RECORD OF SOCIETY OF ACTUARIES
1988 VOL. 14 NO. 1

AIDS AND HEALTH ACTUARIES

Moderator: WILLIAM F. BLUHM
Panelists: ROBERT W. BEAL
GREGG R. SADLER
MICHAEL L. ZURCHER
Recorder: KAREN A. UNTERREINER

- o Pricing
- o Underwriting
- o Contract limits
- o Claim reserves
- o Current experience
- o Modeling
- o Future outlook

MR. WILLIAM F. BLUHM: We have a distinguished panel with us that I think will provide you with some very interesting information.

Michael Zurcher will be speaking on the impact of AIDS on group insurance and modeling.

Robert Beal will be speaking on the impact of AIDS on individual disability income insurance.

The last speaker is Gregg Sadler. He will discuss individual underwriting with respect to AIDS.

MR. MICHAEL L. ZURCHER:

THE IMPACT OF AIDS (HIV) ON GROUP INSURANCE PLANS

The focus of my presentation this morning will be the impact of acquired immunodeficiency syndrome (AIDS) on group insurance plans; more specifically, the impact of the human immunodeficiency virus (HIV). For several years now, there has been much written discussion on how AIDS has affected and will affect the individual life segment of our business. On the other hand, the impact on group insurance has been largely ignored, at least relative to individual life. I believe this is so for several reasons.

Probably the primary reason stems from the nature of the group rating mechanism. A group insurer has the opportunity to rerate products each year for expected HIV costs and is usually dealing with a time horizon of 1 1/2 to 2 years compared with a 30- to 40-year period for individual life. Also, traditional group underwriting philosophies largely omit individual risk underwriting. Thus, the underwriting responses we have seen on the individual side have generally been dismissed as not relevant or not practical to group insurance. Also, the HIV group insurance impact has been understated, I believe, because of the problems in identifying actual HIV claims. In response to these factors, you only need to look at last year's medical underwriting results to see that the

ability to rerate doesn't automatically guarantee adequate premiums will be charged. Success relies on a sound historical cost basis and the predictability of future trends, neither of which is the case with HIV. Group underwriting issues, while different from individual, do exist and need to be addressed. Finally, in group medical, the HIV exposure exists while the claimant is still alive, providing the opportunity in some cases to manage these claims. My primary message to you is that you should be not only interested in your HIV risk but proactive in managing it.

A group insurer can include factors to reflect the anticipated cost of HIV-related conditions in the regular rerating process of each product line. These factors can be established after analyzing internal and external HIV claims data, making any necessary adjustments for completion to recognize underreporting, and projecting future frequency and claim trends. There are several pricing issues that arise relating to HIV that need consideration. HIV-related medical claim costs vary significantly by geographic location. This results from differences in HIV incidence levels, treatment patterns, availability and utilization of alternative care facilities, and costshifting. In addition, these relative geographic differences will change over time and at different rates.

For medical manual rates, some form of "area factor" has always been part of the rating process. Ideally, it would be possible to directly recognize geographic specific HIV projections in the area factors and trend assumptions, but this approach is difficult to implement and requires more credible data than are currently available.

An alternative approach would be to provide for adequate premiums to cover the expected HIV claims for the entire block in aggregate, using an explicit loading in the overall manual rate trend assumption. Some degree of equity among regions is maintained because area factors are updated in response to changes in the total experience for a given area, so any increases in HIV claims in a particular locale will be indirectly reflected in the revised area factors.

Manual rates usually provide for different rate levels by industry. A question arises as to whether industry factors should specifically consider the HIV risk. Historically, specific claim diagnosis has not been part of the industry rating process. Actual emerging total claims experience has been relied upon instead to equitably maintain industry factors. As with the area factor process, poor HIV experience will manifest itself in the review of total experience by industry. Through this process, higher HIV claims in a specific industry will become part of the rating structure over time. Because of the accelerating pace of HIV claims, however, industry analysis might be performed on a more frequent basis than in the past. Typically, both group life and medical manual rates are age and sex specific reflecting the different expected mortality and morbidity for individuals in each category. This permits rates to mirror the expected claim costs as closely as possible. Accordingly, a group insurer should modify its rating structure to recognize the projected changes in cost by age and sex attributable to HIV. As you know, to date there has been a much higher incidence of HIV claims in the younger male population which should be reflected.

Taking this a step futher, the incidence of HIV claims has been much higher in the male homosexual population than the population at large. Is it also then appropriate to develop rating classes for sexual orientation when it can be determined, or use sexual orientation in the case selection or individual underwriting process? It is my belief that it is not appropriate to use sexual

orientation or any surrogate such as marital status or beneficiary designation in the rating and underwriting process. It is clear that membership in a so-called "high-risk group," such as homosexual males, is not the determinant of HIV infection risk. Rather, it is the engaging in high-risk activities that determines the level of risk.

The trend of HIV medical claims will place increasing pressures on public health care -- funding mechanisms (such as Medicaid). This in turn will put additional pressures on local health care providers as they are forced to deal with higher levels of unfunded care. Most likely, this will translate into an increased magnitude of cost shifting to private payors. This cost shifting could be significant, varying regionally by the relative size of the uninsured, indigent HIV population. Recognizing the timing and degree of cost shifting points to a need to develop and maintain a strong medical trend analysis process.

The degree of antiselection among COBRA continuees having HIV hasn't yet been quantified. Some assumed pricing factor specific to HIV antiselection, however, should be included when projecting COBRA claim costs. The impact on conversion pricing needs review as well. A more general analysis might be to quantify the continuation of coverage patterns for all infected group insureds.

The cost of AZT or similar-type drugs on a direct basis is expensive, in the neighborhood of $8,000 annually per patient. Additional costs can also arise from increased physician visits, tests, and transfusions due to side effects. There are many questions relating to AZT that we are just beginning to see answers to: How effective is the drug in prolonging life? Will users have less utilization of medical care than nonusers? As we begin to see many users forced to discontinue use due to side effects, what will be the ultimate continuance pattern for users? Will the availability of the drug increase? Will it be administered at earlier stages of the disease? What about new drugs? All of these questions complicate a difficult rating process even more.

The pricing issues I have just covered indicate the need for complete, accurate, and timely HIV claim data. The identification and collection of internal HIV claims may still be infrequent so it could have to be supplemented with external data. However, internal data remain critical to each insurer, and steps should be taken to capture as much as possible. This will require the investment of resources and the cooperation of several functional areas. One idea is to add an automated HIV flag to your claims system to assist in spotting potential HIV claims. In spite of any efforts to fully capture HIV claims, the data will still be incomplete and pricing assumptions must include "completion factors" to account for this.

