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Session 2

Panel: AIDS and the Valuation Actuary

# The Cost of Treating HIV Infection at Empire Blue Cross and Blue Shield

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## AIDS AND THE VALUATION ACTUARY

MR. TIMOTHY F. HARRIS: We're going to talk about AIDS and the Valuation Actuary. I'm Timothy Harris with Milliman and Robertson, and I'm a member of the Life Committee of the Actuarial Standards Board (ASB), one of the people who was involved with the recent ASB draft standard of practice on AIDS. Another of our panelists is John Eisenhandler, Ph.D., who has a doctorate in sociology and demographics. John is going to go into some detail on the experience that his company, Empire Blue Cross/Blue Shield has had with AIDS. The other panelist is Jack Ladley, FSA with Ernst & Young/Huggins. Jack is going to go over some live calculations regarding AIDS.

My discussion is going to cover some of the requirements in the U.K., the U.S. and Canada regarding AIDS reserving. We're also going to cover a survey that we did earlier this year in connection with another panel, which looked at what actuaries did at the end of 1989 regarding AIDS reserving, and if we have time, we may look at a few possible methods of reserving for AIDS. Let's start with John Eisenhandler.

## THE COST OF TREATING HIV INFECTION AT EMPIRE BLUE CROSS AND BLUE SHIELD

DR. JON EISENHANDLER: Empire Blue Cross and Blue Shield is a "not for profit" health insurer. It sells health insurance to individuals and groups in eastern New York State in a region stretching from the New York City area to the Canadian border. Empire Blue Cross and Blue Shield is the region's largest private health insurer with approximately 10,000,000 customers whose coverages range from stand alone hospital products to major medical packages that encompass the full spectrum of medical services. Although the corporation insures people from throughout the region and, for that matter, from across the country, the vast majority live and work in or near New York City, which has had more AIDS cases than any other area in the United States.

In 1986 Empire Blue Cross and Blue Shield began to analyze its experience with AIDS or, more correctly, the costs associated with treating a Human Immunodeficiency Virus (HIV) infection. This endeavor continues to this day. The sole intent of this and related analyses is to understand and project the impact of the epidemic upon the corporation and its customers. From the onset of the epidemic, Empire Blue Cross and Blue Shield has adhered to a policy of nondiscrimination with regard to individuals affected by the disease and its antecedent conditions, including HIV seropositivity. AIDS has been treated as any other serious illness. The corporation has made no effort to exclude or discourage from

coverage any individual or category of individuals who might be at particular risk for HIV infection. Towards this end, the corporation does not test for HIV seropositivity. As part of this policy, and in keeping with corporate guidelines on the handling of data, Empire Blue Cross and Blue Shield has a policy of strict confidentiality on HIV-related data that could be used to identify specific individuals. Towards this end, the corporation does not maintain permanent lists of individuals with AIDS or of individuals at high risk of HIV infection (e.g., intravenous drug users). When lists of people with AIDS or at risk for AIDS are needed to support analysis and reporting, these lists are created only in the context of an automated process and are erased when processing is completed.

**The Identification of HIV-Related Cases and Claims**

The Identification of Cases -- As previously pointed out, Empire Blue Cross and Blue Shield does not keep a permanent list of people with AIDS. Moreover, it does not maintain clinical records on any of its customers. Hence, the corporation does not have the ability to identify which of its customers have been diagnosed with AIDS as defined by the Centers for Disease Control or when they received the diagnosis. However, the corporation receives reliable diagnostic data (ICD-9-CM) with institutional (hospital) claims for inpatient admissions and those home care services provided by institutions in lieu of inpatient care. Using these diagnoses, an automated methodology has been developed that identifies individuals with AIDS, or more correctly, individuals who have received

hospital care for the opportunistic infections characteristic of an HIV infection. This methodology is accurate, albeit not perfect. It is based on the assumptions that (1) every insured person with AIDS will receive hospital care at some point in the course of his or her illness and that (2) hospital claims contain accurate diagnostic data. A more detailed description of this methodology is described in a paper entitled "The Identification of HIV Related Claims at Empire Blue Cross and Blue Shield," which can be obtained from Empire Blue Cross and Blue Shield.

**The Identification and Classification of Claims**

Once an individual case has been identified, his or her AIDS/HIV-related claims are defined by a simple rule. All claims incurred in the period starting three years prior to the hospital admission which identified the claimants as having AIDS through their most recent claim are considered to be HIV-related. The only exception to this are those maternity-related claims incurred prior to the AIDS/HIV-defining claim or diagnosis. There are two reasons for using a three-year interval:

1. A cohort analysis of the diagnoses associated with the hospital admissions of people with AIDS has shown that inpatient admissions with diagnoses indicative of an HIV infection begin to appear as early as three years before HIV disease is definitively identified off of hospital claims.

2. The same cohort analysis has indicated that a cohort's utilization of hospital services, regardless of diagnosis, begins to increase about three years prior to the claims which identify its members.

Once identified, individuals are assigned cohorts based upon the year in which the AIDS-defining diagnosis/claim was incurred. By placing individuals into cohorts, the average lifetime costs and utilization of people who became seriously ill at approximately the same time can be calculated. By comparing cohorts, changes in the pattern and level of health care utilization can be discerned as the epidemic progresses. It is important to realize that by their very nature cohort data are incomplete. They consist of only that portion of the cohort's experience paid through the date when the data were collected. As long as members of the cohort are alive, the cohort's experience will change, albeit at decreasing levels as members die or lose their coverage.

**The Empire Blue Cross and Blue Shield AIDS Population**

To date Empire Blue Cross and Blue Shield has provided hospital insurance for some 11,929 individuals with HIV infections who have become ill enough to require hospitalization. This number is conservative since an unknown number of cases, especially in the early years of the epidemic, were not identified and, today, many people in the early stages of their illness have yet to be identified. This population has grown significantly

since the start of the epidemic (see Table 1). From 106 new cases in 1982, annual incidence grew to about 3,000 new cases a year in 1988 where it appears to have reached a plateau. However, it is not clear whether this plateau in the number of new cases indicates a peak in the incidence of AIDS or whether it is a function of delays in the onset of AIDS or the need for hospitalization for the treatment of AIDS. It is conceivable that therapies such as AZT, aerosolized pentamidine, etc., as well as greater physician effectiveness in treating AIDS outside of hospital settings, may be contributing to a reduction in the measured incidence of the epidemic.

To date the typical Empire Blue Cross and Blue Shield customer with AIDS has been and continues to be a male in his late thirties (Table 1). The composition of this population is far from static. Most notably, the number of female and pediatric cases have increased substantially in the last few years. While risk group affiliation is not readily identifiable from Empire Blue Cross and Blue Shield's data, the data do suggest that the corporation's experience with the epidemic is paralleling that of New York City as a whole where the epidemic was initially concentrated among homosexual men and then began to affect intravenous drug users, their sexual partners, and their children. Based on the number of women and children in the corporation's AIDS population, as well as corporate studies of insured intravenous drug users, it is reasonable to project that in 1990 slightly more than

## TABLE 1
## AIDS CASES BY AGE, SEX, AND COHORT

| AGE | MALE | PERCENT | FEMALE | PERCENT | TOTAL | PERCENT |
|---|---|---|---|---|---|---|
| NO AGE | 2 | 0.0% | 0 | 0.0% | 2 | 0.0% |
| < 5 | 115 | 1.1 | 96 | 6.7 | 211 | 1.8 |
| 5 - 9 | 38 | 0.4 | 28 | 2.0 | 66 | 0.6 |
| 10 - 14 | 20 | 0.2 | 19 | 1.3 | 39 | 0.3 |
| 15 - 19 | 37 | 0.4 | 28 | 2.0 | 65 | 0.5 |
| 20 - 24 | 154 | 1.5 | 79 | 5.5 | 233 | 2.0 |
| 25 - 29 | 912 | 8.7 | 195 | 13.7 | 1,107 | 9.3 |
| 30 - 34 | 2,054 | 19.6 | 312 | 21.8 | 2,366 | 19.8 |
| 35 - 39 | 2,519 | 24.0 | 278 | 19.5 | 2,797 | 23.4 |
| 40 - 44 | 1,837 | 17.5 | 172 | 12.0 | 2,009 | 16.8 |
| 45 - 49 | 1,285 | 12.2 | 132 | 9.2 | 1,417 | 11.9 |
| 50 - 54 | 801 | 7.6 | 31 | 2.2 | 832 | 7.0 |
| 55 - 59 | 555 | 5.3 | 29 | 2.0 | 584 | 4.9 |
| 60 - 64 | 130 | 1.2 | 24 | 1.7 | 154 | 1.3 |
| + 65 | 42 | 0.4 | 5 | 0.4 | 47 | 0.4 |
| TOTAL | 10,501 | 88.0% | 1,428 | 12.0% | 11,929 | 100.0% |

| | CASES | AVERAGE AGE[1] | FEMALES | | PEDIATRIC CASES[2] | |
|---|---|---|---|---|---|---|
| | | | NUMBER | PERCENT | NUMBER | PERCENT |
| 1982[3] | 106 | 33.8 | 9 | 8.5% | 6 | 5.7% |
| 1983 | 314 | 38.2 | 21 | 6.7 | 3 | 1.0 |
| 1984 | 593 | 37.7 | 35 | 5.9 | 11 | 1.9 |
| 1985 | 961 | 37.7 | 57 | 5.9 | 11 | 1.1 |
| 1986 | 1,383 | 37.8 | 122 | 8.8 | 18 | 1.3 |
| 1987 | 1,882 | 38.2 | 192 | 10.2 | 37 | 2.0 |
| 1988[4] | 2,988 | 38.8 | 427 | 14.3 | 83 | 2.8 |
| 1989 | 2,776 | 38.5 | 423 | 15.2 | 76 | 2.7 |
| 1990[5] | 926 | 38.8 | 142 | 15.3 | 32 | 2.3 |
| TOTAL | 11,929 | 38.3 | 1,428 | 11.9% | 277 | 2.3% |

NOTES:
1. Average age is calculated at date of identification.
2. Pediatric cases include all cases in children younger than 10 years old.
3. Age reporting was inaccurate in 1982.
4. In 1988 New York State went to DRG system of hospital reimbursement which improved the accuracy of diagnosis data which in turn reduced the number of unidentified cases and allowed for earlier identification of cases.
5. Data for the cohort of 1990 are incomplete. It is projected that there will be about 3,000 new cases identified in this year.

SOURCE: Empire Blue Cross and Blue Shield hospital claims incurred and paid January 1,1982 - June 30, 1990.

half of new cases will be homosexual men with most of the rest being intravenous drug users, their sexual partners, and children.

**HIV-Related Utilization**

Institutional Data -- Empire Blue Cross and Blue Shield hospital insurance generally pays for most institutional care including inpatient and outpatient services, as well as 200 home health care visits per year on standard policies. It usually consists of full or first dollar coverage with cost-sharing arrangements, i.e., deductibles and copayments, being the exception rather than rule. It does not pay for all costs associated with hospital care. Private physician visits and certain hospital services not central to medically necessary care (e.g., room telephones) are not covered by hospital insurance. The individual is financially liable for these other services. Those uncovered services that are medically related may be paid by the individual's medical/major medical insurance with the individual being responsible for uncovered services. Individuals are also liable if they exceed the limits of their policy or policies or if their coverage lapses.

