AIDS: PRICING AND RESERVING CONSIDERATIONS

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This session will explore:
o   Results of various studies and programs for the future
o   Methods of projecting extra mortality
o   Implications of state and federal legislation, regulation and prohibitions
o   Statutory versus GAAP considerations
o   To what extent are extra reserves required?
o   Given the explosive potential of the disease, how do you price for it
     adequately?

MR. DENNIS A. DEETER: This is the Panel Discussion on pricing and reserving
considerations relative to the acquired immune deficiency syndrome (AIDS) issue.
This issue is extremely important on several fronts. We will deal with potential
financial implications for our industry.

Actuaries have been working on methods to attempt to get a handle on the
possible financial implications. The current picture is far from clear. As the
picture focuses, we may or may not be surprised by what we see, depending on
how well we have prepared ourselves. Our format will be for all of the panelists
to deliver their remarks with some time left at the end for questions and com-
ments. Since some of you are probably looking closely at the AIDS issue, I
would especially encourage any pertinent comments you are willing to share.

Our first speaker is Chet Lewandowski of The New England. Apart from his
duties at that company, Chet also chairs the Academy's Committee on risk selec-
tion. He will address current risk classification issues.

MR. CHESTER T. LEWANDOWSKI: My speech will be on risk classification and
AIDS. Specifically I'll discuss the following:

o   Motivation for AIDS underwriting procedures: testing for the human
     immuno deficiency virus (HIV) antibody and questions on AIDS applications.
o   Arguments of those opposed to insurance testing for AIDS.
o   Significant regulatory developments impacting an insurer's ability to under-
     write for the AIDS risk.

o   The industry's response to these restrictions limiting the proper classifica-
     tion of risks.

The primary reason for using antibody tests and other techniques to identify
potential AIDS cases is to avoid the extreme cost impact to insurers if relevant
underwriting data are withheld from them.

Key statistics indicating the significant cost impact of AIDS are noted below.

1.   Number of Americans Infected with the AIDS Virus
     The number of people currently infected with the AIDS virus must be
     estimated since only a small proportion of the population has been tested.
     Recently, the Hudson Institute estimated the number of Americans infected
     with the AIDS virus to be three million. The Centers for Disease Control
     (CDC) still feels that its estimate of 1 to 1.5 million infected is reasonable.
     The President's Commission on AIDS found that most analysts agreed with
     the CDC's estimate. In either case the cost implications are significant.

2.   Lifetime Health Care Cost for People with AIDS
     In 1985 the CDC estimated that the health care cost per AIDS patient was
     $150,000. Subsequent studies in San Francisco and Massachusetts have
     indicated a lower cost, $28,000 and $47,000, respectively. The Coolfont
     Planning Conference on AIDS came up with an estimate of $46,000 to $92,000
     per patient. Using these estimates, various government agencies have
     quoted a total health care cost for 1991 in the range of $8 to $16 billion.
     Again the point is not which estimate is accurate but that in either case the
     potential cost is devastating.

3.   Progression from Infection to Disease
     In January 1985 the CDC projected that 5-19% of the people testing positive
     for the AIDS virus would ultimately develop AIDS within 2 to 5 years. In
     June 1988 this estimate was raised to 20-30%. The National Academy of
     Science has estimated that 50% of those testing positive would develop AIDS
     in 10 years and one of the most pessimistic projections, based on a West
     German study, estimated that 75% of those testing positive will develop AIDS
     within 10 years.

4.   Mortality Impact of Being Infected with AIDS
     Various trade associations, e.g., the ACLI and the HIAA, and professional
     organizations, such as the Risk Classification Committee of the AAA have
     noted that people infected with AIDS are 26 times more likely to die over a
     seven-year period than are average Americans.

The second major argument advanced for AIDS testing is that people with other
life-threatening diseases such as cancer and heart disease have been subjected
to testing to qualify for life insurance.

Based on the above facts one would question why insurance departments and
state politicians would attempt to restrict the right of insurers to test for AIDS.
The following are the major reasons why various state insurance department
regulators and legislators have placed restrictions on insurers testing for AIDS.

1.   Accuracy of Tests
     Initially this was the major argument against testing. Specifically the con-
     cern was with false-positives because of the psychological damage done to a

person receiving a false-positive test result. Related to this argument was the fact that a positive result indicated the presence of the AIDS virus and not the disease itself. This issue has faded into the background as the accuracy of the test protocol -- 2 enzyme-linked immunosorbent assays (ELISAs) followed by a Western Blot -- has been established. Respected sources such as the Wisconsin epidemiologist, the CDC and the National Academy of Science have all commented on the accuracy of the above test protocol. The ACLI and the HIAA have published a statement in January, 1988 on the accuracy of HIV antibody tests. This statement indicates that the HIV antibody test protocol is 99.9% accurate when performed in a laboratory with high quality control standards. Regarding the claim that testing positive for the AIDS antibody is not indicative that the person will develop AIDS, one need only reference the previously mentioned statistics on the progression from infection to disease to refute this argument.

2. Confidentiality of Test Results
    Various gay groups have expressed concern regarding the ability of insurance companies to keep tests confidential. Clearly their is a need for confidentiality since people who have tested positive for the AIDS virus have experienced discrimination in housing, employment and financial services. For example I'm sure that you remember the case of the family in Florida whose house was burned down after their children, who carry the AIDS virus, were allowed by the courts to attend regular school classes. Insurers and their trade associations have acknowledged the need for confidentiality and have pointed out that the industry has a good track record in this area. Here in Massachusetts the insurers, in talks with the insurance commissioner, stated that they would establish internal guidelines limiting access of test results to only those people having a legitimate business need for it. Similarly insurers agreed not to disseminate test results to agents. In my reading of the AIDS literature, I didn't come across any documented cases of insurers abusing the confidentiality of AIDS test results.

3. Discrimination Against Gays
    While not solely a disease afflicting gays it is still prevalent among homosexuals. Based on the September 26, 1988 AIDS Weekly Surveillance Report, 63% of all reported AIDS cases occur in the homosexual/bisexual male category. If one includes the category of homosexual males who are intravenous (IV) drug users, the percentage rises to 70%. Various gay groups have expressed concern that insurers will discriminate against gays by taking account of the applicant's sexual orientation in the underwriting process. Supporting this concern is a survey done by the Office of Technology Assessment on the AIDS underwriting practices used by insurers. 61% of the insurers surveyed indicated that they used the applicant's sexual orientation in the underwriting of AIDS. The adverse publicity generated by the press in reporting the results of this study doesn't portray the industry's risk classification procedures in a positive light. In responding to this point, one can note that the NAIC has adopted a model regulation proscribing the use of sexual orientation in the underwriting process. Many states have or are considering the adoption of this model regulation. Many insurers are committed to underwriting for AIDS on objective factors and do not consider the applicant's sexual orientation in their decision. Also, insurers have made the point that not to test for AIDS would be discriminatory against people with other life-threatening diseases who must pay a higher premium for their insurance coverage.

4. Avoidance of Policy Obligations
    Some critics of AIDS testing have indicated that the insurers are attempting
    to get out of paying for AIDS claims on policies issued prior to AIDS test-
    ing. However, as noted in papers published by the HIAA, ACLI and the
    AAA on AIDS testing, insurers are committed to meeting their legitimate
    policy obligations and would use AIDS testing only for prospective
    insureds.

5. Psychological Damage
    Receiving a positive test result for the AIDS virus is a devastating experi-
    ence because there is no known cure for this disease. Certainly we should
    treat the recipient of such news with compassion and the requirement of
    some states to provide psychological counseling for such individuals is
    commendable. Nonetheless, if a private insurance system is going to sur-
    vive, it must charge premiums in line with the risk and to do this requires
    the use of appropriate medical tests.

6. Health Insurance as a Right
    Some critics of AIDS testing have stated that each American is entitled to
    quality health care. They argue to receive quality health care the individ-
    ual must have access to private health insurance coverage and not be
    dependent on Medicaid for his health care. If HIV antibody testing is
    allowed for individual health insurance coverage, we are denying access to
    quality health care to those people who test positive. As a corollary to this
    argument, this testing for individual health insurance will place the burden
    of AIDS costs on group plans which would result in some employers requir-
    ing applicants to submit to AIDS testing so that the employers can reduce
    their future health costs. The proposition that all Americans are entitled to
    health care is difficult to argue against. However, a private insurance
    system cannot exist by subsidizing some groups of insureds at the expense
    of other insureds. Various options are now being considered to provided
    adequate health care to all Americans. These include state risk pools and
    various proposed state and federal legislation to widen the health care
    coverage of Americans.

Based on the above concerns, numerous states have enacted regulations or stat-
utes placing restrictions on an insurer's AIDS underwriting. I'd like to briefly
review the current status of the major state restrictions.

CALIFORNIA
In April 1985, legislation took effect in California which prohibits the use of a
blood test to detect AIDS antibodies. This eliminated the use of the ELISA and
Western Blot test in California. Insurers have been able to use the T-cell test
in underwriting the AIDS risk since the test measures damage to the immune
system and doesn't specifically test for the AIDS virus.

In June of this year two bills were introduced in the California State Assembly
to allow the use of AIDS testing for health and life insurance. The health
insurance bill is contingent upon the passage of another bill which would create
a catastrophic health insurance risk sharing plan. Both bills have been passed
by the state Assembly and have moved on to the Senate. The bill regarding life
insurance testing has received a favorable report from the Senate committee
reviewing it. The health bill essentially has been tabled by the Senate
leadership.

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On August 31, 1988 the legislature passed the bill authorizing HIV testing for life and disability income insurance effective January 1, 1989 and this bill recently became law when the governor signed it.

WISCONSIN
In July 1985, legislation was passed which prohibited insurers from requesting applicants for life and health insurance to take a test. In the fall of 1985 another bill was passed which modified the original law by allowing the use of an AIDS test by insurers once the state epidemiologist certified that a test series was medically significant and sufficiently reliable. In July 1986, the state epidemiologist indicated that the test protocol of 2 ELISAs followed by a Western Blot test was significant and reliable. As of June 1, 1987 the insurance commissioner issued a regulation allowing the use of the above mentioned test protocol for individual life and health policies.

DISTRICT OF COLUMBIA
Effective August 7, 1986 a city council act prohibited insurers from using any AIDS tests in underwriting and ratemaking for a five-year period. In addition insurers can't ask applicants if they have taken an AIDS test or can't use sexual orientation in the underwriting process. After 5 years insurers can use AIDS tests to charge special rates for those testing positive for the AIDS virus but can't use a positive test result as a reason for declination of the applicant.

As a result of this law several insurers have stopped taking applications from the District of Columbia. The industry, through the ACLI, has attempted to get this act amended but so far they have been unsuccessful. The councilman who introduced this current bill has proposed amendments to the current act. These amendments would allow for AIDS testing on life insurance and disability income policies where the amount of coverage sought is in excess of the insurer's non-medical testing limits. Individual health insurance coverage would be split into a high and low option. Insurers would be allowed to test for AIDS on only the high option plan. However, Congress, through the 1989 appropriations bill for the District, has required that the city council repeal its law prohibiting AIDS testing to receive its 1989 funds. Council members have reluctantly indicated that they will follow this mandate.

MASSACHUSETTS
In December 1986 the then insurance commissioner, Peter Hiam, issued a written policy prohibiting AIDS testing in Massachusetts. In his directive the commissioner indicated that he was prohibiting AIDS testing for the following reasons:

1.   The accuracy of the AIDS test was questionable.

2.   The AIDS test was not specific for the disease.

3.   The test would discriminate against gays.

4.   Insurers wouldn't be able to keep the test results confidential.

Several insurers publicly stated that they would not follow the directive because they stated the commissioner lacked the authority to issue such a policy directive.

During the early part of 1987 the insurers talked to the insurer commissioner in an attempt to counter his concerns and arguments against AIDS testing. The

insurers were unsuccessful in their attempt, although Peter Hiam did resign during this period as a result of a dispute with his superior over this matter.

In mid-September the new insurance commissioner (Roger Singer) promulgated an AIDS testing regulation which was effective October 2, 1987. This regulation prohibited AIDS testing for all types of group insurance and for individual health insurance. It allowed AIDS testing for individual life insurance and disability income subject to certain restrictions. These included that insurers provide counseling before and after the test, that they couldn't underwrite based on sex orientation, that testing was not allowed for face amounts of $100,000 or less and that ensurers establish certain procedures to ensure the confidentiality of AIDS test results.

The ACLI, HIAA, Life Insurance Association of Massachusetts and various insurers sought injunctive relief to restrain the implementation of this regulation. The Superior Court granted this relief indicating that the plaintiffs had a good chance of winning the case and that they would suffer severe economic harm if the regulation was implemented and later found unconstitutional. The plaintiffs' major arguments were that the commissioner did not have the authority to issue this regulation and that the regulation discriminated against people with other life-threatening diseases.

On June 7, 1988 the Superior Court ruled that the commissioner had acted within his scope of authority and that the regulation was non-discriminatory since the law required that only people with the same risk characteristics be charged the same premium. A stay on the regulations was granted on July 2, 1988 and the Massachusetts Supreme Court has agreed to hear the case in mid-September.

The arguments were heard in September and a court decision is anticipated in the next few months.

NEW YORK
In May 1987, the New York Insurance Department issued a proposed regulation which would have prohibited AIDS testing for health insurance. The regulation would have also proscribed asking the applicant if previously he had taken an AIDS test. This regulation was originally to be effective July 1, 1987 but the effective date was delayed after public hearings were held on it. In citing reasons for the need for this regulation the commissioner stated that testing positive for the AIDS virus was not a diagnosis of AIDS, that health insurance was an essential right, that insurers wouldn't be able to maintain confidentiality of test results and that the commissioner of health had stated that testing was contrary to public health needs.

On August 12, 1987 the insurance commissioner issued his AIDS regulation with an effective date of September 4, 1987. The ACLI, HIAA, the Life Insurance Council of New York (LICONY) and various insurers filed suit against the commissioner. They opposed the regulation for the following reasons:

o   The insurance commissioner lacked the authority to issue the regulation.

o   The regulation was discriminatory against other insureds who had health conditions requiring higher premium payments.

o   The insurance commissioner action was usurpation of legislative authority.

o   Insurance companies have the right by law to seek material facts regarding the risk.

o   Since the regulation is based on false facts it is arbitrary and capricious.

On August 28, 1987 the Supreme Court of Albany County granted the plaintiffs a stay on the regulation.

On April 16, 1988 the New York Supreme Court ruled for the insurance industry. In explaining its decision the court stated that the commissioner lacked the authority to issue his regulation. In addition the court found the regulation discriminatory against insureds with other health problems and that the law was arbitrary and capricious.

In the state assembly an AIDS testing bill has passed the Senate. The bill would require written informed consent prior to HIV testing. The bill also prohibits the Medical Information Bureau from maintaining individually identifiable information on HIV test results unless they are included in a general code not designated solely for HIV results.

OTHER STATE REGULATIONS ON AIDS
These can be grouped into the following categories.

o   Prohibitions on AIDS Testing
     In addition to the state regulations discussed above, the state of New
     Jersey prohibits AIDS testing for group insurance.

o   Prohibition on Using HIV Tests Taken Prior to Application
     Several states have prohibited the use of HIV tests taken prior to the
     insurance application. Major states with this restriction include California,
     Florida, New Jersey and Wisconsin.

o   Requirement of Informed Consent Prior to HIV Testing
     As of late July 1988, 22 states have laws that require the informed consent
     of the applicant before an HIV test is given to him.

o   Requirement of Before and After Test Counseling
     Seven states require before or after counseling for insurance applicants re-
     quired to take an AIDS test. Most of these are smaller states except for
     Texas.

o   Adoption of NAIC Model Guidelines on AIDS Underwriting
     Ten states have enacted the NAIC model guideline on AIDS underwriting.

FEDERAL LEGISLATION
Up to this time there has not been much activity on AIDS which would directly impact the insurance industry. Congressman Waxman, in recent Congressional sessions, has introduced legislation which would establish federal standards of confidentiality for all AIDS-related testing, but this legislation has failed to get Congressional approval. The industry, through the ACLI and the HIAA, has expressed concern over the criminal and civil penalty provisions of the bill.

In closing I'll discuss what the industry has done to educate legislators, regulators and the public regarding the impact of AIDS on society and specifically on insurance companies.

PANEL DISCUSSION

Beginning with trade organizations, the ACLI and HIAA have done the following in reacting to the AIDS crisis.

o   Papers have been published dealing with the accuracy of the HIV antibody tests, financial consequences of restricting insurers from testing for the HIV virus, methods of financing the cost of AIDS and proper methods of underwriting for AIDS.

o   They have monitored and reacted to proposed state and federal regulations and laws dealing with AIDS.

o   They have published claims surveys on the cost of AIDS claims.

o   They publish the AIDS Update which is a bulletin dealing with insurance activities related to AIDS. This bulletin includes features such as recent state and federal developments regarding AIDS underwriting, AIDS data sources, medical developments regarding AIDS and industry efforts to promote education and support programs for AIDS.

o   They have conducted a survey of the public on arguments for allowing insurers to use AIDS antibody tests.