UNDERWRITING

The number of seropositive insureds is a predictor of future HIV claims exposure, but the availability of such information to a group underwriter is problematic due to the practical obstacles of obtaining such information in a group setting. However, some forms of underwriting for HIV are still possible in the group environment.

Small group cases are usually individually underwritten, relying on short-form medical questionnaires that request information from the applicant concerning immune disorders, known positive HIV antibody tests, and sexually transmitted disease disorders. The actual questions that are permissible vary on a state-by-state basis. For large groups, case selection procedures can be

strengthened by requiring the claim history of the group and details of any active or disabled insured.

Late applicants can also be underwritten using the short-form questionnaire. In addition, the ability to identify preexisting claims during the adjudication process should be reviewed and strengthened if deficient.

As with many other medical conditions, there is a need to identify HIV claims for an underwriter during the renewal process on a case-by-case basis. It is valuable to identify how rating action should be modified on a particular case to reflect case-specific risks. In the presence of large HIV claims (like other risks), consideration should be given to adjusting underwriting and refund calculation reserves. The same need for underwriting information also exists where the claim administration has been delegated by the insurer to an outside party such as a PPO, HMO, or TPA.

On group term life plans, underwriting guidelines should assure that anti-selection within flexible-benefit plans is precluded by preexisting condition limitations. An underwriting review of all group life plans could follow a guiding principle of precluding the availability of amounts in excess of prudent guaranteed issue limits without strict individual underwriting requirements.

There are several other responses that will assist a group insurer in successfully dealing with the HIV risk. The first is to employ case management capabilities to manage large HIV claims. HIV treatment patterns in most locales provide the opportunity for intervention by influencing treatment pattern and providers and by obtaining lower cost services and supplies. An effective claim management process requires the early identification of opportunities, access to lower cost alternatives, and skill in intervening with patients, families, and physicians.

Another key response to managing HIV is the communication of HIV issues through all functional areas of the group operation. One approach would be to establish an HIV Task Force with representation from areas such as pricing, product development, underwriting, claims, and planning. The objective of the Task Force could be providing a comprehensive analysis of the current and future impact of HIV, developing plans to deal with these impacts, and assuring their implementation. In addition, the Task Force could promote a broad-based understanding throughout the organization and could serve as a focal point for the identification of new HIV issues.

A final response is a strong commitment to stay on top of regulative and legislative issues as they develop. This task could be performed by a government relations or legal department working closely with the HIV Task Force.

MODELING

Now let's turn to a model and look at some projections. I will begin by giving you a general description of the model. It projects group insurance plan costs attributable to HIV-related diseases in a three-step process.

Step 1: Number of HIV Insureds by Region and HIV Stage
Step 2: Monthly Progression Paths
Step 3: Monthly Medical Costs

For a given cohort of insured group employees identified by geographic region, the model will develop for each region the number of HIV-infected lives split into four stages of HIV-related disease, and the number of new employee seroconversions in future projection years. These data are used in the second step, in which a monthly progression path through the disease is developed individually for each infected life beginning in the HIV stage assigned from the previous step. The duration in each stage and the disease manifestation are determined using Monte Carlo processes.

Once the progression path for each infected life has been determined, the third step develops monthly medical costs by life and a benefit upon death. The monthly medical costs largely vary by how far the life has progressed through the disease, but can also vary by the primary AIDS diagnosis, the geographic region, the level of alternative care utilized, the utilization of a life-extending drug such as AZT, and trend factors. Actually, the monthly medical costs are developed in the model by summing major benefit cost categories. As for life, the benefits vary by a salary distribution and the selected salary multiple.

As I alluded to earlier in this discussion, the model uses stochastic processes throughout. Stochastic simulation allowed me to integrate a multitude of cost and progression distributions into a single simulation and provided a means for measuring the expected variability in modeled results. The stochastic process in this model is probably best exemplified in the progression path development, where each month a random number is generated to determine whether or not progression to the next stage of the disease takes place.

With the general structure of the model as background, let's look at some of the results. A much more detailed description of the model and its results can be found in a Task Force Report.

The model can be used in many different ways, but the results I will be sharing with you are projections of a year-end 1987 inforce block of group employees which are distributed geographically the same as the U.S. general population. The employee group is also assumed to be 62.5% male. The total U.S. HIV-infected population at the end of 1987 is assumed to be 1,250,000, and an HIV-infected life is assumed to have a 64% chance of having group coverage. Finally, the results I will be discussing were based on Cowell-Hoskins progression rates and the staging convention used in their paper.

The results in Table 1 are a summary of the modeled 1988 HIV annual medical claim probability distribution for the infected employees.

TABLE 1

1988 Infected Employees

Total Annual HIV Medical Cost	Cumulative Annual %
$ 300	43%
500	70
800	81
5,000	90
11,000	95
20,000	98

The left column represents the total HIV medical costs (before any plan design features) for an infected individual, and the right column is the probability of the claimant's annual costs being less than the amounts shown in the left column. It is important to keep in mind that we are modeling the HIV-infected population rather than the AIDS population, so the cumulative probability distribution is skewed heavily toward the lower claims. In other words, only a small percentage of all infected individuals have AIDS and the higher costs associated with AIDS. Also keep in mind as you look at this table that these are annual costs, not lifetime costs. As you can see, 70% of infected individuals would be expected to have claims less than $500, and 90% less than $5,000.

Table 2, using the probability distribution, shows the 1988 annual medical claim costs at several deductible levels. These claim costs are for the entire employee group, but for HIV-related claims only. The claim cost drops from $13.68 at a $500 deductible, to $1.55 at a $20,000 deductible. The next thing we did was to convolute the HIV claim distribution with a projected 1988 full-benefit major medical distribution. By comparing the claim costs from the convoluted distribution with the standard major medical distribution, the relative additional morbidity of HIV was determined. This is shown in the third column. It is consistently in the 1.5% to 2.5% range for deductibles up through $20,000 and decreases thereafter with each successive increase in deductible.