The payment data reflect the rates paid by Blue Cross plans and Medicaid in New York State. Since Blue Cross plans and Medicaid pay for the overwhelming majority of the AIDS cases in New York State, Blue Cross payments reflect the prevailing rates paid for AIDS treatment in New York.

For this study the data include all claims incurred and paid between January 1, 1982 through June 30, 1990. The data used to describe the earliest and latest cohorts are not complete. The data on earliest cohorts, 1982, 1983, and 1984 do not include their earliest utilization. The most recent cohorts, because many, if not most of their members, are still alive and covered by Empire Blue Cross and Blue Shield, continue to incur claims.

Institutional Utilization and Costs -- Virtually all of the costs for the institutional care of people with AIDS have been for inpatient care (see Table 2). Lifetime inpatient utilization, as measured by the average number of admissions and the length of the average stay, declined substantially in the early days of the epidemic. If the data from the cohort of 1982 are adjusted to compensate for the fact that claims incurred prior to 1982 are not included in the analysis, the earliest cases required more than eighty lifetime inpatient days incurred in more than four inpatient admissions. By the cohort of 1987, the last cohort for which there are more or less complete data available, those numbers had declined to 3.7 admissions and 59 days (numbers which will increase slightly as members of the cohort are still alive and will require more hospital treatment). As these numbers do not differ markedly from the experience of the previous two cohorts, 1985 and 1986, it would appear that the decline in lifetime inpatient utilization has ended.

**TABLE 2**
**MEAN LIFETIME INSTITUTIONAL COSTS AND UTILIZATION BY COHORT**

| | | | | INPATIENT | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | LIFETIME | | | | COST | | | | | |
| | | TOTAL[2] | | CLAIMS/ | | | AVERAGE | PER | PER | OUTPATIENT | | HOME CARE | |
| COHORT[1] | PEOPLE | CLAIMS | PAYMENT | ADMISS | DAYS | PAYMENT | STAY | ADMISS | DAY | CLAIMS | PAYMENT | CLAIMS | PAYMENT |
| 1982 | 106 | 6.43 | $33,257 | 4.12 | 77.47 | $32,555 | 18.79 | $ 7,897 | $420 | 2.12 | $ 557 | 0.19 | $145 |
| 1983 | 314 | 5.46 | 38,360 | 3.70 | 75.54 | 37,515 | 20.39 | 10,129 | 497 | 1.54 | 570 | 0.22 | 275 |
| 1984 | 593 | 5.52 | 36,161 | 3.62 | 67.99 | 35,502 | 18.78 | 9,806 | 522 | 1.68 | 321 | 0.22 | 338 |
| 1985 | 961 | 6.02 | 36,278 | 3.63 | 61.31 | 35,026 | 16.87 | 9,639 | 571 | 2.14 | 752 | 0.25 | 500 |
| 1986 | 1,383 | 6.34 | 37,997 | 3.76 | 60.91 | 36,718 | 16.20 | 9,768 | 603 | 2.31 | 752 | 0.27 | 527 |
| 1987 | 1,882 | 7.42 | 39,806 | 3.71 | 59.00 | 38,251 | 15.90 | 10,308 | 648 | 3.44 | 1,064 | 0.27 | 491 |
| 1988[3] | 2,988 | 6.72 | 36,009 | 3.28 | 49.04 | 34,449 | 14.97 | 10,515 | 702 | 3.25 | 1,207 | 0.19 | 352 |
| 1989 | 2,776 | 5.54 | 29,200 | 2.52 | 34.47 | 27,238 | 13.67 | 10,802 | 790 | 2.90 | 1,714 | 0.12 | 247 |
| 1990 | 926 | 3.40 | 18,351 | 1.76 | 20.88 | 17,981 | 11.86 | 10,215 | 861 | 1.58 | 779 | 0.06 | 90 |

NOTES:

1. A cohort consists of all individuals who had their first identifiable AIDS-related claim in that year. Cohort utilization consists of all nonmaternity claims incurred from three years prior to through the identification date and all claims (including maternity) incurred subsequent to that date. A cohort's utilization will continue to increase as long as any of its members are still insured by Empire Blue Cross and Blue Shield. The early AIDS/HIV-related hospital utilization of the cohorts of 1982, 1983, and 1984 is not included in this table because pre-1982 data have been excluded from this analysis because of changes in corporate system which occurred in 1982.
2. All payments are average per case.
3. In 1988 New York State adopted DRGs (diagnosis related groups) for the payment of most hospital inpatient admissions. The sharp jump in the number of AIDS cases reflects improvements in the identification of cases stemming from this change.

SOURCE: Empire Blue Cross and Blue Shield hospital claims incurred and paid January 1, 1982 - June 30, 1990.

Summary -- With the end of the decline in inpatient utilization, the lifetime costs per case can be expected to rise as the impact of inflation will no longer be offset by declining utilization. It is not unreasonable to believe that the ultimate average cost (unadjusted for inflation) of treating the members of the cohort of 1990 will be at least $60,000. These costs, some of which have already been paid, will be spread out over a number of years with most incurred in 1990 and 1991.

Noninstitutional Data -- Empire Blue Cross and Blue Shield offers a variety of noninstitutional coverages. Noninstitutional coverages range from indemnity coverages, which offer a fixed level of reimbursement for limited services, to fairly comprehensive major medical packages. At any given time during the period of analysis, just under half of the AIDS population had no noninstitutional coverage with Empire Blue Cross and Blue Shield, 35-40% had basic medical coverage, and slightly less than 15% had major medical coverage. Data on Empire Blue Cross and Blue Shield basic medical coverages are of limited analytical use because many services are not covered (e.g., drugs) and they often make limited payments on those that are covered. On the other hand, Empire Blue Cross and Blue Shield's major medical coverages pay for most nonhospital costs, e.g., physician visits, laboratory services, prescription drugs, etc. Therefore, this analysis will focus upon subscribers with major medical coverage.

Detailed data are available on most noninstitutional services. For the sake of brevity the data on the number of services to be presented in this report will be limited to home and office visits. Home and office visits are the best indicator of the level and intensity of ambulatory care as a physician visit is normally required for access to other services (e.g., laboratory tests) and therapies (e.g., drugs). Home and office visit data are also the best data in terms of their consistency and accuracy. They are more likely than other claims to represent equivalent services with each claim usually representing a single visit (albeit of varying duration and intensity). On the other hand, a drug claim, for example, can be for any prescription drug with the amount prescribed at the discretion of the physician.

Measuring noninstitutional costs and utilization is complex. Services are generally subject to some form of cost-sharing arrangements (deductibles and copayments) and may only be reimbursed at a predetermined level. The difference between what the insurer pays and the amount charged for the service may be absorbed by the individual, the provider, or both. The best solution to this problem is to report on both the fees charged for the services and the overall level of reimbursement.

The data used in this analysis also include the date on which the service was incurred. Because the data also include the admission date of the hospital claim that identified the

individual as having AIDS, the noninstitutional date can and will be grouped relative to that date.

The analysis of noninstitutional data includes all claims paid from January 1, 1984 through June 30, 1990. As with the institutional data, the data used to describe the earliest and latest cohorts are not complete. Lifetime noninstitutional costs and utilization are difficult to gauge because there is relatively complete experience for only two cohorts, those of 1986 and 1987. The data for the cohorts of 1984 and 1985 do not include sufficient experience prior to their identification as AIDS cases to be comparable. The latter cohorts have large numbers of active members who are still incurring claims. Their lifetime experience is incomplete, i.e., it can be expected to increase significantly over the next few years.

Lifetime Noninstitutional Utilization and Costs -- The increase in noninstitutional utilization can be seen in the growth of claims for lifetime physician home and office claims from 36.5 for the cohort of 1986 to 38.4 for the cohort of 1987 with data from the latter cohort still incomplete (see Table 3). Data from the later cohort of 1988, most of whose members are still alive, show 37.2 claims for physician home and office services. This number will surely increase significantly over the lifetime of the cohort. Much of this growth is coming early in the course of the illness (prior to the hospital claim that identifies the individual as having an HIV infection), indicating a more aggressive approach on the part of physicians

TABLE 3

MEAN LIFETIME MEDICAL EXPENDITURES PAID THROUGH JUNE 30, 1990 FOR INDIVIDUALS WITH MAJOR MEDICAL COVERAGE BY COHORT

| COHORT | EXPOSURE (1) | HOME & OFFICE CLAIMS (2) | HOME & OFFICE FEES | HOSPITAL SERVICES FEES | SURGERY/ ANESTH FEES | RADIOLOGY/ ULTRASOUND NUCLEAR FEES | PATH/ LAB FEES | DRUG FEES | NUTRITION THERAPY FEES (3) | OTHER FEES | TOTAL FEES | TOTAL PAYMENTS | PAYMENT AS A % OF FEES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 84 | 57 | 19.2 | $2,227 | $2,983 | $1,768 | $ 557 | $705 | $1,192 | $ 0 | $2,210 | $11,643 | $10,016 | 86.0% |
| 85 | 99 | 26.2 | 2,673 | 3,654 | 2,611 | 783 | 1,015 | 1,564 | 44 | 2,544 | 14,888 | 12,249 | 82.3 |
| 86 | 158 | 36.5 | 3,788 | 4,510 | 3,633 | 1,195 | 1,556 | 2,528 | 1,121 | 3,768 | 22,099 | 18,288 | 82.8 |
| 87 | 249 | 38.4 | 4,136 | 5,208 | 4,455 | 1,497 | 1,682 | 4,792 | 4,707 | 4,592 | 31,068 | 25,249 | 81.3 |
| 88 | 419 | 37.2 | 3,788 | 3,815 | 3,745 | 1,182 | 1,614 | 5,491 | 2,141 | 4,221 | 25,997 | 21,097 | 81.2 |
| 89 | 378 | 30.8 | 3,489 | 2,511 | 3,088 | 1,294 | 1,400 | 5,386 | 2,604 | 2,665 | 22,436 | 18,026 | 80.3 |
| 90 | 122 | 24.9 | 2,787 | 1,393 | 2,374 | 1,209 | 1,067 | 4,801 | 1,604 | 1,521 | 16,756 | 12,897 | 77.0 |
| MEAN MEDICAL SERVICES USED BEFORE IDENTIFICATION | | | | | | | | | | | | | |
| 86 | 158 | 10.5 | 888 | 448 | 769 | 334 | 503 | 277 | 0 | 272 | 3,491 | 2,595 | 74.3 |
| 87 | 249 | 11.5 | 1,063 | 613 | 919 | 400 | 451 | 479 | 15 | 373 | 4,313 | 3,203 | 74.3 |
| 88 | 419 | 15.9 | 1,410 | 443 | 1,196 | 433 | 684 | 1,146 | 263 | 1,332 | 6,907 | 5,476 | 79.3 |
| 89 | 378 | 18.6 | 1,927 | 434 | 1,411 | 714 | 858 | 2,079 | 920 | 732 | 9,075 | 6,987 | 77.0 |
| 90 | 122 | 20.2 | 2,116 | 340 | 1,537 | 1,046 | 893 | 3,457 | 670 | 628 | 10,687 | 8,075 | 75.6 |
| MEAN MEDICAL SERVICES USED AFTER IDENTIFICATION | | | | | | | | | | | | | |
| 84 | 57 | 14.3 | 1,715 | 2,722 | 1,756 | 434 | 430 | 1,116 | 0 | 2,162 | 10,334 | 8,887 | 86.0 |
| 85 | 99 | 16.3 | 1,883 | 3,179 | 2,055 | 519 | 624 | 1,218 | 44 | 2,358 | 11,882 | 9,892 | 83.3 |
| 86 | 158 | 26.1 | 2,900 | 4,032 | 2,864 | 861 | 1,053 | 2,251 | 1,121 | 4,286 | 19,368 | 15,693 | 81.0 |
| 87 | 249 | 27.0 | 3,074 | 4,595 | 3,536 | 1,096 | 1,232 | 4,313 | 4,692 | 4,219 | 26,756 | 22,046 | 82.4 |
| 88 | 419 | 21.3 | 2,378 | 3,372 | 2,549 | 749 | 932 | 4,345 | 1,878 | 2,890 | 19,091 | 15,622 | 81.8 |
| 89 | 378 | 12.6 | 1,564 | 2,077 | 1,676 | 580 | 542 | 3,307 | 1,684 | 1,933 | 13,364 | 11,041 | 82.6 |
| 90 | 122 | 4.7 | 673 | 964 | 836 | 164 | 174 | 1,344 | 934 | 893 | 5,982 | 4,824 | 80.6 |