Professionally, both the SOA and the AAA have been active in dealing with the AIDS crisis. The Society has published two major reports on AIDS.

1.   AIDS, HIV Mortality and Life Insurance
     I'm sure that all of you are familiar with this seminal work by Michael Cowell and Walter Hoskins dealing with the nature of the AIDS disease, the implication of AIDS on insurers and the development of a mathematical model to predict the financial consequences of AIDS.

2.   Report of the SOA Task Force of AIDS
     This task force was lead by my fellow panelist -- Dave Holland. I was terribly impressed by the amount of quality work done by Dave and his task force. The report deals with such topics as the cost impact of AIDS, modeling techniques which insurers can use to estimate the impact of an AIDS claim on their Individual and Group business, the impact of AIDS on the valuation actuary and specific strategies for insurers dealing with the AIDS crisis.

The Risk Classification Committee of the AAA has published a paper entitled *Risk Classification and Aids*. The paper deals with the purpose and need for proper classification of insurance risks and the financial implications of restrictions on testing for AIDS antibodies. The paper also notes that to underwrite properly for AIDS, insurers must have the right to use AIDS antibody tests and to ask questions regarding AIDS on the insurance application. The statement also stresses that the insurer must maintain the strict confidentiality of test results and that underwriting decisions must not   be based on the sexual orientation of the applicant. This statement has been distributed to various state insurance regulators and legislators who have been considering regulations and statutes regarding AIDS underwriting.

Insurers' responses to AIDS have included lowering face amount limits for blood testing, revising applications to include questions dealing with AIDS symptoms and creating models to determine the financial impact of AIDS on their company.

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Many insurers have participated in discussions with state regulators and legislators to preserve the right to test for AIDS antibodies. Some insurers have elected to stop selling insurance in Washington D.C. because of its prohibition on AIDS testing. These items are common knowledge to most actuaries. However, some of the industry's efforts to educate the public regarding the AIDS disease and the funding of AIDS research projects by the industry are less well known. These include:

o   Funding AIDS hospices.

o   Funding a TV special and play on AIDS.

o   Funding medical research on AIDS.

o   Initiating a bilingual AIDS prevention program.

Other examples of insurers' educational and research efforts can be found in the *AIDS UPDATE* bulletin published by the ACLI and HIAA.

To conclude, I'm sure that each of you are by now well aware of the serious financial consequences that AIDS will have on society and to your firms, but hopefully the above remarks have given you some insight on the legitimate concerns of people opposing AIDS antibody testing, the industry's efforts to act on these concerns, the need to continue to oppose governmental restrictions on underwriting for AIDS and the educational and research projects on AIDS which insurers have established and funded.

MR. DEETER: Next we will hear from Mel McFall of Lincoln National. Mel will follow up on Chet's remarks by talking about how some of the elements we've heard about will impact on pricing.

MR. MELVIN C. MCFALL: My assignment is to address the impact of AIDS on life insurance pricing. Two pricing assumptions -- expenses and mortality -- generally will be affected by AIDS. The impact of AIDS on expense assumptions can be determined fairly precisely. If your company is doing HIV antibody testing -- and almost all companies are testing now -- then your expense assumptions will need to reflect the cost of the tests.

According to an article by Tom Reese in the September issue of the *Reinsurance Section Newsletter*, most companies doing AIDS testing will get a paramedical exam; a complete blood chemistry profile; a urinalysis with screens for cocaine, nicotine, and prescription drugs; and, of course, an HIV antibody test. The total package costs about $75 except in states like California, where a T-cell test must be substituted for an HIV antibody test. The T-cell test is less accurate than the HIV antibody test and costs about $25 more. In that respect the T cell test reminds me of the football player who is not very big but is slow.

In any event, I hope I have made the point that you can determine fairly accurately the impact of AIDS antibody testing on your expense assumptions. The impact of AIDS on mortality assumptions is far more difficult to quantify. Jim Keller of Lincoln National has developed a model to estimate that impact, and I will illustrate the assumptions that go into that model and the mortality results that emerge.

PANEL DISCUSSION

First, we'll review a representative set of assumptions and mortality results that were developed last spring and presented by Gabe Shaheen at the Boca Raton meeting. We'll then update several of those assumptions and show how the changes in the assumptions affect mortality.

We'll start with five sets of assumptions that we felt were representative at the end of 1987. Then we'll run those assumptions through the model to develop the additional mortality attributable to the AIDS epidemic. As we go, I would suggest that you focus primarily on the method and the results, since our set of assumptions is probably not completely appropriate for your set of circumstances, and many key assumptions, such as the number of individuals infected, are at best educated guesses. However, you might want to ask yourself if our assumptions seem optimistic, realistic, or conservative for your situation. That should give you some "feel" for whether our mortality results are too low, about right, or too high for your company.

The first set of assumptions deals with the number of individuals infected today and in the future. For purposes of this set of assumptions, remember that "today" is the end of 1987. We will assume 1.5 million individuals infected today, 3 million individuals seropositive by 1991, no further spread of the infection after 1991, and no cure found in the near future.

The second set of assumptions deals with the demographics of those infected. We assume 93% of the infected individuals are male, and 23% of the infected males are IV drug users. We will ignore the IV drug users, since they are unlikely purchasers of insurance. We will also ignore females, as they comprise only 7% of the AIDS victims, and 50% of the females are IV drug users. Now we have to take the balance of the infected people and assign them somewhere, so we will assume the age distribution is 21% for ages 20-29, 46% for ages 30-39, 21% for ages 40-49, and 10% for ages 50-59.

The next set of assumptions deals with the timing of seroconversion (when victims become infected) and the resulting mortality. We will use mortality assumptions developed in the Cowell-Hoskins study. We will assume that existing seropositive individuals have been seropositive for an average of two years, and that those who become seropositive between 1987 and 1991 are assumed on the average to become seropositive in 1989.

The fourth set of assumptions has to do with antiselection and prevalence. We will assume no antiselection by seropositive individuals, which means that the percentage of new insureds who are seropositive will be the same as the corresponding percentage for the general U.S. population. This is clearly a key assumption and one subject to debate on both sides.

The final set of assumptions is that application questions screen out all individuals who currently have AIDS or AIDS-related complex (ARC), and that HIV antibody tests screen out all of those who are currently seropositive. We assume that the 1975-1980 basic table represents standard mortality. We use Linton AB lapses for those who are seronegative, and zero lapses for those who are seropositive.

Utilizing these five sets of assumptions, Table 1 shows the present value of actual to expected 20-year mortality for seropositive individuals. Table 1 is divided into two sections. The first section is for those that are seropositive today, and the second section is for those that will become seropositive between

1987 and 1991. The first line shows the present value of actual to expected mortality. The second line shows the number of seropositive individuals (excluding females and IV drug users). The third line shows the male U.S. population, and the fourth line shows the prevalence in the insured and U.S. population. Note that the number of seropositive cases is the same in the two sections. That is because we assumed 1.5 million people infected at the end of 1987 and an additional 1.5 million infections between year end 1987 and year end 1991.

TABLE 1

RESULTS

	Age in Years			
	20-29	39-39	40-49	50-59
Seropositive 1987				
Present value of A/E 20-year mortality for seropositive individuals	9150%	4460%	1890%	860%
Number of seropositive cases	226,000	494,000	226,000	107,000
Males in U.S. population (millions)	21.3	19.6	12.8	10.6
Percent seropositive	1.1%	2.5%	1.8%	1.0%
New seropositive between 1987 and 1991				
Present value of A/E 20-year mortality for new seropositive individuals	5210%	2530%	1070%	490%
Number of new seropositive cases	226,000	494,000	226,000	107,000
Males in U.S. population (millions)	21.3	19.6	12.8	10.6
Percent new seropositive	1.1%	2.5%	1.8%	1.0%

Table 1 illustrates graphically how high mortality is on people infected with HIV. For example, consider a group of currently infected 35-year-old males. Their mortality over the next twenty years is 4,460% -- almost forty-five times the mortality of a healthy group of 35-year-olds. Next we'll see how the presence of a relatively small number of infected individuals in your insured population can affect your overall mortality.

First we'll examine the mortality of untested business. And remember that we are assuming no antiselection -- the same prevalence of infection in the insured population as in the population in general. Table 2 contains the percent seropositive in 1987, the percent of new seropositive cases between 1987 and 1991, and the present value of actual to expected 20-year mortality. This present value of actual to expected 20-year mortality (for example, 277% for ages 30-39), is not just the mortality of the seropositive individuals. The mortality for seropositive individuals was illustrated in Table 1. The 277% is the total actual to expected mortality for a block of untested business for ages 30-39. This block contains those who are currently infected, those who will become infected in the next four years, and the vast majority who are currently uninfected and will stay uninfected. It's the extremely high mortality on the infected lives that causes the mortality of the block to be so high.

TABLE 2

UNTESTED

	Age in Years			
	20-29	39-39	40-49	50-59
Seropositive 1987	1.1%	2.5%	1.8%	1.0%
Precent new seropositive between 1987 and 1991	1.1	2.5	1.8	1.0
Present value of A/E 20-year mortality	253	277	150	112

Before we look at mortality on tested business, we first need to introduce a term we call "positive selection." It is believed that high-risk individuals will avoid being tested either by buying small amounts, going to a different company, or not purchasing insurance. From the life insurer's point of view, this is "positive selection." You may think of it as the opposite of antiselection or as the sentinel effect of testing. As we examine the actual to expected mortality for tested business, we will look at four scenarios of positive selection: 0% positive selection (in other words, positive selection does not exist); 50% positive selection (half of the normal insurance buyers who are seronegative but will become seropositive will avoid being tested; 67% positive selection; and 90% positive selection.

Table 3 contains the actual to expected mortality for HIV antibody-tested business. Remember that we are assuming that the HIV antibody test perfectly screens out all of those who are seropositive today; therefore, the percent of seropositive in 1987 in this block of business is zero. The first line of Table 3 shows the percentage of new seropositive cases between 1987 and 1991, and then presents the present value of actual to expected 20-year mortality under our four scenarios of positive selection. For example, if we assume 50% positive selection, then the mortality on a block of HIV antibody-tested business for ages 30-39 would be 133% of expected. Contrast that with the 277% mortality we saw earlier on untested business. The difference between the two numbers is a rough indicator of the protective value provided by HIV antibody testing.

TABLE 3

HIV ANTIBODY TESTED

	Age in Years			
	20-29	39-39	40-49	50-59
Precent new seropositive between 1987 and 1991	1.1%	2.5%	1.8%	1.0%
Present value of A/E 20-year mortality				
0% positive selection	155	165	118	104
50% positive selection	128	133	109	102
67% positive selection	118	122	106	101
90% positive selection	106	107	102	100

That completes the presentation of results based on the assumptions we developed last spring. Because AIDS is still a relatively new phenomenon and our knowledge base is changing rapidly, we have updated several of those

assumptions. Let's review the key changes in assumptions, the reasons for those changes, and the effect of the changes in assumptions on mortality.

By far the most important assumption change relates to the progression from seroconversion to AIDS. In our earlier examples, we used progression rates from the Cowell-Hoskins paper. Those rates were derived from the Frankfort study. A study done by the CDC in San Francisco suggests slower progression rates. One could argue that the San Francisco City Clinic progression rates are more representative than the Cowell-Hoskins progression rates for the highest-risk, nonIV drug users in the U.S.

If the San Francisco City Clinic progression rates are appropriate for the most promiscuous, highest-risk segment of the U.S. population, then one might expect somewhat slower progression rates in the less-promiscuous-but-still-high-risk segment of the population. Presumably, those in this category would have been infected more recently than those in the highest-risk group.

For those assumed to be infected in the future, chances are fairly good that some yet-to-be developed drug will slow their progression from infection to AIDS.

In our earlier calculations, we used the Cowell-Hoskins rates of progression from AIDS to death. These rates were developed by the CDC. For those contracting AIDS after, say, 1987, we might expect life-extending drugs, such as azidothymidine (AZT), to reduce mortality rates at the early durations.

You may recall that we assumed zero lapses for those who are seropositive. This assumption is pretty clearly too conservative, so we now assume that the lapse rates for seropositives are one-half of those for seronegatives.

CDC studies show that the incidence of IV drug users among AIDS victims is increasing, so instead of assuming 23% IV drug users, we now assume 28% of infected males are IV drug users.

Primarily because of the increase in the proportion of IV drug users, we now assume only 90% of infected individuals are male, compared to 93% earlier. We had assumed 1.5 million infected at the end of 1987 and 3 million infected by the end of 1991, with no further spread of the infection after 1991. We now assume 1.9 million infected at the end of 1988 and 3.5 million infected at the end of 1996, with no further spread of the infection after 1996.

How do these changes in assumptions affect the mortality results? For untested business, the present value of additional mortality over twenty years is reduced by about 40%. For example, the present value of mortality for a group of 35 year-olds dropped from 277% to 211%.

For tested business, the changes in assumptions led to a reduction in additional mortality of about 50%. For example, under the 50% positive selection scenario, the present value of mortality over twenty years for a group of 35-year-olds dropped from 133% to 116%.

What other refinements might be made to the model? We have incorporated three so far.

1. We have developed a mechanism to recognize the higher mortality expected on T-cell -- tested business relative to HIV antibody-tested business.

2. We have added a geographic impact factor to reflect the geographic distribution of a company's business between high-risk areas and lower-risk areas. As you would expect, the higher the proportion of business in high-risk areas, the higher the additional mortality.

3. We can recognize the incidence of additional AIDS claims by calendar year instead of using present values. We expect AIDS claims to peak in the early to mid-1990s and then begin to taper off. Of course, a key assumption leading to that result is that there will be no further spread of the infection after 1996.

What conclusions can we draw from the model? I draw two.

1. Under any set of assumptions that could be considered at all realistic, AIDS has a dramatic -- even devastating -- effect on the mortality of business that is not HIV tested.

2. Because the HIV infection continues to spread, AIDS can be expected to have a material effect on the future mortality of business that is tested.

The second conclusion may come as a surprise to those who might have thought of HIV testing as providing complete protection from the impact of AIDS.

In summary, AIDS will affect two pricing assumptions: expenses and mortality. We addressed expenses briefly and then looked at mortality in some detail.

Expenses for Underwriting Requirements
Paramedical Exam

	$45
Testing Kit	3
Blood Profile	15
Urinalysis	4
Cocaine Screen	8
Total	$75

Table 2A - Untested

Present Value of A/E 20-Year Mortality

	Age in Years			
	20-29	30-39	40-49	50-59
"Old" Assumptions	253%	277%	150%	112%
"New" Assumptions	194%	211%	129%	107%

Table 3A-HIV Antibody Tested

Present Value of A/E 20-Year Morality

	Age in Years			
	20-29	30-39	40-49	50-59
50% Positive Selection				
"Old" Assumptions	128%	133%	109%	102%
"New" Assumptions	113%	116%	104%	101%
67% Positive Selection				
"Old" Assumptions	118%	122%	106%	101%
"New" Assumptions	109%	110%	103%	101%

OVERVIEW
MR. DAVID M. HOLLAND: The number of lives being consumed by AIDS continues to mount. At the beginning of 1988, approximately 50,000 cases of AIDS had been reported in the U.S.; in just over nine months, the number of cases has risen to over 75,000. Cumulative deaths from AIDS have risen from 28,000 at the beginning of 1988 to 42,000 nine months later.

As the epidemic mounts, the burden on insurance companies in terms of AIDS-related claims will also increase. The purpose of this presentation is to provide practical assistance to the Valuation Actuary. In addition to reviewing the responsibility of the U.S. Valuation Actuary and describing developments in the U.K., a mortality table for extra AIDS mortality is presented along with present value calculations of the cost of AIDS mortality on several bases. This presentation is organized into the following sections:

1. Overview

2. HIV and the Responsibility of the U.S. Valuation Actuary

3. The Institute of Actuaries AIDS Working Party Bulletins

4. Difficulties in Projecting the HIV Epidemic

5. Development of AIDS Mortality Rates

6. AIDS Reserves and the Present Value of Future AIDS Claims

HIV AND THE RESPONSIBILITY OF THE U.S. VALUATION ACTUARY
The Responsibility of the Valuation Actuary
The HIV epidemic will result in billions of dollars in claims for the life and health insurance industry. Prudent management requires planning to meet the HIV claims on in force business and to minimize the adverse impact of HIV on new business issued. The actuary should recognize expected losses from this epidemic in valuing the business and should discuss with management strategies for dealing with these losses.

In accordance with current requirements, the statutory Annual Statement of a U.S. life insurance company must contain the opinion of a qualified actuary relating to the policy reserves and other actuarial items. The annual statement instructions state:

> The Opinion paragraph should indicate that, in the actuary's opinion,
> the reserves and other actuarial items . . . make a good and sufficient
> provision for all unmatured obligations of the company guaranteed
> under the terms of its policies . . .

The Valuation Actuary in the U.S. must consider "Recommendation 7: Statement
of Actuarial Opinion for Life Insurance Company Statutory Annual Statements" of
the AAA. This Recommendation states:

> In those instances wherein . . . the statutory reserves might not make
> good and sufficient provision for unmatured obligations, then the
> actuary should make further tests (possibly by a gross premium valua-
> tion as described in general terms below) before expressing an opinion
> as to such policy reserves and other actuarial items.

