RESERVING FOR AIDS -- PRACTICAL ASPECTS

Moderator: DAVID J. CHRISTIANSON
Panelists: H. DAVID ALLEN
                WILLIAM C. KOENIG
                THOMAS W. REESE
Recorder: DAVID J. CHRISTIANSON

o   Research on the financial implications of AIDS, particularly reserving and pricing implica-
    tions, has been conducted by several major actuarial bodies. Their up-to-the-minute findings
    and recommendations will be presented at this meeting. We will then have an open discussion
    of these reports and also discuss what actions companies have already taken or plan to take.
    -- Report of the Society of Actuaries Task Force on the Financial Implications of AIDS
    -- Report of the Canadian Institute of Actuaries Task Force on AIDS
    -- Update on the Institute of Actuaries (United Kingdom) findings
    -- Discussion:
        o   Reaction to findings and recommendations in the above reports
        o   What amounts have actually been set aside to provide for the AIDS risk?
        o   In the form of reserves?
        o   In the form of contingency surplus?
    -- What statistical techniques were used to justify these practices?
    -- Where companies have chosen not to set aside funds, what statistical techniques were
        used to justify the decision?

MR. DAVID J. CHRISTIANSON: As the title indicates, we will concentrate on reserving for AIDS
(Acquired Immune Deficiency Syndrome) and will not deal with the subject of AIDS itself, the
disease, how it is spread, and its effects. Our panel consists of Mr. H. David Allen, Vice President
and Chief Financial Officer of Manufacturer's Life Insurance Company, and Chairman of the
New Committee on Expected Experience for the Canadian Institute of Actuaries (CIA). Mr. Allen
will speak to us about the CIA recommendations. Secondly, we have Mr. Thomas W. Reese from
Tillinghast/Towers Perrin. Mr. Reese is chairman of the SOA Committee on HIV (Human
Immunodeficiency Virus) Research and will speak about U.S. AIDS population models developed
by his committee. Our third panelist is Mr. William C. Koenig, Chief Actuary for the Northwest-
ern Mutual Life Insurance Company. Mr. Koenig is a member of the Task Force on the Financial
Implications of AIDS and will present the findings and recommendations of that task force. I am
David Christianson, Vice President and Actuary at Lutheran Brotherhood. I chair the SOA Task
Force on the Financial Implications of AIDS and am moderating this session.

Other issues we hope to discuss are amounts actually set aside by companies for the AIDS risk and
whether the amounts are set up as reserves or contingency surplus. I must point out that state-
ments made here regarding the Committee on HIV Research and the Task Force on the Financial
Implications of AIDS are opinions of those present, not official positions of the SOA.

I will begin the discussion by briefly recapping the actions taken in the U.K. In the U.K. the
Institute of Actuaries set up a working party in 1987. That group issued four *Bulletins*, the first
of which was issued in September 1987. This was a background paper on AIDS. *Bulletin* Two was
issued in December 1987. It covered modeling and gave various recommendations on reserves and
pricing. *Bulletin* Three was issued in June 1988 and dealt with health coverages. Then in March
of this year *Bulletin* Four was issued which revised the projections contained in *Bulletin*
Two.

It's helpful to consider some of the comparative worldwide statistics as of December 31, 1988,
shown in *Bulletin* Four of the Institute's AIDS Working Party. Of the countries reporting to the
World Health Organization, the U.S. ranks number one in number of AIDS cases with 80,538.
Canada ranks tenth with 2,181 cases, and the U.K. ranks eleventh with 1,862 cases. It is more
instructive to look at AIDS cases per million of population but caution must be used. Since these

are all cumulative cases divided by the current population, they do not relate to a yearly rate of cases. In this instance the U.S. drops to sixth place in the world, while Canada ranks twenty-ninth and the U.K. is forty-third. It should be noted that the U.S. has a much heavier prevalence of cases among intravenous (IV) drug abusers, people not commonly in the insured population, than in Canada or the U.K., but nevertheless, the problem appears to be much more severe in the U.S. than in these other two countries.

To summarize the findings of the Institute, it was the first body to make formal recommendations. It developed population models for use in analyzing AIDS. The models are fairly complex compared to the models used by the CIA and the SOA. The Institute's AIDS Working Party used a broad range of models, concentrating its attention on the lowest model, Projection F, but in its recommendations it asks actuaries to consider moving over time to the more severe projections.

In December 1987 the Institute recommended reserves be set up to recognize AIDS for life insurance. The reserves were not enacted as a formal standard of practice by the Institute, but nevertheless the governmental actuaries asked companies why they had not reserved at the level of Projection F, if they had not so done. The governmental actuaries expected justification.

In the U.K. many companies responded. In the September 26, 1988 issue of *The National Under-writer* it was reported that two reinsurers set up additional AIDS reserves in the range of 6.5-7% while for direct insurers the reserve strengthening was approximately 1% of total reserves. Munich Reinsurance conducted a survey of 50 leading life offices in the U.K. showing 84% of the companies used Basis F, while 14% used the higher projected table, Table BC. Slightly less than half indicated that the extra reserves were wholly or partially covered by margins in the existing valuation basis while more than half indicated specific extra reserves were created. And as indicated, *Bulletin* Four issued in March revised the projections downward by approximately 20%. Mr. Allen will now remark on the Canadian situation.

MR. H. DAVID ALLEN: Last June the CIA set up three Working Groups on AIDS -- Modeling, Valuation and Pricing. In November, we presented reports from the modeling and valuation groups and the pricing group will report at the June meeting.

My presentation will be in three parts: a brief overview of the modeling work we did, the valuation recommendations which were made and what actually happened at 1988 year-end, and then some brief comments on the work still to be done.

Up front I want to acknowledge the work done by Harry Panjer (who led our modeling work) and Stephen Clairman (who led our valuation work) -- especially because I have borrowed some of the material they prepared for the November meeting.

I am only going to be able to touch on some of the high points of our work; if anyone is interested in obtaining more detailed information, they can obtain the modeling and valuation reports by contacting the CIA office in Ottawa. As shown in Table 1, on a population-adjusted basis, Canada has about one-quarter of the AIDS problem of the U.S.

TABLE 1
Number of AIDS Cases
by Year of Diagnosis
(To March 6, 1989)

Year	Canada	U.S.A.
1981	11	379
1982	22	1,057
1983	54	2,914
1984	149	5,872
1985	329	10,834
1986	513	17,324
1987	745	24,480
1988	645	24,267
1989	24	969
Total	2,492	88,096

The cause of AIDS is more homogeneous in Canada, as can be seen in Table 2; Canada does not yet have nearly the same level of IV drug abuse.

TABLE 2
Primary Risk Factors of Adult Cases

	Canada	U.S.A.
Homosexual/bisexual activity	81%	61%
Recipient of blood products	5	3
IV drug abuse	3	29
Heterosexual activity	8	4
No risk factors identified	3	3
	100%	100%

When we set up the Modeling task force, we wanted one model which would be accepted by most actuaries in Canada and which would be the basis for standard setting. That meant that the model should be as simple as possible, that the key assumptions and dependencies be easily understood, and that the model be easily updated as new experience emerges. It was based on these objectives that we specifically rejected the modeling approach followed by the Institute of Actuaries; we just felt that it was too complex.

What we ended up with was a population-based macro model; we model the whole population and not just the at-risk group and then make suitable adjustments in applying the model's output to the insured population.

Not being a modeling expert, I don't want to get too detailed, but three points are important. We used a Weibull function to distribute AIDS cases from time of infection; the mean was 10 years, but the shape of the distribution was based on an alpha of 2.5 as derived from current literature. With this function, we could not fit an exponential function to pattern past infections so we used a polynomial growth model. We also decided to specifically separate past from future infections and allow assigned adjustments for behavioral changes.

Traditional epidemiological theory suggests three things will happen in the course of an epidemic. Either the epidemic will wipe out all those susceptible, or the epidemic will die out because the rate of spread is very slow, or it will stabilize and perhaps oscillate about some level value. We chose to look at the future from the latter two points.

We decided that behavioral changes have caused the level of new infections to stabilize as of 1984. We then ran one model with this number level into the future and another model with this number decreasing to zero over 10 years from 1988; this decreasing scenario could result from a combination of behavioral changes, treatment programs and saturation of very high risk groups. These results are shown in Graph 1.

Graph 2 shows the resulting number of AIDS deaths. At the moment we can neither accept nor reject either scenario. From the practical perspective of reserve levels required now, there is very little difference in the two scenarios, and that is a key point to be reinforced. Once the Canadian projections were completed, we turned to the issue of business written in other countries. Because of the limited exposure we suggested that the Canadian model output was appropriate for the U.K. For the U.S. we used the same model but actual U.S. experience. As Mr. Reese will cover, the new AIDS cases are quite close, but there are differences in death rates due to differences in the distribution of deaths by calendar year.

Before I explain what we did with the model's result, let me outline the valuation environment in Canada. Each company has a valuation actuary whose role in certifying reserve levels is recognized in law. The CIA is responsible for setting standards of professional conduct for actuaries and has been especially active in connection with valuation because there are no prescribed valuation assumptions.

The Office of the Superintendent of Financial Institutions (OSFI) looks after banks and federally chartered trusts as well as insurance companies, and it reviews and audits the valuation reports from each actuary. From time to time it issues instructions on items of particular interest that
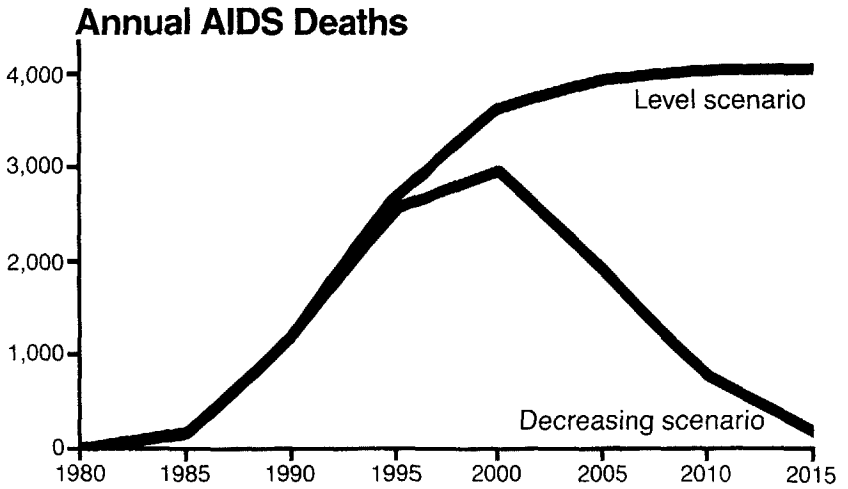
MODEL RESULTS – CANADA

Annual Infections

MODEL RESULTS – CANADA

Annual AIDS Deaths
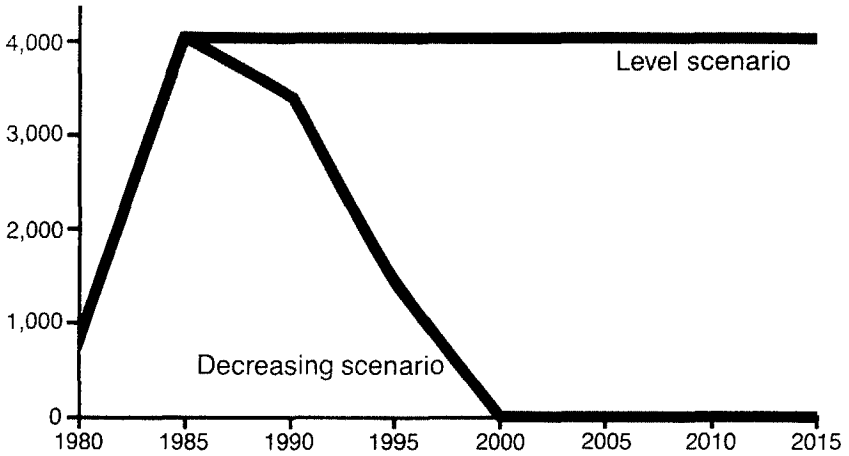
actuaries should evaluate in their reports and sometimes outlines how a particular issue should be handled. I think it's fair to say that OSFI and the CIA work in concert to ensure the solvency of insurance companies.

Finally, the environment we were working in was that of the 1978 Canadian Method. That is a traditional net premium valuation method; I mention it because as you will hear me describe later, we are in the process of potentially moving to a gross premium valuation environment. For those of you more familiar with U.S. valuation, I should add that Canadian reserve levels are generally less than comparable U.S. levels.

Seven key valuation recommendations were made for individual life insurance. First, we believed that AIDS was not a future unknown catastrophe to be covered out of margins for adverse deviations and that actuaries should make a specific provision for it as part of their expected experience assumptions.