NOTES:

1. Exposure is a weighted average of people covered by an Empire Blue Cross and Blue Shield Major Medical Package.
2. Physician services fees.
3. Other services include services not readily classifiable, e.g., ambulance, nursing, medical supplies, etc., and nonstandard or erroneous codes.

SOURCE: Empire Blue Cross and Blue Shield Medical and Major Medical claims paid – January 1, 1984 through June 30, 1990.

towards treating HIV-infected patients in the early stages of their illness. The pre-identification utilization of home and office services has gone up substantially for those cohorts with reasonably complete pre-identification histories (the cohorts of 1986, 1987, 1988, 1989, and 1990). Prior to being identified, members of the cohort of 1987 had filed 11.5 claims for physician services. For the cohort of 1989 the comparable figure is 18.6 claims. The early and very incomplete data for the cohort of 1990 shows 20.2 claims per person (a number which will rise as the data become more complete) suggesting that the level of early utilization may be approximately double that of the cohort of 1987.

The aggressive treatment of HIV infections are beginning to increase lifetime costs significantly. The average lifetime noninstitutional costs for the cohort of 1986 were $22,099. This figure is still increasing as some members of the cohort are living and there are claims yet to be processed. The ultimate lifetime costs for this cohort will probably approach $23,000. When the current cost data for the cohort of 1986 are compared to those of the cohort of 1987, lifetime costs increased 40.6% or $31,068. The growth in noninstitutional costs and services is even more rapid when one considers that many of these fees reflect services associated with hospital inpatient care. If the fees for private physician services associated with a hospital stay and those for surgery and anesthesia are eliminated, the current noninstitutional lifetime costs of the cohorts of 1986 and 1987 are $13,956 and $21,405, respectively, representing a growth of nonhospital-related costs

between the cohorts of 1986 and 1987 of 53.4%. The ultimate difference between the cohorts of 1986 and 1987 can be estimated to be approximately 50% with the average reported lifetime noninstitutional costs for the cohort of 1987 eventually totaling about $35,000. While part of this increase is due to inflation, much of it is due to new outpatient treatment modalities and the improved survival of people with AIDS. This can be seen in the growth of costs related to drug and nutritional therapies. The data from the cohorts of 1986 and 1987 show a virtual doubling of drug costs and a quadrupling of costs related to nutritional therapies. If anything these data understate the impact of these therapies as they did not become widely available until many of the members of the cohort of 1987 had died. As progress occurs, it is almost certain that the high rate of growth for noninstitutional costs will continue for future cohorts.

Summary -- The noninstitutional cost of treating AIDS is rising rapidly as physicians become more aggressive and more successful in their treatment of HIV infections. The data indicate the lifetime costs of treating the cohort of 1986 will ultimately be about $23,000. Inflation, increasing utilization, and improvements in survival, will raise this figure substantially. It is not unreasonable to expect the lifetime cost per cohort to increase 35% to 40% over its predecessor for the next few years. In other words it is very plausible that the ultimate lifetime noninstitutional costs of a case identified in 1990 will be roughly $90,000, albeit without adjusting for inflation. For customers with Empire Blue Cross and

Blue Shield major medical coverage, about $75,000 will be paid for by their health insurance with most of the rest absorbed by the customer. This figure is a conservative estimate as not all aspects of care are covered and there is evidence that some claims are not filed.

**Conclusion**

Early on in the epidemic, AIDS costs were primarily associated with inpatient care. Lifetime AIDS costs were stable and actually declined in real terms as physicians, learning to treat the new disease, were able to reduce lifetime inpatient utilization by a quarter. However, we are now beginning to experience large increases in lifetime costs per case as more aggressive and more expensive therapies become commonplace. The costs associated with drug and nutritional therapies in particular are increasing dramatically. When all costs, both institutional and noninstitutional are considered, it is likely that the average cost for treating a person developing AIDS this year will be approximately $150,000 (unadjusted for inflation). These costs will be spread out over a number of years and will, of course, vary by individual, with some individuals incurring far greater costs than others.

For a corporation with many AIDS cases, such as Empire Blue Cross and Blue Shield, these costs can appear daunting. This year it is likely that the corporation will pay approximately $150,000,000 for HIV-related claims. While this is a significant sum, it needs to be placed

in perspective. The costs associated with treating HIV still represent a very small percentage of all the health care costs. Moreover, the impact of HIV upon the overall annual increase in health care costs is much smaller than that due to inflation and other causes.

Empire Blue Cross and Blue Shield has been able to meet the challenge of HIV by maintaining a large community-rated pool for its small group and individual business. For groups outside of the community-rated pools, the problem of AIDS is one of adjusting to very large claims while maintaining rate stability. Towards this end, Empire Blue Cross and Blue Shield requires all but the very largest groups to purchase stop-loss insurance to mitigate the impact of shock claims.

## AIDS AND THE VALUATION ACTUARY

MR. HARRIS: I'm going to talk about the current AIDS reserving requirements or standards that exist in the U.K., Canada and the U.S. And we're going to look at what actuaries have been doing in these three countries with respect to reserving for AIDS. If we have time, I may go over some of the possible methods of reserving for AIDS.

All three countries, the U.K., Canada and the U.S. presently have some type of requirements for AIDS reserves. The U.K. was the first country to act. It came out with what it called "Bulletin #2" in 1988, which recommended a Projection F. The British had a number of projections, one of which was Projection F. The British recommended the net premium approach, and they allowed their actuaries to use margins and present reserves to partially or totally offset AIDS reserves.

Munich Re did a survey in 1989 to check on what had actually happened in 1988 and found that one-half of the respondents to this survey had indeed established additional reserves for AIDS, and that the other half had not, but they felt that the cost of AIDS was covered by the margins in their existing reserve bases. Some 85% of the respondents had used the recommended Projection F, and the balance had used a stronger basis. The British or the U.K. has since come out with a new bulletin, "Bulletin #4," which included a revised

recommended projection, Projection R, which actually is a little bit softer than Projection F, so a lot of the British actuaries are still using Projection F in their reserving method and are, as I said, reserving for AIDS.

In Canada, the Canadian Institute of Actuaries (CIA) issued in 1988 and 1989, guidance notes for valuation actuaries. These guidance notes recommended the mortality, underwriting, area adjustments and methodology to be used in reserving for AIDS. They also suggested that separate assumptions be used for U.S. and Canadian business. I think we're all aware that the risk is different between the two countries.

Looking at year-end 1988 data again, 140 out of 150 Canadian companies included additional reserves for AIDS, at the end of 1988. And I don't know if I have my facts straight but I heard that most, if not all of the balance, were U.S. subsidiaries operating in Canada. The total additional reserves set up for AIDS was $550 million Canadian. The CIA presently has committees addressing this issue. They address it on an annual basis, and they're also looking at changing their required reserve bases. They're looking at changing to a GAAP basis, and they have a technique paper, which is similar to our standards, that is due out some time in 1991 or 1992 and addresses the reserving issue for AIDS.

What's happening in the U.S.? We talked earlier about the proposed standard of practice, "Guidance for Estimating and Providing for the Cost of HIV-Related Claims Covered Under Life and Accident and Health Insurance Policies." We have had two different exposure drafts on this. As Harold Ingram mentioned in Session 1, the second exposure draft came out because of an ambiguity in the first exposure draft, which surfaced when we reviewed all of the comments. The ambiguity had to do with whether or not allocating surplus was an appropriate method for dealing with the AIDS liability. It was the opinion of the ASB that it was not, in fact, an appropriate method of dealing with this liability. The ASB felt that if you determine that there is a liability, you should establish a reserve for it. The second exposure draft also had an ambiguity, and that ambiguity pertained to whether or not you could take into account existing margins or margins that exist in reserve bases. I think the feeling of the committee at the ASB was that you could, it was just not clearly stated in the standard.

Based on the comments received and the opinion of the life committee, the principles applicable to AIDS are identical to those applicable to other causes of claim, so why do we need a standard? Why do we need a separate standard for AIDS? Why don't we have a standard for heart disease and cancer? Wouldn't it be inappropriate to imply that AIDS claims should be treated differently than other causes of claims, in order to develop an opinion on the adequacy of statutory reserves?

These are some of the reasons why the life committee of the ASB thought that we should not have a separate standard for AIDS reserving.

We already have Recommendation 7. The Life Committee of the Actuarial Standards Board at its last meeting recommended to the ASB that we amplify Recommendation 7, which already addresses reserves for AIDS, and that the exposure draft not be adopted. The ASB at its October 1990 meeting agreed to follow this recommendation.

Recommendation 7 of the Academy's Financial Reporting Recommendations and Interpretations gives specific advice as to the practices that are to be followed by an actuary opining on the adequacy of statutory reserves. For those of you who haven't read Recommendation 7 recently, you will now find it in the back of your grey ASB standards book. It's no longer in the Yearbook. You may want to get it out and take a look at it.

I'm going to quote that portion of Recommendation 7 which addresses this issue:

> In those instances wherein there is evidence that because of company experience or practices, inappropriate or inadequate statutory reserve standards, or extraordinary external events occurring prior to the statement date, the statutory reserves might not make good and sufficient provision of unmatured obligations, then the actuary should make further tests.

