe sex; that is, not practicing anal intercourse. At the same time, she had 9 wives with AIDS whose husbands weren't infected and four of them became infected. From the prospective study, the ability of a woman with AIDS to give this virus to a man is as equivalent as the ability of a man with AIDS to give this to a woman. I think that's important because there's a lot of bias and there are a lot of misconceptions.

But the scientific data says that like every other sexually transmitted disease, and that's what this one is, this virus will go probably equally from male to female, and from female to male by recurrent contact to someone infected. And

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that really should be our null hypothesis until someone proves unequivocally that this will violate that law of nature.

Just to show you the efficiency of vaginal-genital intercourse in those couples that continued to have vaginal-genital intercourse, 13 out of 16 infected their partners (81%) within a 6-to-18 month period. Of those that abstained from sex after being told, none (0 out-of-10) infected their partners. Of those that used condoms all the time 3 out of 17 infected their partners. It shows that condoms reduced the risk of transmission substantially from 81% to 3 out of 17. But as condoms fail for pregnancy, we shouldn't anticipate that they'll be any more effective here; and in fact the failure rate probably will be in the same ballpark -- somewhere between 8-13% -- as it is for pregnancy.

When the Swedish government found their first blood bank individuals to be positive, they in fact followed the standard procedures of public health and told them the methods of transmission and offered the opportunity to follow up the contacts. The contacts did all come in. They, in fact, found that 3 out of 6 women were infected. Unfortunately, so was 1 of the 2 children and 1 of the 2 husbands.

This is a disease that's sexually transmissible like syphilis. This disease has become part of the Canadian and American and world family. It's not going to be a segregated infection.

In our country at least we still have a tendency to focus on a "risk group for AIDS." I had asked people a year ago to sort out not how you got infected, but how you potentially could be infecting others. Even though only 4% of the AIDS cases in the United States apparently have been infected by heterosexual contact through the hierarchical risk group categorization, 26% of the people that are reported with AIDS are, in fact, heterosexuals.

So, once you realize that the virus is transmitted this way, I think we should begin to change our focus from not "How I got infected" but to "How I'm infecting others." When we look at risk assessment, some people felt very strongly a year ago that what you needed to tell people was to "know your sexual partner," "know your sexual partner's, partners," "know your sexual partner's, partners' partners' partners." But I find it very difficult to have any idea about the risk

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assessments of whether or not I'm going to be infected with the AIDS virus if I have sex with this partner.

What you want to know in your own risk assessment is "Is your partner infected with the AIDS virus?" It goes back to why I said that I'm disappointed in the medical and public health community. They haven't provided the leadership to provide that tool which we were involved with. In 1983, we and many scientists worked night and day to find the cause of AIDS because that was so important. In 1987, three years after we've done it, we're still not using that knowledge. So I think this is self-explanatory and the risk assessment is "Is your partner infected with the AIDS virus?" This virus is not going to discriminate who it infects sexually, parentally or perinatally.

We're doomed to fail as long as we focus on AIDS as our problem, because the magnitude of our response is appropriate for what it should have been a decade ago. And you ask the question, "What's the epidemic in the virus?" I answer with an apology. It's a fact that in research, if we had the tools to study a new disease, we'd use them immediately. And yet, three years later, I can't really tell you in our society what the problem is. I can tell you what the prevalence is in gay homosexual groups; I can tell you what it is in IV drug users; I can tell you what it is in people that donate blood; I can tell you what it is in hemophiliacs. But, in general, we really don't have an understanding of people going to VD clinics, prenatal clinics, etc.

One of the few groups that does is the Department of Defense. As part of the medical examination to join the service, one of the medical tests that you undergo is the test for AIDS virus. And I think it's very important that we approach this as a medical problem. I actually have some pride in the Department of Defense for the leadership they have shown in viewing this epidemic in a rational fashion.

The service probably does select against homosexuality and IV drug use; it selects against illiteracy, since you have to have a high school diploma. The prevalence of infection among the young people joining the service was 1.5 per thousand. Now that may not seem like a lot to a lot of you. But in 1975, in San Francisco gay men, the prevalence of infection was less than one per thousand. And it wasn't because of anal intercourse that gay men became infected.

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Because they had sex with someone that was infected is why gay men got infected. And as the prevalence of infection today in the young people wanting to join the service is 1.5 per thousand, that means that's a reservoir of infection for other young people that want to have sex with those young people that are infected.

The male/female ratio was about 2.6 to 1 and the most important independent variable is really age. If you're 18, it was 1 in 2,000, or .5 per thousand for 18 to 20-year-old men; but it was .3 per thousand for women. They're almost equal for that young age group. And it wasn't until you got older, when you were over 26, that it was almost .5%. It was about 1.3 per thousand for the females; that's across the country.

Many people will say that this is an epidemic that's going to be isolated to certain racial groups. That's ridiculous. That's about as ridiculous as our original thinking that it's going to be isolated to gay men.

In large parts of the United States in 1986, the epidemic in this young population is still rare. Some of my colleagues from Montana tell me it's because New Yorkers are different and it will never get to Montana. We laugh at that, but that's the same thing we say about Africa. "Africa's different. It will never happen in the United States." Actually in Washington, DC, 1% of all applicants to the military service were infected.

