REPORT OF THE INDIVIDUAL LIFE INSURANCE EXPERIENCE COMMITTEE

MORTALITY UNDER STANDARD INDIVIDUALLY UNDERWRITTEN LIFE INSURANCE BETWEEN 1991-92, 1992-93, 1993-94, AND 1994-95 ANNIVERSARIES

ABSTRACT

This study is the latest in continuing annual reports on intercompany mortality experience under standard individually underwritten life insurance. In previous reports, mortality experience over a single anniversary year was studied. In this report, experience over four individual anniversary-to-anniversary study years will be reported with the discussion focusing on trends during this period.

Nineteen companies contributed to the 1991-92 and 1992-93 studies. Fifteen and fourteen companies contributed to the 1993-94 and 1994-95 studies respectively. Due to changes in the number and composition of contributing companies from year to year, direct comparisons between study years is impacted to some degree. Where significant, differences between the results presented and results based on the inclusion of experience only from the 13 companies which contributed to each of the four study years (the "13 company group") will be discussed. Tables based on the 13 company group data are not included in this report. A listing of contributing companies is given in Appendix A of each study.

The ratios of actual to expected mortality are based on the 1975-80 Basic Tables. For purposes of comparison with previously published reports, overall results are also given based on the 1965-70 Basic Table in Tables B, 1 and 2 for select experience (policy years 1-15) and in Tables B and 22 for ultimate experience (policy years 16 and over).

The overall mortality in Tables B, 1, 2 and 5 for select experience decreased from 79.6% in the previously published 1990-91 study to 71.3% in the 1992-93 study and has essentially remained at that level. This improvement is reflected in all three underwriting categories, with the greatest improvement in paramedical business. When the 13 company group is examined, the mortality improvement is less dramatic, decreasing from 76.4% in the 1990-91 study to 71.6% in the 1992-93 study, followed by a slight increase thereafter.

The overall mortality ratio in Tables 7, 8 and 14 for select experience over the 5 year anniversary-to-anniversary study periods 1987-92, 1988-93, 1989-94, and 1990-95 reflects the decreasing trend of the individual study years. Combined male-female mortality declined steadily from 80.2% (76.8% for the 13 company group) in the 1987-92 period to 73.6% (73.1% for the 13 company group) in the 1990-95 period, with almost all of this improvement attributable to male insureds.

The overall ratio of smoker to non-smoker mortality in Tables 16 and 17 for the individual study years, or in Tables 18 and 19 for the five-year study periods, has shown little change in recent years. For the five-year study periods, the ratio has remained flat at about 2.25. In evaluating these results, it is noted that since smoker distinct experience is included only for policies issued

in calendar years 1980 and later, all 15 select period durations are included only in the 1994-95 study period.

The overall mortality ratio in Tables B and 22 for ultimate experience has improved from 83.3% (82.7% for the 13 company group) in the 1991-92 study to 80.6% (80.7% for the 13 company group) in the 1994-95 study. The comparable mortality ratios using expected deaths based on the 1980 CSO tables and the 1979-81 U.S. Population Tables are 63.5% and 64.3% for the 1991-92 study and 61.5% and 61.9% for the 1994-95 study.

INTRODUCTION

This report covers the intercompany (U.S.) mortality experience by amount of life insurance under standard individually underwritten issues for four individual study periods, between 1991-92, 1992-93, 1993-94, and 1994-95 anniversaries. The report also combines experience in five-year periods (between 1987-92, 1988-93, 1989-94, and 1990-95 anniversaries) in order to provide a larger volume of data so that broader comparisons of results can be made, particularly for males-females, for smoker-nonsmokers, and for medical-paramedical-nonmedical issues.

In each of the four individual study years, the report is divided into four primary sections:

I. Select Experience (first 15 policy years) for the individual study years (Tables 1-6).

II. Select Experience (first 15 policy years) over a five-year period ending with each of the individual study years (Tables 7-15).

III. Smoker-Nonsmoker Experience (for policies issued in calendar years 1980 and later) for the individual and five-year study periods. (Tables 16-21).

IV. Ultimate Experience (policy years 16 and over) for the individual and five-year study periods. (Tables 22-25).

Each section subdivides experience by insurance issued subject to a medical examination (medical), insurance issued subject to a paramedical examination (paramedical), and insurance issued without a paramedical or medical examination (nonmedical).