I believe this says it all.

This was one of the reasons that we felt that a standard wasn't needed. This recommendation which already applies to us, requires that we address the AIDS issue and requires that we establish additional reserves if they are required. In addition, if we're signing the annual opinion, we have to attest to the good and sufficiency requirements. And that would require that we would have addressed the AIDS issue. Recommendation 7 goes on to suggest that gross premium valuation approach be used, but other methods are acceptable, if they get the job done.

Let's take a look at what actuaries in the U.S actually did at the end of 1989.

We performed a survey in conjunction with the Society of Actuaries and in preparation for a panel that was presented at the Hartford meeting on April 30 - May 1, 1990. We surveyed chief actuaries from the Society's chief actuary mailing list to see what they had done about AIDS at the end of 1989. Let's look at some of the results.

Here's a listing of the number of respondents by type of ownership and by size (Table 1). We used asset categories for size. You can see that we had a decent response to the survey, enough to lend validity to the results.

TABLE 1

NUMBER OF RESPONSES TO AIDS RESERVING SURVEY

| Asset Categories | Mutual | Stock | Mutual & Stock |
|---|---|---|---|
| > 1 Billion | 24 | 40 | 64 |
| > 250 Million < 1 Billion | 14 | 26 | 40 |
| > 100 Million < 250 Million | 8 | 15 | 23 |
| > 25 Million < 100 Million | 4 | 12 | 16 |
| < 25 Million | 1 | 2 | 3 |
| Total | 51 | 95 | 146 |

To get the survey rolling, we laid some groundwork in the early questions. For example, we checked to see whether these chief actuaries were up to speed with the current information on the topic. And we asked them whether or not they had reviewed the July 1989 AIDS committee reports (Table 2). And in fact, 84% had and 16% had not.

TABLE 2

HAVE YOU REVIEWED THE JULY 1989 AIDS COMMITTEE REPORTS?

Totals of All Asset Categories

| Response | Mutual Percent | Stock Percent | Mutual & Stock Percent |
|---|---|---|---|
| Yes | 86.27% | 83.16% | 84.25% |
| No | 13.73 | 16.84 | 16.75 |

We then asked them whether or not they had reviewed this now deceased exposure draft on AIDS (Table 3). We found that a slightly higher percentage had reviewed it. That may be because it was shorter; it wasn't as long as the committee report. But there were still some people who hadn't looked at this.

**TABLE 3**

**Have You Reviewed the Actuarial Standards Board Exposure Draft, "Guidance on Estimating and Providing for the Cost of HIV-Related Claims Covered Under Life and Accident and Health Policies?"**

**Totals of All Asset Categories**

| Response | Mutual Percent | Stock Percent | Mutual & Stock Percent |
|---|---|---|---|
| Yes | 96.08% | 83.16% | 87.67% |
| No | 3.92 | 16.84 | 12.33 |

We then asked these actuaries whether or not they had projected the impact of AIDS on their existing business. We found that just slightly more than half had actually projected the impact of AIDS on their existing business (Table 4). We noted that the percentage that had projected the impact of AIDS increased with the size of the company.

TABLE 4

**Has Your Company Projected the Impact of AIDS on Existing Business?**

**Totals of All Asset Categories**

| Response | Mutual Percent | Stock Percent | Mutual & Stock Percent |
|---|---|---|---|
| Yes | 58.82% | 47.37% | 51.37% |
| No | 41.18 | 52.63 | 48.63 |

We also asked whether or not they had projected the impact of AIDS on new business (Table 5). Note, if you remember the last percentage, there's now a 10% drop in the number that have projected the impact of AIDS on new business, and that may be because of the general impression that new business is not as risky as existing business, because you're now testing. But in any event, you have a lower percentage of people who projected the impact of AIDS on new business.

TABLE 5

**Has Your Company Projected the Impact of AIDS on New Business?**

**Totals of All Asset Categories**

| Response | Mutual Percent | Stock Percent | Mutual & Stock Percent |
|---|---|---|---|
| Yes | 50.98% | 36.84% | 41.78% |
| No | 49.02 | 63.16 | 58.22 |

Now that some of these actuaries have read the material and some of them have projected the impact of AIDS, we asked them how they would assess their company's risk to the financial implications of AIDS on existing business (Table 6). And you can see that about half thought there was little or no risk. Some 44% thought there was moderate risk, and 4% thought there was high risk. In doing some cross-correlation here, we found that all but one of the high risk companies had projected the impact of AIDS. So the high risk companies, all but one of them, were concerned about the impact of AIDS. More of the smaller companies thought that there was little or no risk, and a few thought that they were high risk. We were also able to determine that the assessment of risk had a correlation to the amount of business that was written in what you would consider the high risk states -- New York, California, Florida and Texas. We found that one of the companies that thought it was in the high risk area had a $250,000 testing limit. Which, as we'll see later, is quite high. So the company was not only high risk but also it was taking a lot of this high risk.

TABLE 6

**How Would You Categorize Your Company's Exposure to the Financial Implications of AIDS on Existing Business?**

**Totals of All Asset Categories**

| Response | Mutual Percent | Stock Percent | Mutual & Stock Percent |
|---|---|---|---|
| Little or No Risk | 39.22% | 57.90% | 51.37% |
| Moderate Risk | 56.86 | 37.89 | 44.52 |
| High Risk | 3.92 | 4.21 | 4.11 |

We also asked how chief actuaries would categorize their company's exposure to AIDS on new business (Table 7). And the results are essentially the same. We noted that fewer people thought that their companies were high risk. So there was a slight shift toward perceived lower risk on new business.

TABLE 7

**How Would You Categorize Your Company's Exposure to the Financial Implications of AIDS on New Business?**

**Totals of All Asset Categories**

| Response | Mutual Percent | Stock Percent | Mutual & Stock Percent |
|---|---|---|---|
| Little or No Risk | 39.22% | 58.95% | 52.05% |
| Moderate Risk | 58.82 | 40.00 | 46.58 |
| High Risk | 1.96 | 1.05 | 1.37 |

We then wanted to know whether or not they had incorporated AIDS in their pricing mortality (Table 8). And we found that almost 40% of the chief actuaries responding said that they had. Some of the comments that we received indicated that they were just not considering improvements in mortality. They were assuming that mortality stayed level, and we also had some comments regarding reduced dividend scales on new products.

**TABLE 8**

**Has Your Company Incorporated the Impact of AIDS in Its Pricing Mortality?**

**Totals of All Asset Categories**

| Response | Mutual Percent | Stock Percent | Mutual & Stock Percent |
|---|---|---|---|
| Yes | 41.18% | 36.84% | 38.36% |
| No | 58.82 | 63.16 | 61.64 |

The crucial question was then, did these chief actuaries establish any additional reserves for AIDS at the end of 1989, and if not, why not (Table 9)? You can see that only 6.3% of this group did establish reserves for life insurance. Another 4% allocated surplus, which is now not the way that you do things. What were some of the reasons that were given for not reserving?

TABLE 9

**Did Your Company Establish Additional Reserves or Allocate Surplus for AIDS In Its 1989 Statutory Statement for Individual Life?**

**Totals of All Asset Categories**

| Response | Mutual Percent | Stock Percent | Mutual & Stock Percent |
|---|---|---|---|
| Reserve | 9.76% | 4.65% | 6.30% |
| Surplus | 2.44 | 4.65 | 3.94 |
| Reason #1 | 53.65 | 47.67 | 49.60 |
| Reason #2 | 9.76 | 23.26 | 18.90 |
| Reason #3 | 7.32 | 11.63 | 10.24 |
| Reason #4 | 12.19 | 3.49 | 6.30 |
| Reason #5 | 4.88 | 4.65 | 4.72 |

Reasons Given for Not Establishing Reserve or Allocating Stock
- Reason #1 - Covered by Margins in Table
- Reason #2 - Felt to be an Insignificant Risk
- Reason #3 - Management Decision to Delay Recognition
- Reason #4 - Covered by a Strategy of Changed Guaranteed Elements
- Reason #5 - Other

Reason #1 was that the risk was covered by the margins in the table. This was the reason given most often and in doing some cross referencing, we found that the majority of the people that gave Reason #1 had projected the impact of AIDS on their company. So we hope they know what they're talking about.

Reason #2 was they felt AIDS to be an insignificant risk. About 20% of the people gave this reason. We found that the majority of these people had not projected the impact of AIDS on their company. Therefore, these people are guessing.

Reason #3 was a management decision to delay recognition. This reason always bothers me. It gives you the impression of people being pressured not to reserve for AIDS when they think they should be reserving for AIDS.

Reason #4 was the risk was covered by a strategy of charged guaranteed elements.

Reason #5 was "Other." This was kind of a catchall for anything that we missed. One of the interesting comments that we got here was that a U.S. company did not reserve for AIDS but its Canadian parent did, and that fits with what we've seen so far, in that the Canadians are reserving and the actuaries in the U.S. are not.

We also included some questions on disability income, and Table 10 has the responses regarding reserving. A very small percentage established an additional reserve.

TABLE 10

**Did Your Company Establish Additional Reserves or Allocate Surplus for AIDS In Its 1989 Statutory Statement For Individual Disability Income?**

**Totals of All Asset Categories**

| Response | Mutual Percent | Stock Percent | Mutual & Stock Percent |
|---|---|---|---|
| Reserve | - | 2.17% | 1.28% |
| Reason #1 | 46.88% | 23.91 | 33.33 |
| Reason #2 | 40.63 | 45.66 | 43.59 |
| Reason #3 | 3.12 | 10.87 | 7.69 |
| Reason #4 | 6.25 | 4.35 | 5.13 |
| Reason #5 | 3.12 | 13.04 | 8.98 |

Reasons Given for Not Establishing Reserve or Allocating Stock
- Reason #1 - Covered by Margins in Table
- Reason #2 - Felt to be an Insignificant Risk
- Reason #3 - Management Decision to Delay Recognition
- Reason #4 - Covered by a Strategy of Changed Guaranteed Elements
- Reason #5 - Other

One of the other things we gathered some information on, since we thought it might be useful, was blood testing limits. Table 11 shows the permanent insurance testing limits for males aged 25-40. You can see the majority of the people are at the $100,000 level. On term insurance, the results are essentially the same (Table 12). Companies are pretty much at $100,000 level.