In the Valuation Actuary's Report to OSFI, we believed that the assumptions and reserves for deaths associated with AIDS should be separately identified and commented on. This would not only address the regulators' concerns with the impact of AIDS on solvency levels, but would also allow them to review assumptions which were modifications of the recommendations.

Given the small number of expected AIDS claims for any one company, it was thought that actual AIDS experience would be subject to considerable statistical fluctuation and that it would be generally inappropriate for a company to rely on its own experience. The fact, for example, that a company did not have an AIDS claim yet is not a basis by itself for not holding an appropriate reserve, although having high claims might indicate need to hold higher reserves if anti-selection factors could be found.

We believed that companies should all start with a common intercompany mortality table. In preparing such an intercompany mortality table for use by all companies, the model output should be modified to recognize any differences between the insured and general populations. Because of the general lack of knowledge about AIDS prior to 1984, there should be little anti-selection prior to then. LIMRA (Life Insurance Marketing and Research Association, Inc.) statistics for Canada show the rate of life insurance ownership among single males is only 41% of the ownership rate for all households. We used this 41% figure to adjust the population deaths, but we also had to recognize selective lapsation since 1984. This gave us a final 60% factor to use at the end of 1988. In other words, one would use 60% of the intercompany table for business written prior to 1984.

For untested insurance issued in 1984 and later, we believed that a combination of selection at time of purchase and selective lapsation afterwards meant that a 100% factor should be used for this set of issues; then the insured population's AIDS costs would be the same as that of the general population. Given the low incidence of IV drug abuse, this made sense.

The Valuation Actuary should make modifications to the intercompany mortality table to reflect individual company characteristics. Factors to consider are listed below.

Geography: 90% of cases have occurred in British Columbia, Ontario, Quebec, mostly in Vancouver, Toronto and Montreal. Vancouver's rate is three times the overall rate; Toronto's and Montreal's rate is two times.

Lapse Rates: The higher the lapse rates the higher the impact of selective lapsation for AIDS and hence a greater reserve per thousand.

Par Insurance: If one assumes that dividends will be cut to pay for AIDS claims, in addition to the obvious issues of whether one can, from a marketing perspective, cut enough, there is also the issue of equity. For example, what variations in charges by age groups should be levied?

We believed that except for testing for HIV there was usually no evidence that company underwriting practices could be shown to make a material difference in reducing AIDS costs.

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In testing, the company can eliminate current infecteds, but those testing negative are still exposed to future infections. To assist actuaries in calculating reserves on tested business, we produced population results which assumed no infections after 1988. Subtracting this from the previous output would give the value of only future infections.

While there is evidence of a crossover to the heterosexual population, we believed that at this time it was not necessary to assume the spread of the epidemic beyond the current risk groups. Any such recognition is probably best made at this time through a surplus appropriation.

We recommended that the valuation actuary calculate the present value of future AIDS claims at a zero lapse rate or close to zero and an appropriate interest rate, reduce it by the margin in the gross premiums (based on normal lapse rates), and hold this reserve.

Given that many companies were holding reserves in excess of what could be held on an explicit valuation basis, we suggested that it would be appropriate to model a revaluation and use the resulting excess as a further reduction to the AIDS reserve.

We considered using AIDS excess mortality rates directly in the 1978 Canadian Model, but there were the following practical problems: 1) lack of time -- 2 months till year-end; 2) need for a generational table in order to calculate new net premiums as of calendar year of issue; 3) heaped excess mortality that could result in inadequate reserves through spreading the cost too far into the future; and 4) need for two lapse rates as mentioned earlier (one for excess q's and one for basic).

For these reasons I believe that everyone used modeling and approximation techniques for 1988 year-end. These were along the lines of calculating the present value of AIDS claims and then subtracting the offsets for excess reserves, for margins in the gross premiums and for the ability to adjust premiums and reduce dividends or other benefits.

While these recommendations were made by a CIA task force and endorsed by the CIA, they were not binding standards of practice because they had not yet gone through due process. Shortly after these recommendations were released, OSFI wrote to all valuation actuaries and pointed out their responsibility to recognize AIDS, utilizing the CIA reports. This was the same approach as was taken by the U.K. regulatory authorities. Recognizing the short time available, OSFI also allowed companies the option of either setting up reserves or appropriating surplus.

We are still waiting to hear from OSFI as to the size of the AIDS issue as identified by valuation actuaries. One estimate was that it could hit as high as $500 million for Canadian business and $250 million for non-Canadian business.

Because of the ability to allocate excess margins against the theoretical AIDS reserve, we can't tell from annual reports and annual meeting commentary what the answer will be. In terms of additional reserves or appropriations set up, the highest reported so far was $100 million (under 5% of that company's equity) and the lowest was, not surprisingly, zero.

While we tried to involve a wide variety of people in the process, including those with widely differing views, we were concerned that the release of these recommendations might encounter a storm of criticism. While I heard some criticism that people thought that we were a bit too conservative and some that we should have done the work six months earlier, most believed that within the time available and the extent of our knowledge, we had responded in an appropriate manner. I think that this also enhanced the professionalism of actuaries and the CIA.

Unfortunately, there is considerably more work to be done. We want to have a due process in place for updating the AIDS model given that it will be used as a standard. We do not think that it is appropriate for a technical working group to, in essence, set reserve levels through updates of their model without proper review.

If possible, I would like to see a greater consensus or sense of certainty around the outlook, but this may be more a function of matching actual experience to predicted and updating the key parameters over time.

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In Canada, reserves for calculating taxes are different from statutory -- essentially the original pricing basis is used. One of the reasons why some companies preferred surplus appropriations was because the AIDS reserves were not deductible for determination of taxable income. This has to change because even if no new reserves were set up (due to excess margins), the solvency position of the industry has reduced. We received sympathy, but the issue is now tied up in a full review of the basis for tax reserves.

As I mentioned at the start, we are in the process of possibly moving to a gross premium valuation basis (known as PPM) and for this June, actuaries are having to restate past reserves on this new basis and show the AIDS reserve separately. While this is going on, we have to update our valuation guidance notes for this year-end and start work on a technique paper for incorporation into our Standards of Practice.

Unlike the U.K. situation, price changes have not yet occurred to any significant degree. Although there have been some price changes and product withdrawals, I think people are waiting for something they can go to senior management with and know that other companies are looking at the same thing.

Next month, Mr. Neville S. Henderson's pricing group will be presenting its recommendations on pricing for AIDS and the role the CIA should play in the area of ensuring full disclosure to company management on the impact of AIDS on profits from new business. Just so there is no misunderstanding, pricing -- the setting of price levels -- is a competitive function; the evaluation of the resulting profitability is an actuarial function. In my view, it is dangerous to put all of the responsibility for solvency on the valuation actuary.

MR. CHRISTIANSON: Next, Mr. Reese will present the findings of the SOA Committee on HIV Research.

MR. THOMAS W. REESE: To project AIDS claims, actuaries need a guide to tell them how to relate current AIDS claims experience to future expected claims. We need to know where we are in this epidemic and where we are headed.

To provide such a practical guide, the SOA Committee on HIV Research is publishing a report this month that gives three projections of the AIDS epidemic, including estimated general population AIDS mortality rates.

According to our middle scenario projection, the U.S. AIDS epidemic has accelerated from only about 100 AIDS-related deaths as of the end of 1980 to about 10,000 AIDS-related deaths through 1985, to nearly 20,000 through 1986, more than 30,000 through 1987 and more than 50,000 through 1988.

To see how that compares with where we are going in the future, we compare to the cumulative AIDS-related deaths projected through the year 1992, consistent with the last year of projections published by the Centers for Disease Control (CDC). By then, the cumulative AIDS-related deaths in our middle scenario will exceed 210,000.

Finally, we project the cumulative AIDS deaths 20 years from now. Our middle projection shows cumulative AIDS deaths reaching nearly 1.5 million AIDS deaths by the year 2009, and those numbers keep rising; in another ten years they reach almost 2 million deaths.

The AIDS claims we have seen so far are only a small fraction of those that are yet to come. We cannot measure the size of future AIDS claims from a study of current claims experience. Instead, we need to build a model that will help us to project future AIDS claims. That is not easy to do. We only have a small part of the AIDS epidemic to look at, i.e., the relatively few AIDS cases reported to date. From the observations we make about these early data, we must project the future of the epidemic.

In a way, this is like finding a couple of dinosaur bones and trying to estimate the size and shape of the dinosaur! The bones for our "dinosaur" are the AIDS data we have. We construct our model by dividing the epidemic into four main stages. Persons at risk for the disease (the first stage) may become infected (the second stage) with the HIV (the virus that causes AIDS). Persons who are HIV infected gradually progress to AIDS diagnosis (the third stage) under the definition set

by the CDC. The immune deficiency causing this syndrome usually leads to death (the fourth stage) within a few years due to some opportunistic infection.

We know extremely little about the population most at risk for AIDS. We only have a rough idea of the size of the main at-risk groups, i.e., homosexuals and IV drug users. We have virtually no idea how much the infection will spread within the heterosexual population.

We also know very little about the numbers of people who are currently infected by the HIV. There have been some random sampling studies among various groups, but nothing from which we could project an accurate number of U.S. infected individuals. Mostly, we have to rely on results obtained by modeling that reproduces AIDS cases that have been reported so far and are likely to be reported in the future. These reported AIDS cases are the main "bones" from which we are projecting the size and shape of our "dinosaur."

Finally, after we feel "comfortable" with the number of AIDS cases there might be, we can model the transition to the fourth stage, which is death from AIDS.

Three groups worked together to make the projections documented in our report. The SOA Committee on HIV Research has written the report that is being published this month. Assisting us in the development of these scenarios was a modeling subgroup of the American Council of Life Insurance-Health Insurance Association of America (ACLI-HIAA) Ad Hoc Group on AIDS Data. The members of that group published their version of these AIDS projections in March 1989. The SOA Task Force on the Financial Implications of AIDS was the third group involved in the projections we present herein.

Briefly, our modeling took the following approach. First, we assumed the size of some defined at-risk population. Our models assume 4 million U.S. individuals at highest risk of AIDS.

The second step is to hypothesize a spread of HIV infections within that at-risk population. From these theoretical annual new HIV infections, the third step was to use assumed progression rates from HIV infection to AIDS diagnosis to model the number of new AIDS cases that will be projected each year.

These projected new AIDS cases each year must be "calibrated" in the fourth step by comparing them to the cases we have observed through reporting to date. In our comparison to reported past AIDS cases, we adjusted to take into account reporting delays that will eventually disclose many more cases that were diagnosed in past years but will be reported in future years. Further, we based our middle scenario to match the CDC's projections of AIDS cases through the year 1992. The fifth step is to go back and adjust the assumed spread of the infection through the at-risk population in order to model a new set of AIDS cases that better matches the "target" results through 1992. This process is repeated until the model adequately meets the calibration goals. Finally, the sixth step is to apply assumed rates of progression from AIDS diagnosis to death to model AIDS deaths each year.

We based our assumptions of the progression rates from HIV infection to AIDS diagnosis on a 1988 study of data from the San Francisco City Clinic study. This is a 10-year study of homosexual males. This study produced estimated progression rates for the first ten years after HIV infection, along with 95% confidence interval upper and lower boundaries.

We chose to use a Weibull function to represent the assumed progression from HIV infection to AIDS. This function seems to possess the best properties for modeling this progression. It presents a steadily increasing annual rate of progression, which is consistent with observed results.

We developed three alternative sets of progression rate assumptions, using a least squares method to fit Weibull functions to the estimated progression rates and to the upper and lower 95% confidence intervals of the San Francisco City Clinic study data. This produced three sets of assumed progression rates: "fast," "middle," and "slow." To develop the fast progression rates we assumed that the median time to progression was eight years. The middle scenario assumes the median time to progression is ten years, an assumption that was recently backed up by a 1989 study that estimated the median time as 9.8 years. The slow progression rates assume a median time to progression of twelve years.

These three alternative progression rate assumptions were used to build three different models of the AIDS epidemic. Remember, we are trying to construct a "dinosaur" from the few bones we have observed, i.e., the AIDS cases observed to date and projected for the next few years by the CDC. If we assume that the fast progression rates apply, the result is a low projection of the AIDS epidemic. The projection is low because a smaller group of infected individuals is producing the cases we see because they are progressing to AIDS relatively quickly.

If we assume slow progression rates, on the other hand, a high scenario results. The assumption of slow progression rates produces a high scenario because the observed cases we are seeing are resulting from a relatively large infected population who is progressing relatively slowly to AIDS diagnosis.

