

## **Report of the Individual Life Insurance Experience Committee**

### **Mortality Under Standard Individually Underwritten Life Insurance Between 1995 and 1996 Policy Anniversaries**

#### **Introduction**

This study is the latest in continuing annual reports on inter-company mortality experience by amount of insurance under standard individually underwritten issues. The previous report discussed experience over the 1991-92, 1992-93, 1993-94 and 1994-95 study periods. This study focuses on the single year results from the 1995-96 study period and also examines experience in the most recent five-year period (1991-96) in order to provide a larger volume of data so that broader comparisons of results can be made.

Ten companies contributed data to the Society of Actuaries for the 1995-96 study period. This is down considerably from the 15-20 companies that contributed in each of the preceding years. In order to increase the exposure in the 1995-96 study, the contributions to the SoA were combined with contributions made by 5 additional companies to Bragg Associates for the same study period. Including data from Bragg Associates added \$200 billion in exposure and \$300 million in deaths to the single year study, bringing total exposure in the one-year study up to \$1.2 trillion and total deaths up to \$2.0 billion. The reader must be aware that differences in mortality from previous studies may be due to actual mortality differences, changes in companies contributing to the SoA, and/or the inclusion of Bragg data. The current 5-year study (on deaths between 1991 and 1996 policy anniversaries) uses SoA contributions only.

As in previous studies, the ratios of actual to expected mortality are based on the 1975-80 SoA Basic Tables. For the first time, ratios are also given compared to the 2001 Valuation Basic Tables (VBT), which has composite- and smoker-distinct bases. The VBT was based on experience from contributions to the SoA for the 1990-95 study period. This pure industry experience from 1990-95 was supplemented at the higher ages and projected forward to the year 2001. The VBT was the basis for the 2001 CSO Table.

The SoA data in the 1995-96 study is based on a 25-year select period (compared to a 15-year select period in prior studies). The data contributed to Bragg Associates only contains data in the first 15 durations. Therefore, the reader must be wary in interpreting the select period results in the 1995-96 study since data from the SoA is combined with the data from Bragg Associates.

#### **Overview**

Based on the 1975-80 SoA Basic Table, overall mortality experience in the select period decreased from 71.4% in the 1994-95 study to 66.3% in the 1995-96 study (66.5% using SoA data only). 1995-96 results are 90.9% of the 2001 VBT (90.4% based on SoA data

only). The ratios against the 2001 VBT Table appear low given the fact that the VBT has been projected forward to the year 2001.

Overall select-period mortality experience in the most recent 5-year period remained virtually unchanged. Mortality was 73.6% of the 1975-80 Basic Table in the 1990-95 study and is 73.3% in the 1991-96 study (101% of the 2001 VBT).

Using the 1975-80 Table, which is not smoker distinct, the overall ratio of smoker to nonsmoker mortality is 2.11 in the 1995-96 study compared to 2.17 in the 1994-95 study. Nonsmoker mortality is 88.0% of the 2001 Nonsmoker VBT and smoker mortality is 91.7% of the 2001 Smoker VBT in the 1995-96 study period. Since smoker-distinct experience is generally only available on issues of 1980 and later, smoker/nonsmoker experience is based on a slightly smaller block of exposure.

Since the data from Bragg does not include any exposure beyond the 15<sup>th</sup> duration, ultimate experience is based on contributions to the SoA only. In the 1995-96 study, ultimate experience is defined as experience in durations 26 and over due to the 25-year select period built into the 2001 VBT. The overall mortality ratio for ultimate experience in the 1995-96 study is 84.5% of the 1975-80 Table and 113.7% of the 2001 VBT. Since prior studies defined ultimate experience as policy years 16 and over, direct comparisons to those prior studies may be misleading.

Detailed analysis of the experience is divided into four primary sections:

- I. Select Experience (first 25 policy years) for the individual study period 1995-96.
- II. Select Experience (first 25 policy years) for the five-year period from 1991-96.
- III. Smoker - Nonsmoker Experience for the individual and five-year study periods.
- IV. Ultimate Experience (policy years 26 and over) for the individual and five-year study periods.