They don't understand why Maryland's Montgomery County, which is one of the more prestigious areas near Washington, basically has a rate four times higher than Maryland's Prince Georges County, which is considered to be one of the more economically deprived counties in the United States. And the answer, of course, is that the AIDS virus is more common in people in Montgomery County than the AIDS virus is in people in Prince Georges County. People have a difficult time understanding that.

The capital, of course, is New York. Greater than 1% of male and female applicants from these counties, independent of race, were infected with the AIDS virus. In Manhattan, actually, it was 2.1% of male applicants and 1.7%, or 17 per thousand, of female applicants. Across the country there was a 2 to 1 risk for blacks over whites; 2.61 to 1 for males over females. But in New York, it

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didn't really matter if you were male or female or black or white. What mattered was if you were 18 where the rate was around 3 per thousand, or if you were 25, where the rate got as high as 30 per thousand. That's what mattered.

Since we have such a large population, we really do have cohorts. We can look at people by birth year and whether they joined the service in 1985 or 1986. We looked at young, black, male applicants, male being the highest prevalence of infection and blacks being higher than Caucasian across the country. We wanted to see if there was any difference by birth year cohort. The young applicants that were born in 1967, that joined in the fall of 1985, was .5 per thousand. But if they were born that same year, so it is the same cohort, but didn't join the service until the fall of 1986, the rate is almost 1 in a thousand. If you get down to 1965, you can see it went from 3 per thousand to 9 per thousand. If you went to 1964, it went from 4.7 per thousand to almost 11 per thousand. The estimated incidence of infection in young black males across the United States that wanted to join the service either in the fall of 1985 or the fall of 1986 was almost 1 in 250 to 1 in 300. Now I don't think that's a stable epidemic.

The closed population of the Army (actually we have tested almost the entire army now for the AIDS virus) including the people who came in because of clinical reasons or whom we picked up in routine testing in VD clinics, etc., had the overall rate per males of about 1.9 per 1000 and females of about .8 per thousand. If we only tested single men, we would have missed around 46% of the infections. About 46% of the infected with the AIDS virus occurred in young soldiers that were married men. In this virus, it doesn't understand whether they're married or not. What the virus understands is whether or not you've slept with someone who's infected.

Looking at the prevalence of infection in marital status by age, between the real groups, between the ages of 20 and 24, there really isn't that much of a difference. It really isn't until you get the older individuals that are single at this time that there is a major difference in the group. I think that makes sense, being a sexually transmitted disease.

I close with just a personal perspective on syphilis. Many of us don't have any context which deals with the daily epidemic. Many of you and I were brought

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up in a society of antibiotics. We don't remember the society that was present when my father was growing up, when bacterial diseases were fatal. We really haven't dealt with a fatal epidemic in a long time. And I think part of the context to deal with in a fatal epidemic, the one that most deals with our present situation in society that we can learn a lot from, is syphilis.

But syphilis didn't enter Western Europe gradually; it did so with a dramatic suddenness. It was such that the physicians of the time said, "You know, I didn't learn about this disease in medical school. I've never seen it before." And so they looked to the Aristotelian writings and the Galenic philosophy and they didn't find anything that resembled syphilis, so they went to the great scientists of the time. Remember, in that context in the 1490s, they were astrologists, kind of cocky astrologists, who said, "We understand that the cause of this is Saturn and Scorpio crossed in the stars." They predicted a great human tragedy and said there was nothing that could be done.

Unfortunately the society responded, based on that scientific understanding, for four-and-a-half centuries until 1905, when scientists said, "Wait a second, it's caused by bacteria transmitted sexually, parentally and perinatally." It's ironic that we used to think the major mode of transmission of syphilis was blood. In fact, I think we all realize now the major mode of transmission of syphilis is sex.

And then the diagnostic test was actually developed and I think the first group to use it was the Department of Defense. (At the time, they weren't called the Department of Defense.) But they used it for all young soldiers that wanted to join the service. It was part of the routine medical exam that they did and at that time about 15% of applicants were infected with syphilis. In four-and-a-half centuries, only 15%, not 100%, of young, sexually active men and women who wanted to join the service were infected. I think it's important. I'm not saying that 100% of us will become infected with the AIDS virus, but a sexually transmitted disease in four-and-a-half centuries basically leveled out to around 15% of the young, sexually active people.

After that it took 21 years before knowledge was available for our country to have the wisdom and courage and leadership to develop it into an effective public health policy. And I suspect if I was around then, I probably would have been a little impatient as a young man, but probably not as impatient as I

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am now. We weren't as fortunate as the Europeans. We didn't realize that the AIDS epidemic virus entered our society right away like they did with syphilis. It came in the early 1970s and we recognized it in 1981.

But then it is unprecedented that the government scientists, and they were largely government scientists, and the government deserves a lot of credit for this, solved the problem. They basically defined the etiology, and they understood the methods of transmission. It's just a sexual disease, it's a parental disease and it's a perinatal disease. That's how it's transmitted.

We developed a diagnostic test actually in 1984 and still many of you are being forced not even to use it in your practice of life insurance, which actually makes no sense to me whatsoever. And we as a society in the medical community aren't using it. Now three years more have lapsed, actually as long as it took us to solve the problem once we recognized we had it, and we still don't have a national public health program.

Basically the guideline for a control program as I see it is you are going to have to care for the sick. And as for the insurance industry, you see the burden of cost to care for the sick. Even as we get scientific solutions to the AIDS virus, as many say, it is not curable. We sometimes make the mistake of saying it's not treatable. It is treatable. I'm a doctor. I treat it all the time. It's to the patients' advantages to know that they're infected and it's to the doctors' advantages to know so that they get optimal medical care.