Our high scenario with slow progression rates corresponds to 1.9 million infected individuals as of the end of 1988. The low scenario, on the other hand, with fast progression rates corresponds to only .7 million cumulative infections by the end of 1988. Our middle scenario, which uses a set of progression rates from HIV infection to AIDS diagnosis with a median of ten years, has 1.0 million HIV-infected individuals at the end of 1988. This seems to be consistent with the CDC estimate of 1.0-1.5 million infected individuals at the end of 1987.

Our middle scenario was calibrated to CDC cases. Through 1987, we compare to reported AIDS cases, adjusted for the effect of reporting delays. From 1988 through 1992, we compare our projections to the CDC's projections of AIDS cases. Our middle scenario was adjusted so that it reproduced the reported and CDC projected cases closely. The low scenario was designed to begin to produce fewer AIDS cases by the end of the CDC's projection, and the high scenario was constructed to begin to produce higher AIDS cases by the end of the CDC's projection.

The low scenario peaks at 65,000 new AIDS cases in 1993. The middle scenario peaks at 91,000 cases in 1997 and the high scenario peaks at 186,000 new AIDS cases in 2000. Cumulative AIDS cases through the year 2000 are about .7 million for the low scenario, 1.0 million for the middle scenario, and 1.7 million for the high scenario.

We have compared our scenarios with the projections produced in 1987 by Mr. Michael J. Cowell and Mr. Walter H. Hoskins. The Cowell/Hoskins paper contained three projections. One projection assumed that the spread of the epidemic would continue to 100% of the assumed at-risk group. A lower projection assumed that the infections would gradually decline to zero by 1997. A third Cowell/Hoskins scenario assumed that new infections stopped after 1987.

Our projections are considerably lower than those of Cowell and Hoskins. Modeled cumulative AIDS cases through the year 2000 were 1.9 million for the "Cowell/Hoskins continues" projection, exceeding the 1.7 million for our high scenario. "Cowell/Hoskins declines" projects 1.6 million cumulative AIDS cases through the year 2000; this is much higher than the 1.0 million for our middle scenario.

Our projections are different from the Cowell/Hoskins projections because of new data that were not available to Cowell and Hoskins. In particular, we have seen two more years of AIDS cases reporting and trends than was available in 1987, and we have calibrated our model to CDC projections made in 1988 instead of the 1986 CDC projections that were available to Cowell and Hoskins.

We have also compared our results to the CIA "intermediate" projection of U.S. AIDS cases. This CIA projection assumes that AIDS infections decline after 1988, reaching zero by 1999.

This CIA projection peaks at 104,000 annual AIDS cases in 1997, about 14% higher than the 91,000 peak of our middle scenario in that same year. The CIA model projects 1.1 million cumulative AIDS cases through the year 2000, compared with 1.0 million for our middle projection. After its peak in 1997, the CIA projection declines much more rapidly than our middle scenario does. This results from the assumption that new infections decline to zero by 1999 in the CIA's "intermediate" projection.

The CIA's higher projection assumes that new HIV infections remain constant into the future. This model produces 118,000 annual AIDS cases in 1997, about 29% higher than our middle scenario in that year. This projection does not peak; modeled annual AIDS cases continue to

increase until the annual AIDS cases reach the stationary level of more than 132,000 after 2005. The CIA's "high" projection produces 1.2 million cumulative AIDS cases through the year 2000, about 19% more than for our middle scenario.

We have calculated general population AIDS mortality rates corresponding to our three projections. The first step in this calculation is to model the AIDS deaths that result from the projected AIDS cases. We have found that progression to death after AIDS diagnosis is lower than the rates assumed by Cowell and Hoskins that were based on CDC AIDS reporting as of early 1987. Cowell and Hoskins assumed the mortality rates were 45% in the first two years after AIDS diagnosis, 35% in the third year, and 25% thereafter.

For AIDS cases diagnosed after 1985 we assume mortality rates after AIDS diagnosis of 40% in the first two years, then the same rates assumed by Cowell and Hoskins. These new assumed mortality rates are derived from CDC reported data as of the end of 1988. The major reasons for this reduction in AIDS patients' mortality are the better medical treatment available to AIDS patients and the liberalization of the CDC's definition of AIDS diagnosis.

After we have modeled U.S. AIDS deaths, we split them by gender. Our assumption is that 90% of future AIDS deaths will be males and 10% will be females.

We calculated age-specific AIDS mortality rates by noting that the age distribution of U.S. AIDS deaths has remained stable over the period 1981-1988. We used the age at death distribution presented by Mr. David M. Holland in the fall of 1988 to distribute our deaths by age group. This distribution of ages at death from AIDS is based on reporting through the end of the second quarter 1988.

The modeled AIDS deaths for each calendar year, split by gender and age group, form the numerator for the calculation of general population AIDS mortality rates. The denominator was the U.S. population for each gender/age category, as projected through the year 2010 by the U.S. Census Bureau.

Our low scenario produces additional AIDS mortality rates for the cohort of males age 25 in 1989 that peak at 1.1 deaths per thousand in 1996 at attained age 32. Our middle scenario peaks at 1.8 deaths per thousand in 1998 at attained age 34. The high scenario peaks at 3.3 deaths per thousand at age 36 in the year 2000.

The AIDS mortality rate peaks that occur for each cohort of lives are a combination of the cohort's age and the progression of the epidemic through future years. Within any one calendar year, AIDS mortality rates will be highest at age 35. But sometimes overriding the peak at age 35, however, is the status of the epidemic itself.

For example, a cohort of males age 35 in 1989 does not have decreasing AIDS mortality rates in future years. Instead, our middle scenario AIDS mortality rates for this cohort continue to rise for eight more years, peaking at age 43, because the annual number of AIDS deaths is rising faster than the cohort is advancing to ages with lower relative AIDS mortality rates.

No doubt many of you have used the AIDS mortality rates presented by Mr. Holland in his paper published in the fall of 1988. Those rates are considerably higher than the AIDS mortality rates corresponding to our middle scenario. The primary reason for these higher rates is that Mr. Holland based his rates on the Cowell/Hoskins projection assuming projections gradually decline to zero by 1997. As explained earlier, our middle scenario predicts significantly fewer AIDS cases than those predicted by the Cowell/Hoskins model. Another important difference that should be noted is that the Holland AIDS mortality rates allocated all AIDS deaths to males, whereas our AIDS mortality rates assume only 90% of AIDS deaths will be males.

We have also compared our AIDS mortality rates to those produced for the U.S. by the CIA. We compare to the "intermediate" projection that assumes that new HIV infections will decline after 1988. These CIA AIDS mortality rates are considerably higher than those for our middle scenario rates.

For example, consider the cohort of males age 25 in 1989. The CIA's AIDS mortality rate is 52% higher than ours in 1989, 80% higher in 1994, 48% higher in 1999, and 21% higher in 2004, before falling below our rates due to the assumption that new HIV infections decline to zero by 1999.

In comparing these rates, it is important to note several important differences in the models. The CIA model increased projected AIDS cases by 10% to adjust for the effect of underreporting, i.e., cases that will never be reported. Our model represents only cases that will eventually be reported to the CDC. Further, the CIA model, like the Holland mortality rates, allocated all AIDS deaths to males, compared to our assumption that only 90% of AIDS deaths are males.

Also, it is important to remember that there are considerable differences between the CIA's model and ours. The CIA model was calibrated only to past reported cases, not to the CDC's projected AIDS cases through 1992. Even though the CIA assumed that progression rates from HIV infection to AIDS diagnosis have a median of ten years, the same as for our middle scenario, their model assumed that a smaller cumulative proportion has progressed to AIDS in every year before the median is reached. Thus, the CIA model hypothesized larger numbers of infected individuals in the early years of the epidemic, so that those lower progression rates produced the past reported AIDS cases when applied to the assumed infected individuals. This larger number of past infected individuals eventually produces higher AIDS deaths than our model.

Finally, the CIA model assumed higher progression rates from AIDS diagnosis to death than we did, thus advancing, relative to our model, the modeled AIDS deaths in their calculation of AIDS mortality rates.

It is important to note that the AIDS mortality rates from the SOA Committee's report apply to the U.S. general population only. Several types of adjustments will be needed to use these rates for projecting insurance claims. First, adjustments must be made to the difference between the insured population and the general population. The Task Force on the Financial Implications of AIDS has studied this matter and made a general recommendation.

Second, normal underwriting will screen out many AIDS deaths for the first few years after issue. In the last few years before death, a person with AIDS is likely to have some medical condition that would trigger an underwriting investigation, even if an HIV blood test was not ordered.

Third, life insurance business that is tested for HIV infection will eliminate virtually all AIDS deaths that result from individuals infected before the time of issue, even those deaths that occur long after issue. To facilitate the reflection of this important factor, our report has separated the modeled AIDS deaths by year of infection so that the AIDS mortality rates can be adjusted for tested business.

Other factors that should be taken into account are the effects of anti-selection, especially for untested business, geographic variation between different areas of the country, and characteristics of the marketing methods and products of a specific company.

A final important factor that must be accounted for is the effect of selective lapses on future AIDS-related claims. This occurs because individuals high at risk of AIDS will be less likely to lapse, increasing the relative AIDS mortality rates for the remaining insured population.

These projections of the AIDS epidemic represent our view of the "dinosaur," based on the information we have available to date. Other models will follow in the future, estimating the size and the shape more accurately as more "bones" are found, i.e., as more data become available.

Eventually, actuaries in the future will be able to see how our estimates compare to what really happened. Until future data make that possible, we hope that actuaries will be helped in their work by our report.

MR. WILLIAM C. KOENIG: I will share with you the current status of the report of the Task Force on the Financial Implications of AIDS. The report is still a draft, it has not yet gone to the Board. My comments are not a replacement for a reading of the report, once it is available, and they are only my opinions, not necessarily those of the Task Force itself.

RESERVING FOR AIDS -- PRACTICAL ASPECTS

The Task Force was formed in June 1988 under the auspices of the Committee on Valuation and Related Areas. The Society's AIDS Task Force, chaired by Dave Holland, had wrapped up its work earlier in the year and had recommended that a successor group be formed for the sole purpose of investigating valuation issues arising from the AIDS epidemic. The Holland group had prepared a guide for the practicing actuary for use in addressing AIDS-related issues, but it had neither the time nor the inclination to present definitive recommendations with respect to reserves. Nevertheless, the Holland report included most of the tools, virtually all of the logic, and enough examples and suggestions so that any actuary reading the report was fully armed to report on the potential impact of AIDS on his or her company, and recommend timely and responsible action. One might argue that in some respects the successor group was redundant.

I am not of that opinion. The Holland advice of study, understand, and act responsibly seemed somehow lacking compared to the Institute of Actuaries *Bulletin No. 2* which contained more explicit advice: Reserves based on the low projection (F) should be established, and companies should develop a strategy for further strengthening in the relatively near future to the moderate projection (BC). Why was it that forceful and dramatic action was being taken in the U.K. (and later in Canada), while U.S. actuaries were largely silent on the need for AIDS reserves? Few U.S. companies undertook strengthening, in the face of an epidemic at least as serious, and there was the added complication of regulations limiting a company's ability to protect itself against serious and damaging anti-selection. I do not believe that the Holland advice was lacking, but a second look was necessary to clarify the U.S. situation.

The Task Force was given the charge "to examine and report on the principles and techniques for the financial recognition of AIDS by insurance companies." The group decided to address individual life and disability insurance (DI) only. These product lines are of broad interest, and generally provide only limited means of rate adjustment to respond to changes in experience. The individual life portion of the report has been presented to the Board in preliminary form. The DI portion is still being drafted. Specifically, the charge included examination of reserve methods, the wisdom of, and need for, a new valuation standard to replace the 1980 CSO tables, and the role of the valuation actuary (in small letters).

Now, I myself have never fully understood the difference between Valuation Actuary (capital letters) and valuation actuary (small letters.) The former is described as a "new concept," while the latter has been a staple in our companies for years. I suspect that the primary difference is in the relative reliance on mandated valuation minimum standards. In a case of adverse experience, such as AIDS presents, the actuary is already responsible for publicly opining on the adequacy of reserves for statutory reporting purposes, and for preparing a report to management, which supports his opinion, pursuant to Actuarial Guideline XIV. The days never were when an actuary could simply grind out reserves on the minimum basis without further thought.

Actuaries were faced with similar challenges in the 1930s with respect to the adequacy of disability income reserves and in the 1940s with respect to the adequacy of reserves in an environment of severely depressed interest rates. In both instances, actuaries responsible for maintaining the adequacy of reserves met their responsibility and evaluated the impact of that severely unfavorable experience. These analyses led to the establishment of additional reserves in those instances where valuation actuaries considered it appropriate. There is clear historical precedent calling for actuaries responsible for the adequacy of reserves to address the AIDS issue at this time. The purpose of the report is to help the actuary fulfill that responsibility.