> A gross premium valuation may be made for an entire line of business
> or a major block of business. The results of such a gross premium
> valuation for a line or block of business are considered satisfactory for
> this purpose if the current reserve on the reserve basis being tested
> provides an appropriate margin over the excess of:

> a. the then present value of future benefits and anticipated
>   expenses,

> b. the then present value of future guaranteed gross premiums
>   using interest, mortality, morbidity, lapse, expense and any
>   other appropriate assumptions selected as of the valuation
>   date reflecting actual and anticipated experience . . .

Recognizing the Impact of HIV in Valuations
HIV and the resulting AIDS-related deaths clearly present the Valuation Actuary
with problems in assessing the likely impact of the epidemic:

o   Pricing and reserve standards at the time of issue of in force business
    probably did not anticipate the HIV AIDS risk.   .

o   Margins that may have been included to provide for a variety of adverse
    scenarios cannot be fully allocated to AIDS without creating potential for
    failure to cover adverse deviation from these other scenarios.

o   Since there is a long latency period with HIV infection, the adverse AIDS
    claims are expected to become more significant with each passing year.

o   Knowledge about the impact of HIV is still emerging.

AIDS is a grim reality, and there is unfortunately very little reason for optimism
regarding a short-term eradication of the epidemic. The impact of the disease in
the short run is becoming measurable especially given that a large number of
people are already infected with HIV. Accordingly, the Valuation Actuary
should consider the impact of AIDS in determining whether the reserves make
good and sufficient provision for guarantees provided.

The gross premium valuation process can be used to test the impact of AIDS. A
gross premium valuation using traditional methods and assumptions could be
performed without special consideration of AIDS. Additional AIDS claims could

then be projected using methods as described in the *Report of the Society of Actuaries Task Force on AIDS* (March 1988). These additional AIDS claims could be used to adjust the results of the traditional gross premium valuation. The results of a gross premium valuation may range from the conclusion that the funds currently held are adequate to the conclusion that the anticipated AIDS losses should be provided for by setting aside appropriate additional funds.

THE INSTITUTE OF ACTUARIES AIDS WORKING PARTY BULLETINS
The Institute of Actuaries AIDS Working Party published "AIDS Bulletins" in September, December 1987 and June 1988. "Bulletin No. 1" included various projections of the possible impact of AIDS on insurance mortality; Projection A had the highest extra mortality and Projection F the lowest. Mortality could be worse than Projection A should there be a widespread expansion into the hetero-sexual community. "Bulletin No. 1" concluded that extra mortality from AIDS can be expected to be related to both age and calendar year; this greatly com-plicates modifying existing valuation mortality tables in that a separate genera-tion table would be required for each year of birth.

"Bulletin No. 2" included, among other topics, recommendations regarding re-serving for AIDS. This Bulletin indicated:

> Nevertheless we are satisfied that the assumptions underlying Projection F are sufficiently moderate for it to be essential for insurance companies to have regard to the possibility of an incidence of HIV infection at least at this level. On the basis of information already available, there [is] no reason to delay making changes to reserves and to pricing structures to take this into account. At this level there should not be any reliance placed on the presence of a solvency margin, which is needed to provide some protection against more adverse scenarios.

> We do not envisage, on the other hand, that companies need establish technical reserves at this stage to enable them to cope with a situation such as that described by Projection A, neither would it be sensible, nor commercially viable, to establish nonprofit premium rates now on such pessimistic assumptions. Companies should, however, examine the possible implications of such a pessimistic scenario, particularly with regard to finding out whether the total resources available to the company, including margins in valuation bases, surplus carried forward, reserves and shareholders' funds, would be adequate to enable the company to survive, allowing for new business written on guaranteed premium terms over the next few years.

A net premium approach was used to determine the reserves needed to cover AIDS exposure. Reserves were calculated using assumptions regarding interest, dividends, etc. "Old" basis reserves and net premiums were calculated based on mortality assumptions without loading for AIDS. "New" basis reserves were calculated with the additional AIDS mortality loading but using the "old" basis net premiums. The excess of the "new" basis reserves over the "old" basis reserves was taken as the extra reserve required for AIDS.

Even though companies may start out using Projection F (low), the AIDS Working Party recommends that companies develop a strategy for further strengthening

reserves over the next year or two to Projection BC, which is a projection falling between Projections A and F.

The additional AIDS reserves using these bases appear to be quite substantial. Consider the following per thousand extra reserves at issue for policies issued in 1988 to an individual age 30:

Projection	F	BC	A
20-Year Term	7.32	13.06	22.21
Whole Life	8.69	15.38	25.90

"Bulletin No. 3" deals mainly with Permanent Health Insurance (disability income) in the U.K. It also discusses AIDS and general insurance (non-life) and worldwide developments regarding AIDS.

Actuaries were asked to comply with Bulletin No. 2 for the 1987 year-end with the result that a number of companies established considerable reserves for AIDS. The September 26, 1988, issue of the *National Underwriter* described developments in the U.K. in an article entitled "British Life Reinsurers Beef Up AIDS Reserves." According to this article, Mercantile and General (M&G) Reinsurance set aside approximately $108 million for AIDS as part of its valuation; this amounts to approximately 7.3% of its total U.K. reserves. It has been reported that M&G plans to make a similar provision again for 1988. Swiss Reinsurance (U.K.) recognized the potential impact of AIDS by increasing reserves to comply with Bulletin No. 2 and also by setting aside surplus; the total amount set aside by Swiss Reinsurance (U.K.) amounted to approximately 6.4% of its total U.K. life reserves. For direct insurers, the reserve strengthening was reported to be approximately 1% of total reserves. This lower level of additional reserves is somewhat explained by the fact that direct companies have substantially more permanent business in force than reinsurers whose portfolios are generally term oriented.

In a survey of 50 leading life offices in the U.K. prepared by Munich Reinsurance (U.K.), all companies surveyed indicated that the potential impact of AIDS had been considered in the valuation; no company indicated that it was unable to meet AIDS reserve requirements. Of the respondents, 84% indicated that Basis F had been used, 14% used Basis BC, 2% did not disclose the basis used. Also, 44% indicated that AIDS reserves were wholly or partially covered margins in existing valuation bases whereas 54% indicated that specific extra AIDS reserves were created.

Consistent with the report in the *National Underwriter*, Munich Reinsurance (U.K.) determined that as of mid-1988, a number of U.K. life offices had increased premium rates. Of the 50 companies, two did not write term insurance (one only recently withdrawing from this product line). Of the companies writing term insurance, 77% had already increased term rates, 17% had rate increases under consideration, and only 6% contemplated no action. The average rate for a term policy (male age 30, 15-year non-smoker) increased by 110% (i.e., on average, premiums more than doubled). The highest percentage increase was 142% and the lowest was 90%. Some U.K. life offices have reviewed their contracts with the aim of removing their guarantees on future premium rates. The Munich Reinsurance survey indicated that as of July 1988, 25% of the companies had changed to a nonguaranteed basis and another 6% were actively considering such a change. A majority of life offices are also changing or withdrawing

options providing annual indexed increases or providing guaranteed insurability option (GIO) coverage.

DIFFICULTIES IN PROJECTING THE HIV EPIDEMIC
The Current Level of HIV Infection
In mid-1986, the U.S. Public Health Service, including the CDC, estimated that approximately 1 million to 1.5 million Americans were infected with HIV. The CDC estimates of AIDS cases have been quite accurate; however, they have held their estimate of the number of people infected with HIV constant over the past 2 years. In the September 16, 1988 issue of *Morbidity and Mortality Weekly Reports*, the CDC stated:

> The current estimate for the number of infected Americans is the same as the estimate made in 1986. This does not mean that no new infections occurred. The 1986 estimate was based on preliminary data and was probably too high.

In the article just cited, the CDC also indicated:

> These findings are consistent with some continued HIV transmission (which is also seen in seroconversions in repeatedly tested active duty military personnel and in repeat blood donors) but argue against an explosive spread of HIV in the population.

The CDC has a number of programs underway such as sentinel populations (including hospitals, sexually transmitted disease clinics, drug abuse treatment centers, prisons, Job Corps entrants. etc.), but unfortunately it will be some time before there are sufficient data to make a solid estimate of the prevalence of HIV infection.

In the meantime, other estimates proliferate. It has been reported that Dr. Hay of the Hoover Institution at Stanford University estimates the number of people infected with HIV to be around 500,000 to 800,000.

The August 17, 1988 issue of the *Journal of the American Cancer Institute* contains an article on "Methods for Projecting Course of Acquired Immunodeficiency Syndrome Epidemic" by Dr. Gail of the National Cancer institute and Dr. Brookmeyer of Johns Hopkins University. Comparing a "Back Calculation" method and the indirect use of incidence data as recently discussed at CDC, they observe that a comparison of the two approaches "indicates reasonable concordance and yields a plausible range of 0.7-1.7 million individuals infected by the end of 1987."

On August 19, 1988, the Hudson Institute released a report on "The Incidence of HIV Infection in the United States." This report states (note emphasis is in the original):

> . . . *the actual number of people carrying the HIV virus (sic) in the United States, as of the end of 1987 was not the 900,000 to 1.4 million the official sources estimate, but probably more than twice that number.* That is, there were between two and three million people infected with the AIDS virus, with the most likely total of infections probably close to 2.4 million.

Until data are available to substantiate the actual prevalence of HIV infection, the estimates prepared by the CDC appear to be reasonable mid-range estimates.

Many Epidemics Occurring Simultaneously
Projecting the course of the HIV epidemic is complicated by the fact that there are really many subepidemics varying with time, location, race, risk group, etc. Comments on the change in the epidemic over time were made in this author's presentation to the 1988 Actuarial Research Conference.

If the current trend continues, the number of AIDS cases reported in 1988 for homosexual and bisexual males will be less than would be produced by a linear extrapolation from 1985-1986 levels. This is consistent with other reports of lower incidence rates of HIV infection for homosexuals. However, there has been a rapid increase in the number of AIDS cases for IV drug abusers. Although IV drug abusers are not considered to be consumers of individual life insurance, they do represent one of the major vectors for the spread of HIV into the heterosexual population; this could ultimately have a significant effect on individual insurance experience.

Heterosexual transmission is increasing and is now at the level of the homosexual community in 1983. The "no identifiable risk factor" category is growing, but is still only 3% of the total. Approximately 67% of these cases are being followed up by the CDC and there is a good chance of classifying them into one of the established risk categories. Approximately 19% of the cases have been lost to follow-up due to death, no response, moving, etc., and it cannot be determined whether these cases belong to a known risk group. Only 14% of the "no identifiable risk factor" cases are really not classifiable into one of the major risk factor groups currently used.

AIDS cases have been generally stable by ethnic group. However, during 1988 there has been a decrease in the percentage of cases for Whites and increases in the percentages for Blacks and Hispanics. Distribution by geographic area has changed over time. Whereas the large Northeastern cities predominated in the early stages of the epidemic, currently the highest level of cases is in areas which are not part of a Standard Metropolitan Statistical Area of over 1 million.

The distribution of AIDS cases by age group at diagnosis has remained extremely stable. Age 30-39 has been just over 45% of the cases. Age groups 20-29 and 40-49 have each just over 20% of the cases. Age group 50 and up has remained close to 10%. The pattern by age is striking in all data classified by age. Graph 1 shows the distribution of age at diagnosis of all AIDS patients reported to the CDC as of October 3, 1988.

Based on tests of all members of the U.S. Military on active duty, the distribution of seroprevalence of HIV infection by age is shown in Graph 2.

The peak in the seroprevalence in the 25-29 age group is consistent with a peak in the actual AIDS cases in the 30s age group. Graph 3 shows the prevalence of HIV infection in U.S. military applicants based on a presentation by Dr. Brundage of Walter Reed Army Institute at the National Conference on HIV in Washington on July 15, 1988.

Again there is a striking increase in prevalence by age over the range shown. In a discussion of infections among civilian applicants, Dr. Brundage and his colleagues stated: "Prevalences increased directly and linearly with age from 18

GRAPH 1

Age at Diagnosis
As of October 3, 1988

Thousands

CDC AIDS Cases
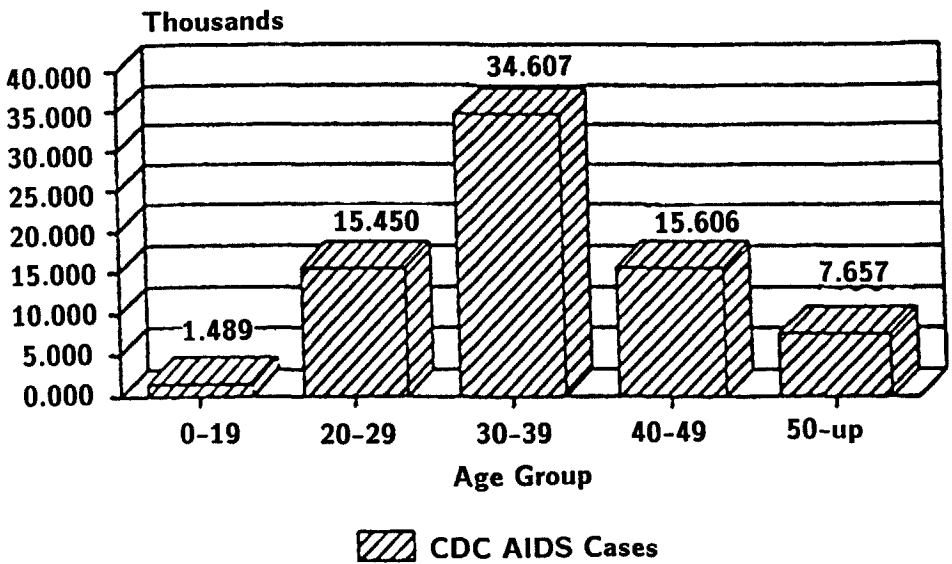
GRAPH 2

Active Duty U.S. Military
1,752,191 HIV Tests

Seroprevalence/1,000
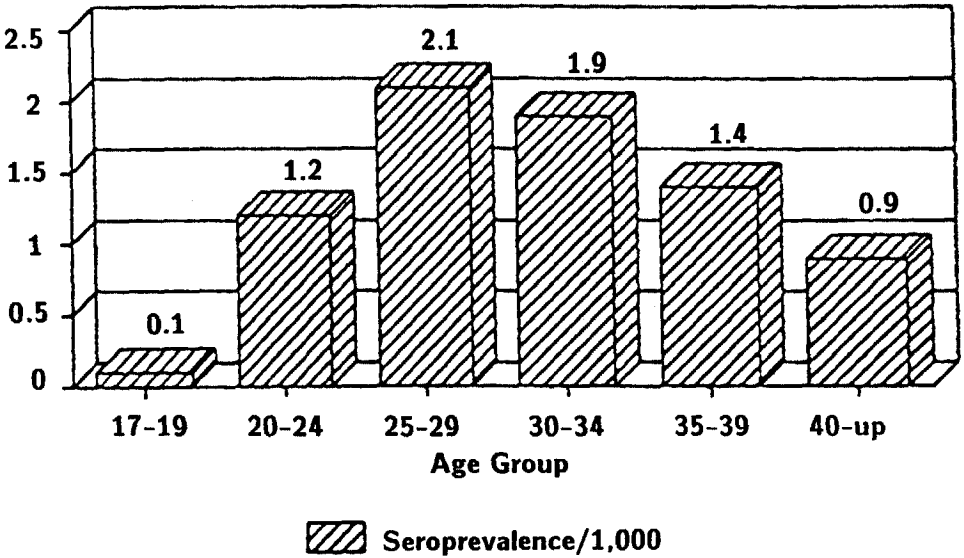
GRAPH 3

Military Applicants
per National Conference on HIV

Age	Seroprevalence/1,000
17	0.2
18	0.2
19	0.6
20	0.9
21	1.4
22	2.2
23	2.3
24	3.2
25-up	3.8

Seroprevalence/1,000
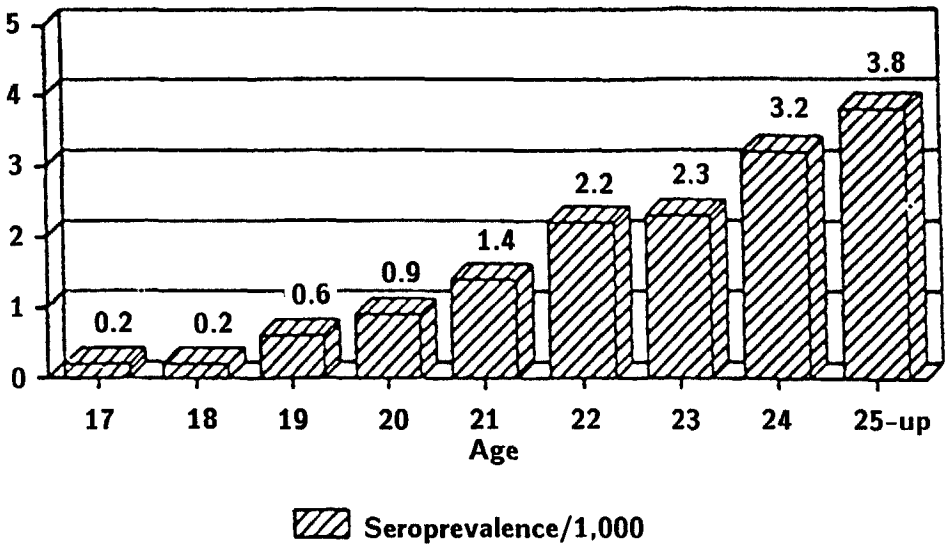
years (0.25) to 27 years (4.94)." (See *New England Journal of Medicine*, Vol. 317, No. 3, pg. 131-137.)