Unfortunately, many people don't have that opportunity because we in the medical community haven't provided the leadership to educate people that it is in their best interest to know. But this is going to cost a great deal of money and I'm sure many of you know more about that than I do. We're going to do research for a better tomorrow. And someday, we will solve the AIDS epidemic. There's no question. I don't know though, as a scientist, if it's going to be in 5 years, 50 years or 100 years. I think we need to begin to respond to this epidemic with that understanding.

We need to educate everybody but we don't need to just educate them about the ps and qs of the AIDS virus. We need to educate them about how this virus is transmitted and educate them as to why they need to know if they're infected or

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not. We need to educate them as to why discriminatory activity that inhibits my ability to want to know if I'm infected is counterproductive to our nation's efforts to control this epidemic. We need routine testing obviously with medical leadership of contact tracing and it's absurd that we don't have it. Most importantly we need leadership and we don't have that either.

Infectious diseases are going to have a major impact on our society. The AIDS virus is going to change the world. That's a fact. The epidemic that I plead with you to try to get a control of is not the epidemic of AIDS of the year 1991, or the year 1995. We can't stop that epidemic. It's coming. These infections have happened. The epidemic that I'm trying to stop is the epidemic of 1998, 1999 and the year 2000. Unfortunately, our politicians and our leaders can't see beyond three to four years. And if they're focusing on AIDS, you can see they're six years behind to start with because of the ten-year lag.

You guys have a tendency to think ahead and maybe some of you could share that thinking process with others and begin to focus on what we need to do to control the epidemic in the year 2000. We have that ability, and in the 21st century, I or we or the other leaders will not be held accountable for whether or not we have an AIDS vaccine or a cure. We will be held accountable for whether or not we have the courage and wisdom and compassion to use the knowledge that's available to us today to control the epidemic at the end of the 20th century. And the fact is, we haven't done that yet.

The unfortunate thing is many of you in business that still don't understand the impact this epidemic can have on you won't understand it until you see the grim reality of the faces of AIDS in your own personal lives. And the tragedy is that all of you will. By that time when you have the courage and wisdom to respond, it will be ten more years out of sync. It's a progressive, deadly, preventable sexually transmitted disease and we have all the tools that we need right now to stop the epidemic of the 21st century.

DR. HOWARD L. MINUK: I'm going to talk to you about the underwriting principles of AIDS as it pertains to the insurance industry. I thought it would be very useful for us to divide the talk into what we did prior to 1984, prior to the discovery of the virus, and what we did after 1984, after we had discovered the virus and after we had antibody tests that were available. Up until 1984,

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the Centers for Disease Control estimated that approximately 9,800 people had CDC AIDS (AIDS as defined by the Centers for Disease Control). We now know that most of those people are dead. But this really just represented the tip of the iceberg. Those 9,800 people are the very top of that iceberg. The base of that iceberg probably represented 330,000 people who were infected with the HIV virus but didn't even know about it. But in 1984, we in the insurance industry carried on business as usual and not surprisingly AIDS claims began to occur. We had 330,000 asymptomatic people who would progress to develop AIDS and insurers began to tell us about their claims in 1984.

At a Home Office Life Underwriting club meeting in New York in January 1984, we learned that people that were promiscuous, people that inhaled butyl nitrate, and people that smoked marijuana were at risk for development of AIDS. Fortunately, the virus was discovered in November 1983 (Montagnier -- lymphadenopathy-associated [LAV]) and eventually in May 1984 (Gallo -- human T cell lymphotropic virus type 3 [HTLV-III]) and in August of 1984 (Levy -- AIDS related virus [ARV]).

In 1985, the underwriters really went through an educational process. They learned a lot about the epidemiology and a little bit about the natural history of the disease through numerous conferences. By 1985, antibody testing was being developed in the United States although it was not available for the insurance industry. The antibody testing fortunately resulted in a good test which protected the American blood supply by June 1985 and the Canadian blood supply by November 1985. But this test really wasn't available for the insurance industry.

So in 1985 what were underwriters doing? Well underwriters were really concerned about eliminating people who they felt were at risk of developing an HIV infection. If we ever found out that an insurance applicant was promiscuous, indeed a very rare finding, or if we ever found out that an insurance applicant had numerous sexually transmitted diseases, we would be concerned. And many companies would have rated such individuals or actually declined the case.

Individuals might have had lingering infections -- colds and lymph node enlargement that persisted for a long period of time. But these were no longer considered to be ordinary colds that could be taken as standard risks. Underwriters

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were now suspicious. And many of these individuals having opportunistic infections, unusual lingering infections, were actually declined or postponed life insurance.

By October 1985, antibody testing was available for the insurance industry. But by this time there were 477,000 people infected, according to the AIDS, HIV Mortality and Life Insurance report by Michael J. Cowell and Walter H. Hoskins. So, the antibody testing that was available was an antibody screen known as an enzymetinted immunosorbent assay (ELISA) test followed by a confirmatory Western Blot. These two tests used together have a very high sensitivity. The sensitivity of these tests is over 99%. That means that the false negative rate is probably less than 1%. The specificity of these two tests used in conjunction with one another is also very high -- probably well over 99%. False positives were indeed very, very rare.