Early on, the Task Force debated the question of a new valuation mortality table. The arguments for such action are that the imposition of a stricter standard would lead to higher premiums and margins, thus protecting solvency. Once a standard is adopted which is likely to provide adequately for the AIDS era, the sooner the block of 1980 CSO business, not necessarily adequately provided for, will be closed off. All companies would have to comply with new reserve standards even if they had never heard of AIDS. If the new table proved to be an overreaction, virtually all companies now have the facility to adjust price through non-guaranteed elements. Finally, the new table would provide guidance for strengthening of existing 1980 CSO business.

There are three general reasons for not recommending development of a new valuation table at this time. Least satisfying, although still convincing, are the practical problems. Some companies will oppose the action, for reasons of varying legitimacy, and this would stall development and implementation. We must act now. The data on insured lives are sketchy at best. AIDS mortality

rates will vary by calendar year, and it is anticipated that after a peak in the middle part of the 1990s they will decline and probably stabilize at a lower level.

The second general reason has to do with what we are learning. Tom Reese has done yeoman work (as have others) to produce AIDS mortality rates by attained age and calendar year for the general population. It is this model that the Task Force has used for its work. Preliminary data on insured lives indicate AIDS mortality considerably below population rates, due to normal underwriting and HIV testing. Almost all jurisdictions now have come to understand the need for responsible risk selection in life insurance.

Following are some comparisons of projected insured AIDS mortality with 1980 CSO mortality rates. Later, I will explain more about how the AIDS rates were calculated.

Consider first a 1989 untested issue for a 35-year-old male. Pre-AIDS mortality is taken as 70% of the Select Male 65-70 Basic Table. While serious, Graph 3 shows continuing mortality margins in spite of AIDS, at least under the assumptions used. Of course, how those margins are presently being used is a matter only the company can determine. Graph 4 shows the same issue, only tested. The salutary effect of testing is obvious.

In Graph 5 we see that the situation for the 25-year-old male is more serious. Here is an untested issue (with pre-AIDS mortality now set to 85% of the Select Male 65-70 Basic Table). The projection shows mortality in excess of the 1980 CSO rates beginning in the seventh year and lasting about seven more years. Graph 6 again shows the importance and impact of HIV testing.

By 1995 the situation is expected to take a turn for the worse, but in Graph 7 for a 35-year-old male issued in 1995, even untested, margins remain. Consider, in Graph 8, the 25-year-old male 1995 issue, not tested for HIV infections. One can see that testing will be more, not less, important.

I did say there were three general reasons for not recommending development of a new valuation table at this time. The third and perhaps best reason is the existence and interest of valuation actuaries who will take responsible action regardless of regulatory mandates. The Task Force report is addressed to them. They can and will act (or already have acted) to protect their companies. Equally encouraging is the emergence of the Actuarial Standards Board. It supports all actuaries by promulgating accepted standards of actuarial practice, which can then be applied and explained to companies' non-actuarial managements. I understand that they are poised and ready to take the Task Force report and other recent work and mold appropriate standards.

So, if the Task Force did not conclude that the development of a new valuation mortality table was necessary, what did they conclude? First, and not surprising after this discussion, we conclude that the valuation actuaries are going to be busy Fellows for the foreseeable future. It is incumbent on them to evaluate the effect of AIDS on their companies, and all companies are not alike. This has been adequately demonstrated in the ACLI/HIAA Claim Surveys, as indicated in Table 3.

TABLE 3

ACLI-HIAA
AIDS-Related Claim Survey
1987 Claims

Ratio-AIDS to Total Claims	% of Companies
Under 1%	58.7%
1% - 2%	27.0
2% - 3%	7.5
3% and over	6.8

A company's response to AIDS will depend on its own characteristics, of which the following is a partial list. An assessment must be made as to whether particular company characteristics are such that it is more or less susceptible or exposed to AIDS claims.

EXTRA AIDS MORTALITY VERSUS 1980 CSO
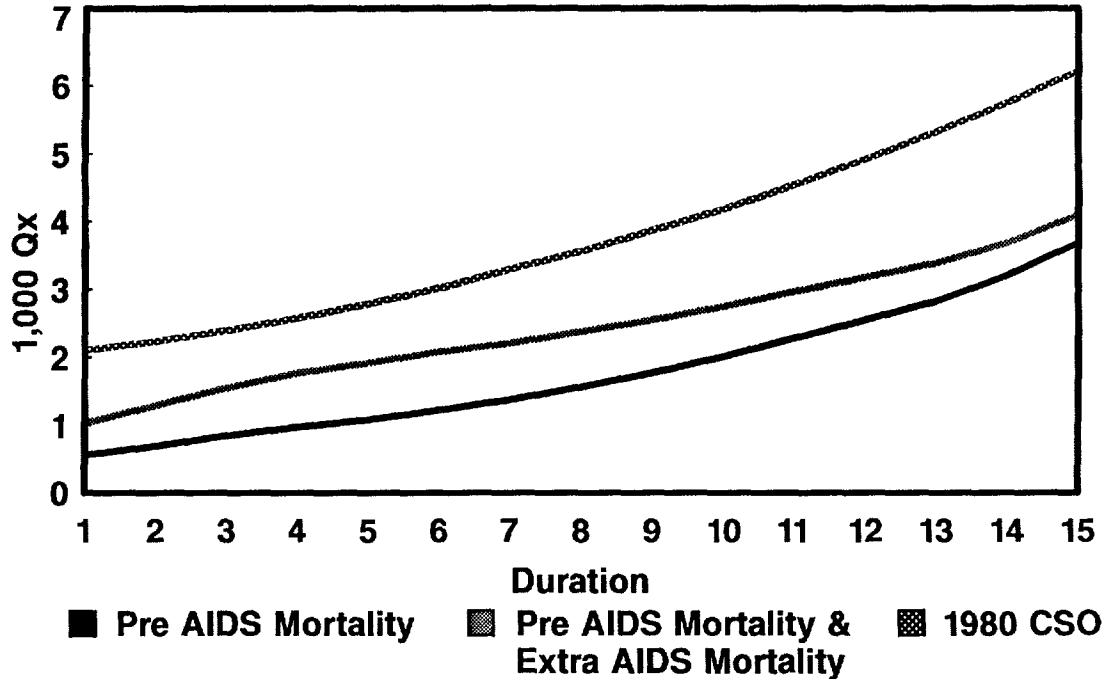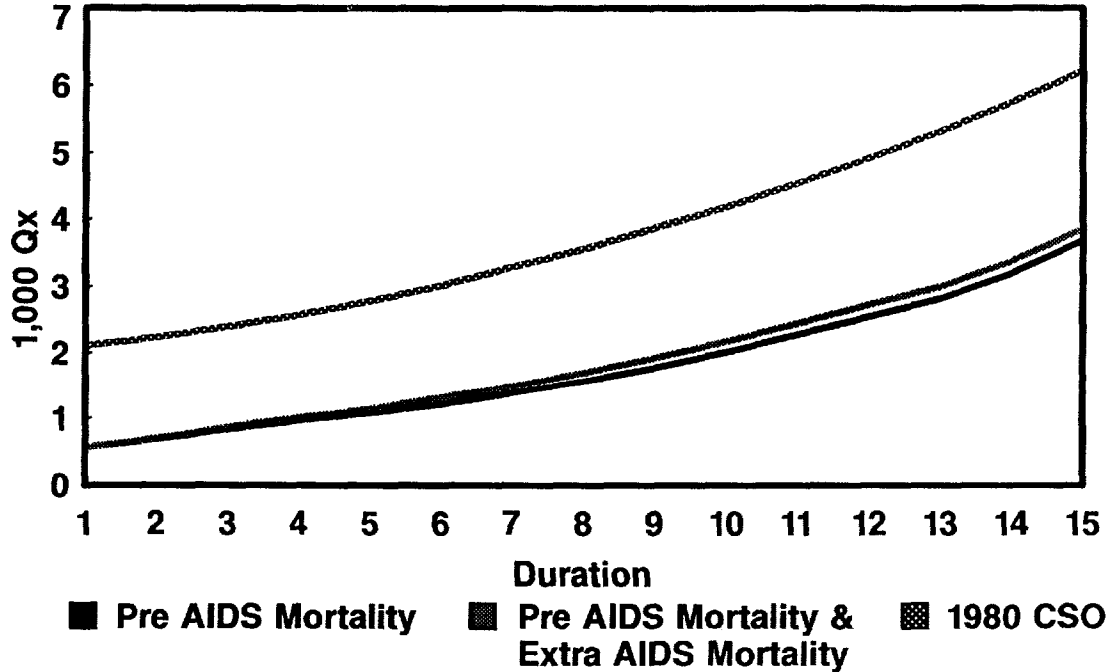
1989 Issue - Not Tested   **Male Issue Age 35**

Duration

■ **Pre AIDS Mortality**   ▨ **Pre AIDS Mortality &**   ▨ **1980 CSO**
                               Extra AIDS Mortality
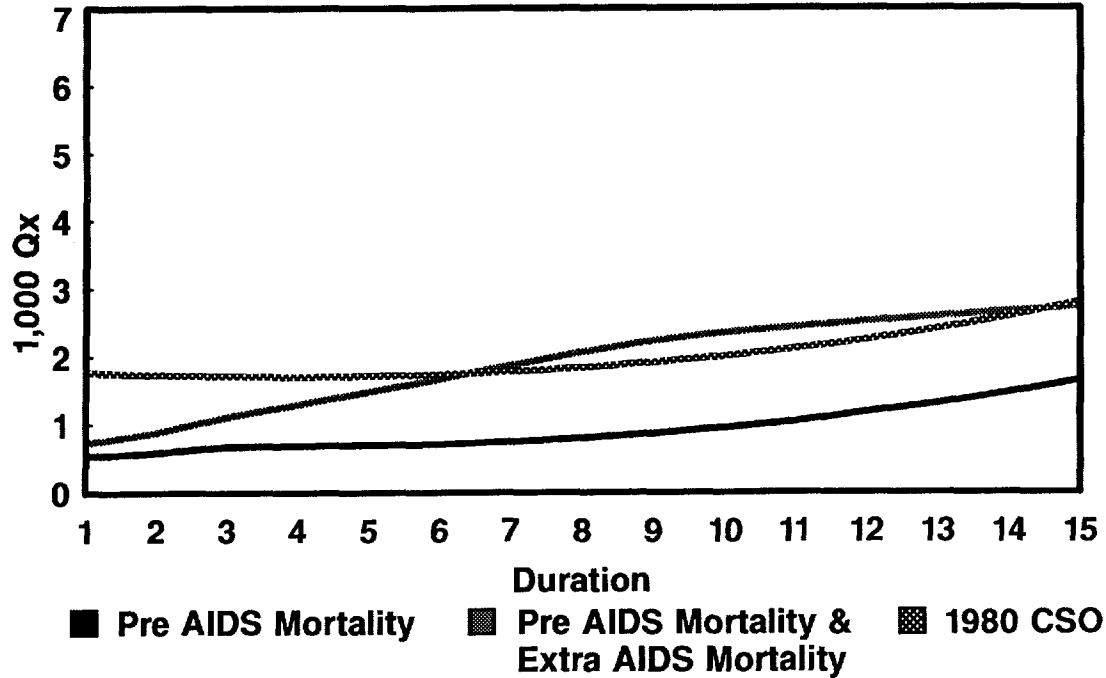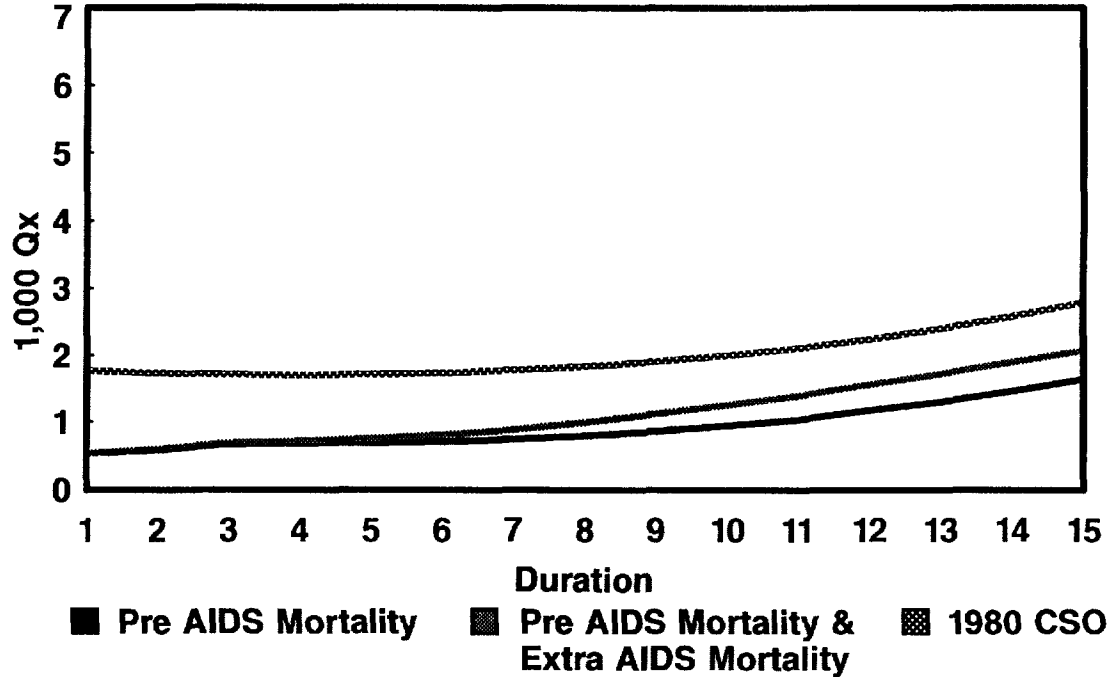
Pre AIDS Mortality is 70% of Select Male 65 - 70 Basic Table