TABLE 2

1988 Medical Claim Cost
Entire Employee Group

Annual Deductible	Annual HIV Claim Cost	Additional HIV Morbidity
$ 0	$ 16.68	1.72%
500	13.68	1.94
2,000	11.30	2.22
5,000	7.85	2.47
10,000	4.62	2.24
20,000	1.55	1.51

Figure 1 takes the total HIV-related medical costs incurred in 1988 and breaks them into the four stages of HIV disease used in the model. What is worthy of note here is that almost 50% of costs are incurred in pre-AIDS stages. If applying a deductible to these costs, the pre-AIDS percentage would be less, but still significant. How many of these claims do you think you are indentifying? Figure 2 shows the same 1988 HIV medical costs broken out by major benefit type. With today's increased availability and utilization of AZT, along with its high costs, it is projected to represent 18% of total medical costs in 1988.

In Figures 3 and 4, we will look at a projection of HIV costs over a five-year period for group medical and life plans. These projections are not only influenced by the major assumptions I've already mentioned, but if you were to model a specific block of insureds, factors specific to the block such as geographic distribution and case management capabilities will also impact the results.

First, let's look at group medical. Figure 3 shows annual HIV costs per insured employee for 1988-1992. The numbers are benefit costs after applying a $250 deductible and 80/20 co-pay to $5,000 to the HIV costs for each individual. Benefit costs increase from about $13 per employee in 1988 to $72 per employee

FIGURE 1

1988 HIV Medical Costs by Stage

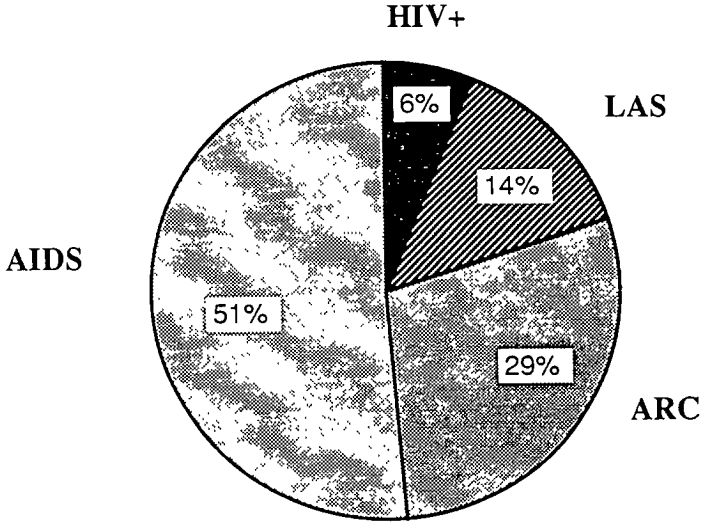


FIGURE 2

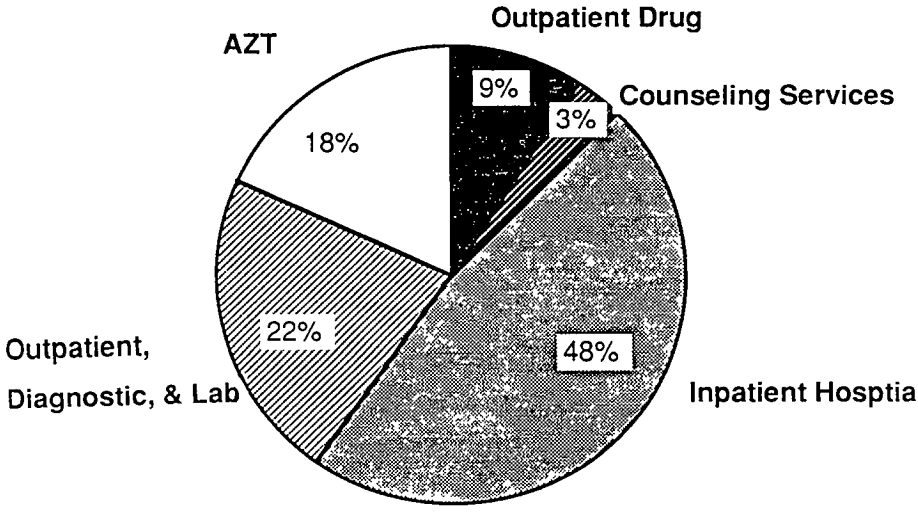

1988 HIV Medical Costs by Benefit
Outpatient Drug
AZT
9%
Counseling Services
3%
18%
22%
48%
Outpatient,
Diagnostic, & Lab
Inpatient Hosptial

FIGURE 3

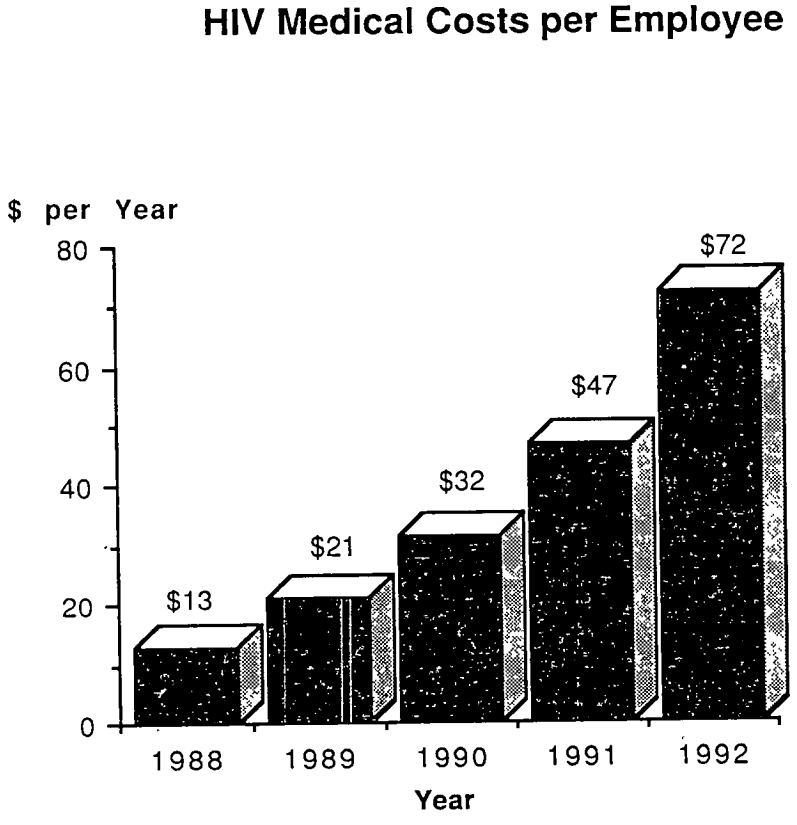
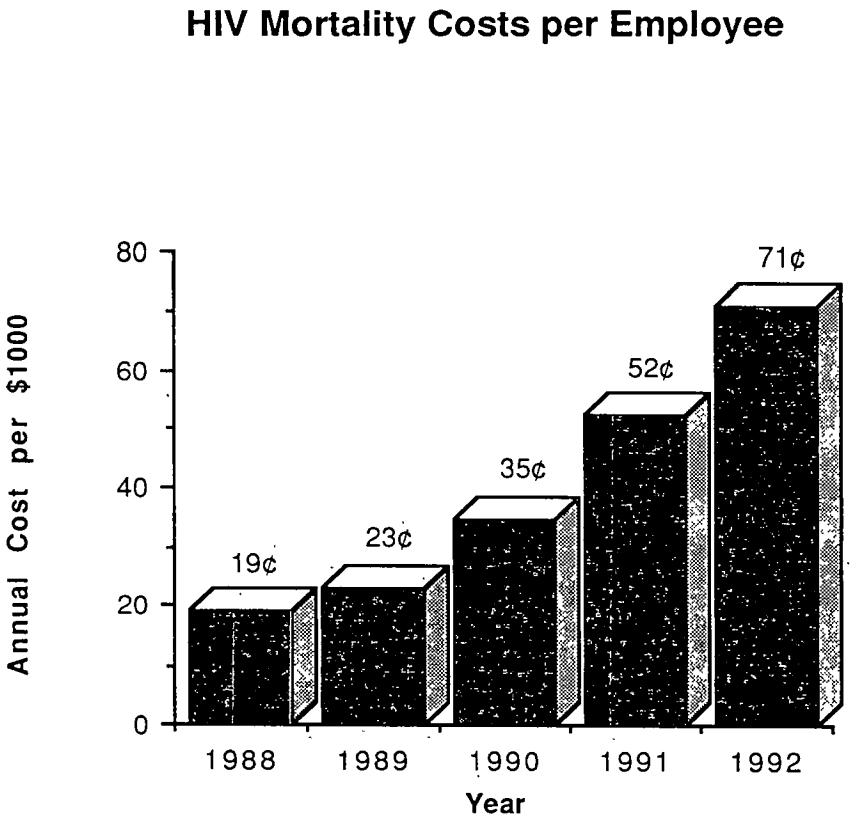