We were forced, however, to utilize T cell testing because the state of California in its infinite wisdom decided that we could not utilize an antibody test. What is the sensitivity of T cell testing? The T cell testing probably has a sensitivity in the order of 50%. Early on in the stage of disease, as Dr. Redfield implied, there is not a significant change in the T cells. So we could anticipate having a normal T cell rate, T4 to T8 ratio. What this means is that of 100 HIV-infected people utilizing the T cell test, we might only pick up 50% or 60% of those individuals.

Now the predictive value of T cell testing, the predictive value of a positive test, is also somewhat low -- in the neighborhood of 10% to 15%. That means if you have an individual who has an abnormal T cell, he only has a 10% to 15% chance of that abnormality being due to an HIV infection. So the test is not sensitive. And it's not specific. But it is the major surrogate test that we are currently using in California.

In 1986, armed now with antibody testing, the insurance companies put questions regarding AIDS on their applications. "Have you ever had a test for the antibody to the AIDS virus?" And the applicant would have to answer yes or no. "Have you ever been told that you have AIDS or have been exposed to the HIV virus?" And that's the tone of the question. Routine AIDS blood testing began occurring in 1986 and many companies started testing for \$500,000 of

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insurance and up. Routinely, there was good solid actuarial data that people who had HIV positive antibody tests were considered to be uninsurable and these lives were essentially all declined.

By 1987, most companies were testing but clearly not all. In a recent Mercantile and General survey of client companies, we found 17% of companies were not testing on a routine basis. In the United States, I am happy to say limits have fallen. Many companies are now testing between \$100,000 and \$200,000 of insurance. In Canada, it is about \$250,000. All the data that we have currently supports the cost effectiveness of testing, not only in the United States, but for testing in Canada as well.

By this time the industry got their act together and began testing at low amounts of insurance. You know where we are at now. We are at a total of 42,000 cases of AIDS. Cumulatively, over half of these are now dead. But we are talking about the tip of the iceberg. In October of 1987, 1.5 million Americans have been infected with the AIDS virus.

I have to digress a moment. There are some Canadians in the audience. And I want to talk a moment about AIDS in Canada. Clearly the magnitude is not the same as the United States. The story of AIDS in Canada primarily is one affecting the four largest provinces: Ontario, Quebec, British Columbia and Alberta. We are talking about 500 cases in Ontario and less cases in British Columbia and Quebec.

In Canada in 1986 there were 211 deaths from AIDS. The Canadian Life and Health Insurance Association (CLHIA) had reported 106 claims from insurance companies and this might indicate that for roughly half the deaths, there was an insurance policy for a total amount of \$5.3 million. What has happened to AIDS in Canada? If we follow the story from 1980 all the way up until 1987, we find that by year end 1987, we would expect 570 cases of CDC AIDS. The mortality on a yearly basis indicates that by 1987, we will expect to have 270 deaths.

What about the future? Our Federal AIDS Center does project between 3,900 and 6,900 cases of CDC AIDS by 1991. The optimistic view suggests that we are now reaching a plateau of between 500 and 600 cases of AIDS on a yearly basis and that plateau should remain stable. I happen to think this is far too

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optimistic. Using this type of model, we would arrive at approximately 3,900 cases of AIDS as a prevalence, living and dead, by 1991. A second model suggests that we are going to see an exponential increase in the number of AIDS cases so that we would have over 1,500 cases of AIDS by 1991 alone. On a cumulative basis, that would account for approximately 6,900 cases of CDC AIDS which our Federal AIDS Center has projected as being probable if the disease got out of hand. I might add that with this scenario, assuming these people were not tested, these claims could affect about 3 1/2% to 6% of the Canadian insurance claims portfolio.

I want to talk about the prevalence of the AIDS virus in Canada as compared to the United States. Now the assumption that I am making here is that 1.5 million Americans have been infected with the virus and 75,000 Canadians have been infected. Let's look for a moment at the prevalence rates.

In Canada, on a population basis, the prevalence is about 3 per thousand. In the United States, it is about 6 per thousand, a difference of about 2 to 1. That's very interesting. Because roughly, in the United States, there were 40 times as many cases of CDC AIDS as compared to Canada, yet there's only twice the prevalence in the population as a whole. When looking at males between the ages of 20 and 59, in Canada, the prevalence is 10 per thousand. In the United States, it's 18 per thousand. In high-risk provinces of Ontario, Quebec, and British Columbia as compared to the high risk state of California, we are looking at 12 per thousand in the Canadian provinces versus 40 per thousand in California. Comparing the high risk cities of Toronto, Montreal and Vancouver to the high risk city of Los Angeles, we'd be looking at prevalence in the Canadian cities of 30 per thousand, versus 57 per thousand in Los Angeles.

Now I want to leave you with this thought. In California we are forced to use the T cell test, which I mentioned before has a poor sensitivity and a poor predictive value. In 1985, males in California between the ages of 20 and 50 purchased 1.14 million policies for a total of \$96 billion. At a conservative insurance prevalence of 20 per thousand (recall the prevalence in the population of California on the noninsured basis in males between the ages of 20 and 59 is probably 40 per thousand), we would anticipate 22,800 HIV positive insurance applicants and we might anticipate that every year. Given the fact that our

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screening test is not very good, I wonder whether we can continue to do business in California in the future at yesterday's prices.