EXTRA AIDS MORTALITY VERSUS 1980 CSO

1989 Issue - Tested   Male Issue Age 35

Pre AIDS Mortality   **Pre AIDS Mortality &**   **1980 CSO**
Extra AIDS Mortality

Pre AIDS Mortality is 70% of Select Male 65 - 70 Basic Table

EXTRA AIDS MORTALITY VERSUS 1980 CSO

1989 Issue - Not Tested　　　　**Male Issue Age 25**

Pre AIDS Mortality is 85% of Select Male 65 - 70 Basic Table

EXTRA AIDS MORTALITY VERSUS 1980 CSO

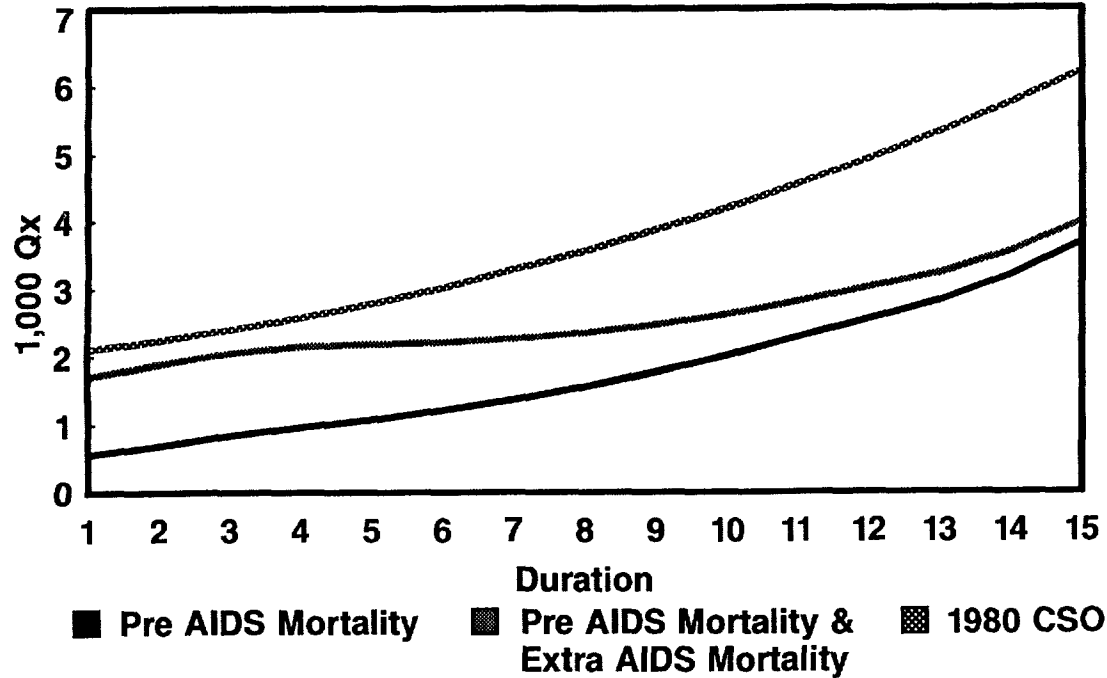## 1989 Issue - Tested   Male Issue Age 25

Pre AIDS Mortality   **Pre AIDS Mortality &**   **1980 CSO**
                              Extra AIDS Mortality

Pre AIDS Mortality is 85% of Select Male 65 - 70 Basic Table

EXTRA AIDS MORTALITY VERSUS 1980 CSO
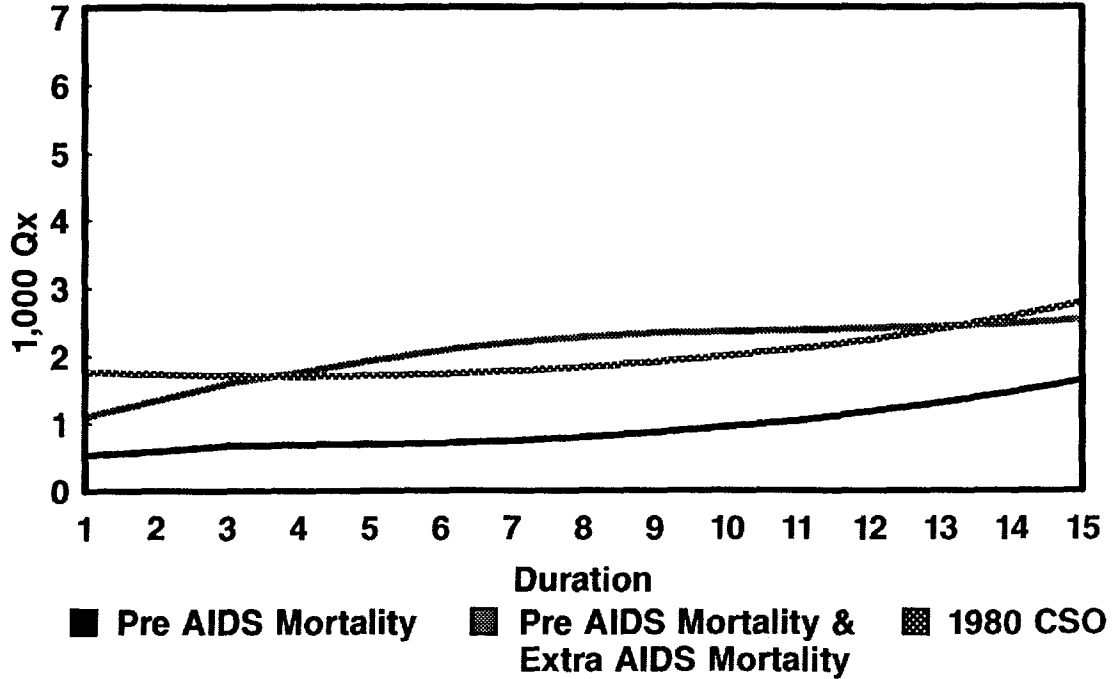
1995 Issue - Not Tested   **Male Issue Age 35**

Pre AIDS Mortality ■   ■ **Pre AIDS Mortality &   ▦ 1980 CSO
                               Extra AIDS Mortality**

Pre AIDS Mortality is 70% of Select Male 65 - 70 Basic Table

EXTRA AIDS MORTALITY VERSUS 1980 CSO

1995 Issue - Not Tested   Male Issue Age 25

■ Pre AIDS Mortality   ▦ Pre AIDS Mortality &   ▦ 1980 CSO
                           Extra AIDS Mortality

Pre AIDS Mortality is 85% of Select Male 65 - 70 Basic Table

RESERVING FOR AIDS -- PRACTICAL ASPECTS

Products -- Low premium forms may be more attractive to anti-selectors.
Margins   -- Can mortality losses be funded by gains from other sources?
Markets   -- Is there a geographical or other reason to believe a company is more or less exposed?
          Much work has been done on geographical differences and is included in the report.
Selection -- How serious has the company been in HIV testing?
Resources -- How material is the AIDS effect likely to be to overall company operations?

One characteristic sometimes listed is company growth, the thought being that a spurt of growth at a time when anti-selection may have been heavy would be worse than stagnant sales through such a period. Type of sales force is another potentially important factor. No one really knows how these characteristics will impact AIDS claims, and certainly no one knows how different combinations will interact. But to the extent one can investigate these matters in a company, one lends credibility to subsequent projections.

The actuary must develop an estimate of the cost of AIDS and educate senior management on the implications. Cash flow testing is very important, given the current conventional wisdom that the epidemic will peak, then decline and stabilize in the early part of the next century. Companies must survive the peak to enjoy the stabilization.

I believe the actuary's work should include projections based on population as well as company data, so that the relationship is clear between what the president reads in newspapers and hears from his or her actuary.

Extraordinary company exposures based on its particular characteristics should be fully explained. The company projections should be presented as a range. Senior management must be aware that things can get worse or better than any "best guess" estimate. This will help avoid locking into an inflexible action. While the Task Force has concluded that the middle scenario of the report of the HIV Research Committee represents the presently most plausible projection of population mortality, neither the low nor high scenarios are at all implausible, and they produce total deaths that are 40% and 200% of the mid-scenario, respectively. There is no certainty here.

Finally, alternative actions should be explored and presented. There are many actions that can be taken to protect solvency, and senior management should be aware of all the possibilities. In the words of the report: "We believe it is desirable for actuaries to provide recommendations to management regarding the manner in which AIDS claims should be funded."

Once senior management understands the AIDS problem, it must decide what to do about it. My choice would be to err on the side of prudence, and I believe the Task Force agreed. It concluded that: "The preferred method of providing for the future cost of AIDS is in reserves." Not all companies will be able to fully fund the entire present value of their future AIDS claims, and the report does not conclude that this is necessary. However, it goes on to say: "In these instances in which the valuation actuary uses an allocation of surplus, or relies on changes to premiums or dividends, the Task Force believes that the reasons for failing to maintain additional reserves should be fully documented, including any plan of action for funding." Presumably, such reasons are typically included in the actuary's reserve report (to be prepared pursuant to Actuarial Guideline XIV), which has been required now for some years. The plan must be cohesive in the sense that it recognizes all the operations of the various company departments. At the rate things change regarding AIDS, any actions must be reviewed regularly. And, whenever possible, provision should be made for changing strategies. Finally, the plan must be deliverable, in the sense that ongoing business considerations cannot be ignored.

So, this brings us back to the valuation actuary, who must document the company plan, whether or not it includes special reserves (especially if it does not) both for purposes of the company's management, and for regulators, should they request it, as is their right.

As I mentioned, the Task Force concluded that the middle scenario of the Society's Committee on HIV Research was the most plausible. Graph 9 compares that projection with both the high and low scenarios, and the Cowell/Hoskins projection, expressed in terms of annual deaths. Note especially, that based on experience through 1989 alone, it is impossible to tell which curve we are on. The decision to pick the middle scenario was based on other factors. It assumes a 10-year incubation period, which seems in line with available data. But, to repeat, there is no certainty here.

GENERAL POPULATION AIDS DEATHS
COMPARISON OF FOUR MODELS
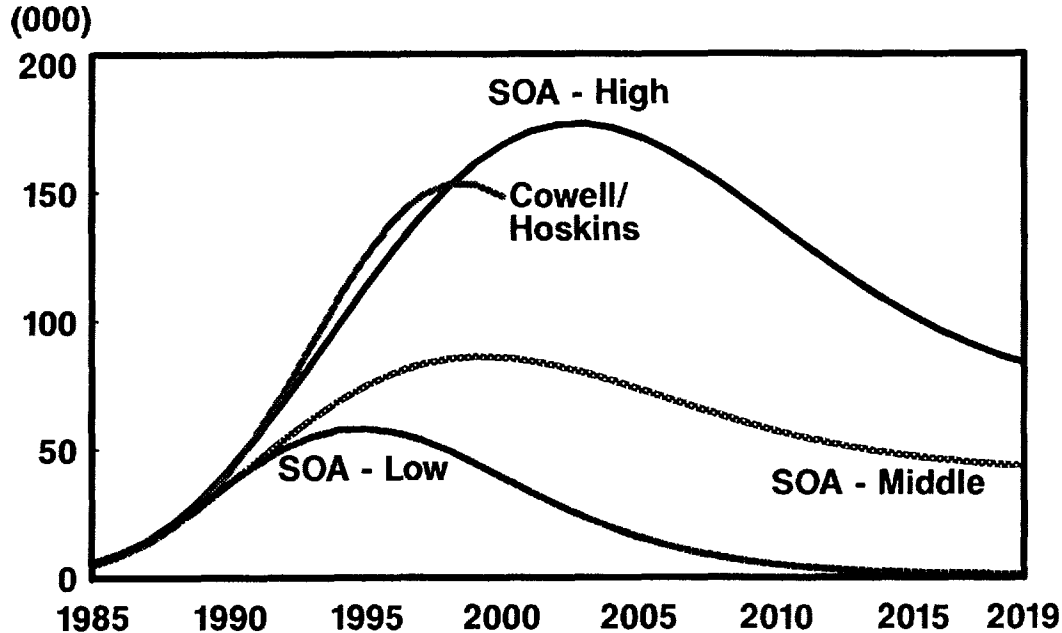
This Cowell/Hoskins Projection Assumes Infection Stops in 1997.