Each of the above sections contains narrative, a summary of numerical results, and references to more detailed numerical reports. The detailed reports consist of a Table of Contents and links to 23 tables. Many of the detailed tables subdivide 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). The reader should be aware in comparing the experience of these groups that there are considerable variations in amount limits and proportions of medical, nonmedical and paramedical policies among contributing companies.

## I. 1995-96 Select Period Experience (SoA and Bragg Data) (Males and Females Combined)

### Overall

The overall 25-year select period mortality experience based on the 1975-80 Basic Table and the 2001 Valuation Basic Table (VBT) between anniversaries in 1995 and 1996 are shown in Tables 1-5. It should be noted that the VBT includes smoking-distinct mortality rates with a 25-year select period while the 1975-80 includes a 15-year select period and mortality rates that do not vary by smoking status. These differences confound direct comparisons of mortality ratios on each basis. Comparisons to the 1994-95 study may be difficult to interpret, as data from five contributors to Bragg Associates who had not contributed to the 1994-95 SoA study are included in the 1995-96 study. Also, some contributors to past SoA studies have discontinued their participation in recent studies. Lastly, the 1994-95 study was based on a 15-year select period compared to the 25 year select period in this study.

The overall select mortality experience for 1995-96 was 66.3% of the 1975-80 Basic Table and 90.9% of the 2001 VBT (Table 1). The corresponding ratio from the 1994-95 study, 71.4% based on the 1975-80 Basic Table, was 5.1% higher than the 1995-96 study.

The 1995-96 experience during the first 25 policy years by issue age group is shown in Table 1 and by policy year in Table 2. Separate data for medical, paramedical and nonmedical underwriting bases are shown by issue-age groups 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 basis. Table 1 (SoA data only) shows differences in mortality by policy amount bands.

**Issue Age (Table 1)**

<b>1995-96 Select Period Experience by Issue Age Males, Females, Smokers and Nonsmokers Combined</b>		
<b>Issue Age</b>	<b>1975-80 Basic Table</b>	<b>2001 VBT</b>
<b>0-19</b>	65.2	100.4
<b>20-29</b>	70.7	93.8
<b>30-39</b>	56.6	90.2
<b>40-49</b>	60.8	90.9
<b>50-59</b>	68.6	91.0
<b>60+</b>	77.4	90.4
<b>Total</b>	66.3	90.9

The underlying slope of the 1975-80 Basic Table, taken together with unismoker mortality expectations, complicate both the interpretation and application of mortality ratios by issue age shown in Table 1. The underlying slope of the 2001 VBT facilitated more limited variations among the mortality ratios with increase in issue age. Issue ages 30-49 generally showed the lowest mortality ratios based on both the 1975-80 Basic Table and the 2001 VBT.

**Policy Year (Table 2)**

<b>1995-96 Select Period Experience by Policy Year Males, Females, Smokers and Nonsmokers Combined</b>		
<b>Policy Year</b>	<b>1975-80 Basic Table</b>	<b>2001 VBT</b>
<b>1-2</b>	53.9	87.7
<b>3-5</b>	62.9	99.5
<b>6-10</b>	64.5	85.8
<b>11-15</b>	72.8	90.5
<b>16-20</b>	72.8	92.4
<b>21-25</b>	78.2	98.5
<b>Total</b>	66.3	90.9

The increase in mortality ratios from policy years 1-2 to 3-5, 9% based on the 1975-80 Basic Table and 11.8% on the 2001 VBT, indicate some degree of antiselection following expiration of the contestability period.

**Underwriting Basis – Medical, Paramedical and Nonmedical (Table 3)**

Table 3, not shown, compares mortality by underwriting basis and quinquennial issue age groups. Overall mortality ratios based on the 1975-80 Basic Table were similar for medical and paramedical, 65.2% and 64.4%, respectively, and 71.4% for nonmedical. The corresponding ratios based on the 2001 VBT are 86.4%, 91.3% and 98.4%. Issue ages 10-34 show ratios exceeding 100% of the 2001 VBT, indicating that many medicals at the younger ages were obtained for cause, such as an adverse medical history, rather than strictly on the age and amount of insurance applied for. Among policies underwritten based on a paramedical at ages 50+, the mortality ratios are distinctly increased and surprisingly similar to experience on corresponding nonmedically underwritten business.