Other data exhibit similar trends with infection increasing sharply during ages 20-29 with AIDS cases (or deaths) predominating in the 30-39 age group. Accordingly, this author is convinced that age is an extremely significant variable in determining mortality from HIV infection.

Long-Range Projections
Given the level of data currently available, it is very difficult to make long-range projections of AIDS cases and deaths with any degree of statistical certainty. In addition to the material covered in a paper presented to the Actuarial Research Conference, consider Graph 4 which shows AIDS cases per calendar quarter as developed by the CDC:

The CDC is projecting that 80,177 cases will be diagnosed during 1992. However, the 68% confidence interval for this 1992 projection has a lower bound of 10,357 cases and an upper bound of 128,613.

In the September 16, 1988 issue of *Morbidity and Mortality Weekly Report*, the CDC indicated that they had estimated in 1986 that there would be:

> . . . 15,800 cases diagnosed in 1986 and 23,000 in 1987. The actual number of cases for these years, adjusted for reporting delays, are 17,100 and 25,200 cases respectively.

Although there is great uncertainty regarding the ultimate course of the epidemic, this author feels, as did Cowell and Hoskins and the SOA AIDS Task Force, that the CDC projections continue to be the best available reference guides.

DEVELOPMENT OF AIDS MORTALITY RATES
Determining a Distribution of Deaths by Age and Developing Crude Death Rates
During the work of the SOA AIDS Task Force, Stephen Goss, an actuary with the Social Security Administration, made some extremely valuable data available to us. This included a tabulation of AIDS deaths by quinquennial age group, year of death and sex. When these data were plotted, a distribution could be discerned. Graphs 5 and 6 show, by number and on a frequency basis, the distribution of deaths for males by age group and year of death:

These data were fitted to a log-normal distribution with the results as shown in Graph 7.

Using this distribution along with a projection of total AIDS cases by year consistent with Cowell-Hoskins, deaths by age and year were projected. By combining deaths with population estimates by year, crude death rates were developed. (This development and the associated rates are included as part of an Actuarial Research Conference paper.)

Following the Conference, Stuart Klugman of Drake University used software he developed to fit various parametric models to the distribution of deaths by age and year. The log-normal, inverse gaussian gamma all produced models having good fit to the underlying data. Based on a negative log likelihood test, he was able to demonstrate that there was statistical basis for the assumption that the average differed by calendar year of death. Because of the crude nature of the

CDC PROJECTION
AIDS Cases Per Quarter
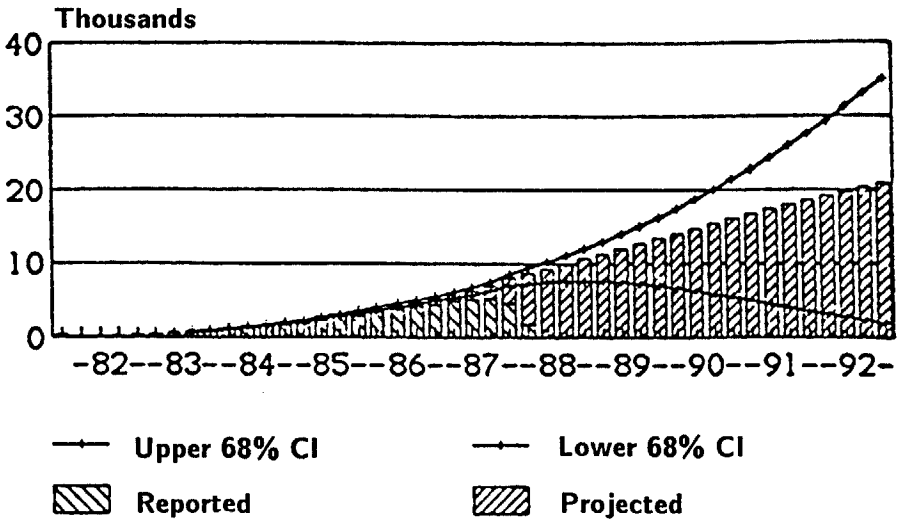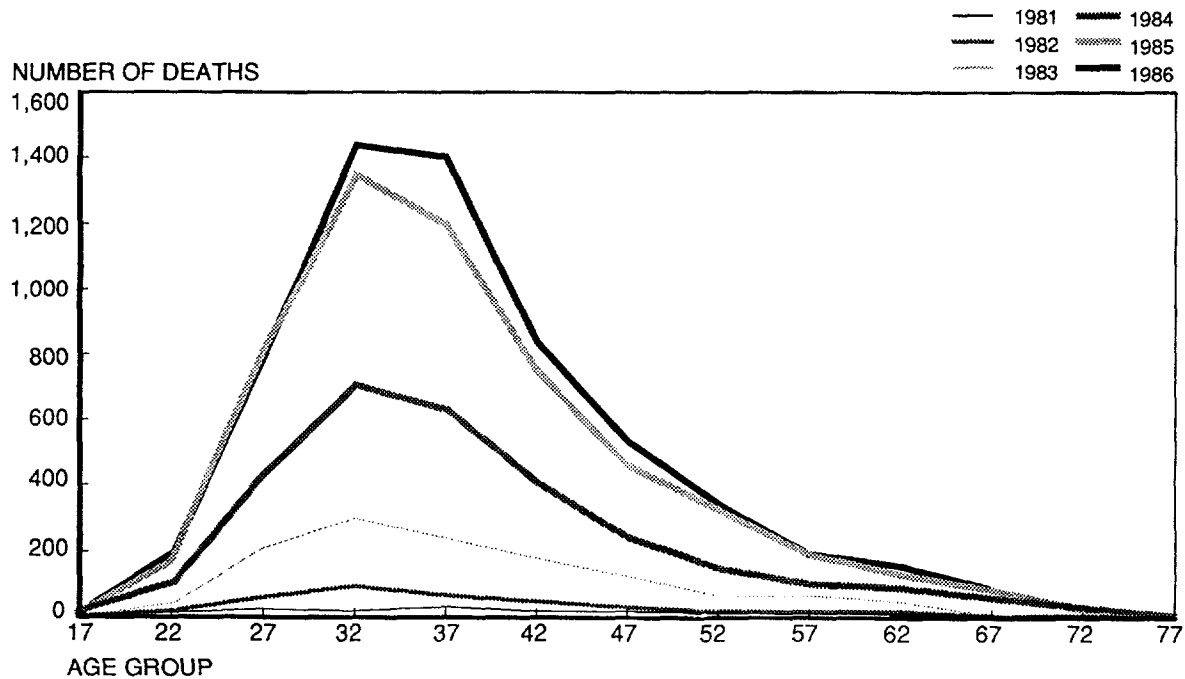
Thousands

MALE AIDS DEATHS
By year and age

NUMBER OF DEATHS

Legend: 1981, 1982, 1983, 1984, 1985, 1986

AGE GROUP

MALE AIDS DEATHS
By year and age

GRAPH 6

FREQUENCY – percent

Legend: 1981, 1982, 1983, 1984, 1985, 1986

AGE GROUP
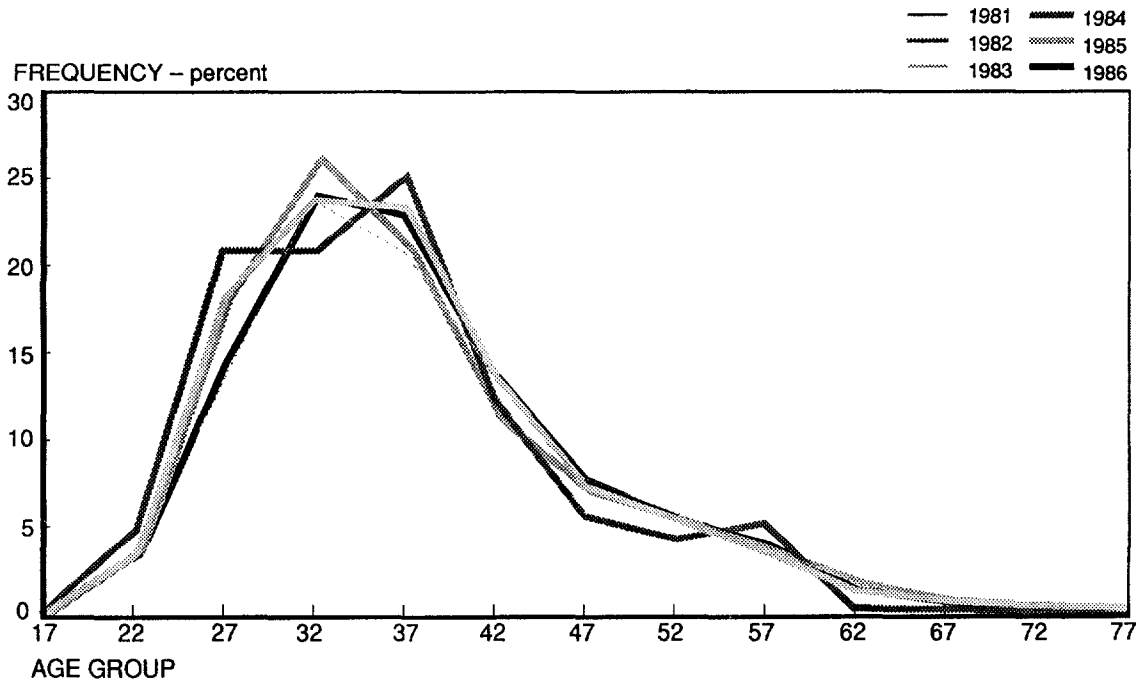
MALE AIDS DEATHS
By age for 1981-86

THOUSANDS

Actual 1981-86
Log normal 1981-86

AGE GROUP
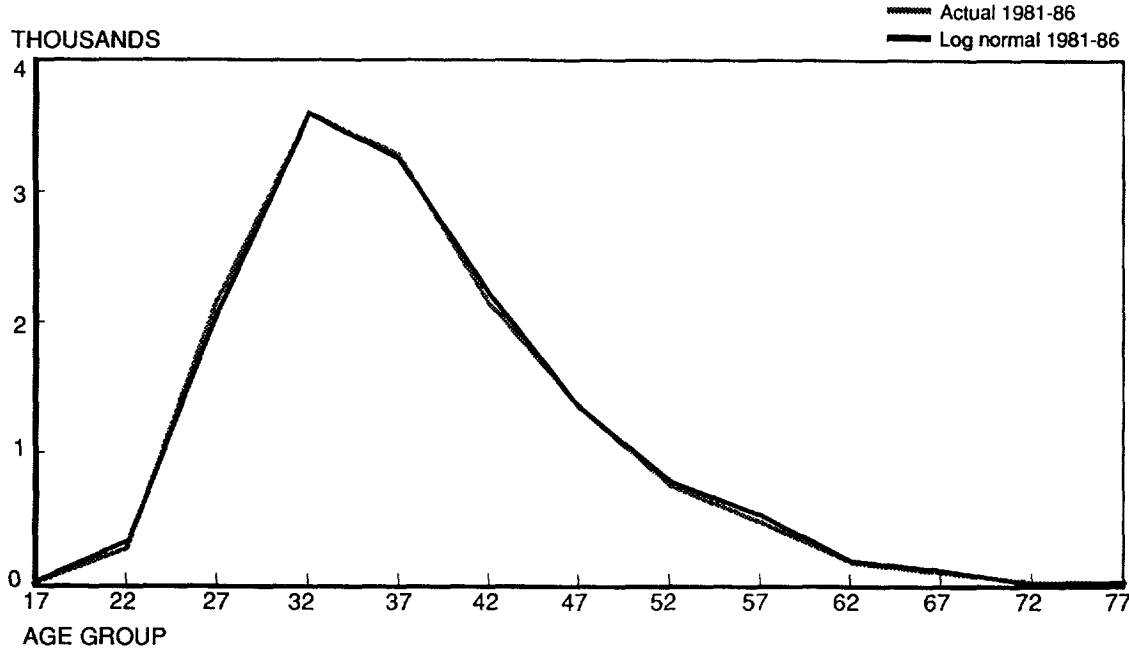
PANEL DISCUSSION

GRAPH 7

rates developed and the status of other work in progress, it seemed satisfactory to continue to use the original rates developed.

Interpolation of AIDS Mortality Rates
The crude death rates developed were interpolated using the Karup-King formula with linear interpolation for the end points. The interpolated AIDS mortality Rates are shown in Appendix 1 to this paper (found at the end of this article). Table H1 shows the male extra mortality by attained age and calendar year for all risk factor groups.

Graph 8 shows rates for Table H1 by decennial issue age as measured from 1986. (Because these extra mortality rates vary by attained age and calendar year, it has been convenient to illustrate them on an "issue age" basis for a particular calendar year. This is especially helpful when combining rates which vary by attained age and calendar year with a select mortality table.)

For issue age 25 in 1986, the greatest extra mortality occurs around 1998. Each succeeding age group has generally lower extra mortality from AIDS. Also, the level of extra AIDS mortality in relation to normal mortality is important. Graphs 9-12 show basic mortality taken as 70% of the 1965-1970 basic mortality tables and the basic mortality plus the additional mortality for AIDS. Notice the sharp reduction in AIDS mortality as a percentage of total mortality as issue age increases.

Also, Table H2 was developed by adjusting the projected deaths to remove the estimated number of IV drug abusers. Based on data from the CDC public information database, it was assumed that the percentage of non-IV drug abusers varied by attained age as follows:

Attained Age	% Non-IV Drug Abuser
up to 29	76.55
30-39	71.03
40-49	79.95
50 & up	89.39

Comparison of Tables H1 and H2 with Institute of Actuaries Tables
Graphs 13-16 illustrate the levels of mortality for Tables H1 and H2 compared with Tables A and F of the Institute of Actuaries AIDS Working Party. The tables are for an issue in 1988 followed through the year 2005. Tables H1 and H2 have a more marked difference by age than the U.K. tables, but as discussed above, this is believed to be a key variable in HIV seroprevalence and in AIDS experience.

For issue age 25 Table A does not cross Table H1 until 1997. The assumed level of standard mortality is about the same for both countries.

For issue age 35, tables H1 and H2 fall between tables A and F. Again, assumed standard mortality is similar.