Most of the tables in this report show actual amounts of death claims (to the nearest $1,000) and mortality ratios of actual-to-expected death claims based on the 1975-80 Basic Tables for Male and Female Lives. Tables B, 1, 2 and 22 also show mortality ratios based on the 1965-70 Basic Tables. In addition, Tables 1, 2, 7, 8 and 16-22 show amounts exposed to risk (to the nearest $1,000,000) and Tables 1 and 2 show expected deaths (to the nearest $1,000).

The number of contributing companies was 19, 19, 15 and 14 in the 1991-92, 1992-93, 1993-94 and 1994-95 anniversary year studies respectively. In no two study years was the composition of contributing companies identical. However, 13 companies provided data to each of the four study years. In each of these studies, all companies that contributed data to a particular study year contributed both select and ultimate experience. Two companies which contributed to each of the study years did not provide smoker-nonsmoker experience. Appendix A from each study gives the names and proportionate contributions from each company. Appendices B, C, and D, which are not published here but which can be obtained from the Society Research Department,

contain detailed medical, paramedical, and nonmedical experience, respectively, by ages at issue for each year of issue, for males and females separately, as well as data in smoker and nonsmoker categories.

The following summary tables show some interesting trends. Table A shows the change in proportions of policies issued by type of underwriting. From issue year 1977 through 1986, there was a substantial increase in nonmedical business and a corresponding decrease in medical business. Since 1987, there has been a reversal of this trend, but to a less pronounced degree. The contribution from paramedical business reached a low in 1983 increasing to a level where it now represents the largest percentage of new issue exposures.

TABLE A

EXPOSURES FOR POLICY YEAR 1
AS PERCENTAGE OF TOTAL EXPOSURES

Year of Issue	Medical	Paramedical	Nonmedical
1977	34.7%	28.9%	36.4%
1978	35.1	28.5	36.4
1979	35.1	30.5	34.4
1980	38.2	32.5	29.3
1981	33.1	30.6	36.3
1982	29.2	25.1	45.7
1983	24.7	23.5	51.8
1984	22.5	25.3	52.2
1985	20.8	27.1	52.1
1986	15.7	27.3	57.0
1987	17.1	30.9	52.0
1988	17.2	36.1	46.7
1989	19.0	37.2	43.8
1990	19.1	37.8	43.1
1991	17.3	41.2	41.4
1992	18.1	43.3	38.6
1993	20.0	41.9	38.1
1994	20.3	42.4	37.3

Table B shows mortality ratios by exposure years since the introduction of the 1965-70 Basic Tables. The past trend of decreasing ratios continues through the 1992-93 study year, but remains essentially at this level for the 1993-94 and 1994-95 studies. As previously noted, the decreasing trend in mortality ratios is less dramatic when based on the results of the identical 13 company group.

TABLE B

AGGREGATE MORTALITY RATIOS BASED ON 1965-70 SELECT BASIC TABLES
(NUMBERS IN PARENTHESIS ARE MORTALITY RATIOS
BASED ON THE 1975-80 BASIC TABLES)

Exposure Year	Policy Years 1-15				Policy Years 16 and Over
	Medical	Paramedical	Nonmedical	Combined	
1973-74	88.0%	84.1%	99.1%	89.9%	93.4%
1974-75	85.1	85.5	94.9	87.8	87.1
1975-76	80.9	81.4	88.5	82.3	85.0
1976-77	75.5	78.0	87.9	77.9	82.0
1977-78	75.0	80.5	85.9	77.4	80.5
1978-79	68.7	74.5	84.9	72.1	77.0
1979-80	69.8	80.3	82.9	73.3	77.1
1980-81	69.5	70.1	79.8	71.0	75.2
1981-82	67.8	73.2	79.2	70.7	72.8
1982-83	68.0	69.9	74.2	69.6	73.2
1983-84	68.6(93.6)	68.8(92.2)	70.8(89.6)	69.1(92.4)	71.2(91.8)
1984-85	66.2(90.5)	69.9(94.3)	72.4(92.5)	68.5(91.9)	71.0(91.1)
1985-86	61.2(83.7)	67.9(91.8)	72.0(92.4)	65.5(88.0)	70.0(89.8)
1986-87	57.8(79.1)	68.0(91.9)	71.5(92.0)	64.2(86.3)	71.0(90.8)
1987-88	61.0(83.5)	64.3(87.2)	67.2(86.5)	63.6(85.6)	67.5(86.3)
1988-89	60.1(82.3)	59.5(80.9)	65.3(85.0)	61.3(82.6)	66.6(84.8)
1989-90	56.9(78.0)	58.4(79.3)	66.4(86.6)	59.8(80.7)	66.2(84.0)
1990-91	55.4(76.0)	57.2(77.5)	67.3(88.3)	58.9(79.6)	66.4(84.2)
1991-92	54.0(74.1)	53.9(72.8)	62.8(82.8)	55.9(75.6)	65.9(83.3)
1992-93	52.6(72.1)	47.7(64.4)	61.7(81.4)	52.8(71.3)	64.6(81.7)
1993-94	52.6(72.2)	49.3(66.4)	58.5(77.1)	52.7(71.2)	63.9(80.7)
1994-95	51.9(71.4)	49.7(66.9)	59.8(78.6)	52.9(71.4)	63.9(80.6)