## TABLE 11

### 1989 Permanent Blood Testing Limits for AIDS For a Male Age 25-40

### Totals of All Asset Categories

| Response | Mutual Percent | Stock Percent | Mutual & Stock Percent |
|---|---|---|---|
| All Business | 1.96% | 2.11% | 2.05% |
| 15,000 | 1.96 | - | 0.69 |
| 50,000 | - | 1.05 | 0.69 |
| 75,000 | - | 1.05 | 0.69 |
| 95,000 | - | 1.05 | 0.69 |
| 100,000 | 60.79 | 61.06 | 60.95 |
| 100,001 | 11.76 | 9.47 | 10.27 |
| 101,000 | - | 2.11 | 1.36 |
| 150,000 | - | 1.05 | 0.69 |
| 150,001 | - | 1.05 | 0.69 |
| 250,000 | 1.96 | - | 0.69 |
| No Responses | 21.57 | 20.00 | 20.54 |

TABLE 12

**1989 Term Blood Testing Limits for AIDS**
**For a Male Age 25-40**

**Totals of All Asset Categories**

| Response | Mutual Percent | Stock Percent | Mutual & Stock Percent |
|---|---|---|---|
| All Business | 1.96% | 2.11% | 2.05% |
| 15,000 | 1.96 | - | 0.69 |
| 50,000 | 1.96 | 1.05 | 1.37 |
| 50,001 | 1.96 | - | 0.69 |
| 75,000 | - | 1.05 | 0.69 |
| 95,000 | - | 1.05 | 0.69 |
| 100,000 | 56.87 | 57.98 | 57.52 |
| 100,001 | 9.80 | 8.42 | 8.90 |
| 101,000 | - | 2.11 | 1.37 |
| 150,000 | - | 2.11 | 1.37 |
| 250,000 | 1.96 | - | 0.69 |
| No Responses | 23.53 | 24.21 | 23.97 |

The one thing that I found interesting about the responses to this portion of the survey, was the $100,001 limit. For any of you who have looked at a distribution of face amounts of insurance, that distribution typically clusters at certain amounts and $100,000 would be one of the more popular amounts. So if you go to $100,001, you really are opening a door for some of the risks to come through. One of the respondents gave the following reason for his company's $100,001 limit: "The agency department had lobbied with management,

saying that what difference is one dollar going to make?" This is where the actuary has to get his numbers together and show what difference one dollar will make.

We have seen what was done for year-end 1989, and we've now seen what we should be doing. What are some of the possible methods of strengthening reserves?

They should be practical in application, and they should allow the company to change assumptions to represent current conditions, which we need with the AIDS epidemic. Because we still don't have a firm grasp on the numbers, I don't think we know which way they're going. You would hope that you could implement the strengthening process over a period of years to avoid surplus strain, but I don't think that's going to be the case. That's not the case in Canada and it's not the case in the U.K. and under Recommendation 7, and the amplifications that are going to come out from the Actuarial Standards Board, that's not going to be the case in the U.S. If the reserve is required, you're going to have to set it up now. And you would hope that reserve strengthening would create as little disturbance as possible in dividend and current cost of insurance or premium calculations.

Some of the possible methods of reserve strengthening are (1) a net premium approach, which is used in the U.K.; (2) a fund approach, which was recommended in the task force

report; and (3) gross premium valuation, which is recommended by the Actuarial Standards Board in its amplification of and in the original Recommendation 7.

Cash-flow testing, in and of itself, is not a reserving method. But it's something that has to be considered when you're looking at your AIDS risk, since the AIDS claims are not going to come on an even basis. They're going to peak somewhere around the year 2000. When you run a gross premium valuation, you just get a number. That number doesn't tell you in which years you're going to incur these claims.

The net premium approach, as I mentioned, is the U.K. approach, and the concept is to start with the old basis reserves, which are calculated excluding AIDS. Then calculate new basis reserves using your revised mortality, which incorporates AIDS. But as I understand it in the U.K., you can cut out some of the margins on your base mortality, but you use the old basis net premiums. Your reserve is then the excess of the new basis reserves over the old basis reserves. Now if we were to apply this on a statutory basis in the U.S., we would have to take into account some type of persistency adjustment, since it's anticipated that individuals with AIDS are going to tend to persist more than individuals without AIDS.

Another approach, which I really don't think we can use now with the position of the Actuarial Standards Board, was described in the 1988 AIDS Task Force Report. This was

a fund approach, which had a few other problems as well. Under this approach, you accumulate a fund using an anticipated level of cost of AIDS, and you can establish an initial reserve if you think it is necessary. Your fund is then increased by this level cost plus interest, less actual AIDS claims. The Task Force also recommended that the level cost of AIDS be calculated over some limited period. Again, this is to deal with the peak AIDS claims, instead of running your calculations over the lifetime of a block of business. There is also a chance of the fund going negative in those years of peak AIDS claims.

For those of us who remember some of our actuarial mathematics, the gross premium valuation approach is the present value of all future benefits and expenses, less the present value of all future premiums. Benefits, expenses and withdrawals are adjusted for AIDS. Profits and other margins can be used to offset the cost of AIDS. An additional liability results if profits and margins do not cover the additional cost of AIDS. The results, however, can be misleading. Again, the reference here is to the fact that when you do a gross premium valuation, unless you dig into the detail, you get a number. And that number is not going to tell you the years in which you're going to have peak cash outflows due to AIDS. That's why you need to consider cash-flow testing. These previous three methods may use, what I describe as "distant future sufficiencies" to offset near future deficiencies. By that I mean that, when you're doing a gross premium valuation, you're looking at premiums over the lifetime of a block of business. Your AIDS claims are going

to be concentrated in certain years, and those years are going to occur sooner than the final years that are covered by your premium projection.

If required, a reserve then can be established to help deal with future cash flows that result.

Contingency reserves are also known as allocated surplus: This is not the appropriate method for dealing with your AIDS liability. However, in the amplification that's going to come out from the Actuarial Standards Board, it mentions that you may want to consider setting up an additional liability, possibly allocated surplus, above and beyond your most probable AIDS scenario. Let's say that you project your most probable AIDS scenario and come up with a base reserve using a gross premium valuation in conjunction with cash-flow testing. However, you're a little nervous about your projection. You're not really sure what's going to happen with AIDS mortality. You think that it may exceed your most probable projection. You would be wise to set up some additional liability possibly in the form of allocated surplus. This can then be easily adjusted should conditions change. If you feel that your AIDS mortality projections are becoming a little more stable, then you can take this allocation down. If they're becoming a little less stable, then you may want to bump your reserve.

We've seen what the other countries are doing. We've seen what we did at the end of 1989, and we now know what we should have done at the end of 1989. It's up to us as valuation actuaries to do what we should be doing as valuation actuaries.

## AIDS AND THE VALUATION ACTUARY

MR. JOHN (JACK) D. LADLEY: I'm going to focus on some life insurance calculations -- some of the practical results that we've developed in evaluations of AIDS claim levels. I'll discuss results of a sample of companies that we've worked with, and I'll provide some brief highlights of an Ernst & Young survey that we did concerning practices with respect to AIDS claims evaluation.

Table 1 shows some basic middle "Society of Actuaries scenario" results. There are seven companies shown on the table, labeled A through G. I'll use some of those designations again in the talk. The distribution systems are identified; you can see there are a variety, and there are some mixed distribution systems, also.

The third column shows a rating that I've assigned to the underwriting approach of the particular company. It's relative and not as arbitrary as you might think. Frankly, when you have seven or more companies to compare, assigning some underwriting rating with respect to their treatment of AIDS is not all that difficult. Further, some reference to Tim's survey with respect to testing limits also helps. Incidentally, that will be published in the Record. That survey should provide some assistance in establishing underwriting relativities.

**TABLE 1**

| COMPANY | DISTRIBUTION SYSTEM | UNDERWRITING APPROACH[2] | PRESENT VALUE OF AIDS[1] CLAIMS AS OF 12/31/89 PER BILLION OF IN FORCE | PRESENT VALUE OF AIDS[1] CLAIMS AS OF 12/31/89 AS A PROPORTION OF RESERVE[3] |
|---|---|---|---|---|
| A | Direct | 1 | $2.92 Million | 1.7% |
| B | General Agents | 1 | 3.25 Million | 8.2 |
| C | Broker/Direct | 5 | 1.88 Million | 19.8 |
| D | Direct | 2 | 3.69 Million | 91.0 |
| E | Branch and P/C Agents | 3 | 2.05 Million | 6.7 |
| F | Broker | 2 | .81 Million | 1.5 |
| G | Branch | 4 | .92 Million | .6 |

1. SOA, Middle Scenario, 20 Years, 6% Discount Rate
2. Scale of 1 (Highly Liberal) to 5 (Highly Conservative)
3. All OL Reserves, Including Deficiency Reserves

The next two columns of the table provide a present value of AIDS claims -- as I mentioned, this is based on the SOA middle scenario -- discounted at 6%. I'll explain this in somewhat more depth later. A comparison is made on two bases: one is per billion dollars of in force, and the second is a percentage of reserve.

As you can see, the proportion of in force is a much better measure. This provides a reasonable benchmark, at least for this series of companies. You may have results that deviate from this, but for these seven it worked rather well. The benchmark is approximately $2 million (of AIDS claims present value) per billion of in force, with the range being from just under $1 million to about $3.5 million.

The percentage of reserves is not a very reliable indicator or benchmark, obviously -- due to varying reserve practices and the effect of items such as deficiency reserves on term. Incidentally, companies B and E also had material present value of AIDS claims on individual disability income and C and D also on material present value of AIDS claims on their group life lines.

I'd like to emphasize that these results are not entirely theoretical. We have made an attempt to calibrate or validate these results against as much company data as we could. I think this gives the results a compelling reality. I'd also like to note that, initially, and in

the absence of any analysis, most of these companies tended to evaluate their AIDS risk at a very low level. Considered in developing these numbers are, of course, testing limits, geography, the time of introduction of testing, and various breakdowns of the blocks of business involved.

Table 2 summarizes, for the first four companies, the ratios of the results from the Society's low scenario to the middle, and from the high scenario to the middle. You'll notice the company's results are fairly tightly grouped. The low typically came out about two-thirds of the middle, and the high approximately 65% higher.

Looking further at company C (Chart 1), we see graphed some actual dollars of AIDS claims, as opposed to the prior comparisons of ratios. Note a couple of things here. The claims scenario rises over time then falls. The start date here would be 12/31/89, so we're looking at a period in the late 1990s for the peak of these curves. Notice also the amplitude of the curves at their peak, relative to current AIDS claim levels. Also notice the shape of the curves relative to one another. The low scenario reaches its peak approximately two years earlier than the middle, which in turn is approximately two years earlier than the high. This illustrates one of the key differences among the three scenarios.