HIV Medical Costs per Employee
$ per Year
80
60
40
20
0
$13
$21
$32
$47
$72
1988
1989
1990
1991
1992
Year

FIGURE 4


HIV Mortality Costs per Employee
Annual Cost per $1000
80
60
40
20
0
19¢
23¢
35¢
52¢
71¢
1988
1989
1990
1991
1992
Year

in 1992, a compounded annual rate of increase of 54%. Even after taking out the effects of trend, the rate would still be 45%.

Figure 4 shows the annual traditional mortality per $1,000 of coverage for the block of insured employees resulting from HIV-related deaths. The additional mortality increases from $.19 per 1,000 in 1988 to $.71 per 1,000 by 1992, an increase of 39% per year. If you compare these costs with expected group mortality, you can see they are very significant.

In closing, it should be clear that HIV will have a major impact on group insurance plans. There are many HIV-related issues surrounding group insurance, and although different than individual life insurance, these issues must be addressed and actively managed. I hope my presentation has given you some ideas about possible responses to these issues.

MR. ROBERT W. BEAL:

THE IMPACT OF AIDS ON INDIVIDUAL DISABILITY INCOME INSURANCE

I would like to discuss the AIDS risk as it pertains to individual disability insurance. It has been suggested to me on a number of occasions that disability insurance should be insulated from the AIDS risk because the high mortality associated with the disease will lead to very short-term claims. As I will demonstrate, this is certainly not the case. Indeed, the risk brings potentially greater claim frequency and greater average claim durations in many situations. In many ways the impact of AIDS could be more devastating for disability insurance than life insurance.

The magnitude of the AIDS risk for individual disability is a function of the prevalence of HIV-infected insureds in the inforce and new business and the mortality pattern of AIDS-related claimants. Prevalence of infection is almost impossible to determine although thoughtful modeling should provide some reasonable indications. As for mortality experience, there should be enough incurred AIDS-related claims to quantify this part of the risk.

Mike Cowell and Walter Hoskins in their paper, "AIDS, HIV Mortality and Life Insurance," derived annual AIDS mortality rates based upon Centers for Disease Control (CDC) reported AIDS cases and deaths. These annual mortality rates were 45% in the first and second years from the progression to AIDS, 35% in the third year, and 25% per year thereafter.

It is not obvious whether or not the mortality experience of AIDS disability claimants should be significantly different from that of AIDS cases in general. On the one hand, it can be argued that mortality of AIDS disability claimants will be higher because they can no longer perform the important duties of their occupations. On the other hand, the overall health and available medical care of an insured group should be better than for the general population. Thus, the mortality experience of AIDS disability claimants may be lower than for the population of all AIDS cases, of which 35% are intravenous (IV) drug users. In addition, AIDS disability claimants may include those suffering from AIDS-related complex (ARC) at disablement, and this subgroup should experience lower mortality than those with fully developed AIDS.

Social Security Disability Insurance (DI) studies show that of persons entitled to DI benefits on the basis of AIDS or ARC, only 50% survived to the end of the first calendar year of entitlement, 20% survived to the end of the second year,

and 10% survived to the end of the third year. Presently, the percentage of AIDS cases entitled to Social Security DI benefits is around 25%. Assuming entitlement first occurs in the middle of the calendar year, on the average, this subset of AIDS cases is experiencing a much higher mortality rate for disability claimants than would be expected from the Cowell-Hoskins estimates.

INTERCOMPANY STUDY OF INDIVIDUAL DISABILITY AIDS CLAIMS

Last fall, in order to better evaluate the mortality associated with AIDS disability claimants, I collected data on 489 individual disability AIDS-related claims from sixteen insurers. These companies wrote approximately 60% of the 1986 new individual disability premium and had approximately 60% of individual disability inforce premium at the end of 1986.

My database included all individual disability AIDS-related claims that were incurred by the 16 contributing companies since they began identifying such claims. Only AIDS-related claims that had received a benefit were included in the database. The monthly indemnity of the 489 claims was $842,000 with $7.3 million in benefits paid. About 54% of these claims had terminated due to death. The average duration of claim beyond the waiting period was 8.7 months for all claims in the database.