Table C shows the proportion of medical, paramedical, and nonmedical exposures in policy year 1 and policy years 1-15 by issue age groups. This indicates that the use of nonmedicals predominates at the younger issue ages while medical underwriting becomes increasingly more prevalent with advancing issue age.

It would be desirable for the comparisons of medical, paramedical, and nonmedical experience to be based on strictly comparable policies, but such comparisons are not possible. Medically underwritten business generally includes larger amounts of insurance issued to persons at higher socio-economic levels than nonmedical and paramedical business. However, medical business also includes polices issued to individuals within nonmedical or paramedical amount limits who were not acceptable on these bases because of medical histories. Similarly, paramedical policies include persons not acceptable on a nonmedical basis. In addition, there are considerable variations in amount limits and proportions of medical, nonmedical, and paramedical polices among contributing companies. In this comparison and throughout this report, the difference in the mix of companies contributing to each of the studies in this report and in previous reports will account for some of the year-to-year differences in the published mortality ratios.

Note also that some of the more recent nonmedical issues are likely based on applications with limited medical history even though such simplified underwritten cases are ordinarily excluded from these studies. In addition, nonmedical issues over age 50 often arise from business issued under pension trust and salary allotment plans. Also included in nonmedical issues for some companies are issues on the basis of a medical examination within the previous 6 or 12 months.

I. 1991-92, 1992-93, 1993 –94,and 1994-95 SELECT EXPERIENCE (MALES AND FEMALES COMBINED)

The experience between one-year anniversaries starting 1991 and ending 1995 during first 15 policy years presented in Tables 1-6 includes the following data:

	All Participants		13 companies	
	Exposure	Actual Death	Exposure	Actual Death
91-92	$995,620	$1,488,410	$845,280	$1,184,415
92-93	$1,059,319	$1,545,049	$920,785	$1,283,926
93-94	$1,046,078	$1,508,428	$972,637	$1,403,847
94-95	$1,121,002	$1,707,289	$1,063,579	$1,623,464

(Exposures in $1,000,000 units. Deaths in $1,000 units.)

The 1990-91 amounts for all companies were $1.031 trillion for exposures and $1.568 billion for the actual deaths, and for 13 companies $779 billion and $1.090 billion, respectively.

The experience for the first 15 policy years compared by issue age group shown in Table 1 and by policy year in Table 2. Separate data for medical, paramedical, and non-medical are shown by issue age group in Table 3 and by policy year in Table 4. Tables 5 and 6 present the data by issue age and policy year groupings for each underwriting classification.

Note that the totals of the actual deaths as classified by underwriting basis in Tables 3 and 4 are nearly equal to the total actual deaths in Tables 1 and 2. Any differences are due to business not identified as medical, paramedical, or non-medical. Subtotals for the business, which has been classified by underwriting basis, are not shown.

The overall mortality ratios for the policy years 1-15 for experience between 1991- 1995 one-year anniversaries based on 1975-80 Basic Tables are shown in the following table.

	All Participants	13 companies
	Mortality Ratio (1975-80 Basic Table)	Mortality Ratio (1975-80 Basic Table)
91-92	75.6%	74.5%
92-93	71.3%	71.6%
93-94	71.2%	72.3%
94-95	71.4%	72.0%

The comparable ratios from 1990-91 study were 79.6% for all participants and 76.4% for the 13 companies.