For issue at age 45, the level of extra mortality for tables H1 and H2 is about the same as for table F, but the total assumed U.K. mortality before AIDS is at the same level as U.S. mortality with tables H1 or H2 included.

q[x] = t
Extra for AIDS
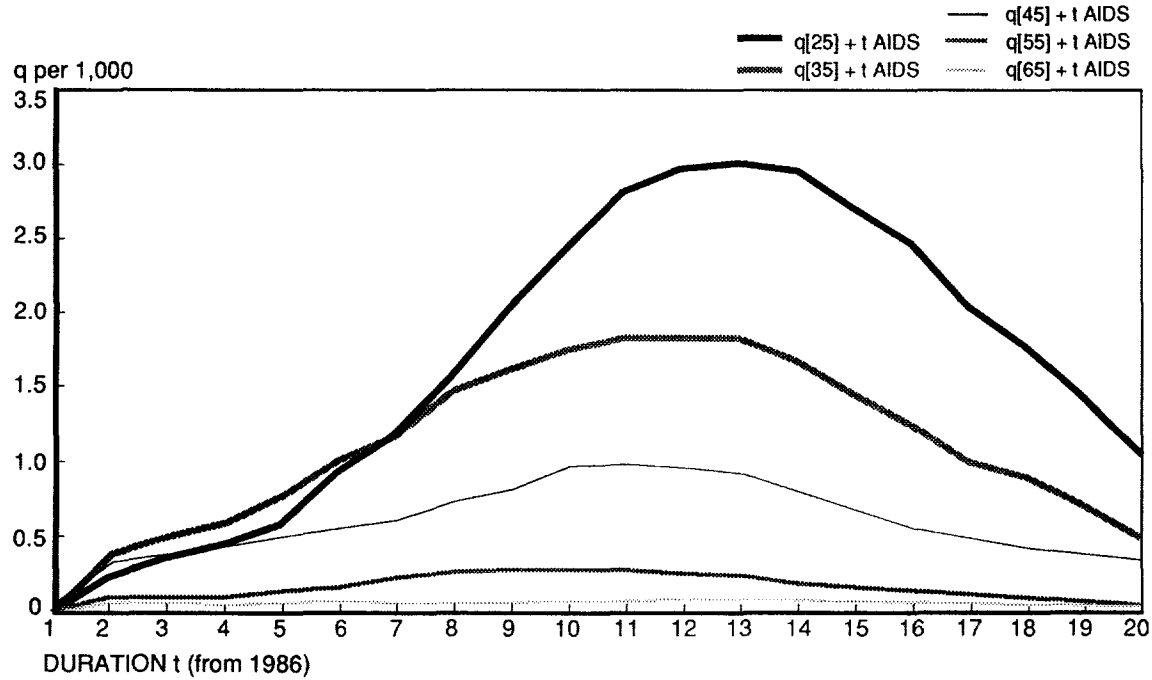
GRAPH 9

q[x] + t
Issue Age 25

q per 1,000

duration t (from 1986)

—•— q[25]+t   —+— q[25]+t W/AIDS
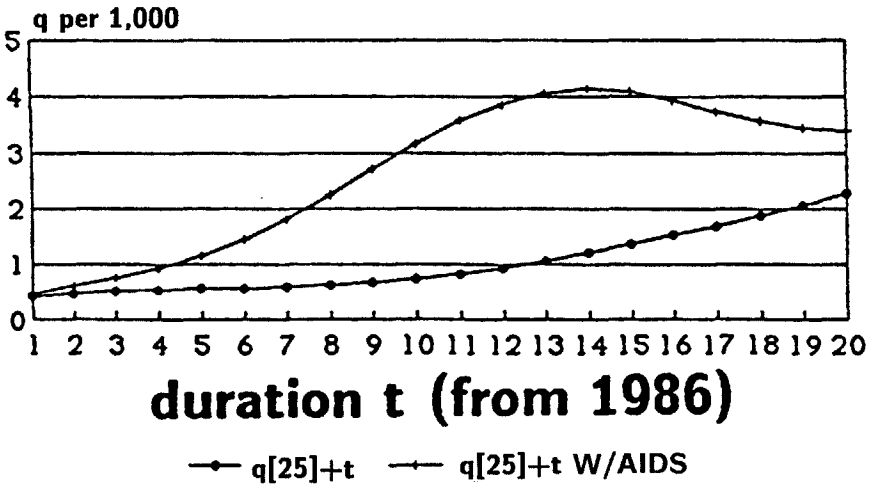
GRAPH 10

q[x] + t
Issue Age 35

q per 1,000

duration t (from 1986)

—✳— q[35]+t   —•— q[35]+t W/AIDS
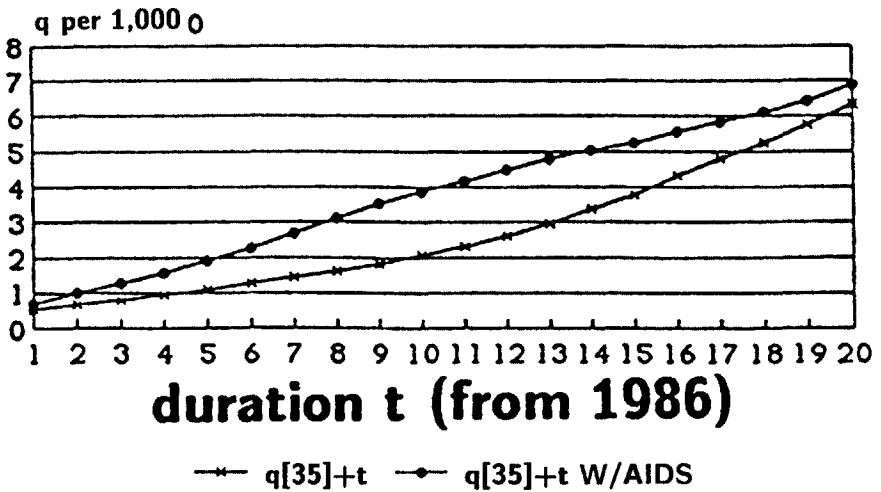
GRAPH 11

q[x] + t
Issue Age 45

q per 1,000

duration t (from 1986)

—•— q[45]+t   —⊕— q[45]+t W/AIDS
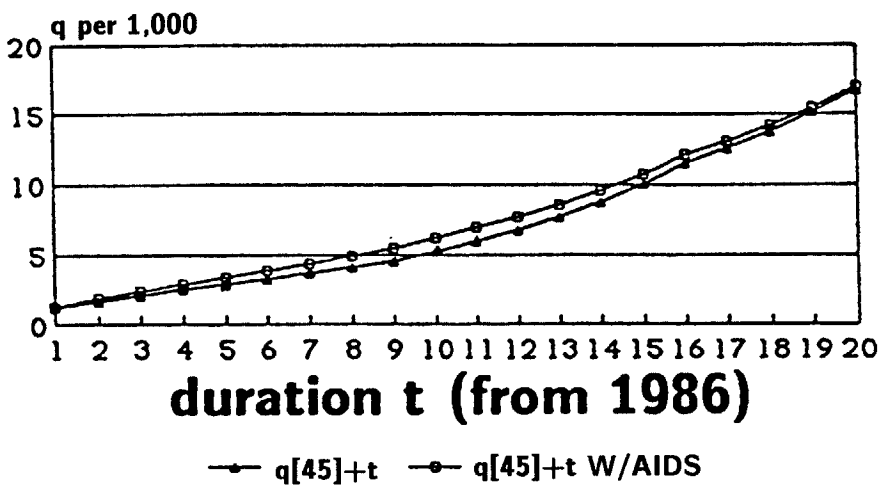
GRAPH 12

q[x] + t
Issue Age 55

q per 1,000

duration t (from 1986)

—— q[55]+t   —— q[55]+t W/AIDS
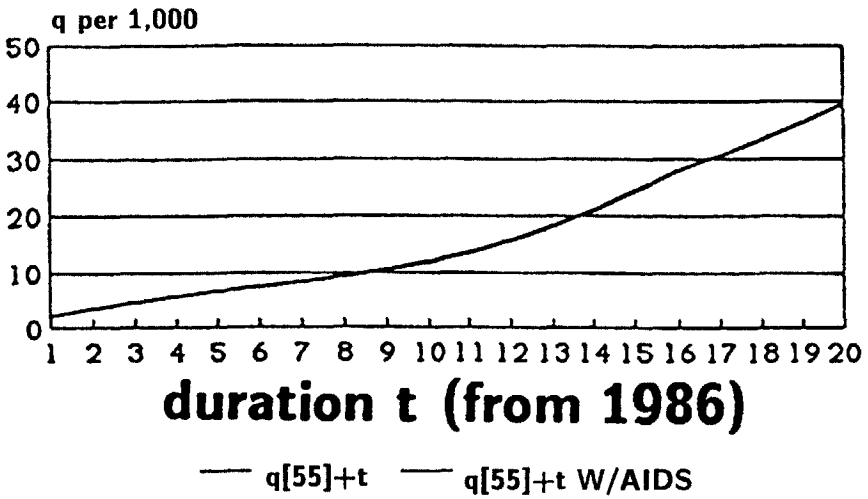
MORTALITY FOR ISSUE IN 1988
Issue age 25

GRAPH 13

MORTALITY FOR ISSUE IN 1988
Issue age 35
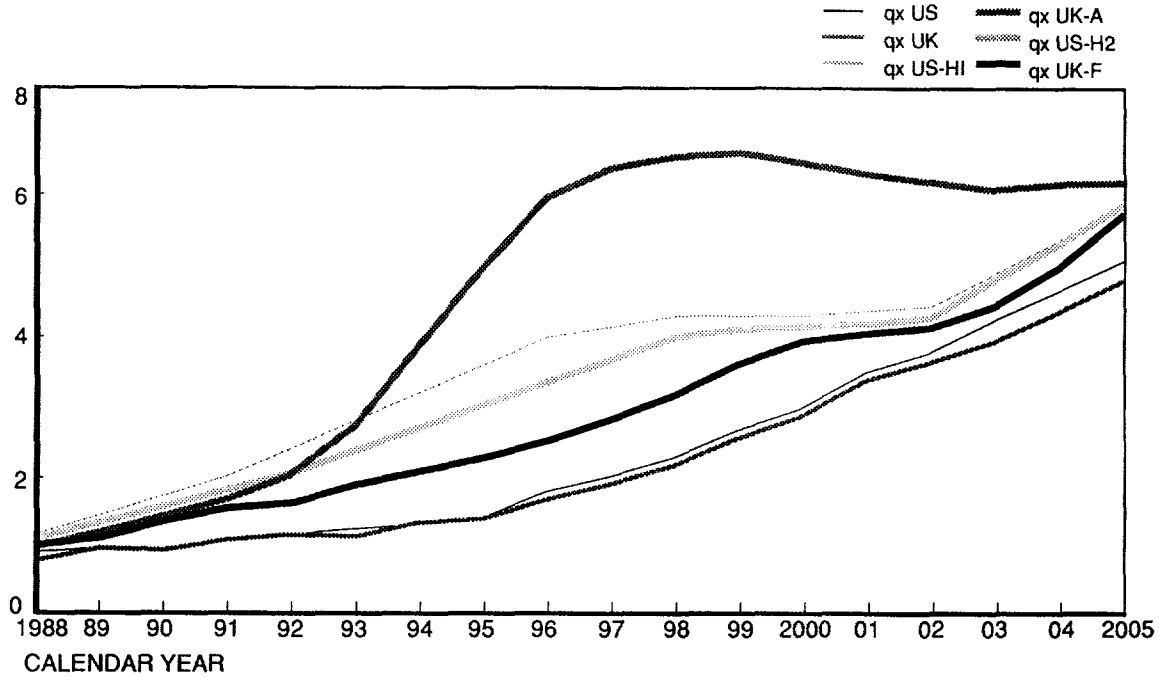
GRAPH 14

MORTALITY FOR ISSUE IN 1988
Issue age 45
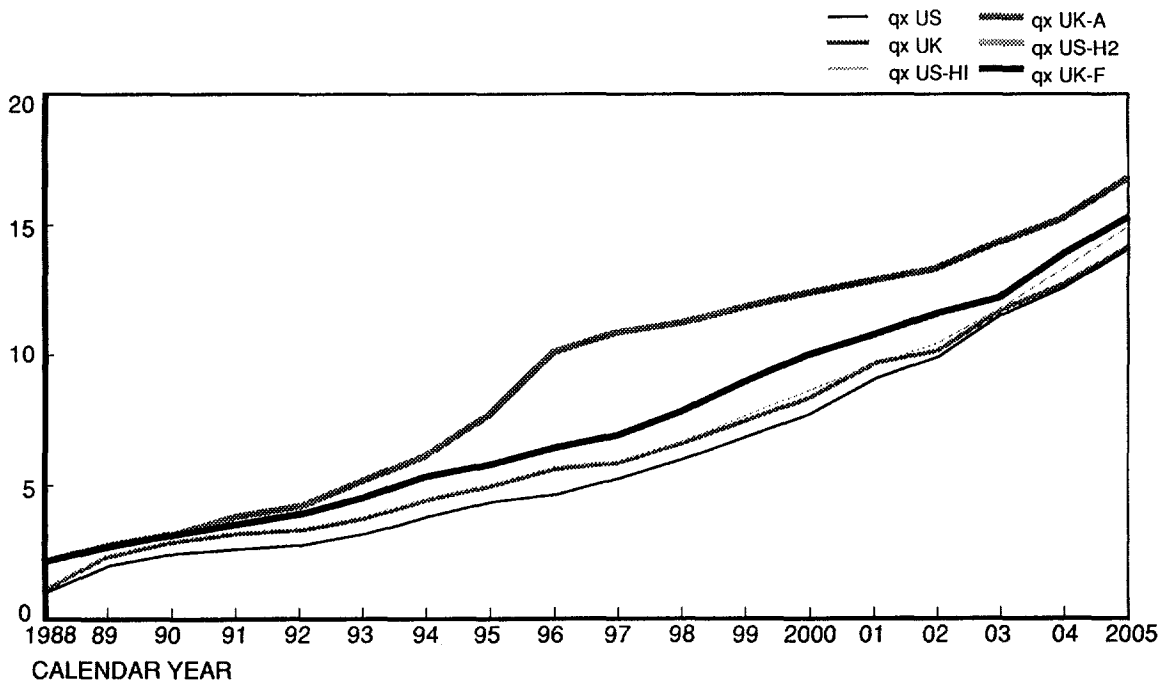
GRAPH 15

MORTALITY FOR ISSUE IN 1988
Issue age 55

Legend:
- qx US
- qx UK
- qx US-HI
- qx UK-A
- qx US-H2
- qx UK-F

CALENDAR YEAR
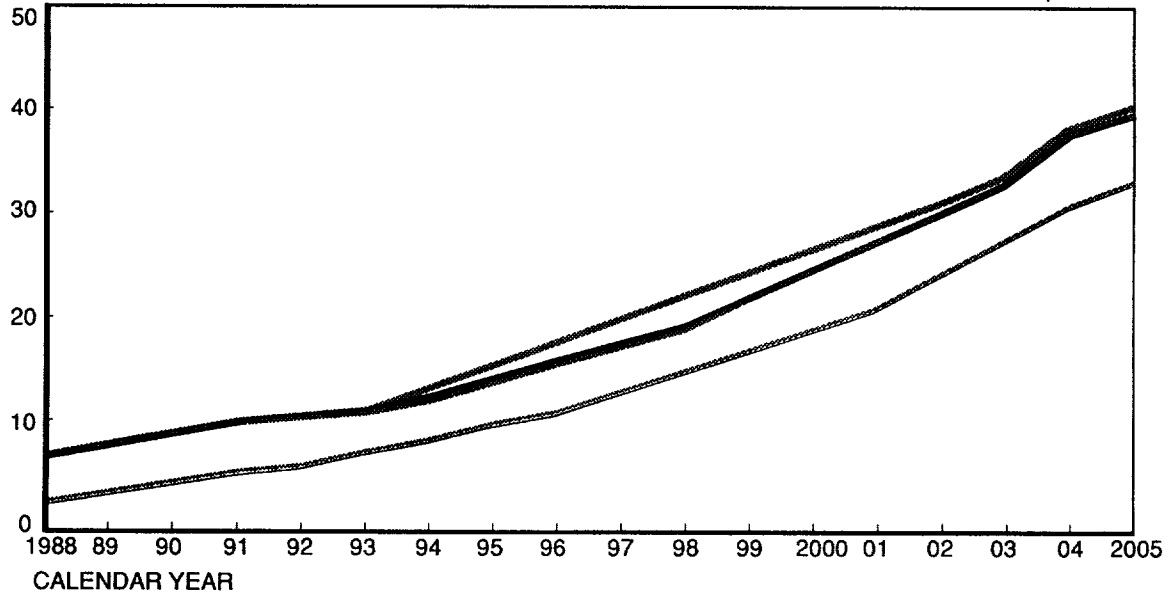
For issue age 55 and up, extra mortality for AIDS is small as a percentage total mortality. However, the assumed level of standard mortality in the U.K. model is much higher than for the U.S.

AIDS RESERVES AND THE PRESENT VALUE OF FUTURE AIDS CLAIMS
Gross Premium Valuation
The SOA AIDS Task Force report provides excellent information and guidance on developing models for estimating the impact of AIDS on insurance operations. However, in discussions with a number of actuaries, it seemed there was significant interest in having a table of AIDS extra mortality to use in more traditional actuarial models. Although there are a number of important modeling considerations such as revision of assumptions other than mortality because of AIDS, it seemed worthwhile to develop the above rates for pragmatic applications.

Using Table H1, model offices were developed to determine the effect of extra AIDS mortality at this level on profitability. The difference in profitability with and without AIDS was basically accounted for by the present value of the extra AIDS mortality. Accordingly, rather than prepare separate gross premium valuations, the present value of extra AIDS mortality can be used as a measure of extra AIDS reserves needed. The present value of AIDS claims could be adjusted for profit margins as determined in gross premium valuations to the extent management is willing to devote these future earnings to AIDS.

The remainder of this presentation demonstrates how AIDS mortality rates may be used to estimate the potential impact of AIDS for reserving purposes. The values calculated merely illustrate calculation techniques and the relative impact of various tables and should not be taken as recommended factors for reserving (or pricing). It should be emphasized that the Table H1 and H2 rates used are based on population experience. The situation of each particular company should be considered in determining potential AIDS mortality experience. Factors for consideration include geographic distribution, underwriting generation, age and sex distributions of insureds, product mix, lapses, etc. (For a more comprehensive review of modeling for AIDS Claims, see the *Report of the Society of Actuaries Task Force on the Implications of AIDS for Life and Health Insurance Companies*, March 1988.) Also, it should be noted that this topic is being studied by working groups within both the CIA and the SOA, and when available, final reserve procedures recommended by these bodies may differ substantially from the techniques described herein.