MS. BARBARA J. LAUTZENHEISER: How many of you are really concerned about bans on AIDS testing? How many of you have a task force in your company comprised of underwriters, medical directors, actuaries, claims personnel and attorneys to make sure you aren't already suffering from antiselection in your company? How many of your companies have been working in your domiciliary state to make sure the proposed legislation requiring banning AIDS testing does not pass or better yet is not proposed? We are in trouble, aren't we? My charge is for you to not only feel committed to *check* to see if you are doing this in your own companies, but to make sure that you *are doing* this in your own companies.

Seventeen years ago, the chief underwriter of the company I was then with walked into my office and said, "I just had an interesting luncheon conversation. I had lunch with a woman who was head of the Epileptic Foundation, and she said that it wasn't fair she had to pay more for her insurance, because it wasn't her fault that she had epilepsy." Well that made a great big connection in my mind because about that time women were saying it wasn't their fault that they lived longer than men and they shouldn't have to pay more for disability income, nor should they have to pay more for their annuities. And I said to myself, "If we do not take a stand on the risk classification issue of unisex pricing, where we have data running back 200 years, we are going to lose it on medical conditions."

I have to tell you there were many who thought I was a Cassandra and said it was absolutely ridiculous that that would occur. Unfortunately, I didn't turn out to be a Cassandra. I turned out to be a prophet and here we are today with a very severe medical condition. You have seen much of the statistics and we are actually having our ability to determine whether a person is infected challenged at the state level.

As you know, we already have legislation in California, Wisconsin and the District of Columbia. In California we may be able to make some changes next year. However, over 50 bills were introduced on AIDS in California in 1987. They ranged from providing a 55% tax credit, to private donations to AIDS

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research, to bills which would have advocated increased testing and an end to confidentiality for those who actually carried the disease. But we were unable to get any kind of a repeal or a modification to the legislation that is already there in California.

In Wisconsin we had better luck. We were able to get the legislation amended in Wisconsin. We unfortunately, however, weren't able to put the word *underwritten* behind *individual* so we still can test only on individual contracts, not on group contracts. And there are companies that are still working to see if we cannot in fact have testing on individually underwritten group contracts.

In the District of Columbia we are working to see whether or not in some conversations with Commissioner Stokes, Chairman of the Committee Ray, Chairman Clark of the District Council, and the gay community we can come up with some possible changes in the D.C. bill.

We have an additional concern about a significant number of states. We still have 8 states that look like we ought to be paying a great deal of attention to them.

In Hawaii legislation was enacted and the rules to allow the use of testing are yet to be promulgated.

In Texas a bill prohibiting mandatory testing with specified exemptions which do not include insurance has passed. The Texas State Board has promulgated emergency regulations outlining conditions necessary for testing for insurance to clarify that legislation but we still don't know the results.

In Massachusetts we have a regulation which prohibits testing for health insurance, guaranteed renewable disability income contracts, both group life and health and would require us to issue amounts of insurance up to \$100,000 only if we had "for cause" testing. And "for cause" is determined by a list. If you have taken a look at that list, that list shows "AIDS conditions," not "HIV infection."

We have filed a lawsuit in the State of Massachusetts and we received a preliminary injunction. I was extremely pleased by the language of that preliminary

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injunction. It actually said, "A persuasive case is made by the plaintiffs that the regulations place high-risk persons who are infected with HIV virus in essentially the same class as low-risk noninfected policyholders. This is of necessity and is demonstrated by the affidavits submitted and would require that the low-risk uninfected policyholder will be required to subsidize the policyholder infected with HIV." That's probably the first time I have seen anything, particularly from the state of Massachusetts, that even recognizes that low risks are subsidizing high risks.

In Vermont legislation is now coming out that would not allow us to do reporting to Medical Information Bureau (MIB) if the proposed insured requested that, as well as a retesting in 3 years.

In New York we have a regulation which would prohibit testing for health insurance.

In Ohio antitestng is being reviewed by a task force and I am told that we probably will have legislation sometime next year.

In Indiana the NAIC guidelines are basically what are being followed there. However, test results can't be shared with a "bureau of any kind and you can have no limits or exclusions for AIDS."

Colorado allows testing with informed consent but is challenging our ability to report to MIB.

I heard there was some possibility of legislation or regulation in New Hampshire. I don't know exactly what that is because I was unable to see anything on that.

Even at the CDC lowest 20% figure, we are talking about a mortality that is 2600% of standard. That's 5 times what we normally carry as a substandard rate. To compare that with some other diseases, 2600% for AIDS compares with quadriplegia at 750%, myocardial infarction at 500%, diabetes at 400%, smoking at 200%. In other words, it's like writing someone who is over 70 years old at a 30-year old's price.

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Major Redfield indicated a 90% progression. But let's listen to what's happened over only the last 20 months. In January 1986, the CDC said 5% progressed to 19% in 5 years. In June 1986 they said 20% progressed to 30% in 5 years. The National Institute of Health in July 1986 went to 35% in 6 to 8 years. The Academy of Science in October 1986 stated 50% progress within 10 years. The San Francisco study showed 15% progress in 3 years, 25% in 6 years and 36% in 7 years. This last study reiterates some of the things that Major Redfield said.