For all participating companies for individual years from 90-95, the pattern of change in mortality ratios of two years of decline followed by two years of no significant change was striking. The magnitude of the changes was surprisingly large with 79.6% in 90-91, 75.6% in 91-92 and down to 71% in 92-93, 93-94 and 94-95. Since different companies contributed over the 90-95 period, the effect of changing contributors was controlled by rerunning the reports for 13 companies that contributed over the entire 90-95 period.

For the 13 companies in the individual years from 90-95, the magnitude of the changes in mortality ratios was lower than for all participating companies. For the 13 companies, the mortality ratios were lower in the earlier years with 76.4% in 90-91 and 74.5% in 91-92. Then the mortality ratio was higher with 72% in 92-93, 93-94 and 94-95. This resulted in a mortality ratio change over 5 years that was 4.4% lower for the 13 companies as opposed to a mortality ratio change that was 8.2% lower for all participating companies. The magnitude of these differences indicates that variation in mortality exists among companies.

The consistent pattern of stable mortality results in 92-93, 93-94 and 94-95 was unexpected and occurred for both the participating companies and the 13 companies. With the advent of AIDS blood testing, the industry obtained valuable additional underwriting evidence from blood and urine. Substantial advances have been made in cardiovascular treatments. It is interesting that these factors would largely affect male mortality and that in the five-year studies the male non-smokers have the only consistent pattern of decreasing mortality. For the one-year studies, a possibility is that the lower mortality due to these factors has largely been taken into account by 92-93.

Underwriting Basis - Medical, Paramedical and Non-Medical

The mortality ratios by underwriting basis in the following one-year studies are shown in the table below. The comparable ratios from 1990-91 study for all companies were 76.0% for medical, 77.5% for paramedical, and 88.3 for non-medical. These aggregate ratios are not directly comparable because of the different distributions by issue age.

	All Participants			13 companies		
	Medical	Paramedical	Non-Med	Medical	Paramedical	Non-Med
91-92	74.1	72.8	82.8	71.6	72.9	81.5
92-93	72.1	64.4	81.4	72.8	64.4	81.3
93-94	72.2	66.4	77.1	74.5	66.9	77.9
94-95	71.4	66.9	78.6	72.3	67.7	78.7

For the participating companies, the Paramedical mortality ratios are lower than the Medical mortality ratios. The pattern of lower Paramedical mortality ratios is confirmed in the 13 companies results. In all studies, Non-Medical mortality ratios are the highest.

With more underwriting, insurers identify more higher risk individuals leaving a more homogeneous lower mortality risk group among remaining individuals. Consequently, one expects lower mortality with the increase in underwriting. However, companies contributing data assign underwriting basis differently. In some companies any individual that gets a medical exam is listed as a Medical underwriting basis. Therefore, a problem case that is identified in Non-Medical underwriting and is sent for a medical exam is reported as a Medical underwriting basis. Such actions would tend to shift mortality from Non-Medical to Medical. Therefore, the Medical A/E ratios in the individual years from 91-95 may be overstated. For the rest of this section, the Paramedical basis will be used as a comparison.

By Issue Age (Tables 1 & 3)

The Paramedical experience between one-year anniversaries starting 1991 and ending 1995 by Issue Age is reported below. Experience for other groups can be found in Table 1 & 3.

Paramedical Experience only, 1-15 Policy Years Mortality Ratios								
Ages at Issue	All Participants				13 companies			
	91-92	92-93	93-94	94-95	91-92	92-93	93-94	94-95
0-19	66.8	75.3	56.1	54.5	46.5	85.0	59.6	55.7
20-29	59.0	54.5	45.9	64.9	55.6	56.7	47.7	66.9
30-39	56.0	53.2	49.0	48.9	54.8	51.7	48.5	49.1
40-49	70.6	58.4	62.8	63.4	70.9	57.9	62.9	64.6
50-59	82.4	73.4	78.9	77.4	84.5	75.8	80.0	77.4
60&over	97.1	85.4	92.1	89.3	98.1	86.5	94.1	90.9

Within each year, the mortality ratios for ages at issue 30-39 are lower than older issue ages and mortality ratios become higher with increasingly older issue ages. For example in 91-92 for the 13 companies, the mortality ratios are increasing with 54.8% for issue ages 30-39, 70.9% for issue ages 40-49, 84.5% for issue ages 50-59 and 98.1% for issue ages 60 and over.

Within the range of Ages at Issue, there is not a consistent pattern of change in mortality ratios over the individual years studied. The lack of a pattern by issue age over successive study years is not surprising given that overall mortality did not materially change from 92-93 to 93-94 to 94-95.