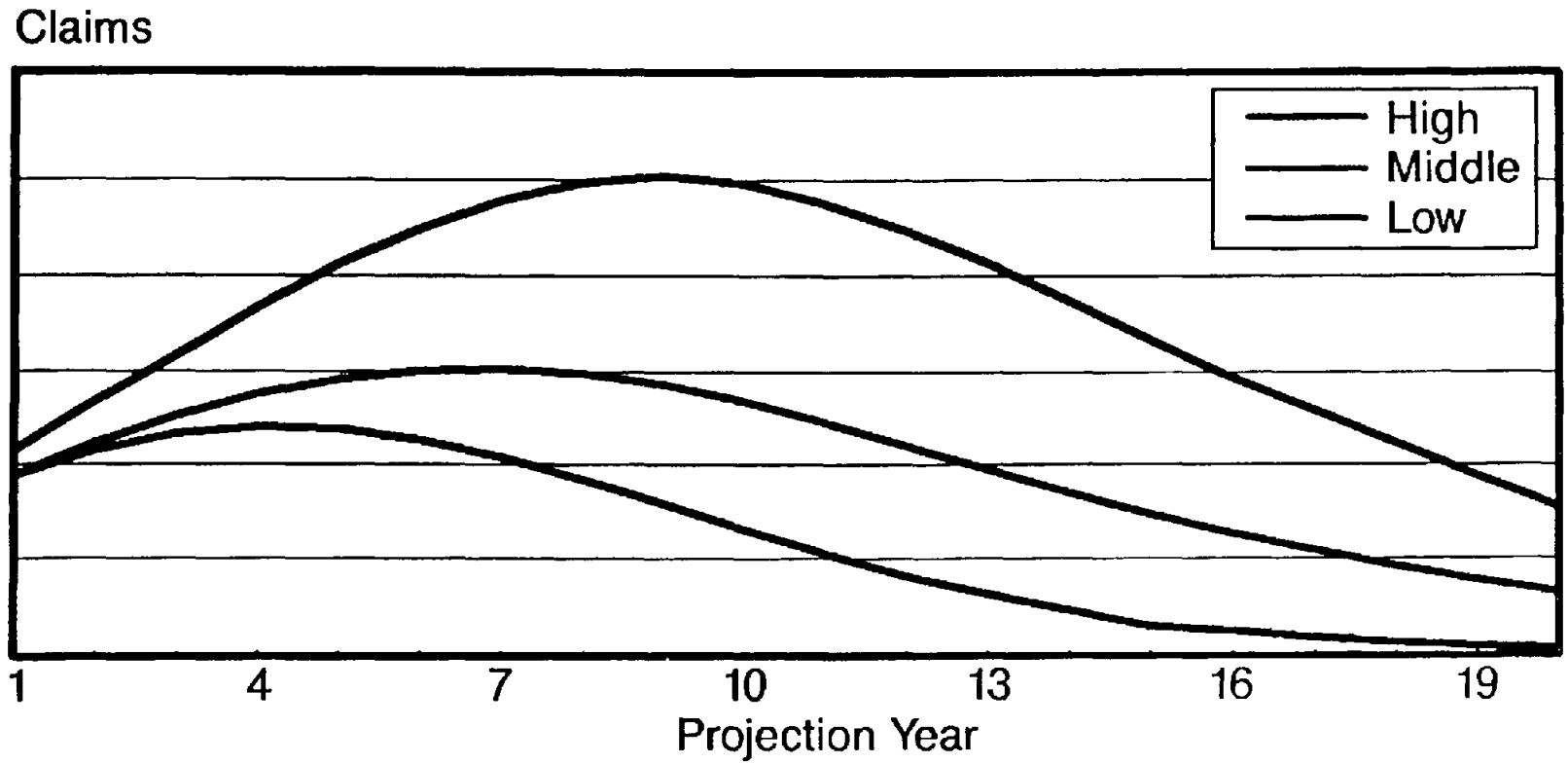
**TABLE 2**

**Present Value of AIDS Claims at 6% as of the Beginning of the Projection Comparison by SOA Scenario**

| | Ratio of Low Scenario to Middle Scenario | Ratio of High Scenario to Middle Scenario |
|---|---|---|
| Company A | 69% | 164% |
| Company B | 55 | 174 |
| Company C | 66 | 163 |
| Company D | 65 | 168 |

CHART 1

COMPANY "C" AIDS CLAIMS
COMPARISON OF SOA SCENARIOS




SOA High, Middle, and Low Scenarios

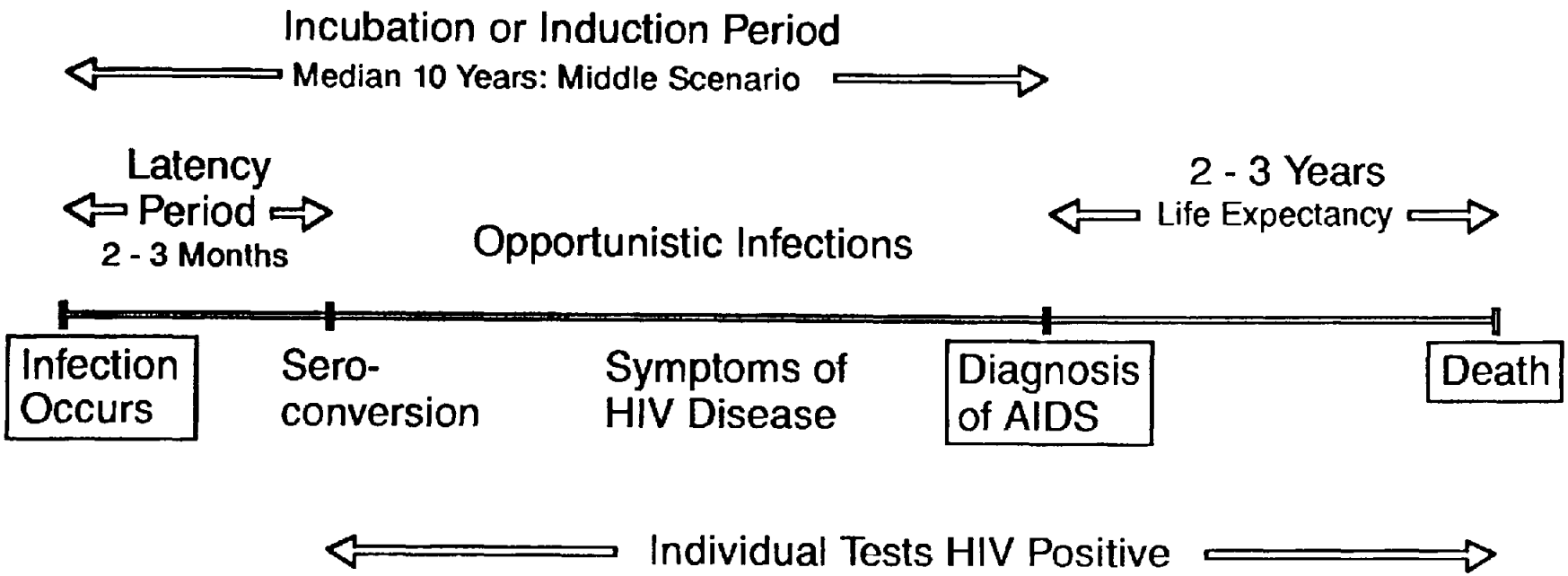
Huggins / E&Y

Chart 2 will undoubtedly appear relatively simplistic to people who have evaluated their AIDS exposure and looked carefully at this. However, to this day I find that among general management, and in fact, among some of the financial management of companies, this AIDS progression is not generally appreciated. The fairly long period of time before infection occurs and is detected, and the time when AIDS may actually be diagnosed, is not well understood. This middle scenario time period averages approximately ten years, and the other scenarios averaged approximately 8 and 12 years, respectively. If asked whether the shape of the curves that I just showed you, or this kind of time period is widely understood, I would say no. Again, this is particularly true among general management of insurance companies.

This is more than just a reaction; it is now substantiated by some of Ernst & Young's survey results (along with the ones Tim just exposed to you). Let me mention briefly our own Ernst & Young survey, which tends to substantiate the Society's work. We have found that in a 50 company survey, which included over two dozen Blue Plans, that only between 15% and 20% of the companies were reflecting AIDS in their GAAP reserving process. The same level of recognition was recorded for pricing. Statutory was lower yet at 10-15%. (This does not speak to how many have actually analyzed the risk). Value-added measures, incidentally, almost uniformly recognized AIDS exposure. And with deference to

**CHART 2**

**PROGRESSION OF AIDS FROM HIV INFECTION TO DEATH**



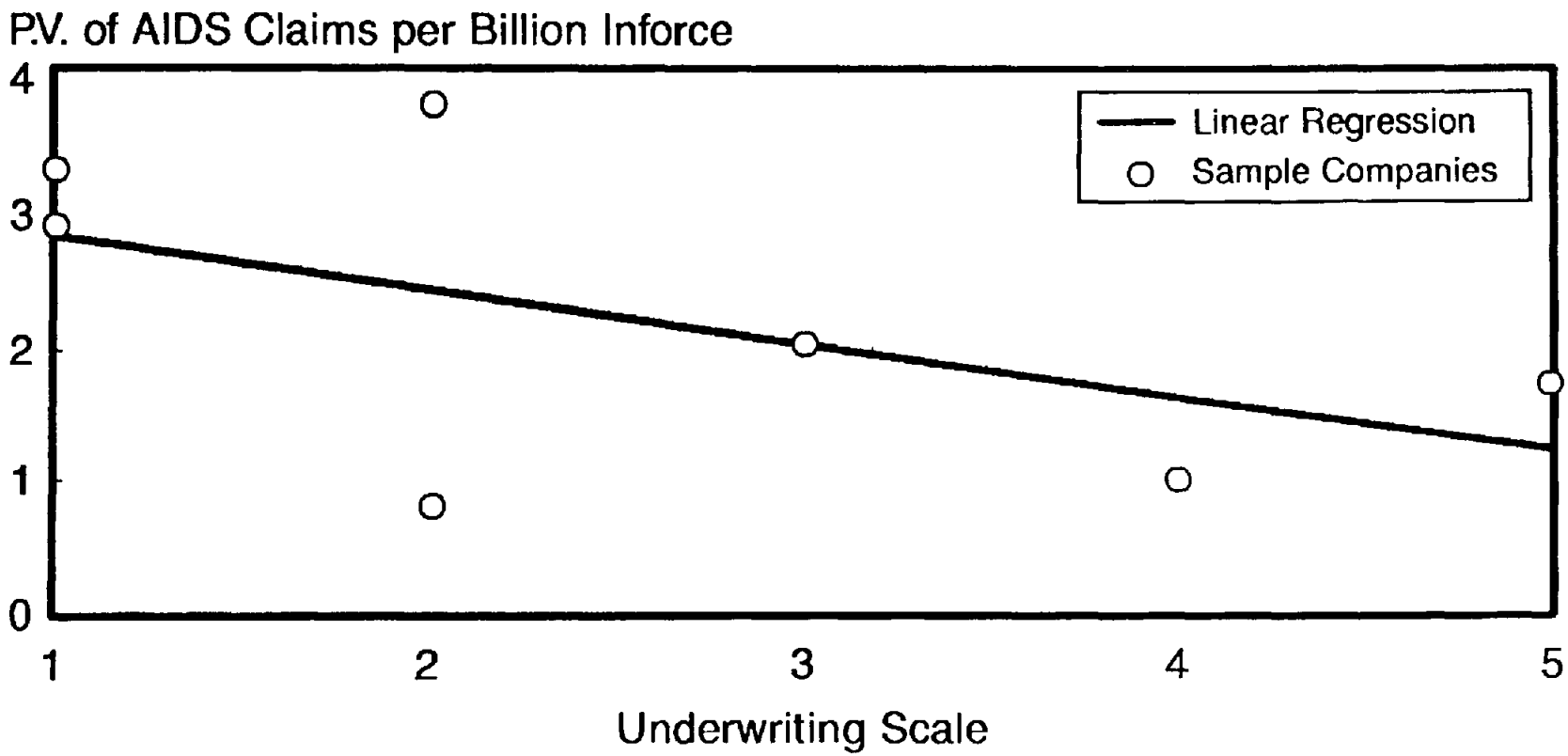

Huggins / E&Y

John Eisenhandler, in Blue Plans, there was very little indicated recognition of AIDS in the reserving process.