Paul O'Malley, Director of the San Francisco Health Department said, "What we are seeing is the risk of actually developing AIDS increases in the second 5 years compared to the first 5." Dr. George Rutherford also of the San Francisco Health Department said, "The longer one is infected, the higher are the chances of developing AIDS." Dr. Harold Jaffe, an AIDS epidemiologist at the CDC, also working with the San Francisco Health Department said they were "unable to identify any factor other than time that triggers the onset of the disease."

Major Redfield said he is talking about a 90% progression rate. The *Navy Times* of January 1987 said, and I am sure he had some say in this, "Another year of tracking AIDS has convinced some military medical experts that the disease is even more deadly than originally thought. Knowledge gained by military researchers this year suggests that AIDS will kill 99.9% of those who are exposed to the virus." When we use those kinds of numbers, that 2600% isn't anything at all. The numbers are gigantic in comparison.

The hospital costs for the AIDS victims are estimated to be from \$46,000 to \$140,000. The recently published *Rand Report* shows a range of \$67,500 to \$200,000. One major insurance company has reached a cost of \$450,000 for one AIDS patient. The Rand Study showed an average of \$94,000. These are substantial costs that are going to have to be subsidized by others. It has been determined that for those who are infected, they can expect to incur an inpatient hospital cost 13 times the expected cost.

In New York, it has been estimated that with antiselection and only a 50% progression rate, individual health insurance rates could increase 5 times or more above their current levels. In Massachusetts where the infection rate is less, that number reduces to 2 2/3 times. And none of these costs include any ARC

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costs. And the Rand Report indicates "there are more ARC victims than there are AIDS victims." There is prolonged short-term survival in some and reduced symptoms in some but there is not a cure. It's not going to extend life long enough to help our life insurance costs and it's possibly even going to increase our health insurance costs. It has it's own side effects such as anemia and suppression of bone marrow production.

A new retroviral drug may extend life but it may or may not reduce total hospital costs. In the 15 patients studied, it did reduce hospital stays from 3 weeks to 8 days, but it's yet unknown as to whether total hospital stays and hospital days and total costs will be reduced.

There is a leading natural drug that is an extract from an Australian chestnut, would you believe, that is being tested in conjunction with azidothymidine (AZT) at Harvard. Early results indicate the right dosage completely prevents the spread of the virus but only time is going to tell. AIDS vaccines have just begun to be tested in humans but even if successful, they will not be made available until 1990. Dr. Salk has one that he would like to test on some people. His problem is he wants to implant the entire virus and for some strange reason, he can't seem to find anybody who wants to try it.

On the heels of the announcement of the human test of the vaccine, comes even newer research from the Los Alamos National Laboratory showing that the AIDS virus has mutated its genetic code as much as 5 times faster than the flu virus. Were an AIDS vaccine developed, new vaccines would have to be continually developed to keep up with the virus' behavior change. Myers, who did this particular study, said that the Los Alamos finding "casts bewildering shadows" on prospects for reliable diagnosis, effective treatment, and the vaccine to block all forms of the virus. Hopefully, he is wrong and persons like Major Redfield can find those solutions.

The virus not only mutates, it migrates. Worldwide, the World Health Organization as of August 10, 1987 had 56,320 cases, 8,000 (14%) reported in the last 3 months. And 121 countries reported cases; 16 were in just the last 3 months. The World Health Organization fears that as a result of underreporting, the actual number of cases may be more than double those actually reported. Approximately 70% of those cases came from the United States. The number of

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AIDS cases in the U.S. as of September 28 is over 42,000. That's an increase of 7,800 since April 20, 1987. That's 19% in 5 months, or 47 new cases per day.

As Major Redfield indicated, what we are talking about is a very long delay about things that happened 10 years ago. In June 1986, the CDC officials predicted 14,000 to 18,000 new cases in 1986. There were in fact 13,197. That gives you some idea as to how close those 1991 projections really are. Original estimates were that 400,000 persons carried the virus. Subsequent estimates are a million to a million and a half, and some go to 3 million.

You have heard a lot of statistics but here are some you may not have heard. The New York percentage still remains the highest, but it is in fact decreasing. Why is it decreasing? Because it is spreading to other states. It is even in Montana. There are no states that haven't had at least 2 cases in 1987. There is no state with less than 5 total cases since 1981. In May that number was 4 cases. There are less than a half dozen states where there are less than a dozen cases.

The cities are changing in order as well. In June, Newark had more cases than Chicago. Now Chicago has more cases than Newark. It is thought to be a young person's disease, yet 21% are between 21 and 29, 47% are between 30 and 39, 21% are between 40 and 49 and 10% are over 49.

As of September 1, as you know, we changed the definition of what was included in AIDS. Now they are including dementia and emaciation. It is going to cause some of our statistics to be slightly distorted but they anticipate another 10% to 15% more persons ultimately when that bulge levels out.

Homosexual and bisexual men and men and women who use drugs continue to be at the highest risk. The leader of the gay community out in Los Angeles may have something to talk about, and may have exaggerated, but declares that 10% of the population is gay. The Kinsey Reports back in the 1950s indicate that maybe as high as 40% to 46% of adult males are bisexual.

An estimated 750,000 Americans inject heroin or other drugs intravenously at least once a week. A similar number inject drugs less often. All these factors increase the probable cause of the larger number that is there.

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We heard that 17% of the companies still are not doing testing. I keep hearing "We don't write in that market." Well you don't know what "that market" is and if you didn't listen to Major Redfield tell you that "that market" is not identifiable, you haven't learned anything, or won't learn anything.