By Policy Year (Tables 2 and 4)

The Paramedical experience for the 13 companies between one-year anniversaries starting 1991 and ending 1995 by Policy Years are reported below. Experience for other groups can be found in Tables 2 & 4.

Paramedical 13 Companies								
	Policy Years		Policy Years		Policy Years		Policy Years	
	1-2		3-5		6-10		11-15	
	Actual	Mortality	Actual	Mortality	Actual	Mortality	Actual	Mortality
	Deaths	Ratio	Deaths	Ratio	Deaths	Ratio	Deaths	Ratio
90-91	$71,469	60.0%	$132,306	72.5%	$139,523	80.9%	$55,591	89.2%
91-92	$72,140	56.9%	$140,340	68.2%	$172,007	83.2%	$65,034	83.7%
92-93	$73,664	52.9%	$132,067	58.6%	$174,284	70.6%	$77,898	78.2%
93-94	$65,298	49.1%	$150,533	64.4%	$201,333	72.1%	$103,996	78.0%
94-95	$75,460	60.4%	$158,722	61.3%	$252,770	69.5%	$140,459	78.6%

Within each year, the mortality ratios increase as the number of policy years increase. For example in 91-92 for the 13 companies, the mortality ratios are increasing with 56.9% for policy years 1-2, 68.2% for policy years 3-5, 83.2% for policy years 6-10 and 83.7% for policy years 11-15.

Within the range of Policy Years, there is not a consistent pattern of change in mortality ratios over the individual years studied. The lack of a pattern by policy years over successive study years is not surprising given that overall mortality did not materially change from 92-93 to 93-94 to 94-95.

By Issue Age and Policy Year (Tables 5 and 6)

In Table 5, actual deaths and mortality ratios are given by underwriting basis for six issue age groups each subdivided into four policy year groups. This breakdown provides an opportunity to examine the separate medical, paramedical and nonmedical data in more detail than that provided by issue age for all policy years combined in Table 3 or by policy year for all issue ages combined in Table 4. Table 5 is useful in analyzing Tables 2 and 3. Over most of Table 5, one can find a pattern of increase in mortality ratios by increasing issue age beginning at 30-39 within an individual study year.

II. 1987-92 through 1990-95 SELECT EXPERIENCE (INCLUDING SEX-DISTINCT DATA)

The experience between four consecutive 5-year anniversary periods (1987-92, 1988-93, 1983-94, 1990-95) during the first 15 policy years is presented in Tables 7-15 in the same format as that presented for the 1991-92 through 1994-95 experience in Tables 1-6 (Tables 11-14 correspond to Table 5), except that data for males and females are presented separately as well as combined.

This experience includes exposures ranging from $4.6 to $5.3 trillion and actual deaths ranging from $6.9 to $7.8 billion. Corresponding 1986-91 figures were $4.4 trillion and $6.5 billion, respectively. As previously mentioned, from 14-19 companies contributed to the five-year studies.

The overall mortality ratios for policy years 1-15 for experience between anniversaries in 1987-92 through 1990-95 dropped steadily from 80.2% to 73.6%. The comparable ratio from the 1986-91 study was 81.9%. The mortality for males decreased from 80.0% in 1987-92 to 72.0% in 1990-95 and the mortality ratio for females decreased from 81.1% to 80.8%. The corresponding ratios from the 1986-91 study were 81.8% for males and 82.4% for females. These mortality ratios are based on expected deaths derived from the separate male and female 1975-80 Basic Tables.

The mortality ratios by underwriting basis in the recent five-year studies range from 77.6% to 73.1% for medical, 77.2% to 69.2% for paramedical, and 88.7% to 81.5% for nonmedical. The comparable ratios from the 1986-91 study are 79.3%, 81.3% and 86.9%, respectively.

Thus, improvement occurred in all categories. As noted before, these aggregate ratios by underwriting basis are not directly comparable because of the different distributions by issue age.

By Issue Age (Tables 7 and 9)

Actual-to-expected mortality generally exceeds roughly 90% for males for issue ages 20-24 and 98% at 70 and over. The mortality ratios exceed 90% for females for all issue ages 55 and over. The mortality ratios are generally highest at issue ages 15-24 and 70 up for males. Both males and females showed increased mortality ratios for issue ages 55-69 on paramedical issues and at ages 70 and over for both medical and paramedical issues. The high mortality ratios on issue age 70 and over may be explained by recognizing the more recent experience is likely to be based on significantly older ages than those underpinning the 1975-80 Basic Tables at issue age 70 up.