Is the size of the AIDS exposure on a block of life insurance business somewhat predictable? Coupled with the information on the two prior charts, showing the nature of the risk that we're trying to evaluate, I created a fairly simple scatter diagram (Chart 3), relating again those underwriting ratings that I made against the present value of AIDS claims. I used the same basis -- middle scenario and a 6% discount rate. The computer drew a regression line for us. I'm not sure it's the same one I'd draw, but there is some relationship here, I think. And in fact, for at least one of those data points that's well off the line, we had some very serious reservations about the level of AIDS claims that were being projected. A company rated "1" on underwriting would tend to be highly liberal -- for example it might use guaranteed or highly simplified issue with very little attention given to the AIDS risk. From this graph you might estimate that a category "1" company would come up with about $3 million of AIDS claims per billion in force. With a very tight underwriting process with respect to AIDS, we might expect more on the order of a million dollars of claims per billion of in force.

CHART 3

RELATIONSHIP OF PROJECTED AIDS CLAIMS TO UNDERWRITING




AIDS Claims per SOA Middle Scenario

Huggins / E&Y

An analysis like this might be reasonably helpful in identifying companies that have some significant AIDS risk. This would tell you they all have significant exposure to the AIDS risk, but this might help in identifying just how significant that risk might be.

In terms of reserving, there are clearly further motivations coming to the fore now. One, for example, would be the New York questionnaire that was sent out. I won't go into depth on that. It is several pages in length, and was sent to chief actuaries, as Harold Ingraham mentioned. It is "part of the efforts to measure the financial impact of HIV on life and health insurance." Survey results will be aggregated and provided, according to this questionnaire. Illinois also has made inquiries.

Perhaps, more importantly, we have noticed in doing our model calibration that, since 1988, actual AIDS claims are reaching noticeable, and in some cases, significant levels. They have begun to rise substantially, both in terms of numbers and amount. Virtually all companies that I have seen in 1990 have noticeable AIDS claim levels. Companies are starting to accumulate detailed claims information with some guidance from actuarial personnel. Usually at this point, two or possibly even three reasonably good years of information are available. This provides considerable realism in evaluating a risk that otherwise might be quite theoretical.

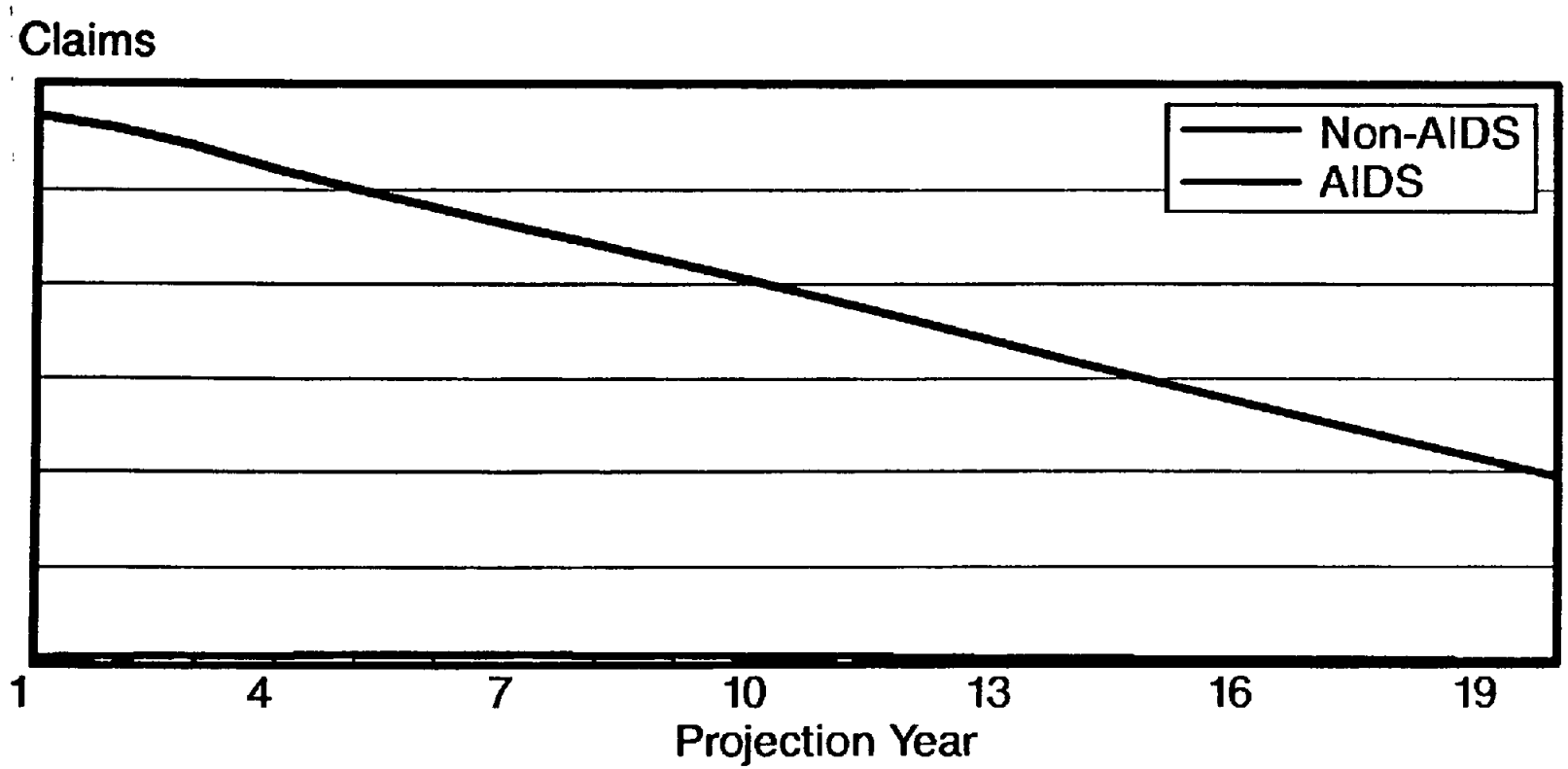
Chart 4 compares AIDS claims to non-AIDS claims. The top line that you can see is company A's non-AIDS claims. The line at the bottom is its AIDS claims. Is the relationship of AIDS to non-AIDS claims an indicator of the company's overall AIDS risk levels? Not really. Contrast that with company D (Chart 5), which is showing a highly significant ratio of claims. The top line is non-AIDS, and the bottom line is AIDS. (Again, these are for life insurance only). The AIDS to non-AIDS relationship is not a good benchmark of risk.

To conclude, the discussion for these seven companies, what was actually done? Companies B and F actually set up a full present value as an offset to their value-added calculations. However, a somewhat higher discount rate than the 6% shown was used. None to date has made any adjustment in GAAP reserves, and as far as statutory reserves, only E is considering setting up a provision with some funding over 20 years, but not with an implementation until at least 1991.

What does this model do (Chart 6)? In brief, it uses multiple issue year blocks and eras, with the typical pre-awareness versus awareness, and pre-testing versus post-testing breakdowns. Multiple issue ages can be used within each era. Lapses and surrenders are not taken into account. (However, if they were to be recognized there's a good treatment

**CHART 4**

**COMPANY A**
**AIDS CLAIMS VS. NON-AIDS CLAIMS**

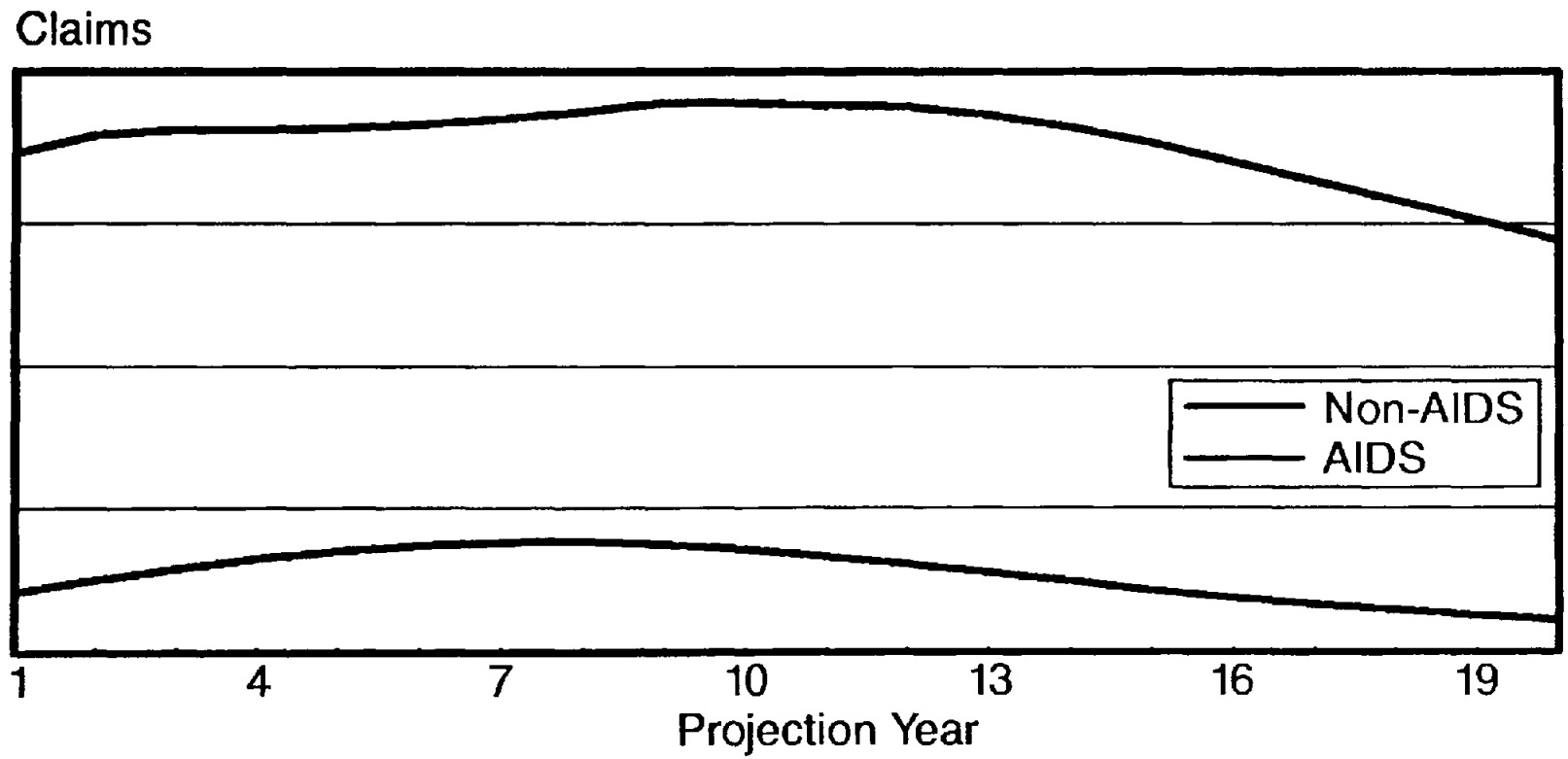



AIDS Claims per SOA Middle Scenario

Huggins / E&Y

CHART 5

COMPANY D
AIDS CLAIMS VS. NON-AIDS CLAIMS




AIDS Claims per SOA Middle Scenario

Huggins / E&Y

## CHART 6

## MODEL FEATURES

- Multiple Issue Blocks - Amounts at Risk
  - Issue Era and Year
  - Age
  - Gender
  - Nature of Business
- Geographic Distribution
- Antiselection Adjustment
- Reinsurance
- Calibration

of this, which is to appear in the upcoming Record. This discussion concerns the handling of the high-risk versus the nonhigh-risk lapse rates that might be used, and the impact on reserves).