Let me give you some more statistics. One company has been testing all medically underwritten policies since November 1985 and for the first two months, found 14 persons who tested positive for the AIDS virus. Twelve were not identifiable as being in a high-risk group. One was a female, the other 11 were married men and as Major Redfield indicated, almost 50% of his were in fact married men. In 1986 and through April 1987, they had 16 more positive tests and 9, over half, were married. One half of their AIDS claims are in states not in the top 5 by number. HORN reports 61% of their positive finds are in non-high-risk areas. The CDC projects that by 1991, more than 80% of the cases will be from cities outside of New York City and San Francisco. Clearly this is a disease that does not discriminate.

One study done by Dr. Thomas A. Peterman of the CDC studied husbands and wives of people who got the AIDS infection from receiving tainted blood transfusions. Five percent of the men and 16% of the women who were sexually active became infected. A Tennessee study done by an epidemiologist over 4 years showed that the infected spouses passed it on to their partners, as *Business Week* quoted it, "only 20% of the time." Now if one out of every 5 airplanes I flew on was going to go down, I don't think I'd get on the airplane. We heard from Major Redfield that the numbers were 44% and 43% respectively.

Dr. Brian Saltzman, of the Montefiore Medical Center in New York City studied sexual partners of AIDS infected IV drug abusers. None of the partners were drug abusers. Fifty percent of the men and 42% of the women eventually became infected with the AIDS virus and he attributed this totally to heterosexual transmission. Major Redfield talked about the Fischl study in which 16 AIDS patients continued to have unprotected intercourse despite doctors' warnings. Thirteen of the partners, 80%, became infected. What this also says is fear will not stop risk taking. How many of you still smoke?

As a result of a recent California study, the CDC anticipates far less infections than once thought from heterosexual transmission, but this study does continue

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to indicate that the risk of infection increases through increased sexual activity and Major Redfield's studies all indicate that although heterosexual transmission may not be of epidemic proportions, as the CDC once anticipated, we still have it. I unfortunately have a very good memory. A little over a year ago we said there was no heterosexual transmission in the United States like there was in Africa. When we began to see it, we blamed it on the prostitutes. Now we are saying it is all coming from IV drug abuse and I happen to believe, as Major Redfield does, that it's going to be coming from more of the heterosexual, bisexual population. That is the part that really scares me, particularly for the insured population. Remember Kinsey said it would be as high as 40-46% in the bisexual community.

What about the female side of the equation? A new Hite report entitled "Women in Love, a Cultural Revolution" is about to hit the bookstands. Their study indicates 70% of the women surveyed married 5 years or more are having extra-marital affairs. Now that's being challenged. Her sample was relatively small. However, I have to tell you that the Kinsey Report also said 23%. You start combining a very large bisexual population with the number of single people as a result of nonmarriage or as a result of divorce, and the extra-marital statistics I've just given to you, and we have a major problem.

Latency too is also a measurement problem. The British medical journal *Lancet* now reports that the latency period that we thought was never going to go beyond 6 months may now be up to one year.

We also see with the California study that the probability of infection is a function of sexual activity. That latency period may, in fact, be a function of sexual activity. So it may be a long time before we see anything. Clearly it is not an issue of what you are, it is an issue of what you do. It is a disease transmitted by dirty needles and unsafe sex practices. We've seen in the homosexual community an average latency period of 4 to 5 years. We have absolutely no way of knowing what it is in the heterosexual community.

We've been talking about the property casualty business as being a long-tail business. We've got a similar problem in the life and health business. I remind you of that San Francisco study where we were talking about 4% at the end of the third year, then 15% at five, then 25% at six, and then 36% at seven. We've

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got a very flat curve and then it takes off like you wouldn't believe and we are somewhere on the flat part of that curve.

I think you all remember that old joke about the company being very much like a car. The CEO has her hands firmly on the wheel. The agency Vice President has his foot on the accelerator pedal, the accountant or chief controller has his foot on the brake and the actuary is drawing a map by looking out the back window. I am proclaiming that many of us are still drawing our maps by looking out the back window at our claims experience last year or last month. We are not looking at this curve and saying what our claims are going to be in the future. So that is one of the things that we have to do -- not look at today or yesterday. We have to start looking forward.

The number infected may be significantly larger than already estimated. Also you have to test. And why are we ending up with all of these questions on our testing? Let's listen to some of the comments that have been made. They are as life threatening to our voluntary insurance market as AIDS is to IV drug abusers. Comments like "you should be allowed to categorize or classify risks only on what a person can control." "Insurers should bear the cost of life threatening diseases, not the public." "It's not fair for someone who has only a 20% probability of dying in the next year not to get insurance; after all, they need it." "Testing will increase the economic burden on states and the federal government because public welfare programs, instead of insurance companies, should bear the cost."

The question quite simply is "Who pays?" Will the cost of care for those who test positive be borne through increased taxes or distributed among those who are part of the private insurance system? With the enormous budget deficits, it's far more difficult for the government to assume new expenses. Indeed, the sole purpose of health insurance is to pay for medical expenses.

What we're seeing, of course, is a gay community that is very nervous. They are nervous about losing their jobs, and they are nervous about losing their health insurance as a result of those jobs. They are nervous about not having enough money in order to pay for their health costs. They are nervous about not having life insurance to pay for their partners' health costs. They are powerful, and they have a lot of money. How many of you donate money to a

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political action committee (PAC)? They do it in blocs and they vote in blocs. And they are only one special interest group. The next special interest group to come along hasn't as yet been identified. It may be age. They are a very large group.