RESERVING FOR AIDS -- PRACTICAL ASPECTS

As I also mentioned, what data are available indicate that AIDS mortality of insured lives is considerably below population rates. The Task Force spent much time investigating why and to what extent this is true.

The Task Force performed two analyses of actual to expected AIDS claims, where expected claims are based on male life insurance in-force data for attained age groups multiplied by the middle scenario general population AIDS mortality rate for the central age of each group.

The Task Force compared actual AIDS death claims and numbers of deaths for individually underwritten life insurance business from the ACLI-HIAA claims surveys to calculated expected values, and also the AIDS claims from nine large insurers to expected claims using actual in-force amounts and numbers of policies by age group.

The results are shown Table 4. The Task Force study showed slightly declining ratios by number for the individual years 1986-1988, but more rapidly decreasing ratios by amount. This may indicate that companies were giving more attention to AIDS claims and possibly identifying smaller size claims that may have been overlooked previously.

TABLE 4

Actual to Expected
AIDS Mortality Ratios

	By Number	By Amount
ACLI-HIAA Survey (86-87)	46%	31%
Task Force Study (86-88)	37	21

The higher actual/expected ratios by number are surprising. However, the expected claims are based on in-force amounts without regard to issue year. Since the in-force business is tilted to recent issues, it naturally has an average size larger than that of actual claims. Also, the use of aggregate AIDS mortality rates does not recognize the effect of selection in identifying AIDS-related infections and symptoms and, therefore, minimizing AIDS claims in early policy years.

Graph 10 shows the middle scenario AIDS mortality rates for a 35-year-old male in 1989. Based on the two studies mentioned above, as well as some general reasoning which is outlined in the report, the Task Force concluded that it is reasonable to adjust the general population rates by a factor of 40% for all business issued in 1983 and prior when there was no widespread knowledge or understanding of AIDS.

The question then becomes: How do we adjust for business written in 1984 and subsequent, when knowledge of AIDS was more widespread? The Task Force suggests a factor of 80% for untested business written in 1984 and after. Once AIDS became generally recognized, issues to at-risk individuals in 1984 and after were likely to be for larger amounts than previously, with a concentration of amounts just below the testing threshold. This anti-selection will produce higher actual/expected ratios for 1984 and later untested issues. The 80% factor is simply a doubling of the 40% factor to recognize the anti-selection by both policies and amount.

What about tested business? Well, before any adjustment, the population rates must be reduced to eliminate deaths arising from infections prior to the year of the test. The report explains how this is done. The Task Force suggests adjusting the resulting population rates by 60%. The results are shown in Graph 11.

For tested business, it can be assumed that an applicant with HIV would not qualify, except in those cases where the test did not detect infection because of its recent origin. However, the test gives no assurance that the applicant will not become infected later, so mortality rates associated with deaths from infection in or after the year of testing must be used. Further, some anti-selection in this group must be assumed to recognize the likelihood of at-risk, but uninfected, individuals who will now buy life insurance, but formerly would not have, or who may buy more insurance than they otherwise would have.
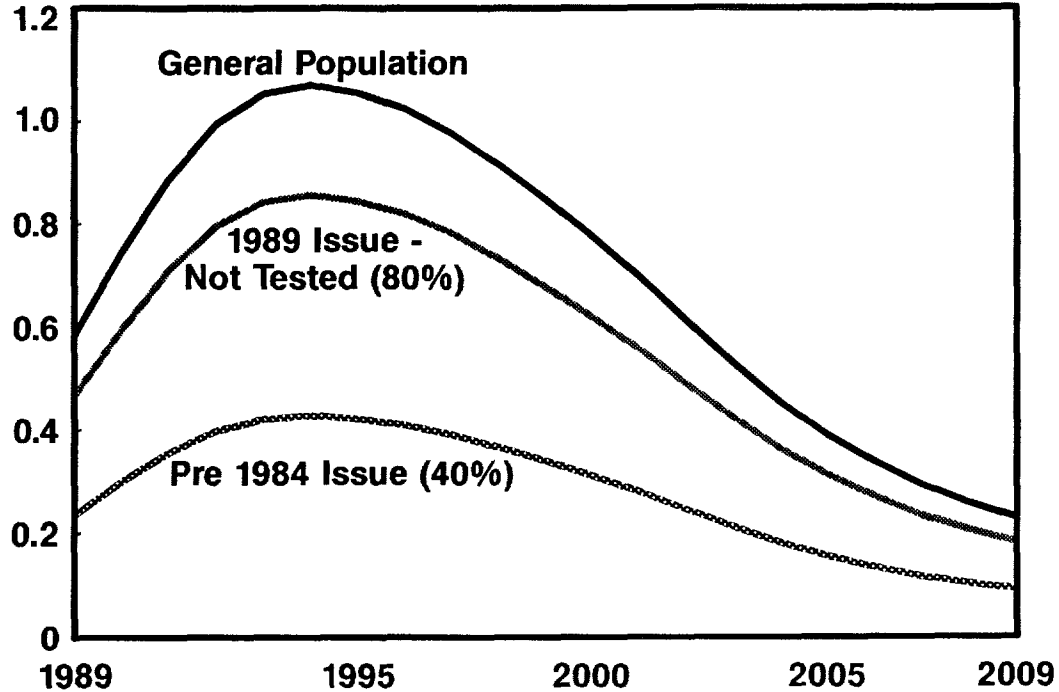
551
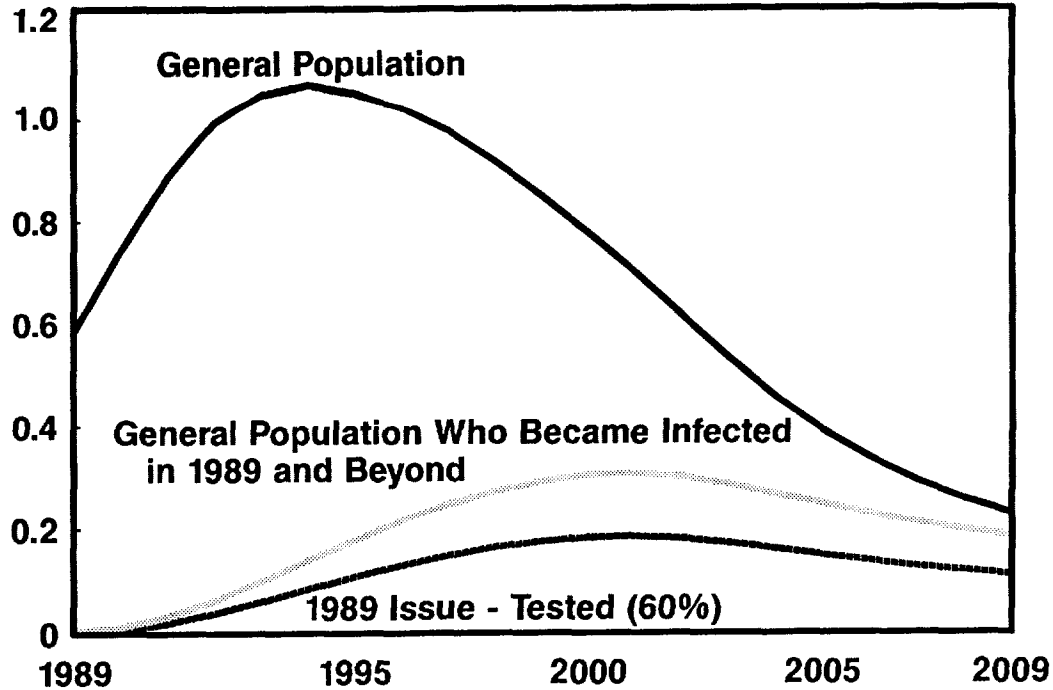
AIDS MORTALITY RATE PER THOUSAND

SOA Middle Scenario   **Male Age 35 in 1989**

AIDS MORTALITY RATE PER THOUSAND

SOA Middle Scenario   Male Age 35 in 1989

General Population

General Population Who Became Infected
in 1989 and Beyond

1989 Issue - Tested (60%)

Graph 12 summarizes all these rates. First, the value of testing is obvious. Second, these rates are as firmly anchored in fact as we could make them, but the 80% and 60% are no more than reasonable guesses. Even the 40% is not necessarily appropriate for any particular company, since it was based on an average of many companies. Recall the widespread disparity among companies' with regard to their AIDS experience. The factors used to adjust general population AIDS mortality rates to insured life AIDS mortality rates should be tailored to reflect individual company experience, if at all possible.

Once a company's expected AIDS mortality rates are calculated, using the 40, 60, and 80% adjustments, or better yet, actual company experience, these rates can be incorporated into a gross premium valuation. Because the epidemic is expected to peak near the end of the century, it is imperative that a cash flow analysis be part of the actuary's work. One must consider the year-by-year effects, as present values that appear manageable now may in reality be unmanageably high AIDS claims in the 1990s, tempered by mortality gains in the 21st century. The actuary should be able to demonstrate to his management that the company will be solvent in the year 2000 to enjoy those future gains.

I would like to say a few words about selective lapsation. This is one more thing the valuation actuary is going to have to worry about, and one more thing that will require a good understanding of a particular company in order to make a fair assessment of its importance. It is generally agreed that people more often than not act in their own self-interest, so it would be prudent to assume that a block of infected or at-risk lives will exhibit excellent persistency.

A valuable exercise would be to run an asset share using the additional AIDS mortality rates described, but with perfect persistency. Then, separate the deaths into AIDS and non-AIDS blocks, and rerun the asset share applying normal company lapse rates to the non-AIDS portion and reduced or zero lapse rates to the AIDS portion. The resulting picture is certain to vary considerably from an asset share calculation which applies AIDS extra mortality rates to a block of business which is assumed to be proportionately reduced by lapse each year among the AIDS at-risk or infected group and the non-infected or not at-risk group.

The report hits at this point hard and often, but I believe it is justified in doing so, because it has received so little attention elsewhere.

Once the actuary has estimated what a company's claims will be, the question becomes one of what he or she is going to do about it, and how cheerfully he or she is going to view the annual exercise of signing the reserve opinion next February.

In this pre-Valuation Actuary (capital letters) day and age, of course, valuation actuaries (small letters) are charged with much responsibility for reserves and little or none for surplus. The report was written in this context. Now this is not necessarily a meaningful distinction. As Randy Newman says: "It's money that matters." In the long run, investors will demand an adequate return on their capital, and company surplus positions will be maintained within a range that provides comfort to owners, management, rating agencies, and policyholders alike. The question is: How will companies absorb the unanticipated AIDS claims in the interim between now and then?

From a valuation actuary (small letters) standpoint, there is nothing that would give him or her more comfort than to appropriate the entire present value of AIDS claims from surplus, were this possible, to set up a reserve for the sole purpose of paying AIDS claims as they arose. (The Task Force is not, repeat not, concluding that this is necessary.) But, from a pure Valuation Actuary standpoint, and certainly from an overall company standpoint, this action, taken alone, is an exercise in futility. No money has been created, no AIDS claims have been avoided, and the company's overall financial picture hasn't changed. What has changed, from the valuation actuary's viewpoint, is that now he has the money, and it will be up to the "other guy," whoever that is, to restore surplus, one way or another, most likely through additional policyholder charges. From either point of view, the company has recognized, quantified, and funded a heretofore unexpected obligation, demonstrated that it has the wherewithal to weather the storm, and reduced the possibility that next year's management will spend those dollars unwisely.

All this just highlights the need for a company to have a plan. Few companies have the resources to write a check for all future AIDS claims and forget the whole thing.