Some may view the 8.7-month average claim duration as proof that disability AIDS-related claims have significantly shorter claim durations than non-AIDS claims. However, when we look at the average claim duration by year of disability, it becomes clear that the 8.7 months is indicative of an immature block of claims (Table 3).

TABLE 3

AIDS Study
Average Claim Duration

Year of Disablement	Number of Claims	Average Claim Durations
1987	92	4.0 mos.
1986	211	8.8
1985	118	9.9
1984	43	11.0
1983	18	19.3
Pre 1983	7	23.2
	489	8.7

Companies were asked to identify the medical condition at time of disablement for each claim, specifically AIDS, ARC, HIV positive (but asymptomatic), or some other condition. Three companies with a combined total of 109 claims were able to distinguish between AIDS and ARC at disablement. No other conditions at disablement were given. If the distribution of the claims between AIDS and ARC for these three companies is representative of the total AIDS database, then approximately 25% of the claims had ARC at disablement and 75% had AIDS.

Monthly mortality rates for these claims were calculated. The months of exposure contributed by a claim beyond the waiting period was the amount of disability benefits received divided by the monthly indemnity. In order to avoid potential distortions from overhead expense policies, only claims with benefit periods over 24 months were included in the mortality study. Table 4 provides

the resulting monthly mortality rates at various durations from the date of disability.

TABLE 4

Monthly Mortality Rates
AIDS Claims With Benefit Periods Over 24 Months
by Number of Claims

Period of Months Since Disablement Beginning	End	Months of Exposure	Deaths	Monthly Mortality Rates	Annualized Mortality Rates
1	6	1,456	56	.038	.37
7	12	1,335	76	.057	.51
13	18	612	49	.080	.63
19	24	271	14	.052	.47
1	24	3,673	195	.053	.48
25 and over		261	13	.050	.46
Overall		3,934	208	.053	.48

The average monthly mortality rates during the first 24 months of disability were .053, which is equivalent to an annualized rate of .48. The result is consistent with the Cowell-Hoskins mortality rate of .45 for each of the first two years from progression to AIDS.

The average monthly mortality rate after the first two years of disablement was .050, which is also close to the .45 death rate. However, the months of exposure after two years of disability are quite small and the Cowell-Hoskins annual mortality rate of .35 in the third year may still be reasonable. The increasing/decreasing pattern of monthly mortality rates shown in Table 4 is noteworthy but not necessarily statistically credible.

EXPECTED CLAIM DURATION OF INDIVIDUAL DISABILITY AIDS CLAIMS

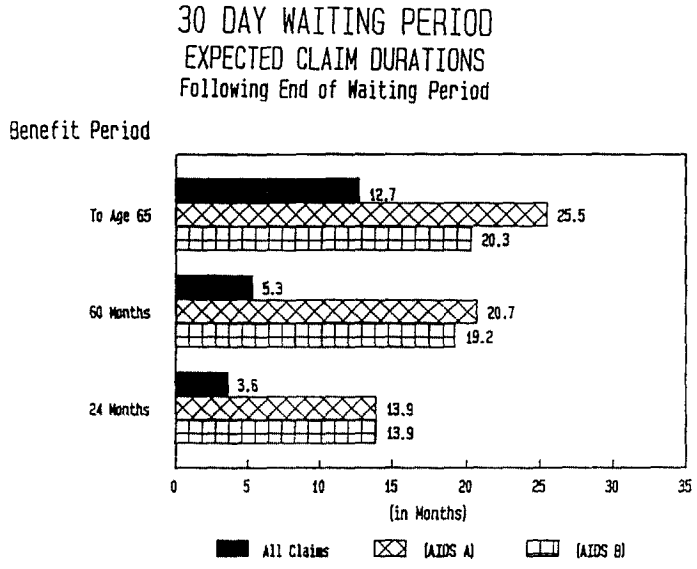
The study suggests that the Cowell-Hoskins AIDS mortality rates may reasonably represent the mortality of disability AIDS claims, even though the AIDS claims had either AIDS or ARC at disablement. There is some indication that the mortality rates may not decrease after the second year.

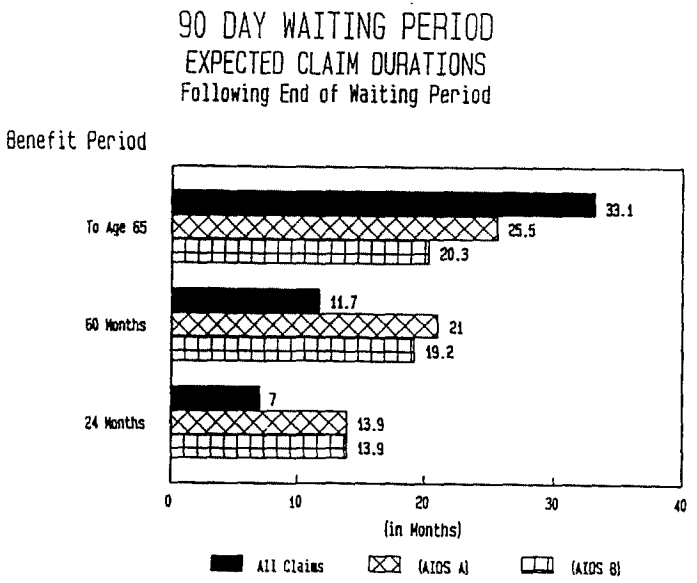
Graph 1 compares the expected claim duration of a non-AIDS claim with that of a disability AIDS claim. The non-AIDS duration is based upon the Commissioner's Individual Disability Table A (CIDA), occupation class 1, male, age 40, accident and sickness combined. The AIDS claim duration is calculated under two scenarios:

AIDS A: AIDS disability mortality follows the Cowell-Hoskins mortality rates (.45, .45, .35, and .25) from date of disablement.

AIDS B: AIDS disability mortality follows a level .45 annual death rate from date of disablement.

GRAPH 1


30 DAY WAITING PERIOD
EXPECTED CLAIM DURATIONS
Following End of Waiting Period
Benefit Period
To Age 65
60 Months
24 Months
12.7
25.5
20.3
5.3
20.7
19.2
3.6
13.9
13.9
0
5
10
15
20
25
30
35
(in Months)
All Claims
(AIDS A)
(AIDS B)


90 DAY WAITING PERIOD
EXPECTED CLAIM DURATIONS
Following End of Waiting Period
Benefit Period
To Age 65
60 Months
24 Months
33.1
25.5
20.3
11.7
21
19.2
7
13.9
13.9
0
10
20
30
40
(in Months)
All Claims
(AIDS A)
(AIDS B)

It is apparent that unless the waiting period is long (such as 90 days or longer) and the benefit period is To Age 65 (or Lifetime), AIDS-related claims should have claim durations significantly longer than non-AIDS claims. In the AIDS database, only 20% of the claims had the longer waiting/benefit period combinations. In the future, drugs like AZT may lengthen the average claim duration even more.