By Policy Year (Tables 8 and 10)

The lowest mortality ratios by duration for both males and females in the 1987-92 through 1990-95 experience occur in the first five policy years. There is somewhat of a tendency for the female ratios to increase by duration to a greater extent than for males.

By underwriting basis the only mortality ratios for males in excess of 100% occur for nonmedical business at durations 10-15. For females, the general trend upward by duration noted above can be seen for each underwriting basis, although more irregularly. Also, for females, the mortality ratios increased sharply for medical business in the third and fourth policy duration's following the end of the contestibility period and worsened considerably in the 1989-94 and 1990-95 study periods.

Comparison of Medical, Paramedical, and Nonmedical Experience

Although, as mentioned before, caution needs to be exercised in comparing mortality ratios by underwriting basis because of the different distributions by issue age, the overall pattern for males (decreasing from 77.6% to 69.7% for medical, 77.2% to 67.7% for paramedical, and 88.7% to 84.5% for nonmedical) conforms with the supposition that higher ratios will occur for the less exacting requirements, but this pattern is nearly totally reversed for females (increasing from 83.0% to 94.3% for medical, then decreasing from 83.9% to 76.8% for paramedical, and 77.8% to 73.9% for nonmedical). This might suggest that examinations, because they largely identify cardiovascular risk profile characteristics (e.g. build, blood pressure, and pulse), may be of relatively less value in underwriting females at the older ages where more of the less favorable paramedical and medical experience occurs and where the cancer risk may exceed the cardiovascular risk. At issue ages 50 up, the mortality ratios on paramedical business are distinctly higher than those on medical business and are more pronounced for females than males. The increased mortality ratios at issue ages 70 up may also reflect a somewhat older distribution of issue ages than those basing the experience during the 1975-80 period of exposure.

By Issue Age and Policy Year (Tables 11-15)

Tables 11-14 subdivide the 1987-92 through 1990-95 experience into the same six issue-age groups and the same four policy-year groups as in Table 5, but with the additional breakdown by sex. This provides an opportunity to examine the experience by issue age-policy year cells.

Table 15 summarizes these mortality ratios and gives the ratio of the mortality ratios as in Table 6, again with the additional breakdown by sex. For males, as expected, the ratios of the less exacting underwriting requirement to the more exacting basis generally exceed 1.00, as in Table 6, except where the comparisons are distorted by small amounts of data. For females, these expected results do not hold. A possible explanation for this phenomenon was suggested in the previous section.

III. SMOKER-NONSMOKER EXPERIENCE

Tables 16-21 present smoker-nonsmoker experience for 15 years of issues. Tables 16 and 17 show the experience for one study year by issue age and policy year, respectively, separately for medical, paramedical and nonmedical issues. In addition to volatility caused by the changing mix of companies included in each study year, note that two companies did not submit smoker/nonsmoker distinct experience. Tables 18 and 19 show the experience for 5 study years combined, but are otherwise identical to Tables 16 and 17. Tables 20 and 21 show the 5-year experience subdivided by sex.

The following table summarizes the experience given in Tables 16 and 17 for each of the current one-year studies and the most recent previously published study ('90-'91 policy year).

	Nonsmoker	Smoker	Ratio
1990-91	63.8%	150.9%	2.36
1991-92	62.7	143.9	2.29
1992-93	59.8	136.0	2.28
1993-94	59.7	142.5	2.39
1994-95	60.4	137.0	2.27

The nonsmoker ratio decreased and then remained level for the last 3 years. The smoker ratio has fluctuated more but dropped from its 1990-91 level. When looking at the group of 13 companies that contributed in all 5 years, nonsmoker mortality improved 2% while smoker mortality got worse by 1.5% over the five year period.

For medical underwriting, nonsmoker mortality has increased over the five 1-year studies although smoker mortality has decreased significantly resulting in an overall decrease in the ratio of smoker to nonsmoker mortality from 2.80 in the 1990-91 study to 2.16 in the 1994-95 study. For the 13 company group, both nonsmoker and smoker mortality slightly increased resulting in the ratio of smoker to nonsmoker mortality decreasing from 2.36 in the 1990-91 study to 2.20 in the 1994-95 study.