The Present Value of Additional AIDS Claims
The various tables described herein have been used to develop factors for the present value of AIDS claims for the period 1988-2005. The assumptions included an 8% interest rate and lapses of 20% first year, 15% second year and 10% thereafter. Standard mortality for tables H1 and H2 was assumed to be 70% of the 1965-1970 basic table. Standard mortality for tables A, BC and F was taken to be "Normal Mortality" as set out in "AIDS Bulletin No. 2." The composite Present Value of AIDS Mortality was based on an age distribution of 33.7% for age 25, 33.1% at 35, 23.3% at age 45, 8.2% at age 55 and 1.7% at age 65. The resulting present values were as follows:

Present Value of AIDS Mortality Per $1,000

Issue Age	Table A	Table BC	Table F	Table H1	Table H2
25	4.69	2.42	1.44	5.45	3.96
35	6.95	4.33	2.49	5.72	4.37
45	6.74	4.18	2.42	3.32	2.82
55	3.83	2.32	1.51	1.34	1.20
65	0.22	0.19	0.16	0.41	0.37
Composite	5.77	3.42	2.00	4.62	3.54

Also, annuity factors were determined and the Present Values of AIDS Mortality were spread over the period 1988-2005 in level annual installments. (Although the annuity factor described later in this report is described in terms of an annuity certain, these calculations included both interest and survivorship to illustrate an alternative approach.) The Level Annual Costs were as follows:

Level Annual Costs Per $1,000 for Additional AIDS Mortality

Issue Age	Table A	Table BC	Table F	Table H1	Table H2
25	0.94	0.48	0.29	1.09	0.79
35	1.39	0.86	0.50	1.15	0.87
45	1.37	0.85	0.49	0.67	0.57
55	0.80	0.49	0.32	0.27	0.25
65	0.05	0.04	0.04	0.09	0.08
Composite	1.16	0.69	0.40	0.92	0.71

Although the slopes by age are quite different, the Present Values of AIDS Mortality and the Level Annual Costs for Table H2 are similar to those for Table BC. Detailed calculations of the values for Table H2 are shown in Appendix 2, found at the end of this article.

The values shown above have been calculated using an interest rate of 8%. The following shows the Present Value of AIDS Mortality and Level Annual Cost based on Table H2 as calculated above but using various interest rates:

Interest Rate	Present Value of AIDS Mortality	Level Annual Cost
0%	6.00	0.83
4%	4.53	0.77
8%	3.54	0.71
12%	2.85	0.66

A Reserve Procedure

Appendix 1 to Chapter 9 of the AIDS Task Force Report (March 1988) set out a possible procedure for the development of an AIDS mortality reserve, and this is reproduced later in this report. Using factors along the lines of those developed above, such a reserve could be readily developed. For example, using the assumptions and values of Appendix 2, the present value of AIDS claims is $3.54 per thousand and could be funded with a level annual payment of $0.71 per thousand. The present value of AIDS claims could be reduced by any margins developed from a traditional gross premium valuation, and a smaller level cost developed. The level cost could then be applied to the development of an AIDS mortality fund (reserve or surplus). For the next year, the Present Value of AIDS Mortality could be redetermined. If there is no change in the expected AIDS mortality basis, the value for 1989 would be $4.49 per thousand. This

could be reduced by the accumulated value of the AIDS fund (on a per thousand basis), and the remainder spread over the remaining funding period by dividing by the annuity factor. This would be the current contribution to the AIDS fund. The procedure described herein has the advantages of being relatively simple to implement and providing flexibility in future funding as the real level of AIDS extra mortality becomes known.

AN AIDS MORTALITY RESERVE

In order to test current reserves, a gross premium valuation reflecting AIDS may be prepared. One approach would be to prepare the gross premium valuation using mortality which has been modified to take the impact of AIDS into account. Another approach may be to prepare a gross premium valuation without regard to AIDS and to adjust the results of that valuation by adjusting for additional mortality as a result of AIDS.

In lieu of performing special tests, some actuaries may want to consider the establishment of an AIDS Mortality Reserve as generally set out below. Note that this is not being recommended as a standard of practice, but is included as a possible approach which should be investigated further.

Let AMR_t = AIDS Mortality Reserve at time t

then AMR_{t+1} = $(AMR_t + LC_t)*(1+j_t) - AM_t$

Where

LC_t = Level (Annual) Cost for AIDS Mortality

j_t = net interest earned during year t

AM_t = Actual AIDS Mortality during year t (i.e., actual AIDS Claims)

LC_t would be calculated as follows:

LCH_t = $(PVAM_t - AMR_t)/\ddot{a}_{\overline{n}|\,i}$

Where

$PVAM_t$ = the Present Value of AIDS Mortality calculated at time t

An annuity due at interest rate i, payable for n years certain is given by:

$$\ddot{a}_{\overline{n}|\,i}$$

The value for n should be large enough so that there is a reasonable period to accumulate the necessary reserve but not so large that the accumulation is deferred indefinitely. Initially, a value of n of from 15 to 20 is suggested.

AIDS claims could be determined in accordance with models set out in other parts of this Report, and discounted at either interest or interest and survivorship. Because the Present Value of AIDS Claims (PVAM) would be redetermined each year, the reserve would be automatically updated for revisions regarding the impact of the AIDS epidemic.

By subtracting Actual Mortality (AM) for AIDS, in determining the reserve, the reserve would be written down as actual AIDS claims emerge and thus would match the reserve release with the time the excess mortality is incurred. The minimum value of the Catastrophic Mortality Reserve could be set at zero.

Similarly, the Level Cost (LC) could go negative if AIDS experience improves so much that the present value of future claims is less than the reserve on hand. This would be the natural mechanism for gradually running off the reserve if experience improves.

PANEL DISCUSSION

In developing the AIDS Mortality Reserve, due consideration should be given to strategies adopted by management in providing funds to meet future AIDS claims. For example, if the gross premium valuation did not reflect management's decision to take actions such as revising dividends because of AIDS, this could be brought into consideration in calculating the AIDS Mortality Reserve.

A number of refinements could be applied to this approach such as the use of Net Amount at Risk rather than face amount. Another refinement would be to provide only for the AIDS mortality in excess of otherwise expected mortality. Again, this approach is not being proposed as recommended for anything other than further consideration as a pragmatic approach to dealing with expected AIDS mortality.

MR. DAVID J. CHRISTIANSON: I am Vice President and Actuary of Lutheran Brotherhood, a fraternal benefit society located in Minneapolis. I'm chairperson of the Task Force on the Financial Implications of AIDS. Our task force reports to the Committee on Valuation and Related Areas (COVARA), chaired by Bob Stein. Members of our task force include Ardian Gill of Gill & Roeser, Tom Reese of Tillinghast/Towers Perrin, Bill Koenig of Northwestern Mutual Life, Bob Beal of UNUM, and Harold Deutscher of Lewis & Ellis. Bob Stein is also involved as chair of COVARA. An important liaison is Bob LaLonde of the AAA. Other interested persons who have been quite involved in our work include John Dinius of Hartford, Walter Hoskins of Sentry Life, Harry Panjer of the University of Waterloo, Dave Holland of Munich Reinsurance, Barbara Lautzenheiser of Lautzenheiser & Associates, and Paul Sarnoff of Prudential.

The charge of our task force is to examine and report on the principles and techniques for the financial recognition of AIDS for insurance companies, recognizing both statutory and GAAP accounting. Techniques may include both reserving and development of new valuation tables. The role of the valuation actuary is also to be considered. The purpose is to recommend actions to be taken by individual actuaries, regulators, actuarial organizations and other interested parties.

We plan to have a progress report to COVARA in December and plan to have a final report by mid-1989. I am moderating a session on AIDS at the Vancouver meeting in May, and my hope would be to deliver our report at that meeting.

The main focus of our task force is individual life insurance and disability income. While we feel that other plans such as group insurance, medical expense and other forms of insurance are also important, it is necessary to limit our focus. The plans we are focusing on generally have greater guarantees, giving them the greatest risk.

Our advice for 1988 has been to pay careful attention to the statement that must be signed as part of the annual statement, namely, that reserves are good and sufficient. We will have no definitive statements on reserve adequacy in 1988.

We feel that there is a continuum of issues to be considered as one looks at reserve adequacy regarding AIDS. I will highlight three of these continuums. First of all, there is a continuum between old mortality bases such as American Experience and 41 CSO tables, and new tables such as 80 CSO. It appears that there are large margins available in these older mortality tables, margins that can easily encompass additional AIDS mortality. However, when one gets to the

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58 CSO and the 80 CSO table in particular, one sees inadequate margins for males between the ages of 25 and 40.

The second continuum ranges from policies with dividends, adjustable premiums or adjustable charges to policies with guaranteed rates. One may find that companies with adjustable charges and dividends may have adequate margins or, at least, more margins than policies that are charging the guaranteed maximum rate. The length of time that the rates are guaranteed is also an important factor in that continuum.

The third continuum is from heavily reserved policies to lightly reserved policies, for example, term where often one-half cx is held as a reserve. Clearly, this would not be a sufficient reserve to include extra AIDS mortality.

MR. PAUL E. SARNOFF: I would like to compliment Dave Holland on his interesting and well-done analysis of AIDS mortality and the anticipated financial impact. Dave's study shows the potential that this disease has for affecting the financial operations of life insurance companies in the United States.

An important section is the appendix, which outlines a possible methodology for establishing appropriate reserves for the extra mortality which is not contemplated by existing mortality tables and valuation methods. The reason actuaries need to devise a reserving methodology for this risk is the fact that extra mortality is expected to rise year by year. Existing mortality tables, which have mortality rates that depend on the age of the insured, or on the age of the insured and the policy year, do not reflect this increase in extra mortality by calendar year. Accordingly, a method, one set forth by Dave, is needed to produce an appropriate pattern of extra mortality reserves.

A number of actuaries have made remarks about the general adequacy of the margins inherent in the standard valuation tables and about the size of these margins in relation to extra AIDS mortality. While these comparisons are of some intellectual interest, they are not appropriate in the discussion of reserve adequacy. That is because the margin inherent in the mortality table is only one element in determining the provision that reserves make for mortality. It is important to realize that the valuation method has a lot to do with how much mortality can be provided for by the reserves. It is possible to show that, under commonly used valuation methods which are accepted by the states, reserves can fail to provide for mortality levels equal to those required by the minimum valuation standards of mortality. This result arises when cash values are greater than the reserves computed without regard to such cash values. Then, the premium and tabular interest are not sufficient to provide for tabular cost and the required increase in reserve. Those statements are true even before we consider any possible extra mortality from AIDS. Since current reserves can already be shown to fail to provide for the mortality level of the valuation standard, we should not fool ourselves into thinking that the valuation standards have an element of conservatism that can cover additional AIDS mortality. It isn't so. In many cases, these margins have already been used up.

It is not necessary, however, to make provision all at once for future extra mortality from AIDS. The extra mortality will emerge over a number of future years and can be provided for by regular charges from future annual premiums as they are earned. That is the justification for using an annual premium concept in the reserving methodology for extra AIDS mortality, such as the one set forth by Dave Holland.

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Table H1. AIDS Extra Mortality Rates per 1,000 for Attained Ages Shown.

Attained Age	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Cal Year																
1986	0.000	0.003	0.005	0.008	0.010	0.013	0.022	0.034	0.047	0.061	0.074	0.086	0.098	0.110	0.120	0.128
1987	0.000	0.006	0.012	0.018	0.024	0.030	0.051	0.078	0.109	0.140	0.168	0.196	0.223	0.250	0.273	0.291
1988	0.000	0.008	0.016	0.024	0.033	0.041	0.070	0.108	0.152	0.196	0.237	0.277	0.319	0.360	0.396	0.423
1989	0.000	0.011	0.022	0.033	0.044	0.055	0.096	0.149	0.209	0.270	0.327	0.382	0.441	0.497	0.546	0.584
1990	0.000	0.014	0.028	0.043	0.057	0.071	0.126	0.199	0.282	0.366	0.443	0.518	0.595	0.669	0.734	0.785
1991	0.000	0.018	0.035	0.052	0.070	0.087	0.162	0.262	0.375	0.488	0.591	0.687	0.784	0.877	0.958	1.022
1992	0.000	0.021	0.042	0.063	0.084	0.105	0.203	0.333	0.481	0.629	0.762	0.885	1.010	1.128	1.230	1.311
1993	0.000	0.025	0.049	0.074	0.099	0.124	0.247	0.412	0.599	0.787	0.954	1.108	1.262	1.406	1.531	1.629
1994	0.000	0.028	0.057	0.085	0.113	0.141	0.290	0.490	0.716	0.943	1.146	1.332	1.519	1.694	1.846	1.963
1995	0.000	0.031	0.062	0.094	0.125	0.156	0.324	0.551	0.808	1.069	1.305	1.529	1.758	1.976	2.164	2.306
1996	0.000	0.033	0.066	0.100	0.133	0.166	0.346	0.586	0.861	1.145	1.410	1.675	1.959	2.233	2.469	2.638
1997	0.000	0.033	0.066	0.099	0.132	0.165	0.352	0.603	0.891	1.191	1.479	1.777	2.103	2.421	2.695	2.889
1998	0.000	0.031	0.062	0.093	0.125	0.156	0.344	0.594	0.884	1.190	1.491	1.813	2.175	2.530	2.836	3.048
1999	0.000	0.028	0.056	0.084	0.111	0.139	0.323	0.568	0.854	1.158	1.459	1.789	2.162	2.531	2.849	3.068
2000	0.000	0.024	0.048	0.071	0.095	0.119	0.293	0.527	0.799	1.090	1.378	1.695	2.052	2.406	2.713	2.928
2001	0.000	0.020	0.040	0.060	0.079	0.099	0.252	0.456	0.695	0.953	1.212	1.500	1.829	2.157	2.442	2.645
2002	0.000	0.016	0.032	0.048	0.064	0.080	0.210	0.383	0.586	0.807	1.033	1.288	1.581	1.874	2.132	2.317
2003	0.000	0.013	0.025	0.038	0.051	0.063	0.170	0.313	0.481	0.666	0.858	1.077	1.331	1.587	1.813	1.977
2004	0.000	0.010	0.020	0.029	0.039	0.049	0.135	0.250	0.387	0.538	0.696	0.881	1.097	1.315	1.509	1.651
2005	0.000	0.007	0.015	0.022	0.030	0.037	0.105	0.196	0.305	0.426	0.556	0.708	0.888	1.071	1.234	1.354

Attained Age	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Cal Year																
1986	0.133	0.135	0.135	0.135	0.134	0.134	0.133	0.131	0.129	0.125	0.120	0.114	0.107	0.099	0.092	0.085
1987	0.304	0.312	0.317	0.318	0.317	0.314	0.306	0.297	0.286	0.275	0.264	0.253	0.240	0.227	0.214	0.199
1988	0.441	0.452	0.457	0.458	0.456	0.449	0.437	0.422	0.405	0.388	0.372	0.354	0.336	0.318	0.299	0.280
1989	0.610	0.626	0.635	0.638	0.635	0.624	0.605	0.581	0.555	0.531	0.509	0.486	0.463	0.439	0.415	0.390
1990	0.820	0.844	0.857	0.861	0.857	0.841	0.812	0.777	0.739	0.706	0.677	0.649	0.622	0.593	0.563	0.530
1991	1.069	1.103	1.124	1.132	1.127	1.103	1.059	1.005	0.951	0.905	0.871	0.841	0.813	0.783	0.748	0.706
1992	1.367	1.404	1.424	1.430	1.424	1.401	1.359	1.306	1.248	1.193	1.139	1.080	1.021	0.962	0.907	0.856
1993	1.696	1.739	1.761	1.766	1.757	1.730	1.682	1.620	1.552	1.485	1.416	1.341	1.263	1.186	1.114	1.048
1994	2.041	2.088	2.110	2.112	2.099	2.067	2.011	1.940	1.860	1.780	1.693	1.597	1.496	1.398	1.309	1.230
1995	2.393	2.438	2.452	2.443	2.420	2.381	2.318	2.237	2.147	2.052	1.948	1.829	1.705	1.586	1.480	1.392
1996	2.730	2.762	2.753	2.720	2.681	2.634	2.567	2.484	2.387	2.282	2.159	2.016	1.865	1.723	1.602	1.508
1997	2.987	3.015	2.994	2.946	2.894	2.832	2.745	2.642	2.530	2.415	2.293	2.160	2.021	1.886	1.761	1.647
1998	3.149	3.168	3.132	3.067	3.002	2.929	2.832	2.718	2.596	2.474	2.349	2.215	2.078	1.942	1.815	1.695
1999	3.170	3.187	3.146	3.076	3.004	2.925	2.819	2.697	2.568	2.442	2.316	2.184	2.050	1.917	1.791	1.668
2000	3.037	3.069	3.046	2.992	2.928	2.847	2.732	2.597	2.457	2.325	2.201	2.074	1.947	1.822	1.700	1.579
2001	2.751	2.789	2.778	2.737	2.686	2.617	2.516	2.397	2.272	2.153	2.041	1.926	1.810	1.695	1.583	1.471
2002	2.417	2.459	2.457	2.429	2.391	2.334	2.249	2.146	2.037	1.935	1.836	1.735	1.632	1.530	1.430	1.330
2003	2.069	2.112	2.118	2.100	2.073	2.028	1.958	1.872	1.781	1.694	1.610	1.523	1.434	1.345	1.259	1.172
2004	1.733	1.775	1.786	1.777	1.759	1.725	1.669	1.599	1.523	1.451	1.382	1.308	1.234	1.159	1.085	1.011
2005	1.426	1.466	1.480	1.478	1.467	1.442	1.398	1.342	1.281	1.222	1.165	1.105	1.043	0.981	0.920	0.858

Table H1. AIDS Extra Mortality Rates per 1,000 for Attained Ages Shown.