Adjustments in our model are also made for geographical distributions, the percentages of females and special antiselection or positive selection factors. Reinsurance is also considered.

Table 3 shows typical results in a certain company, with a $2.3 million AIDS claims present value per billion in force. An entirely "preawareness" to an entirely "awareness but with no testing," shift could double the cost of claims, with all the other assumptions fixed. A shift by issue age can create fairly dramatic results -- from a young to an older distribution 3:1, approximately. And moving from an entirely male to entirely female population can make a 12:1 change!

With respect to considerations in setting up the reserves (Chart 7), I will not go back over some of Tim's commentary. I would, however, emphasize cash-flow testing. Looking at term insurance blocks of business, in particular, we may be talking about approximately $2 per thousand or more present value of claims. This could easily cause, on a year-by-year basis, some serious cash-flow deficiencies. Of course, this depends on the block of

## TABLE 3

| | |
|---|---|
| Sample Results<br>Total 1990 NAR = $1 Billion<br>Baseline | $2,373,000 |
| Change<br>(1) All Issue Years Prior to 1983 | $1,910,000 |
| vs.<br>Issue Years 1983-86 Only | $3,876,000 |
| Change<br>(2) All Attained Ages 10-35 | $4,112,000 |
| vs.<br>Attained Ages 40-60 Only | $1,349,000 |
| Change<br>(3) 100% Male | $2,904,000 |
| vs.<br>100% Female | $ 247,000 |

## CHART 7

## RESERVING CONSIDERATIONS

- Gross Premium Valuation Approach
- Funding a Reserve over a Fixed Period
  - Following the Claims Pattern
  - Source of Funding
  - Combination with Single Premium
  - Negative Reserves
  - Adjustability
- Deficiency Method
- More Refined Approaches
- Cash-Flow Testing

business. This gives you an ability to look at results at points in time and also to perform scenario testing or sensitivity testing, which is very difficult to do with a gross premium valuation approach.

MR. STEVEN A. SMITH: On the question of term insurance. I'm on a committee that's working on Guideline XXX on term insurance reserves, and one of the issues we addressed was mortality deterioration on term insurance, which has increasing premiums, particularly. To the extent, and I think we're making the statement in the report, that you would argue that say the redundancies in the ADCSO table would cover mortality deterioration, they cannot also be used to cover AIDS reserves, or the need for an AIDS reserve. I guess the flip-flop of that is, if you're going to say that we don't need AIDS reserves because we've got redundancies in the ADCSO mortality table for term insurance, then we also have to consider the possibility of mortality deterioration such that you don't use that redundancy twice. It can really only be used once. Has any thought been given to that? Or does anyone in the audience have any additional thoughts?

MR. HARRIS: That has crossed my mind. I think it has come up in some of the work we've done on the Life Committee of the Actuarial Standards Board. I think that something like that is really just going to be left up to the valuation actuary or the actuary, and you may need communication among several actuaries. It would be hard to show that

the sufficiency in mortality had not been used for two different purposes, which is what your concern is. Are people going to use the sufficiency in the 1980 CSO table for two different purposes or for two different potential liabilities? I would hope they wouldn't. I don't think they should. I would think, really, what you're addressing is what I refer to as cumulative antiselection, which is also one of the issues that you're going to run into with AIDS where the healthy people are going to terminate more rapidly than the unhealthy people. The two might possibly be the same issue.

MR. ROBERT H. DREYER: The number of companies that did not adjust for AIDS last year seems pretty cavalier, until you consider the margins in the 1980 CSO as we just have. I'm wondering how many of the companies that did not adjust on the grounds that they had margins, took different action when they filled out their GAAP statements?

MR. HARRIS: I'm not sure; I think GAAP is a different issue. I don't believe you're allowed to set up a reserve under a GAAP unless you have a deficiency. I think you had to have gone through all of your margins before you can establish an AIDS reserve. Someone else might want to comment on that.

MR. SMITH: At FAS 60 you're locked in.

MR. HARRIS: Right, you can under FAS 97 unlock, but I thought that only impacted some of the other calculations. I didn't think that impacted your benefit reserves. I thought that you were supposed to take into account additional AIDS mortality under FAS 97, but that didn't impact the liability, does it?

MR. DREYER: Again, the point I was making, is that under FAS 60, in order for it to unlock, you have to get almost in a loss recovery situation. But in FAS 97 products, you've got gain from interest, gain from mortality, gain from loading expenses, capital gains, those things get repeatedly unlocked and so you would have a chance, so you may have a different answer under FAS 97 products than you do under FAS 60.

MR. STEPHEN L. WHITE: Tom and Jack, I appreciate the value of what you said about cash-flow testing, in terms of looking at alternative assumptions and for management information. But now I'm concerned particularly with respect to the actuarial opinion that I'm going to sign at the end of 1990 and your comments about the fact that the AIDS claims are going to come early. At this point, I'm signing an opinion that the reserves now are adequate for all future liabilities, and I believe, I'm not specifically opining that the reserves now are sufficient to fund both the claims that I'm going to have in the next five years and the statutory reserves I'm going to set up at that point in time. That is, I would

claim that I can use cushions beyond 1995 to fund those immediate claims I'm going to have now, as far as looking at the 12/31/90 opinion. Would you agree?

MR. HARRIS: You're doing the gross premium valuation; you're using the future sufficiencies to fund near-term deficiencies.

MR. WHITE: Isn't that permissible?

MR. HARRIS: That may be a matter for the valuation actuary's conscience. I would recommend an approach where you looked at cash flows and took them into account in your gross premium valuation. If nothing else, you should at least make sure you're going to have the cash to fund those liabilities. I don't think everybody agrees with what I just said though.

MR. WHITE: No, I mean in particular in Regulation 126, as perhaps a comparable situation, isn't all New York requiring that we have enough cash flow over the entire projection period, without looking at exactly that we've got to be able to meet our year by year cash flows? But I don't think in my opinion I had to tell New York where I stood at the end of five years, with respect to my statutory reserves and my cash flows up until that

point. I know I didn't tell them. I would have been fine, on 126 and I suspect that would be fine under AIDS. But it's not anything that I specifically wrote up in my memorandum.

MR. HARRIS: We've had discussions about this at the Life Committee of the Actuarial Standards Board meetings, and I don't think everybody else agrees with what I just proposed.

MR. JAMES B. MILHOLLAND: I wanted to raise one other possibility in the GAAP accounting and that is the use of FAS 5 to set up an AIDS reserve, even though a liability may not be deficient. I think you can make an argument and a good one that, if the loss from AIDS is material and, under the FAS 5 criteria, probable and reasonably able to be estimated, you can and should set up a reserve, and I believe it's been done under that basis. So certainly, the fact that you don't have loss recognition wouldn't necessarily mean that you couldn't or shouldn't set up a reserve for AIDS on GAAP. Finally, under statutory and GAAP, and I think this is ancillary to Jack Ladley's comment on cash-flow testing, the fact that your reserves were adequate today, doesn't mean that they're going to be adequate next year or the following year, and if you can project a future reserve inadequacy, that means you should change your reserve funding starting now so that your earnings are impacted this year rather than waiting to the year in which they become deficient to all of a sudden restore the sufficiency.

MR. FRANK S. IRISH: I have a question for Jack Ladley. He, like a previous speaker, I think, used a term or the phrase "cash-flow testing" a little loosely. I'd like to take issue with him on that. It seems as though we're being told that cash-flow testing is any process that looks at the incidence of claims by year of occurrence. Cash-flow testing, actually, is a far more complex process, which specifically looks at the maturity of assets and the call risk of asset. I'm quite sure that's stated clearly in the Actuarial Standards Board publication entitled *What is Cash Flow Testing?* which came out about two years ago. So I would suggest that we don't throw around this term "cash-flow testing" too loosely. My personal feeling is that cash flow testing is not the kind of technique that should be used for setting up AIDS reserves. I quite agree with some of the comments, that you do have to look at your incidence of claims by year, and you have to set up your reserves so that you don't run into a loss situation in particular years. But that's not cash-flow testing. That's simply a little bit of analysis beyond gross premium valuation. Do you agree, Jack, or disagree?

MR. HARRIS: I'd like to answer that. I disagree and I have disagreed at, again, the Life Committee of the Actuarial Standards Board meetings. Cash-flow testing is cash-flow testing. It's the same thing that we all do with our personal money when we check to see whether or not we have enough to buy lunch. You're checking to see whether or not an insurance company has enough money to pay its obligations. The standard that you're

referring to from two years ago is being replaced, and I was a member of the task force that worked on the new "how-to-do-cash-flow testing" standard, which I think, more clearly addresses other risks. The old standard addressed primarily the investment risk. It slighted the default risk, and it slighted the operations risk. The new standard, I believe, more clearly addressed all the possible cash flows. I admit investments in the past were one of the primary concerns, and that's where the initial standard came from. It was an outgrowth, I believe, of the Baldwin-United debacle. However, we have other issues to deal with now. We have defaults to deal with, and we have things such as AIDS and other operations problems to deal with, which need to be addressed by, we hope, this new draft.

MR. IRISH: Are you referring to a draft that has not yet been published?

MR. HARRIS: It's out. I assumed it was mailed. There is a new draft called *Cash Flow Testing for Insurers*.

MR. IRISH: Oh, I see. All right. Well that certainly will change the definition of cash-flow testing.

MR. HARRIS: Let me just read what the cash-flow testing definition is in the "when-to-do-cash-flow-testing" standard, which is a joint effort of the Casualty and Life Committee,

and I think this has been tailored so it's going to be the same as the exposure draft you haven't seen yet on how to do cash-flow testing. Now this definition is right out of the standard: "The process of projecting and comparing as of a given date, called the valuation date. The timing and amount of asset and obligation cash flows after the valuation date." That's what it says. Obligations would include expenses, benefits, dividends to stockholders, debt service.