DISABLED LIFE RESERVES

Table 5 compares the disabled life reserves of a non-AIDS claim with an AIDS claim. The non-AIDS reserves are on based duration, except that sickness-only termination rates were used.

TABLE 5

Diasbled Life Reserve Factors
Discounted at 5% Annually
Per $1 Monthly Indemnity
30-Day Waiting Period/To Age 65 Benefit Period

Month of Disablement	85 CIDA	AIDS A	AIDS B
1	$10.88	$22.46	$18.75
3	22.09	22.89	18.77
6	44.67	23.65	18.80
12	76.49	25.59	18.90
24	101.28	31.98	19.20
36	107.68	35.97	19.20
48	110.73	35.96	19.20

Note: 85 CIDA based on occupation class 1, male age 40, sickness only.

It is clear that the non-AIDS disabled life reserve basis is inappropriate for AIDS claims. As a company's block of disabled AIDS claims increases, significant distortions in earnings could result by continued use of the non-AIDS basis.

OTHER AIDS CLAIM CHARACTERISTICS

In addition to the mortality study, other interesting information was obtained from the database.

Of the 489 AIDS claims, only 2 were female, reflecting both the low percentage of female insureds and the low percentage of female AIDS cases in the general population.

Table 6 compares the age distribution at disablement of the AIDS claims to the CDC age distribution of all AIDS cases as of October 12, 1987. Ages 30-39 represent the same proportion of cases, but as we might expect, there is very little representation in the under age 30 category for the disability AIDS claims.

Table 7 shows the distribution of AIDS claims by occupation. This reflects the underlying primary markets defined by occupation for many companies. It suggests that companies should not necessarily feel protected from the AIDS risk because they sell primarily to the professional or executive occupations.

TABLE 6

AIDS Claims
by Age at Disablement

Age At Disablement	AIDS Database Number	AIDS Database Monthly Indemnity	CDC Reported Cases
Under 30	3.7%	1.9%	22.7%
30-39	46.8	51.4	46.5
40-49	34.8	33.7	20.8
50+	14.7	13.0	9.9
TOTAL	100.0%	100.0%	100.0%

TABLE 7

Distribution of AIDS Claims by Occupation

Occupation	Number	Monthly Indemnity
Doctor	21.5%	31.9%
Dentist	7.4	12.1
Executive	7.0	7.8
Attorney	3.7	4.6
Hairdresser	4.9	3.3
Realtor	3.1	2.8
Psychologist/Psychiatrist	2.0	2.6
Manager	2.9	2.2
Interior Decorator	2.5	2.1
Teacher	3.3	1.6
Other	41.7	29.0
TOTAL	100.0%	100.0%

UNDERWRITING

The AIDS risk has three prongs. First, some segment of our inforce has or will become infected by the virus following issuance of insurance and will ultimately fall victim to AIDS. Second, we can expect that some persons who have AIDS will seek to purchase insurance if they do not have it. And third, we can expect that a significant segment of persons who are infected or who are leading a high-risk life-style will be inclined to purchase insurance.

Last year many individual disability carriers initiated blood testing for the virus during underwriting as protection against the third prong. Many of these companies settled on blood test limits around $3,000. In my opinion, it is questionable how effective this limit will be in controlling the risk from HIV-infected applicants.

For a recent article in Lincoln National's *Reinsurance Reporter*, Mike Brodrick and I developed a model to estimate the overall cost of various blood test limits in relation to the present value of expected premiums from a block of new business. The overall cost is equal to the extra cost due to blood testing applicants

at or above the limit, plus the present value of future claim costs from infected applicants not tested.

Using information from the Cowell-Hoskins model, we estimated the present value of future claim costs from infected applicants to be $12.05 per $1.00 monthly indemnity. This is approximately 15 times the corresponding figure for non-infected standard insureds. This calculation assumes a To Age 65 benefit period, 70% with a 30-day waiting period and 30% with 90-day, a 5% annual lapse rate, and a 5% annual discount rate.

The marginal cost of an HIV antibody test in our model was set at $35 to include the lab fees and the cost of a paramedic to draw the blood, assuming there is no other reason for the blood test. When additional blood analysis is needed, which we assumed to occur at coverages of $4,000 and over, the marginal cost for the HIV antibody test was set at $25.

The prevalence rate of HIV infection among the group of applicants is the big unknown. We assumed a 2% prevalence rate. This is based on a rough estimate that 2% of the U.S. male population between the ages 20-59 are infected. Including only the male homosexual/bisexual population representing the 65% of the infected population, and recognizing that roughly 85% of new insureds are male, the 2% estimate is adjusted down to 1.1%. However, by anticipating antiselection by the infected population in the decision to purchase insurance, we moved the prevalence.

Some people may view this estimate as too conservative and point to the results of blood test laboratories that have experienced hit rates in the order of 0.2%. We believe that this hit rate underestimates the true prevalance because people in high-risk groups may avoid applying for insurance when HIV-antibody testing is required.

Given the model assumptions, we solved for the ideal test limit,

$$\frac{\$35.00}{.02 \times 12.05} = \$145$$

This test limit implies that it is "theoretically" cost-effective to test every applicant.

To determine the overall cost at various blood test limits, we incorporated a distribution of new business by policy size bands that was provided by a larger writer of individual disability insurance. We assumed the average premium per policy is $800 and the present value of $1.00 of annual premium was $6.500 recognizing lapses and a 5% discount rate. We also assumed that the nonmedical limit was $4,500 and that 85% of all applications resulted in paid business.

Table 8 shows the modeled overall cost at various blood test limits as a percent of expected premiums from a group of new applicants.

Without testing, companies run the risk of losing over 10% of their premiums. This exceeds the expected pretax profit margin for many carriers. Even a $3,000 limit could ultimately cost 7% of expected premiums.

I believe companies should be assessing the appropriateness of their blood test limits using a model such as this. Many of the model assumptions used here may

TABLE 8

Overall Cost at Various Blood Test Limits
as a Percent of Expected Premiums
From a Group of New Applicants

Blood Test Limit	Overall Cost
$ 0	0.8%
1,000	3.0
2,000	5.4
3,000	7.0
4,000	8.0
5,000	8.8
6,000	9.1
8,000	9.6
10,000	10.0

be challenged, and the marketing implications of lowering blood test limits cannot be ignored. Regardless, companies should not remain blind to the potential claim costs that can surface down the road, and estimates of their future impact should be revised frequently.