AIDS MORTALITY RATE PER THOUSAND

SOA Middle Scenario　　　　　　　**Male Age 35 in 1989**
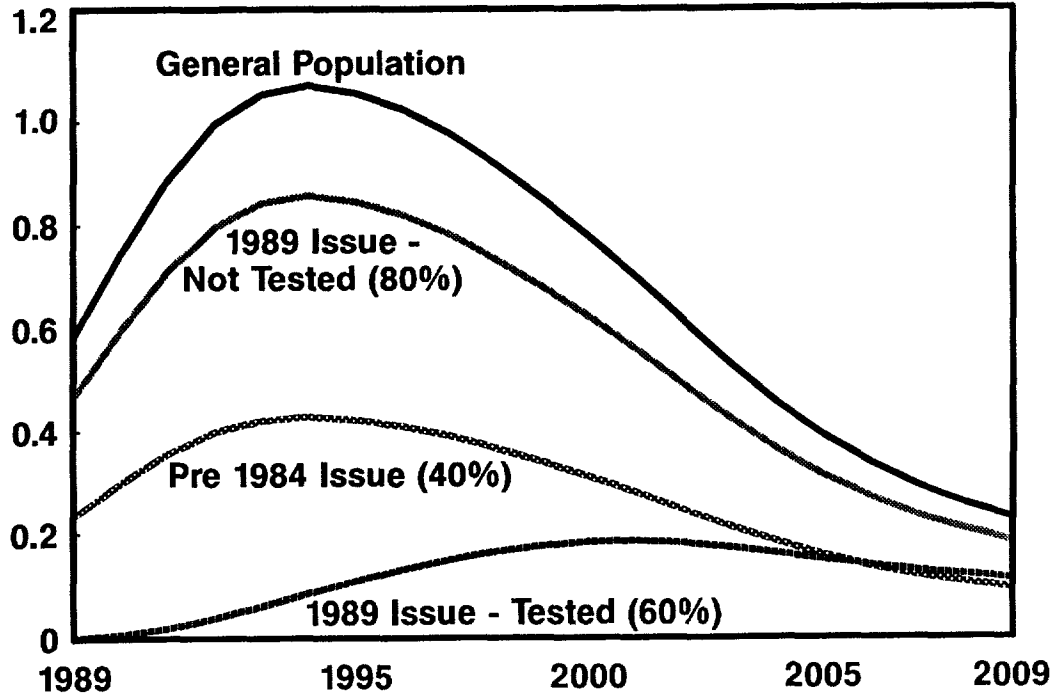
Short of funding all future AIDS claims, the actuary has a range of options. The Task Force believes that two are most appropriate. Either demands a plan. The first choice is to calculate the entire present value of AIDS claims and pick the period of time over which to fund them through charges against the business. The period should not extend beyond the point after the peak has been reached, where the claims are projected to be less than the annual charge against the business. This is perhaps 15 years. At the other extreme, if the period picked is one year, you have the situation described above where the entire present value is appropriated out of surplus, immediately. The Task Force is not suggesting that this is necessary. It is suggesting that an orderly plan of funding the claims is desirable, and that some measured reserve response will preempt disruptive, but necessary, action later.

The second preferred approach is to calculate the AIDS claims in excess of the mortality redundancies present in the 1980 CSO table for a given company. These excesses, then, would be funded over some limited period. This leaves reserve redundancies from other sources intact to protect against the originally anticipated non-mortality risks.

Other approaches are possible, although the Task Force believes that the actuary should be considerably less confident, to minimally confident in the level of reserves if they are adopted. In order of less to lesser confidence, the excess of AIDS claims over all ordinary life redundancies would be funded, or the excess of AIDS claims over all redundancies in all lines would be funded.

The report contains examples of possible reserve formulas, although these, by no means, exhaust the reasonable possibilities.

In closing, just what has the Task Force accomplished beyond that already provided by the Holland Committee? Mostly, it has clarified the U.S. regulatory environment, and, thanks to the work of the Committee on HIV research, made it possible for any actuary to assess a company's current exposure in its in-force business, without starting from first principles. This is a meaningful contribution that should make it much easier than formerly to approach the AIDS problem.

The environment in the U.S. is different than in Canada or the U.K. The many and diverse companies, the generally conservative statutory reserve basis, and the need to cooperate with multiple regulatory agencies preclude a single-minded, inflexible approach.

AIDS is and will continue to be a significant problem. Graph 13 shows current and projected major causes of death for males 25-34. The AIDS deaths are based on the middle scenario and, remember, things could be much worse. In fact, the rates for the non-AIDS causes of death have been decreasing, but they are held steady in this chart. Graph 14 gives results for males 35-40. We will be talking about AIDS for years to come.

In summary, the Task Force concluded that the valuation actuary is responsible for making his or her company aware of the potential impact of AIDS. The actuary should provide for AIDS mortality in reserves or explain why not in the reserve report. The middle scenario appears to be a reasonable estimate of population AIDS mortality. Insured AIDS mortality has been considerably less than population AIDS mortality, and in absence of meaningful company experience, fall-back factors are provided, based on industry data and reasonable estimates. The Society must continue to track AIDS deaths carefully in order to not lose track of the trend in mortality, absent AIDS. And, lastly, it would not be profitable to pursue a new valuation mortality table now, in the midst of such great uncertainty. Valuation actuaries everywhere are up to the task!

Finally, I believe the Task Force report to be a big step in the right direction, and I am thankful for the effort expended by Dave Christianson, chairman of the Task Force, and all the others involved. With this contribution to the literature, the foggy crystal ball of knowledge of AIDS and life insurance will clear up a little bit more -- to all our benefit.

MR. CHRISTIANSON: I wish to publicly thank Bill and the Task Force members and interested persons who have worked very hard on this report. The written report will be considered by the SOA Board of Governors, and, if approved, will be available to the membership by mid to late June.

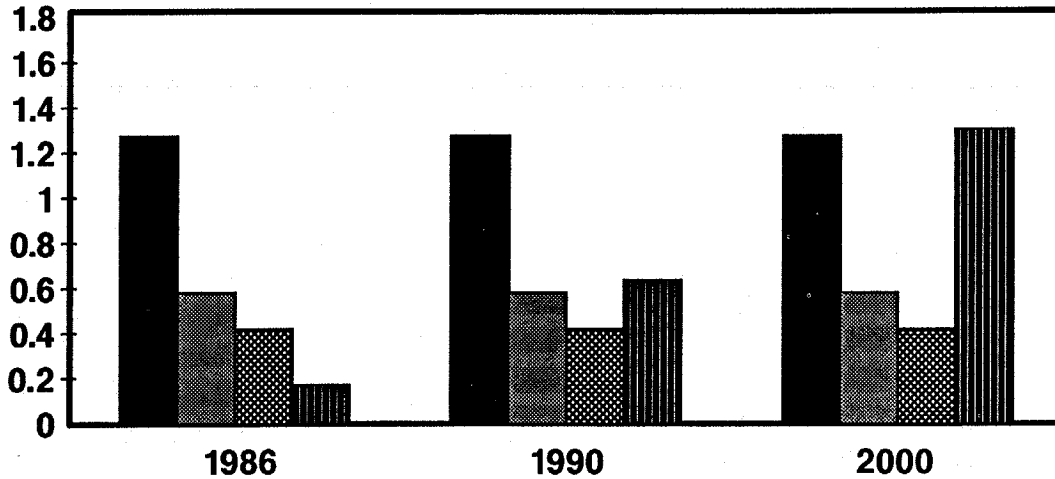# GENERAL POPULATION MORTALITY RATES PER THOUSAND BY CAUSE OF DEATH

Males Ages 25 - 34
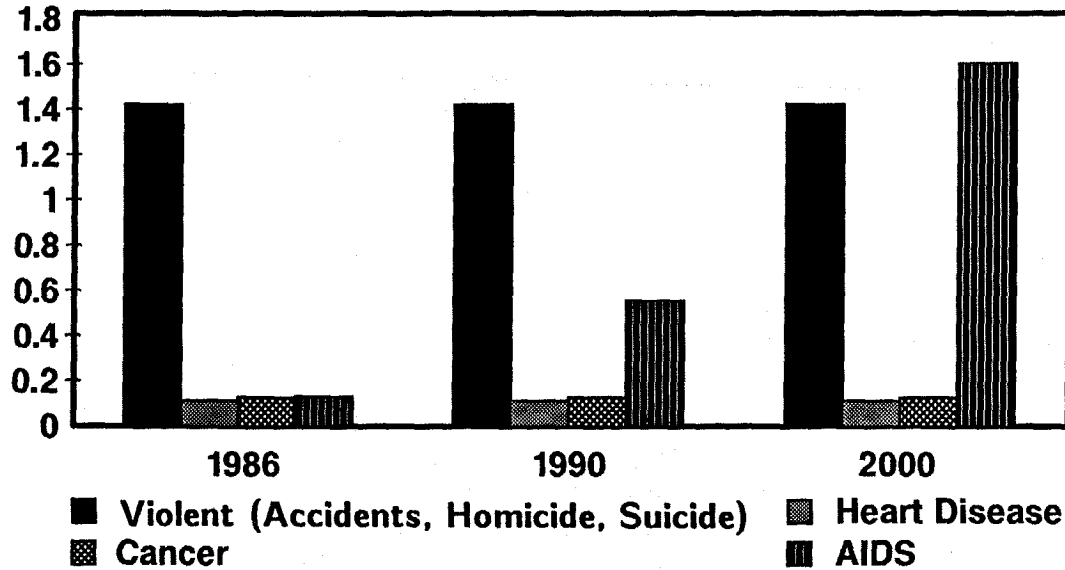
Legend:
- ■ Violent (Accidents, Homicide, Suicide)
- ▨ Cancer
- ▨ Heart Disease
- ▥ AIDS

- Violent, Heart Disease, Cancer rates are from 1985 and are assumed to stay constant

- AIDS rates use SOA Middle Scenario

GENERAL POPULATION MORTALITY RATES PER THOUSAND BY CAUSE OF DEATH

Males Ages 35 - 40

- Violent (Accidents, Homicide, Suicide)
- Heart Disease
- Cancer
- AIDS

- **Violent, Heart Disease, Cancer rates are from 1985 and are assumed to stay constant**

- **AIDS rates use SOA Middle Scenario**

MR. WALTER N. MILLER: I am a Vice Chairman of the Actuarial Standards Board (ASB) and I'd like to offer a comment on behalf of the ASB. This is basically to confirm what Bill Koenig said. The ASB considers the question of AIDS reserving to be one of paramount importance, and we're going to proceed as fast as feasible to work up, develop and issue a standard of practice on AIDS reserving, first for life insurance, I think, because of the timetable of this committee. We hope to develop a reasonable exposure draft for the consideration of the profession sometime in the third quarter of this year. We hope that if we can do that, we will be able to have a final standard done before the end of the year. A lot of the quality of the final standard is going to depend on the input that we get from the members of the profession, who have not set a great record so far in commenting on ASB drafts. We think your input is important. This standard is going to affect the business lives of many of the people here and their associates, and it's going to have an impact on what companies do. So when the exposure draft is released, please help us by giving your maximum attention to making comments and helping this be the best standard possible on this important subject.

MR. CHRISTIANSON: We look forward to the development of a standard.

MS. CAROL MOELLERS: I'd like to ask Mr. Allen about the two different mortality tables, based on decreasing infections and on level infections. How did you decide there was not a big difference between the two, and under what conditions might that no longer be true?

MR. ALLEN: Because of the effects of discounting, the current levels of reserves that are required are significant under either scenario, and the numbers of deaths projected in the near term are similar. For pricing or valuation in the future, then obviously it will become increasingly important to narrow down the estimate.

MR. ARDIAN C. GILL: I was on the Task Force with Bill and Dave. The Task Force and a couple of speakers have referred to the effect of lapse on reserves and projected deaths, but in a general way. Last week I did some models to try to quantify that result. I think that quantifying the risk for future AIDS claims really stands traditional actuarial thought on its head. Following is a short report on my findings, The Effect of Lapses on AIDS Calculations:

THE EFFECT OF LAPSES ON AIDS CALCULATIONS
The Task Force on AIDS report makes reference to the effect of lapse on mortality margins (Section 1.3), on calculating claim costs (Section 2.9) and on reserves (Section 2.9). This note attempts to quantify the lapse effect with the conclusion that it will cause serious understatement of liabilities if not properly taken into account. The main reason for this is that the HIV-positive subset of the insured lives population will have better persistency than the non-infected group, so that applying mortality rates derived by assuming a constant number of lives (as was assumed in calculating the AIDS mortality rates in the report) to a declining population will not produce the intended result, which is to provide for the correct number of AIDS deaths in the group.