In contrast, for paramedical and nonmedical issues both nonsmoker and smoker mortality have decreased over the five 1-year studies, but, the ratio of smoker to nonsmoker mortality increased from 2.24 (1990-91 study) to 2.41 (1994-95 study) for paramedical issues and from 2.09 to 2.20 for nonmedical issues. Similar trends are seen in the 13 company group except for paramedical smoker issues which saw an increase in mortality rather than a decrease.

Tables 18 and 19 show mortality experience by underwriting basis over a 5-year period. Nonsmoker and smoker mortality has generally decreased or remained level over each of the consecutive 5-year time periods for all underwriting bases. Contrary results are seen in the consistent group of 13 companies. Medical mortality has increased over each 5-year time period for both smokers and nonsmokers. Paramedical mortality has decreased for nonsmoker and remained relatively unchanged for smokers. Nonmedical mortality is relatively unchanged for nonsmokers and has increased for smokers.

Below are listed the 5-year smoker and nonsmoker mortality ratios by sex:

	Nonsmoker		Smoker	
	Male	Female	Male	Female
1986-91	65.6%	64.2%	149.6%	140.4%
1987-92	64.8	65.7	147.4%	142.3%
1988-93	61.3	65.5	133.1%	144.2%
1989-94	59.6	68.6	135.6%	147.0%
1990-95	59.5	67.3	134.7%	149.6%

In each of the 5-year studies, male nonsmokers account for approximately 60% of the exposure while male smokers account for approximately 10% of the exposure. Female nonsmokers account for approximately 25% of the exposure while female smokers account for approximately 5% of the exposure. Keeping in mind the more limited exposure among female smokers, notice that for males both the nonsmoker and smoker mortality ratios have decreased and leveled off while for females both the nonsmoker and smoker mortality ratios have increased over the time period. The same general pattern of decreasing male mortality and increasing female mortality holds for the 13 company group.

Although the patterns by policy year are somewhat irregular, some trends can be seen. In the earliest 5-year studies (1986-91, 1987-92, and 1988-93), the ratio of smoker to nonsmoker mortality does decrease by policy year with smaller decreases over later 5-year periods. In the last two 5-year studies (1989-94 and 1990-95), the ratio of smoker to nonsmoker mortality is mostly level by policy year. Keep in mind that although the maximum policy year is 12 for the 1986-91 study, the 1990-95 study has exposure in all 15 policy years.

IV. ULTIMATE EXPERIENCE (POLICY YEARS 16 AND OVER)

The experience over a one year time period for policy years 16 and over is shown in Table 22. The overall mortality ratio based on the 1975-80 Ultimate Basic Tables is 84.2% in the 1990-91 study decreasing to 80.6% in the 1994-95 study—a 4.3% improvement. Note that the company mix did change dramatically over this 5-year time period, resulting in a decrease of 1.9% for the 13 company group.

The ratios by attained age group are always less than 100% except for attained ages 30-34 and 35-39 where the ratios are significantly greater than 100%. Part of the extra morality at these ages could be attributable to AIDS deaths.

The experience over 5-year time periods for policy years 16 and over is shown in Tables 23-25. In table 23, the mortality ratio for premium-paying policies has decreased from 84.7% in the 1986-91 study to 76.8% in the 1990-95 study—a 9.3% improvement. The mortality ratio for paid-up policies has shown less of a decrease from 86.9% in the 1986-91 study to 85.6% in the 1990-95 study--a 1.5% improvement. The comparable analysis for the 13 company group shows an improvement of approximately 6.6% for premium-paying policies and an increase of 1.9% for paid-up policies. This pattern of lower mortality ratios for premium-paying policies has been a characteristic of the experience for many years, perhaps due to a shorter average duration since selection compared to paid-up policies.

In Table 24, the mortality ratios for medical issues decreased 5.6% from 82.8% in the 1986-91 study to 78.2% in the 1990-95 study. For nonmedical issues, the ratios fell 2.7% from 97.5% in the 1986-91 study to 94.9% in the 1990-95 study. For the 13 company group the medical mortality ratios fell 4.1% while nonmedical ratios slightly increased.

In Table 25, the mortality ratios for males decreased 5.5% from 85.9% in the 1986-91 study to 81.2% in the 1990-95 study. Female mortality has increased 1.5% from 88.8% in the 1986-91 study to 90.1% in 1990-95. In the 13 company group, male mortality decreased 3.3% and female mortality increased 4.8% over this time period.