CONCLUSIONS

In many ways, risk of AIDS for individual disability insurance looks very similar to that for individual life insurance. The current and future prevalence of infection within the inforce is as uncertain for both types of insurance and the threat of antiselection is just as real. Three factors appear to increase the severity of the AIDS risk for individual disability:

1. The average payout per AIDS-related claims should be significantly greater than for non-AIDS claims.

2. Drugs like AZT should dramatically lengthen the average payout per AIDS-related claims without necessarily reducing the incidence rate.

3. Disability claims for insureds who are infected, but asymptomatic, may become more common in the future.

The HIV-infected, but asymptomatic, claim may be infrequent now, but companies should not ignore this aspect of the disability AIDS risk. The following recommendations from the Council on Ethical and Judicial Affairs of the American Medical Association suggest that the HIV-infected, asymptomatic claims will become more common:

1. "A physician who knows that he or she is seropositive should not engage in any activity that creates a risk of transmission of the disease to others."

2. "A physician who has AIDS or who is seropositive should consult colleagues as to which activities the physician can pursue without creating a risk to patients."

It may be difficult to deny a claim to a seropositive physician who chooses not to practice his or her profession on ethical grounds. Given that physicians represent the largest occupation for many, if not most, individual disability writers, the seriousness of this aspect of AIDS, which applies only to disability insurance, becomes very clear.

MR. GREGG R. SADLER:

UNDERWRITING FOR HIV INFECTION

The subject of my comments is "Underwriting for HIV Infection", not underwriting for AIDS. There's a big difference between the two. If any company out there is underwriting for AIDS and not for HIV infection, they are missing most of the risks because there's a lot more people who have been infected with the HIV virus than there are diagnosed AIDS cases. There are currently 1,500,000 to 2,000,000 people (maybe more) in the United States who have been infected with the AIDS virus and a large majority of those are projected to ultimately develop AIDS. According to the CDC, 52,250 AIDS cases have been diagnosed as of February 1, 1988. Several published studies are estimating that 40-50% of those infected with the HIV virus will develop AIDS within 10 years and 70-80% within 15 years. So, the risk is dramatic. Our underwriting at Business Men's Assurance Co. (BMA), and I'm sure for most of your companies, is focused on underwriting for HIV infection not for AIDS.

Many individuals who have been infected by HIV are aware of this fact and have a great opportunity to "anti-select" against an insurance company by obtaining coverage before the symptoms of the illness develop. In my career in the insurance industry I don't think there has ever been a disease where pure insurance antiselection is operating any more than with the current AIDS epidemic.

At BMA, there are four underwriting principles with regard to AIDS and HIV infection that we feel are very important. First, AIDS and HIV infection must be treated like any other disease with major risk implications. Second, our job is to assess the risk, not to make a diagnosis. We are not here to make a diagnosis. We're not set up to make a diagnosis. We are merely assessing the insurance risk based on the factors we know about our applicants. Third, we are committed to maintaining the confidentiality of the medical and underwriting information we receive. That is very important and I will comment a little bit more on it later. Fourth, we must, of course, comply with the laws in the states where we do business, and there are some states that have special laws regarding underwriting for AIDS and HIV infection.

Several underwriting tools are useful in underwriting for this disease. First is the blood chemistry profile. This is just about the only way that you are going to find out if someone is positive for HIV. Once in a while it will show up in an attending physician's report, but most typically that's our best way of underwriting for HIV infection.

Second, we have designed some application questions to try to focus on the AIDS risks. Certainly our underwriters are paying attention to individuals exhibiting symptoms of AIDS or who have been diagnosed as having AIDS. We're also looking much closer now at histories of sexually transmitted diseases. It used to be that that might not have been a major underwriting concern, but I really question in this day and age with the AIDS risk whether or not an individual who has a history of more than one sexually transmitted disease in the past is a standard risk in today's environment.

Third, we found our personal history interviews that we conduct from the home office to be valuable in combating the AIDS risk.

Fourth, of course, attending physicians' statements indicate whether someone has been treated for symptoms or diagnosed as having AIDS. In some cases, it will also give you information on whether or not an individual has been tested for HIV.

Fifth, I think it's important to look at your claim results and see where the AIDS claims are coming from and try to learn as much as you can that will help you in the underwriting process.

BLOOD TESTING FOR HIV INFECTION

Currently, the best tool for underwriting HIV infection is the blood test for the presence of antibodies to HIV. The immune system profile includes an HIV-antibody test (enzyme-linked immunoabsorbent assay [ELISA] method) and a Western Blot confirmation test. You must have the two positive ELISA tests and the confirmatory Western Blot before an individual is reported as positive for HIV. In California, where these two tests are not legal right now because they are antibody tests, the T-cell test is used.

The following items are important for a successful testing program:

1. Reliable Results. Test accuracy is, of course, essential to all parties involved -- the applicant, the insurer, and the agent. The reliability of HIV antibody testing has been questioned by many, including the media, the state insurance departments, and state legislatures. However, it is becoming more clear that the approved testing protocol is very accurate. According to Dr. James Allen of the CDC, when the total sequence of testing is performed by a qualified laboratory, the probability of a false-positive test in a population with a low prevalence of infection is 0.001% (1 in 100,000). This low false-positive rate makes it an excellent test for insurance underwriting purposes.

2. Consistency. Consistency of testing methodology for all applicants is essential to ensure equitable and sound risk classification.

3. Confidentiality. As with other underwriting and medical information, it is critical that test results remain confidential. There has been concern expressed by many individuals regarding the confidentiality of test results. Although I believe our industry's track record is very good in this area, I also believe we must be extremely vigilant in maintaining the confidentiality of these results.

   At BMA, we have a written, documented procedure about the confidentiality not only for AIDS but for other diseases as well. Those kind of results are kept in a special place with very limited access. When we have a positive result that has to be communicated to an applicant, our procedure is to send a letter by registered mail with a return receipt requested directly to the person who was tested, the proposed insured. They must sign that they received the letter.