The effect at age 25 on policies issued three years earlier is examined with respect to both mortality margins and reserves. The 1980 CSO table is used without select factors and without a smoker/nonsmoker division. One company's preferred and smoker experience mortality of recent vintage is used along with several lapse combinations. The Task Force recommendations are used without geographic or other modifications, i.e., 40% and 80% of the middle scenario to represent the AIDS mortality rates. Where an interest rate was required, 5.5% was used to facilitate comparisons with the reserve calculations in the report; similarly, the reserve calculation assumed a net premium of $1 per thousand for the AIDS risk if negative reserves did not result and $.50 per thousand otherwise, approximately those used in the report.

The Problem
Statutory reserves are designed to be conservative. Aside from interest rates this conservatism derives from built-in mortality margins and from ignoring lapses. GAAP reserves are less conservative but follow a similar methodology, with lapse included. Traditional actuarial thought is stood on its head when it comes to recognizing the future cost of AIDS extra mortality in reserves. This follows from another actuarial principle, that the healthier lives lapse first. The HIV-positive individuals will, therefore, persist better than the remainder of the group.

If we have a certain number of expected deaths from AIDS among a given population at the outset, that number will change only slightly as some at-risk members who, in ignorance or need,

terminate their policies. The mortality rates that produce these deaths will, if normal statutory or GAAP methodology is used, be applied to a group that is steadily reducing in size, primarily because of lapse among the uninfected group. The number of deaths will, therefore, be steadily understated. This will produce steadily declining mortality margins and produce two errors in the reserve calculation: 1) too few future deaths from AIDS and 2) too much future premium income, if future margins are assigned to fund AIDS reserves.

The Task Force report provides an aggregate valuation approach taking lapse into account (Section 2.9) and suggests a grading upward by duration of mortality rates in calculating individual policy reserves.

The Numerical Effect
Various tests were performed at age 25, male, dealing only with providing for the extra AIDS deaths and ignoring changes in amount at risk. The model was run from 1989 through the year 2015. The only cell that showed positive margins on the 1980 CSO Table throughout the period was that for preferred risks where AIDS mortality was 40% of the middle scenario and HIV-positive lapses were half normal.

The following is a summary of the results for one set of assumptions:
Assumptions:
    Preferred Mortality
    80% Middle Scenario AIDS mortality
    10% normal lapse, all durations
    0% HIV-positive lapse, all durations

Results:
    Mortality margins become negative in 1994
    Only 38.7% of AIDS deaths are recognized
    Mortality rates need to be graded up on average to 386%, ranging up to nearly 1700%
    Present values of AIDS claims are understated by $5.82 per thousand at the outset, rising to
      $16.42 per thousand in force before declining
    Reserves are understated at the outset by $5.24 per thousand rising to $14.99 per thousand in
      force before declining.

AIDS reserves are poorly approached through traditional life insurance reserving methods. They are better approached as separate, aggregate reserves, rather than on a single life basis or as an integral part of the base policy reserves. This permits appropriate recognition of the lapse effect and a ready change in reserve levels as actuarial knowledge improves with respect to AIDS mortality.

If an aggregate reserve method is not adopted, the most appropriate reserving technique is a multiple decrement method analogous to that used for disability income insurance with an HIV-positive individual being treated as a disabled life with zero income. AIDS mortality appropriate to the company's situation and risk class would be used; the insurance is payable on death and there are no recoveries. The uninfected group is considered to consist of active lives where standard mortality, lapse and reserving methods apply.

MR. CHRISTIANSON: This emphasizes what Bill said before, namely that each company has to evaluate the situation for itself. I've looked at some of the results that Ardian has produced, based on a 10% normal lapse rate for a company, and 0% for HIV infecteds. No one knows exactly how quickly HIV infecteds will lapse, and each company has different lapse rates. Therefore, each company has to puzzle through this situation for itself, and there is really no way within the Task Force report that we can express this as one "cookbook" method for a company to use.

MR. GILL: One of Mr. Allen's graphs used zero lapse rates, and the Canadian method suggests that you present value the margins and the gross premiums. I think that's wholly incorrect.

MR. ALLEN: I think you've misunderstood my comments on the use of lapse rates. One way of providing for selective lapsation (and the one I referred to in my talk) is to use a zero lapse rate on the excess q's (AIDS) but normal lapse rates for the base q's. This is specifically covered in the Report on Valuation as we were very concerned that this issue be handled properly.

RESERVING FOR AIDS -- PRACTICAL ASPECTS

MR. BENJAMIN GEORGE PETERS: Earlier you mentioned that some work was done with disability income insurance. Would someone care to comment on either the conclusions, without really going into the whole report, or some other aspect of the issues?

MR. CHRISTIANSON: At this point there is very little we can tell you since the report is still being drafted. What we're doing is using the same models that Tom Reese's committee has produced for deaths and backing up a few years to represent disablement. Tom, if you have any comments on that I'd appreciate it.

MR. REESE: Bob Beal and I have been working together to develop disability rates, and we have run the middle scenario model to turn it into a disability income model. He has the data and is writing a report. It will be a separate report. It might be out by the end of June, but right now he has not put the numbers together.

MR. CHRISTIANSON: For the disability report we will be using the same type of adjustment factors as for life insurance, although adjusted for disability insurance. I believe Bob was trying to look at some intercompany data to establish how applicable the 40%, 60% and 80% factors were for DI.

MR. MICHAEL E. MATEJA: The most recent report, I think, continues the rather ominous spread of bad news about AIDS. Quite simply AIDS is not good news for insurers, but I'm troubled about one aspect of the focus on AIDS and particularly the references to mortality rates and margins in the 1980 CSO Table. My impression from reading life insurance reports is that there has been steady improvement in insured mortality over a long secular trend that goes back 20 or 30 years. I've seen nothing that would cause me to say that trend has changed. Now, given that AIDS is going to reverse it, have you considered or made any attempt to balance out a secular improving trend in mortality in light of what you see about AIDS, and specifically would it somehow temper your conclusions in this regard?

MR. CHRISTIANSON: We looked at significant causes of death for various ages. For 25-34, the leading causes are violent deaths, cancer and heart disease. Currently, for a 25-34 year old, cancer and heart disease, the second and third leading causes of death, are fairly equal to AIDS mortality rates. As you see, as you get out beyond the year 2000, AIDS mortality rates are above violent deaths and way above cancer and heart disease. Frankly, rates don't have much farther to go down at these ages, so I don't know how you're going to offset those enough to make up for the extra deaths in AIDS. And I believe you get the same type of result when you look at ages 35-40. I think there may be some improvements in mortality coming, but the relative mortality levels of the leading cause of death compared to AIDS does not provide a significant offset. It is something to take into consideration, but I would not rely on it.

MR. LEROY PRUITT: On the scenarios, do you have any preliminary data as to what they look like when you consider strictly insured mortality? These show rather ominous scenarios, but as we know, one of the primary causes of AIDS is IV drug use. Once you remove those IV drug users, what do your results look like?

MR. KOENIG: That was the purpose of the 40% factor derived from actual insured claims versus actual in-force business of nine companies, the ACLI-HIAA. The general reasoning behind the 40% factor is that you take out drug users and reduce the purchases of other at risk groups and you get to about 40%.

MR. PRUITT: Okay, but in that same scenario, how does AIDS compare relative to other causes of death?

MR. CHRISTIANSON: You'd have to look at it by blocks of business. For the pre-1984 block, it would be 40% of that peak, which would still, I believe, put it up quite high. We used 80% for untested business. These are general factors. Each company will have to determine the appropriateness of these factors. I believe at 40%, AIDS would still be the second leading cause of death by the year 2000 for the 35-40 group, and for the 25-34 group it is clearly going to be the second leading cause of death even at 40%. So it's going to be very significant.

I would offer one other comment in that regard. As the Task Force proceeded toward completion of its report, things became clearer and new revelations came along. Mr. Gill mentioned one of

them and I'll touch on another. Frankly, we need to get the report out, and trying to include all these new thoughts is rather difficult.

When we looked at actual/expected ratios we looked at all insurance in force, as Bill mentioned, and then applied general population AIDS mortality rates to the in-force business to get actual/expected ratios. I believe that because of the underwriting process, regardless of testing, you're going to see very few deaths in the first few years from AIDS just because the people will be exhibiting signs of deterioration.

My own personal thoughts are that in the first year maybe 90% of the AIDS deaths might be excluded. For people who are underwritten maybe 50% of second-year AIDS deaths will be screened out. If you look at the tremendous amount of insurance being written over the last few years compared to the total amount of insurance in force, this is a very significant factor, and it understates the expected by quite a bit. I think if you adjust for that, the 40% would go up higher. On the other hand, you would then be applying higher factors to the older blocks of business and much lower initial factors to the newer blocks.

Frankly, it is too late to get into these kinds of refinements, and we don't have the data to do it. It's another indication that what we've tried to do here is to be reasonable and not to try to overstate the situation.

MR. RICHARD J. IRWIN: In using models to project our company's own experience, one of the key parameters you could cue on is the expected prevalence of HIV-infected lives in your block of business that you're studying. In the past year or so companies have been testing a lot more and my question is, to what extent is the prevalence among tested business? If you are getting "hit" rates in your blood test of .1%, what might that say about the expected prevalence in your untested business?

MR. CHRISTIANSON: Let me refer back to Bill's discussion. The rates would be quite low for the tested business, primarily because when a person is tested in a given year, for example 1989, you've excluded deaths from all infections prior to 1989, and so they can only die of AIDS if they became infected after that point. It will dampen the rates down quite considerably. I would guess that for a 1989 issue, if it was tested, it might need about 10% of the reserve that an untested block of business would need. In other words, you'd expect about 9 times more.

MR. IRWIN: I'm particularly interested in an estimate for the prevalence among untested business. If companies have been testing at $100,000 and above and had a hit rate of 0.1%, would that suggest that they would have a 0.1% prevalence under amounts of $100,000, or more than that? Has anyone addressed the question of anti-selection above and below the blood test limit?

MR. KOENIG: I can only speak for myself here. I would take very little comfort in having a low hit rate, understanding that people who know they're infected are not very likely to want to be tested. I think that our feeling was that for all untested business, there would be a certain level of anti-selection, and we tried to reflect that in the 80% factor.

MR. CHRISTIANSON: I would agree with that. We did not really approach it from the amount of infection, rather that was the 80% factor that we suggested for untested business issued in 1984 and later years.

MR. LARRY WAYNE GULLEEN: I'd like to get your feeling on the effect that we should have upon statutory reserves versus a more GAAP-like, or economic or realistic set of reserves, especially in light of the work that's being done on return on equity where primarily the statutory reserves are used to determine target asset levels and target surplus levels for underlying economic reserves. Do you think we should have both an economic or an underlying realistic reserve for AIDS and a statutory constraint, or do you think that there is adequacy in the statutory reserves considering the fact that the statutory reserves do not consider deferral of acquisition costs also?

MR. KOENIG: I can try to relate what I remember from the report. Bob Stein, who understands those issues far better than I, wrote that part. He came down, as I read it, as very ambivalent. He believed there were some reasons for acting one way and some for acting the other way, and frankly I don't think there is any firm advice that's going to be given in the report on GAAP reserves.

MR. BURTON D. JAY: I was thinking a little bit about the comments that Mike Mateja made a while ago on the possible continuation of the secular improvements in mortality rates. Your response was that the improvements had to do primarily with heart disease and cancer and that at the ages we are focusing on with AIDS experience, there is little room for improvement. I think that Mike may have, if I understood his question, responded that if the secular trends continue, the impact will be at the older ages, people my age and older perhaps, where the majority of our death claims occur, and I think for the whole industry that there is still a possibility of those trends continuing, and as a possible offset to what we believe are very large increases in death claims can still be margins that become increasingly large at the older ages, if those trends continue. I am not suggesting that is a good practice. I think it is far more likely that the AIDS claims that we are projecting will come about than that the trends in cancer and heart disease at the older ages will to some extent offset those. But I think that there is that possibility.

MR. CHRISTIANSON: I agree with your statement that there is that possibility, and you have to examine if that's good practice for your company to offset those savings with additional claims at other ages. That is something that the actuary and the company management definitely has to determine, and it brings up another point that Paul Sarnoff on our Task Force has brought up many times. In reality, examination of the margins and the mortality tables is not the pertinent issue. The pertinent issues are "What are the premiums being charged in your company? What are the reserves set up in your company? And what will the cash flow analysis look like in your company?"

MR. JOHN W. PADDON: Did the Task Force consider if extra reserves are put up without another valuation table being constructed, whether or not the IRS will recognize these reserves as deductible for tax purposes?

MR. CHRISTIANSON: Frankly, what we tried to do was to quantify what the future cost of AIDS might be and consider ways that the actuary might recognize the cost. Taxes do not directly relate to the costs, so we did not address that issue.