I'm going to close by asking again, how many of you have a task force in your company to assure you're not already suffering? How many of you are working in your domiciliary states to make sure there is no ban on AIDS testing? Because I say to you, if you don't do something about the problem, you are part of the problem.

MR. DAVID M. HOLLAND: Briefly, the charge of the Society's Task Force on AIDS was to evaluate the impact of AIDS on the solvency of life and health insurance companies. We first had to develop an understanding of the impact of the models, the spread of the disease, and we studied the number of models, epidemiological and biostatistical, and models constructed by actuaries.

We're thankful that Mike Cowell is a member of the committee and we decided very early on that Mike had the most promising model, the model that Mike and Walter Hoskins worked on for practical applications in terms of what we were looking into. I spend a good deal of time working with Mike. We feel that the product that he and Walter produced is really a landmark in actuarial literature and we're proud to have had any association with that. I think Mike said many times that they feel they've established a methodology which can be evaluated which is as important as the actual numbers that are being produced.

We are now looking at the impact on life insurance companies. We're trying to develop tools that actuaries can use (and maybe we can make available in terms of spreadsheets) for calculating the impact of AIDS claims in individual companies.

We'll also have points to consider, general guidance in terms of constructing models. Our timetable according to the charge to the task force is to have reported to the Board of Governors by January. We hope to incorporate Mike's and Walt's paper in our report and have the models ready by then. We're on track but for now that's all that I'll say.

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DR. HARRY H. PANJER: I would like to thank Mike Cowell, because he really initiated the study that I did. It was really a statistical analysis of the Frankfurt data which was included in the Cowell-Hoskins Report. The methodology incorporates what we call survival analysis in actuarial science.

However, in follow-up work that I'm doing now I'm attempting to develop a mathematic model which an individual company can use in assessing its own risk to AIDS on the basis of its emerging AIDS claims in conjunction with industry data. The notion is that the general idea of this follow-up model is that we should as insurers use this as an Incurred But Not Reported (IBNR) problem. This is a risk that was unanticipated at the time the policy was insured.

We do know that we're going to have some claims and we should allocate appropriate surplus, whether we get tax credit for it or not, for this risk. What we need is, I believe, a general methodology so that companies can assess their own risk. As Dr. Redfield pointed out, individuals sleep in different areas and they usually buy insurance where they sleep. So companies write in different areas.

Their emerging AIDS claims will be at least some indication of what their exposure to risk is. The model that is presented in my paper is really a model of the lag distribution. That's the incubation period. In the follow-up paper, what we are really doing is attempting to weigh the size of a dog by looking at its tail. We know something about this relationship, between the size of the tail and the size of the dog, from independent sources.

MR. KEVIN S. PIKE: We have been quite lucky in Australia. A recent report called the Meade Report states that we are going to be allowed to do HIV testing on an undiscriminatory basis. We are very thankful and we've made submissions on that. One interesting thing is that they want to change the federal life insurance act to overcome a decision made last year. The high court of Australia said the essence of life insurance business was the classification of risk and the setting of premiums. And the antidiscrimination lobbies don't like that decision. One other statistic, from a survey that has recently come out in Australia, 4% of people in the survey were bisexual and had bisexual contact in the last 12 months.

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MR. COWELL: Let me quickly summarize some of the questions that we have had. I am going to ask Dr. Minuk if he will start because these are underwriting questions that I know are of great interest to many of you. And they go to essentially two areas. How do you know that the T cell test is only half as reliable as the HIV test? What other diseases are we coming up with as a result of testing for HIV infection and do we have any estimate of their impact on underwriting and cost savings?

DR. MINUK: The second question will be answered first. Of the blood tests that are currently done by the insurance industry, we have found an inordinate number of liver function test abnormalities. And having been partner with the Association of Life Insurance Medical Directors of America (ALIMDA) in the Medical Impairment Study of 1983, alcohol abuse was underpriced. So the prevailing feeling is that the liver function abnormalities are coming up as a result of more and more blood testing and it is a bonus in the detection of undeclared alcohol abusers.

Now several companies have determined the additional cost benefit of these abnormalities. I believe Great West Life in the U.S. and Northwestern Mutual have data on the liver function test abnormalities, many of which may have been derived before AIDS testing was even done. I can't recall the number, but I believe that for every dollar invested, you get 10 back for liver function abnormalities. So I think the savings there can be considerable as well. And in general, when we have developed a cost benefit analysis, the cost we are talking about is about \$60 for the whole test and this would include the whole battery of tests.

The other question is more difficult to answer. How have you determined that T cell testing is 50% effective? I believe that the Home Office Reference Laboratory, in a bulletin a number of months back, did suggest a sensitivity of about 50%. Now I think that from what we know about this disease, in the earlier stages of the disease, and I think Major Redfield alluded to it, there didn't seem to be an effect on the T cell. As the disease progresses, we would tend to find, I believe, the abnormal T cells would be a predictor of subsequent CDC AIDS. My sensitivity of 50% is a "guestimate" from the Home Office Reference Laboratory initial data and from what we know about the disease. But clearly

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the test does not have the sensitivity that the ELISA/Western blot does and I believe that the 50% number is probably very, very reasonable.