   Our letter says that the reason that their insurance was declined was due to abnormal laboratory results. We recommend that they see their doctor for interpreting this result. We enclose a self-addressed, stamped envelope

for them to write back to us with the doctor to whom they would like us to disclose the results. We do not put the results in that letter. The individual at that point does not know the specifics of the tests that we have performed. We feel it is very important since we're not in the business of diagnosing risk to get the applicant to their doctor since the doctor is in a much better position than we are to discuss the implications of the results with the insured. So far, in all of the positive results that we have had, the individuals have responded to that very first letter. Our procedure is that if someone does not respond to our first letter, we will send a follow-up letter in two weeks, again by registered mail, indicating that this is the second letter.

4. Protective Value. Blood chemistry profile testing for antibodies to HIV has a very large protective value. The greatest value of HIV testing is at the younger ages where underwriting has tended to be most liberal. I have developed a hypothetical example assuming testing was done for Major Medical insurance on 10,000 policies in a population with a 1% prevalence rate. In age groups with a higher prevalence, the protective value would be proportionately higher.

Number of Policies	10,000
Number of HIV-Positives (1% prevalence)	100
Estimated Present Value of AIDS Claims	$3,500,000
Cost of HIV Testing (lab and paramedical)	$ 500,000
Protective Value Per Dollar of Cost	7-1

As you can see, the protective value is dramatic (a 7-1 present value return) for this single component of the blood profile. The value of non-AIDS-related tests received from the blood chemistry profile would add significantly more value. I have estimated the total protective value of "routine" blood chemistry profiles to be in excess of 20-1 on BMA's individual life insurance.

5. Agent Acceptance. Of course, any testing program must be understood and accepted by the sales force. The current network of paramedical companies has made blood testing much easier for both applicants and agents.

In summary, the projected cost of HIV infection to insurers is large. AIDS medical costs to insurers has been estimated to be in the neighborhood of $10 billion from 1987 through 1991. Sound, up-to-date underwriting for HIV infection is essential for the protection of insurers, policyowners, and shareholders.

MR. JAN R. HARRINGTON: Mr. Sadler mentioned the accuracy of the tests and I'm one of the people who has been questioning the accuracy, and I still question the accuracy because you have these small-print things about the population with low risk. There are two aspects of the tests that I would like him to comment on. One is the accuracy of the third conceptual test, the one that California lets you do but you don't do unless you have to. And the second question is false-negatives. False-positives unfairly may deprive a healthy individual of insurance, but false-negatives give the insurance company an unhealthy life when they thought they had a healthy life. I would think the

cost-effectiveness of testing would go down substantially if you do have a significant number of false-negatives.

MR. SADLER: Let me respond to the second question first on false-positives and false-negatives. Certainly both are of concern. I think it's very important, particularly for an HIV test, that the false-positives be as low as possible. When the disease has the implications that it does in our society today, the testing that we do has just got to have a very, very low false-positive rate. The ACLI has a paper on the false-positives of the testing and it reinforces that when you are using a quality laboratory, the false-positive rate is very low. A lot of the publicity about quality of laboratory testing you've read about in the paper has been aimed at some of the smaller, local laboratories and that's why I believe it's very important to deal with a quality laboratory in your testing. On the false-negative issue, I would refer you to Dr. Bill Roberts of Home Office Reference Laboratory, who I think can respond more knowledgeably on what a possible false-negative rate is.

On the T-cell question, it is not the insurance industry's choice and it's not Home Office Reference Laboratory's choice; that is the choice of the California Legislature. The T-cell test is not nearly as accurate for predicting HIV positivity. The T-cell test is very accurate for what it does. It gives the T-cell ratios which are important in the immune system, but certainly it would be much more accurate for predicting HIV positivity to be able to do the HIV antibody tests. Hopefully, in the near future, there will be progress made in this regard and the insurance industry will be allowed to use the test that is accurate. If there are other tests developed like the antigen tests that laboratories are working on, hopefully that's a test we will be able to do.

MR. STEPHEN M. MAHER: Mr. Beal used the 2% prevalence rate, and I was wondering if he had done any other work through testing with a lower prevalence rate and how that might have affected those figures or if he would care to speculate.

MR. BEAL: I think it's proportional based on the relatively simple calculation in the model. I didn't get scientific in terms of the spread of the infection by band size and things like that. In those figures, if you were using a 1% prevalence rate instead of 2%, the maximum 10% of premium would be 5%. At a .2% prevalence rate the cost would tend to be level. Regardless of where you set your test limit, it came out to around 1% of premium. This says, theoretically, in that situation, whether you test or not, your overall cost is going to be the same as percent of premium. I look at that and say do you want to go out on a limb and assume there is a .2% prevalence rate on those you are not testing and be cavalier, or be a little more conservative. The curve is not the typical one that we learned in our study notes for nonmedical testing where you had a U-shaped utility curve. Essentially, this curve is a straight line and it is up primarily.

MR. R. DENNIS CORRIGAN: I have a question on testing. I understand that the California department's problem is with antibody testing and that there is a direct virus test that is under development. I wonder if we could be updated as to the progress on that and would there be any desire if that test proved effective to replace the current protocol. And, finally, in California I've heard some rumors that there may be some progress in reversing the current stand against antibody testing. Any comments on that?

MR. SADLER: I've heard the same rumors. That's about all I can say on the California situation. I am on the ACLI Risk Classification Committee and I've heard that there may be some progress there. On the different tests, again, I'm not an expert in the medical testing field. What I've heard Dr. Bill Roberts at Home Office Reference Laboratory say recently, if I understood him correctly, is that the antigen test that is being worked on does have a lot of promise. For one thing, it would be positive even before the individual seroconverts and actually is positive for the antibodies. So there could be a time frame where someone's been infected with the virus that we're missing on the HIV antibody test because they haven't developed the antibodies yet. I understand that with the antigen test you would pick up those individuals. I also understand that once the individual seroconverts, the antigen count goes way down. So the problem is with the antigen test to make it sensitive enough that it will test positive even after an individual has seroconverted and without developing any falsepositives. Right now it's an expensive test, but it's one that shows a lot of promise. From an underwriting point of view it would be an excellent test once it gets perfected.

MR. ELLIOTT I. COBIN: Question for Mike Zurcher. In your model of employee costs, I assume that it was for group insurance in total. Do you have any extension to that model that we could take into account medical underwriting, specifically if a good HIV question was used?

MR. ZURCHER: Obviously it was easier to build the model without having those type of issues, because I could just take a general population model and assume that the group insurance coverages were related to that. I haven't taken the model and applied underwriting selection to it, but we've provided the model to other areas of the company and encouraged them to modify it and try something like that.