Attained Age	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
Cal Year
1986	0.078	0.071	0.064	0.057	0.051	0.045	0.039	0.034	0.030	0.026	0.023	0.021	0.018	0.016	0.014	0.013
1987	0.183	0.167	0.151	0.137	0.122	0.109	0.095	0.083	0.073	0.064	0.056	0.050	0.045	0.039	0.035	0.031
1988	0.261	0.241	0.221	0.202	0.183	0.164	0.145	0.128	0.112	0.099	0.087	0.077	0.067	0.059	0.052	0.047
1989	0.364	0.338	0.312	0.287	0.261	0.235	0.210	0.186	0.164	0.145	0.128	0.113	0.099	0.086	0.076	0.068
1990	0.496	0.461	0.427	0.393	0.360	0.326	0.293	0.262	0.234	0.208	0.183	0.160	0.140	0.122	0.107	0.095
1991	0.661	0.613	0.566	0.521	0.478	0.436	0.395	0.357	0.320	0.285	0.252	0.221	0.193	0.168	0.147	0.131
1992	0.807	0.760	0.713	0.666	0.616	0.565	0.515	0.466	0.420	0.377	0.334	0.294	0.258	0.226	0.198	0.176
1993	0.984	0.923	0.863	0.804	0.747	0.690	0.636	0.582	0.530	0.479	0.428	0.379	0.333	0.293	0.259	0.229
1994	1.158	1.089	1.022	0.956	0.890	0.826	0.763	0.702	0.642	0.583	0.524	0.468	0.415	0.367	0.325	0.288
1995	1.314	1.242	1.173	1.102	1.028	0.956	0.884	0.814	0.747	0.681	0.617	0.555	0.496	0.442	0.393	0.348
1996	1.433	1.367	1.303	1.232	1.152	1.070	0.988	0.907	0.832	0.761	0.692	0.627	0.566	0.508	0.453	0.401
1997	1.537	1.434	1.336	1.245	1.162	1.088	1.019	0.952	0.884	0.815	0.746	0.679	0.615	0.554	0.497	0.443
1998	1.578	1.466	1.360	1.263	1.174	1.094	1.020	0.950	0.881	0.815	0.751	0.691	0.632	0.576	0.521	0.466
1999	1.546	1.429	1.319	1.219	1.133	1.057	0.988	0.923	0.859	0.796	0.737	0.680	0.625	0.572	0.519	0.468
2000	1.457	1.339	1.229	1.133	1.052	0.984	0.925	0.869	0.812	0.754	0.699	0.645	0.594	0.545	0.497	0.451
2001	1.359	1.249	1.148	1.058	0.983	0.920	0.865	0.812	0.760	0.706	0.654	0.604	0.556	0.509	0.465	0.422
2002	1.229	1.131	1.040	0.959	0.891	0.834	0.784	0.737	0.689	0.640	0.593	0.548	0.504	0.462	0.422	0.383
2003	1.084	0.998	0.918	0.847	0.788	0.738	0.694	0.652	0.610	0.567	0.525	0.485	0.446	0.409	0.373	0.339
2004	0.936	0.862	0.793	0.732	0.681	0.638	0.600	0.565	0.528	0.491	0.455	0.420	0.386	0.354	0.323	0.293
2005	0.794	0.732	0.674	0.623	0.580	0.543	0.511	0.481	0.450	0.418	0.387	0.358	0.329	0.302	0.275	0.250

Attained Age	65	66	67	68	69	70	71	72	73	74	75	76	77
Cal Year
1986	0.012	0.011	0.010	0.009	0.008	0.008	0.007	0.007	0.007	0.006	0.006	0.006	0.005
1987	0.028	0.025	0.023	0.021	0.019	0.018	0.017	0.016	0.016	0.015	0.014	0.013	0.012
1988	0.042	0.038	0.035	0.031	0.029	0.027	0.025	0.023	0.023	0.022	0.021	0.019	0.017
1989	0.061	0.055	0.049	0.045	0.041	0.038	0.036	0.033	0.033	0.031	0.029	0.027	0.024
1990	0.085	0.077	0.069	0.062	0.057	0.053	0.049	0.046	0.046	0.043	0.040	0.038	0.032
1991	0.117	0.105	0.094	0.084	0.077	0.071	0.065	0.060	0.060	0.057	0.054	0.050	0.043
1992	0.156	0.139	0.124	0.111	0.100	0.092	0.085	0.078	0.078	0.073	0.069	0.065	0.056
1993	0.202	0.180	0.159	0.142	0.128	0.116	0.106	0.098	0.098	0.092	0.087	0.081	0.071
1994	0.254	0.224	0.198	0.175	0.157	0.143	0.130	0.119	0.119	0.112	0.105	0.099	0.086
1995	0.306	0.269	0.236	0.209	0.187	0.169	0.154	0.140	0.140	0.132	0.124	0.116	0.100
1996	0.354	0.310	0.272	0.241	0.215	0.194	0.176	0.159	0.159	0.150	0.140	0.130	0.111
1997	0.391	0.345	0.304	0.269	0.240	0.216	0.195	0.175	0.175	0.164	0.152	0.141	0.118
1998	0.415	0.367	0.325	0.289	0.257	0.230	0.206	0.185	0.185	0.172	0.160	0.147	0.122
1999	0.420	0.375	0.334	0.297	0.265	0.236	0.210	0.188	0.188	0.174	0.161	0.148	0.121
2000	0.407	0.366	0.329	0.294	0.262	0.233	0.207	0.184	0.184	0.170	0.157	0.143	0.116
2001	0.381	0.343	0.307	0.275	0.245	0.217	0.193	0.171	0.171	0.159	0.146	0.134	0.108
2002	0.346	0.311	0.279	0.249	0.222	0.197	0.175	0.155	0.155	0.144	0.132	0.121	0.098
2003	0.306	0.275	0.246	0.220	0.196	0.174	0.154	0.137	0.137	0.127	0.117	0.107	0.086
2004	0.265	0.238	0.213	0.190	0.169	0.150	0.133	0.118	0.118	0.110	0.101	0.092	0.074
2005	0.225	0.202	0.181	0.162	0.144	0.128	0.113	0.101	0.101	0.093	0.086	0.078	0.063

Table H2. AIDS Extra Mortality Rates per 1,000 for Attained Ages Shown Excluding IV Drug Abusers.

Attained Age	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Cal Year																
1986	0.000	0.002	0.004	0.006	0.008	0.010	0.017	0.026	0.037	0.047	0.056	0.064	0.072	0.080	0.086	0.091
1987	0.000	0.005	0.009	0.014	0.018	0.023	0.039	0.060	0.084	0.108	0.129	0.147	0.165	0.181	0.196	0.207
1988	0.000	0.006	0.013	0.019	0.025	0.031	0.054	0.084	0.118	0.151	0.181	0.208	0.236	0.261	0.283	0.300
1989	0.000	0.008	0.017	0.025	0.034	0.042	0.074	0.115	0.162	0.209	0.250	0.288	0.325	0.360	0.391	0.415
1990	0.000	0.011	0.022	0.033	0.043	0.054	0.097	0.155	0.219	0.283	0.339	0.390	0.439	0.485	0.525	0.557
1991	0.000	0.013	0.027	0.040	0.053	0.067	0.125	0.203	0.291	0.377	0.452	0.518	0.580	0.636	0.686	0.726
1992	0.000	0.016	0.032	0.048	0.065	0.081	0.157	0.259	0.373	0.486	0.583	0.667	0.746	0.819	0.881	0.931
1993	0.000	0.019	0.038	0.057	0.076	0.095	0.190	0.320	0.465	0.608	0.731	0.835	0.932	1.021	1.096	1.157
1994	0.000	0.022	0.043	0.065	0.087	0.108	0.224	0.380	0.556	0.729	0.877	1.003	1.122	1.230	1.322	1.394
1995	0.000	0.024	0.048	0.072	0.095	0.119	0.250	0.428	0.628	0.826	0.999	1.151	1.298	1.434	1.549	1.638
1996	0.000	0.025	0.051	0.076	0.102	0.127	0.267	0.456	0.670	0.886	1.079	1.260	1.445	1.619	1.766	1.874
1997	0.000	0.025	0.050	0.076	0.101	0.126	0.272	0.469	0.694	0.922	1.132	1.336	1.550	1.754	1.928	2.052
1998	0.000	0.024	0.048	0.072	0.095	0.119	0.266	0.463	0.689	0.922	1.141	1.363	1.601	1.832	2.028	2.165
1999	0.000	0.021	0.043	0.064	0.085	0.107	0.250	0.443	0.666	0.897	1.117	1.344	1.591	1.832	2.037	2.179
2000	0.000	0.018	0.036	0.055	0.073	0.091	0.227	0.411	0.623	0.844	1.055	1.273	1.510	1.741	1.940	2.080
2001	0.000	0.015	0.030	0.046	0.061	0.076	0.195	0.356	0.543	0.739	0.928	1.126	1.345	1.560	1.746	1.879
2002	0.000	0.012	0.025	0.037	0.049	0.062	0.163	0.299	0.458	0.626	0.791	0.967	1.162	1.355	1.524	1.646
2003	0.000	0.010	0.019	0.029	0.039	0.049	0.132	0.245	0.376	0.517	0.656	0.808	0.978	1.147	1.296	1.404
2004	0.000	0.007	0.015	0.022	0.030	0.037	0.105	0.196	0.303	0.417	0.533	0.661	0.806	0.950	1.078	1.172
2005	0.000	0.006	0.011	0.017	0.023	0.028	0.082	0.154	0.239	0.331	0.425	0.531	0.652	0.773	0.882	0.962

Attained Age	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Cal Year																
1986	0.094	0.095	0.095	0.095	0.095	0.097	0.099	0.100	0.101	0.100	0.097	0.092	0.085	0.079	0.074	0.069
1987	0.215	0.220	0.223	0.224	0.225	0.227	0.227	0.227	0.224	0.220	0.213	0.203	0.193	0.181	0.171	0.161
1988	0.312	0.318	0.322	0.323	0.324	0.324	0.324	0.322	0.317	0.310	0.299	0.285	0.269	0.253	0.239	0.227
1989	0.431	0.441	0.447	0.450	0.451	0.451	0.448	0.443	0.435	0.425	0.410	0.392	0.371	0.350	0.332	0.316
1990	0.580	0.595	0.603	0.607	0.609	0.607	0.601	0.592	0.579	0.564	0.546	0.523	0.498	0.473	0.450	0.430
1991	0.756	0.778	0.791	0.799	0.801	0.796	0.783	0.765	0.745	0.724	0.702	0.677	0.651	0.624	0.598	0.573
1992	0.966	0.989	1.002	1.009	1.012	1.012	1.007	0.996	0.978	0.954	0.917	0.870	0.818	0.767	0.725	0.694
1993	1.199	1.225	1.239	1.245	1.248	1.249	1.246	1.236	1.217	1.187	1.141	1.080	1.012	0.946	0.891	0.850
1994	1.443	1.471	1.484	1.489	1.491	1.493	1.490	1.480	1.459	1.423	1.364	1.286	1.199	1.115	1.047	0.998
1995	1.692	1.718	1.725	1.722	1.719	1.720	1.718	1.707	1.683	1.641	1.569	1.473	1.366	1.265	1.184	1.129
1996	1.931	1.947	1.937	1.918	1.905	1.903	1.903	1.895	1.872	1.825	1.740	1.623	1.494	1.374	1.281	1.224
1997	2.113	2.125	2.107	2.078	2.055	2.045	2.034	2.015	1.983	1.931	1.848	1.740	1.620	1.505	1.408	1.335
1998	2.228	2.234	2.205	2.163	2.132	2.115	2.097	2.072	2.035	1.978	1.894	1.785	1.665	1.550	1.451	1.374
1999	2.243	2.247	2.215	2.169	2.134	2.112	2.087	2.056	2.012	1.952	1.867	1.760	1.643	1.530	1.432	1.352
2000	2.149	2.164	2.145	2.110	2.080	2.054	2.021	1.978	1.925	1.859	1.774	1.672	1.561	1.454	1.359	1.279
2001	1.947	1.967	1.956	1.931	1.908	1.889	1.862	1.826	1.780	1.722	1.645	1.552	1.451	1.352	1.265	1.192
2002	1.711	1.734	1.730	1.713	1.698	1.685	1.664	1.635	1.596	1.547	1.480	1.398	1.308	1.221	1.143	1.078
2003	1.464	1.489	1.491	1.482	1.472	1.464	1.449	1.427	1.395	1.354	1.298	1.227	1.150	1.074	1.007	0.950
2004	1.226	1.252	1.258	1.254	1.249	1.245	1.235	1.219	1.194	1.160	1.114	1.054	0.989	0.924	0.868	0.819
2005	1.009	1.034	1.042	1.042	1.042	1.041	1.035	1.023	1.004	0.977	0.939	0.890	0.836	0.782	0.735	0.695

Table H2. AIDS Extra Mortality Rates per 1,000 for Attained Ages Shown Excluding IV Drug Abusers.

Attained Age	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
Cal Year																
1986	0.064	0.060	0.056	0.051	0.046	0.041	0.036	0.031	0.027	0.023	0.021	0.018	0.016	0.015	0.013	0.012
1987	0.152	0.142	0.132	0.122	0.111	0.099	0.086	0.075	0.065	0.057	0.050	0.045	0.040	0.035	0.031	0.028
1988	0.216	0.205	0.194	0.181	0.166	0.149	0.131	0.115	0.100	0.088	0.078	0.068	0.060	0.053	0.047	0.042
1989	0.302	0.288	0.273	0.256	0.236	0.213	0.189	0.167	0.147	0.130	0.115	0.101	0.088	0.077	0.068	0.060
1990	0.411	0.393	0.373	0.351	0.325	0.295	0.265	0.235	0.209	0.185	0.164	0.143	0.125	0.109	0.096	0.085
1991	0.548	0.522	0.495	0.465	0.432	0.395	0.357	0.320	0.286	0.255	0.225	0.197	0.172	0.150	0.132	0.117
1992	0.670	0.649	0.625	0.595	0.556	0.511	0.464	0.418	0.376	0.337	0.299	0.263	0.230	0.202	0.177	0.157
1993	0.817	0.787	0.756	0.719	0.674	0.625	0.573	0.522	0.474	0.428	0.382	0.339	0.298	0.262	0.231	0.204
1994	0.961	0.929	0.896	0.855	0.804	0.747	0.688	0.629	0.574	0.521	0.469	0.418	0.371	0.328	0.291	0.257
1995	1.091	1.060	1.028	0.985	0.928	0.864	0.797	0.730	0.667	0.609	0.551	0.496	0.443	0.395	0.351	0.311
1996	1.191	1.168	1.143	1.101	1.040	0.968	0.890	0.813	0.743	0.680	0.619	0.561	0.506	0.454	0.405	0.359
1997	1.275	1.222	1.170	1.113	1.050	0.984	0.919	0.854	0.790	0.728	0.667	0.607	0.549	0.495	0.444	0.396
1998	1.308	1.249	1.191	1.129	1.061	0.990	0.920	0.852	0.788	0.728	0.671	0.617	0.565	0.515	0.465	0.417
1999	1.281	1.217	1.154	1.090	1.023	0.957	0.891	0.828	0.768	0.712	0.659	0.608	0.559	0.511	0.464	0.419
2000	1.206	1.139	1.076	1.013	0.951	0.891	0.834	0.779	0.726	0.674	0.625	0.577	0.531	0.487	0.444	0.403
2001	1.125	1.063	1.004	0.946	0.888	0.833	0.780	0.729	0.679	0.631	0.584	0.540	0.497	0.455	0.415	0.377
2002	1.018	0.963	0.910	0.857	0.805	0.756	0.708	0.661	0.616	0.572	0.530	0.490	0.451	0.413	0.377	0.342
2003	0.898	0.849	0.803	0.757	0.712	0.668	0.626	0.585	0.545	0.506	0.469	0.433	0.399	0.366	0.334	0.303
2004	0.775	0.734	0.694	0.655	0.616	0.578	0.542	0.506	0.472	0.439	0.406	0.375	0.345	0.317	0.289	0.262
2005	0.658	0.623	0.590	0.556	0.524	0.492	0.461	0.431	0.402	0.374	0.346	0.320	0.294	0.270	0.246	0.223

Attained Age	65	66	67	68	69	70	71	72	73	74	75	76	77
Cal Year													
1986	0.011	0.010	0.009	0.008	0.007	0.007	0.006	0.006	0.006	0.006	0.005	0.005	0.005
1987	0.025	0.023	0.020	0.018	0.017	0.016	0.015	0.014	0.014	0.013	0.013	0.012	0.011
1988	0.038	0.034	0.031	0.028	0.026	0.024	0.022	0.021	0.021	0.020	0.018	0.017	0.015
1989	0.054	0.049	0.044	0.040	0.037	0.034	0.032	0.030	0.030	0.028	0.026	0.025	0.021
1990	0.076	0.068	0.061	0.055	0.051	0.047	0.044	0.041	0.041	0.038	0.036	0.034	0.029
1991	0.104	0.093	0.084	0.075	0.069	0.063	0.059	0.054	0.054	0.051	0.048	0.045	0.039
1992	0.140	0.125	0.111	0.099	0.090	0.082	0.076	0.069	0.069	0.066	0.062	0.058	0.050
1993	0.181	0.161	0.142	0.127	0.114	0.104	0.095	0.087	0.087	0.082	0.078	0.073	0.063
1994	0.227	0.200	0.177	0.157	0.141	0.127	0.116	0.106	0.106	0.100	0.094	0.088	0.077
1995	0.274	0.240	0.211	0.187	0.167	0.151	0.137	0.125	0.125	0.118	0.111	0.103	0.089
1996	0.316	0.277	0.244	0.215	0.192	0.174	0.157	0.143	0.143	0.134	0.125	0.116	0.099
1997	0.350	0.308	0.272	0.241	0.215	0.193	0.174	0.157	0.157	0.147	0.136	0.126	0.105
1998	0.371	0.328	0.291	0.258	0.230	0.206	0.184	0.165	0.165	0.154	0.143	0.131	0.109
1999	0.375	0.335	0.298	0.266	0.237	0.211	0.188	0.168	0.168	0.156	0.144	0.132	0.108
2000	0.364	0.328	0.294	0.263	0.234	0.208	0.185	0.164	0.164	0.152	0.140	0.128	0.104
2001	0.340	0.306	0.275	0.245	0.219	0.194	0.172	0.153	0.153	0.142	0.131	0.119	0.097
2002	0.309	0.278	0.249	0.223	0.198	0.176	0.156	0.139	0.139	0.128	0.118	0.108	0.088
2003	0.273	0.246	0.220	0.197	0.175	0.155	0.138	0.122	0.122	0.113	0.104	0.095	0.077
2004	0.237	0.213	0.191	0.170	0.151	0.134	0.119	0.106	0.106	0.098	0.090	0.082	0.067
2005	0.201	0.181	0.162	0.145	0.129	0.114	0.101	0.090	0.090	0.083	0.077	0.070	0.056

AIDS: PRICING AND RESERVING CONSIDERATIONS

APPENDIX I CONTINUED

Actuarial Present Values Based on Table H2 AIDS Extra Mortality

FILE: AIDCOST5 BASED ON 70% OF 1965-70 BASIC MALE MORTALITY AND HOLLAND AIDS EXTRAS PER TABLE H2

YEAR	INTEREST	AVERAGE LAPSE %	BASIC Q25	AIDS Q25	AVERAGE RESERVE	NET AMT AT RISK	PRES VAL FACTOR	PRES VAL *NAR/M	PRES VAL AIDS QX BY YEAR	PRES VAL AIDS QX TOTAL	ANNUITY	LEVEL ANNUAL COST
								1				
1988	8.00%	20.00%	0.420	0.118	0	1000	1.00000	1.00000	0.118	3.964	5.019	0.790
1989	8.00%	15.00%	0.470	0.209	0	1000	0.74024	0.74024	0.154	5.196	5.429	0.957
1990	8.00%	10.00%	0.520	0.339	0	1000	0.58213	0.58213	0.197	6.342	5.632	1.126
1991	8.00%	10.00%	0.540	0.518	0	1000	0.48465	0.48465	0.251	7.211	5.564	1.296
1992	8.00%	10.00%	0.560	0.746	0	1000	0.40340	0.40340	0.301	8.041	5.483	1.466
1993	8.00%	10.00%	0.570	1.021	0	1000	0.33568	0.33568	0.343	8.767	5.388	1.627
1994	8.00%	10.00%	0.590	1.322	0	1000	0.27924	0.27924	0.369	9.312	5.275	1.765
1995	8.00%	10.00%	0.620	1.638	0	1000	0.23220	0.23220	0.380	9.608	5.141	1.869
1996	8.00%	10.00%	0.670	1.931	0	1000	0.19302	0.19302	0.373	9.589	4.981	1.925
1997	8.00%	10.00%	0.730	2.125	0	1000	0.16038	0.16038	0.341	9.216	4.792	1.923
1998	8.00%	10.00%	0.830	2.205	0	1000	0.13323	0.13323	0.294	8.536	4.564	1.870
1999	8.00%	10.00%	0.920	2.169	0	1000	0.11065	0.11065	0.240	7.624	4.292	1.776
2000	8.00%	10.00%	1.060	2.080	0	1000	0.09189	0.09189	0.191	6.568	3.964	1.657
2001	8.00%	10.00%	1.220	1.889	0	1000	0.07631	0.07631	0.144	5.404	3.569	1.514
2002	8.00%	10.00%	1.370	1.664	0	1000	0.06337	0.06337	0.105	4.233	3.093	1.368
2003	8.00%	10.00%	1.540	1.427	0	1000	0.05263	0.05263	0.075	3.093	2.521	1.227
2004	8.00%	10.00%	1.700	1.194	0	1000	0.04371	0.04371	0.052	2.006	1.831	1.096
2005	8.00%	10.00%	1.880	0.977	0	1000	0.03631	0.03631	0.035	0.977	1.000	0.977

YEAR	INTEREST	AVERAGE LAPSE %	BASIC Q35	AIDS Q35	AVERAGE RESERVE	NET AMT AT RISK	PRES VAL FACTOR	PRES VAL *NAR/M	PRES VAL AIDS QX BY YEAR	PRES VAL AIDS QX TOTAL	ANNUITY	LEVEL ANNUAL COST
								1				
1988	8.00%	20.00%	0.560	0.322	0	1000	1.00000	1.00000	0.322	4.365	5.003	0.873
1989	8.00%	15.00%	0.690	0.450	0	1000	0.73992	0.73992	0.333	5.465	5.410	1.010
1990	8.00%	10.00%	0.810	0.609	0	1000	0.58157	0.58157	0.354	6.381	5.611	1.137
1991	8.00%	10.00%	0.960	0.796	0	1000	0.48388	0.48388	0.385	6.938	5.542	1.252
1992	8.00%	10.00%	1.110	1.007	0	1000	0.40244	0.40244	0.405	7.385	5.461	1.352
1993	8.00%	10.00%	1.270	1.236	0	1000	0.33458	0.33458	0.414	7.672	5.366	1.430
1994	8.00%	10.00%	1.440	1.459	0	1000	0.27804	0.27804	0.406	7.744	5.253	1.474
1995	8.00%	10.00%	1.620	1.641	0	1000	0.23095	0.23095	0.379	7.567	5.121	1.478
1996	8.00%	10.00%	1.830	1.740	0	1000	0.19176	0.19176	0.334	7.138	4.963	1.438
1997	8.00%	10.00%	2.060	1.740	0	1000	0.15917	0.15917	0.277	6.503	4.774	1.362
1998	8.00%	10.00%	2.320	1.665	0	1000	0.13208	0.13208	0.220	5.740	4.548	1.262
1999	8.00%	10.00%	2.610	1.530	0	1000	0.10958	0.10958	0.168	4.912	4.277	1.149
2000	8.00%	10.00%	2.970	1.359	0	1000	0.09090	0.09090	0.124	4.077	3.950	1.032
2001	8.00%	10.00%	3.370	1.192	0	1000	0.07538	0.07538	0.090	3.278	3.557	0.921
2002	8.00%	10.00%	3.790	1.018	0	1000	0.06250	0.06250	0.064	2.515	3.084	0.816
2003	8.00%	10.00%	4.320	0.849	0	1000	0.05181	0.05181	0.044	1.806	2.515	0.718
2004	8.00%	10.00%	4.790	0.694	0	1000	0.04292	0.04292	0.030	1.155	1.828	0.632
2005	8.00%	10.00%	5.250	0.556	0	1000	0.03555	0.03555	0.020	0.556	1.000	0.556

FILE: AIDCOST5 BASED ON 70% OF 1965-70 BASIC MALE MORTALITY AND HOLLAND AIDS EXTRAS PER TABLE H2

YEAR	INTEREST	AVERAGE LAPSE %	BASIC Q45	AIDS Q45	AVERAGE RESERVE	NET AMT AT RISK	PRES VAL FACTOR	PRES VAL *NAR/M	PRES VAL AIDS QX BY YEAR	PRES VAL AIDS QX TOTAL	ANNUITY	LEVEL ANNUAL COST
							1					
1988	8.00%	20.00%	1.190	0.269	0	1000	1.00000	1.00000	0.269	2.816	4.971	0.567
1989	8.00%	15.00%	1.650	0.350	0	1000	0.73939	0.73939	0.259	3.444	5.370	0.641
1990	8.00%	10.00%	2.090	0.450	0	1000	0.58056	0.58056	0.261	3.941	5.566	0.708
1991	8.00%	10.00%	2.510	0.573	0	1000	0.48243	0.48243	0.276	4.200	5.495	0.764
1992	8.00%	10.00%	2.880	0.670	0	1000	0.40065	0.40065	0.269	4.368	5.412	0.807
1993	8.00%	10.00%	3.260	0.787	0	1000	0.33256	0.33256	0.262	4.455	5.316	0.838
1994	8.00%	10.00%	3.660	0.896	0	1000	0.27589	0.27589	0.247	4.422	5.202	0.850
1995	8.00%	10.00%	4.100	0.985	0	1000	0.22874	0.22874	0.225	4.253	5.068	0.839
1996	8.00%	10.00%	4.570	1.040	0	1000	0.18954	0.18954	0.197	3.944	4.910	0.803
1997	8.00%	10.00%	5.240	0.984	0	1000	0.15697	0.15697	0.155	3.507	4.721	0.743
1998	8.00%	10.00%	5.960	0.920	0	1000	0.12990	0.12990	0.120	3.048	4.496	0.678
1999	8.00%	10.00%	6.780	0.828	0	1000	0.10742	0.10742	0.089	2.573	4.228	0.609
2000	8.00%	10.00%	7.710	0.726	0	1000	0.08876	0.08876	0.064	2.112	3.906	0.541
2001	8.00%	10.00%	8.790	0.631	0	1000	0.07328	0.07328	0.046	1.679	3.521	0.477
2002	8.00%	10.00%	10.040	0.530	0	1000	0.06042	0.06042	0.032	1.271	3.057	0.416
2003	8.00%	10.00%	11.550	0.433	0	1000	0.04976	0.04976	0.022	0.899	2.498	0.360
2004	8.00%	10.00%	12.610	0.345	0	1000	0.04092	0.04092	0.014	0.567	1.821	0.311
2005	8.00%	10.00%	13.780	0.270	0	1000	0.03361	0.03361	0.009	0.270	1.000	0.270

YEAR	INTEREST	AVERAGE LAPSE %	BASIC Q55	AIDS Q55	AVERAGE RESERVE	NET AMT AT RISK	PRES VAL FACTOR	PRES VAL *NAR/M	PRES VAL AIDS QX BY YEAR	PRES VAL AIDS QX TOTAL	ANNUITY	LEVEL ANNUAL COST
							1					
1988	8.00%	20.00%	2.200	0.131	0	1000	1.00000	1.00000	0.131	1.199	4.902	0.245
1989	8.00%	15.00%	3.490	0.167	0	1000	0.73858	0.73858	0.123	1.446	5.283	0.274
1990	8.00%	10.00%	4.610	0.209	0	1000	0.57879	0.57879	0.121	1.632	5.465	0.299
1991	8.00%	10.00%	5.590	0.255	0	1000	0.47974	0.47974	0.122	1.717	5.387	0.319
1992	8.00%	10.00%	6.520	0.299	0	1000	0.39719	0.39719	0.119	1.766	5.299	0.333
1993	8.00%	10.00%	7.360	0.339	0	1000	0.32848	0.32848	0.111	1.774	5.198	0.341
1994	8.00%	10.00%	8.250	0.371	0	1000	0.27139	0.27139	0.101	1.737	5.081	0.342
1995	8.00%	10.00%	9.230	0.395	0	1000	0.22400	0.22400	0.089	1.655	4.945	0.335
1996	8.00%	10.00%	10.420	0.405	0	1000	0.18467	0.18467	0.075	1.528	4.785	0.319
1997	8.00%	10.00%	11.750	0.396	0	1000	0.15204	0.15204	0.060	1.364	4.598	0.297
1998	8.00%	10.00%	13.420	0.371	0	1000	0.12499	0.12499	0.046	1.178	4.376	0.269
1999	8.00%	10.00%	15.510	0.335	0	1000	0.10256	0.10256	0.034	0.984	4.114	0.239
2000	8.00%	10.00%	17.970	0.294	0	1000	0.08396	0.08396	0.025	0.793	3.804	0.208
2001	8.00%	10.00%	20.860	0.245	0	1000	0.06855	0.06855	0.017	0.611	3.435	0.178
2002	8.00%	10.00%	24.300	0.198	0	1000	0.05578	0.05578	0.011	0.450	2.992	0.150
2003	8.00%	10.00%	27.940	0.155	0	1000	0.04522	0.04522	0.007	0.310	2.457	0.126
2004	8.00%	10.00%	30.420	0.119	0	1000	0.03651	0.03651	0.004	0.192	1.805	0.106
2005	8.00%	10.00%	33.230	0.090	0	1000	0.02939	0.02939	0.003	0.090	1.000	0.090

FILE: AIDCOST5 BASED ON 70% OF 1965-70 BASIC MALE MORTALITY AND HOLLAND AIDS EXTRAS PER TABLE H2

YEAR	INTEREST	AVERAGE LAPSE %	BASIC Q65	AIDS Q65	AVERAGE RESERVE	NET AMT AT RISK	PRES VAL FACTOR	PRES VAL *NAR/M	PRES VAL AIDS QX BY YEAR	PRES VAL AIDS QX TOTAL	ANNUITY	LEVEL ANNUAL COST
							1					
1988	8.00%	20.00%	5.590	0.038	0	1000	1.00000	1.00000	0.038	0.367	4.748	0.077
1989	8.00%	15.00%	8.480	0.049	0	1000	0.73553	0.73553	0.036	0.447	5.095	0.088
1990	8.00%	10.00%	10.750	0.061	0	1000	0.57308	0.57308	0.035	0.511	5.256	0.097
1991	8.00%	10.00%	12.500	0.075	0	1000	0.47183	0.47183	0.035	0.546	5.169	0.106
1992	8.00%	10.00%	14.010	0.090	0	1000	0.38770	0.38770	0.035	0.573	5.074	0.113
1993	8.00%	10.00%	15.460	0.104	0	1000	0.31802	0.31802	0.033	0.589	4.967	0.119
1994	8.00%	10.00%	17.010	0.116	0	1000	0.26043	0.26043	0.030	0.592	4.844	0.122
1995	8.00%	10.00%	18.820	0.125	0	1000	0.21290	0.21290	0.027	0.583	4.702	0.124
1996	8.00%	10.00%	21.150	0.143	0	1000	0.17368	0.17368	0.025	0.561	4.538	0.124
1997	8.00%	10.00%	24.160	0.147	0	1000	0.14131	0.14131	0.021	0.514	4.348	0.118
1998	8.00%	10.00%	28.120	0.143	0	1000	0.11458	0.11458	0.016	0.454	4.129	0.110
1999	8.00%	10.00%	33.220	0.132	0	1000	0.09248	0.09248	0.012	0.385	3.877	0.099
2000	8.00%	10.00%	39.660	0.104	0	1000	0.07421	0.07421	0.008	0.316	3.585	0.088
2001	8.00%	10.00%	47.430	0.097	0	1000	0.05911	0.05911	0.006	0.266	3.246	0.082
2002	8.00%	10.00%	56.370	0.088	0	1000	0.04666	0.04666	0.004	0.214	2.845	0.075
2003	8.00%	10.00%	66.920	0.077	0	1000	0.03644	0.03644	0.003	0.162	2.362	0.069
2004	8.00%	10.00%	72.300	0.067	0	1000	0.02811	0.02811	0.002	0.110	1.766	0.062
2005	8.00%	10.00%	78.140	0.056	0	1000	0.02154	0.02154	0.001	0.056	1.000	0.056

ALL AGES COMBINED

YEAR	PRES VAL AIDS QX TOTAL	ANNUITY	LEVEL ANNUAL COST	AGE	IN FORCE
1988	3.54	4.99	0.71	25	33.70%
1989	4.49	5.39	0.83	35	33.10%
1990	5.31	5.59	0.95	45	23.30%
1991	5.86	5.52	1.06	55	8.20%
1992	6.33	5.44	1.16	65	1.70%
1993	6.69	5.34	1.25		100.00%
1994	6.88	5.23	1.31		
1995	6.88	5.09	1.34		
1996	6.65	4.93	1.34		
1997	6.20	4.75	1.30		
1998	5.59	4.52	1.23		
1999	4.88	4.25	1.14		
2000	4.13	3.93	1.04		
2001	3.35	3.54	0.94		
2002	2.60	3.07	0.84		
2003	1.88	2.51	0.75		
2004	1.21	1.82	0.66		
2005	0.58	1.00	0.58		