**Underwriting Basis by Policy Year (Table 4)**

<b>1995-96 Select Period Experience by Policy Year and Underwriting Basis Males, Females, Smokers and Nonsmokers Combined</b>				
<b>1975-80 Basic Table</b>				
<b>Policy Year</b>	<b>Medical</b>	<b>Paramedical</b>	<b>Nonmedical</b>	<b>Combined</b>
<b>1-2</b>	59.4	47.6	58.8	53.9
<b>3-5</b>	57.6	63.0	70.9	62.9
<b>6-10</b>	59.7	64.9	69.6	64.5
<b>11-15</b>	76.9	69.8	71.0	72.8
<b>16-20</b>	65.7	78.6	92.5	72.8
<b>21-25</b>	74.2	77.2	93.8	78.2
<b>Total</b>	65.2	64.4	71.4	66.3

Relative to the 1975-80 Basic Table, both paramedical and nonmedical mortality experience deteriorated in policy years 16-20, increasing from 69.8% and 71.0% in policy years 11-15 to 78.6% and 92.5%, respectively, during policy years 16-20, indicating shortened select periods relative to medical mortality.

<b>1995-96 Select Period Experience by Underwriting Basis and Policy Year Males, Females, Smokers, Nonsmokers Combined 2001 VBT</b>				
<b>Policy Year</b>	<b>Medical</b>	<b>Paramedical</b>	<b>Nonmedical</b>	<b>Combined</b>
<b>1-2</b>	91.6	80.3	96.4	87.7
<b>3-5</b>	86.6	104.3	112.0	99.5
<b>6-10</b>	76.7	88.5	93.3	85.8
<b>11-15</b>	92.0	87.2	93.5	90.5
<b>16-20</b>	86.4	98.8	103.7	92.4
<b>21-25</b>	95.4	99.2	108.6	98.5
<b>Total</b>	86.4	91.3	98.4	90.9

Based on the 2001 VBT, mortality ratios on medical and nonmedical cases increased from 86.4% and 103.7% in policy years 16-20 to 95.4% and 108.6%, respectively, in policy years 21-25. The largest increases on both paramedicals and nonmedicals occurred between policy years 1-2 and 3-5, suggesting some degree of antiselection culminating within three years following the end of the contestability period.

#### **Underwriting Basis by Issue Age (Table 5)**

<b>1995-96 Select Period Experience by Underwriting Basis and Issue Age Males, Females, Smokers and Nonsmokers Combined 1975-80 Basic Table</b>				
<b>Issue Age</b>	<b>Medical</b>	<b>Paramedical</b>	<b>Nonmedical</b>	<b>Combined</b>
<b>0-19</b>	60.7	106.5	63.9	65.2
<b>20-29</b>	100.4	55.7	74.0	70.7
<b>30-39</b>	59.0	49.6	65.3	56.6
<b>40-49</b>	59.4	58.6	67.8	60.8
<b>50-59</b>	60.2	75.3	76.9	68.6
<b>60+</b>	71.4	88.3	92.4	77.4
<b>Total</b>	65.2	64.4	71.4	66.3

Compared to the 1975-80 Basic Table, issue ages 30+ show mortality ratios increasing with age from 30-39 to 60+. The largest increase on paramedicals, 16.7%, occurred between ages 40-49 and 50-59, followed by a 13% increase between ages 50-59 and 60+. Another large increase, 15.5%, emerged among nonmedicals between issue ages 50-59 and 60+.

<b>1995-96 Select Period Experience by Underwriting Basis and Issue Age Males, Females, Smokers and Nonsmokers Combined 2001 VBT</b>				
<b>Issue Age</b>	<b>Medical</b>	<b>Paramedical</b>	<b>Nonmedical</b>	<b>Combined</b>
<b>0-19</b>	92.8	156.5	98.7	100.4
<b>20-29</b>	131.8	76.4	96.6	93.8
<b>30-39</b>	94.6	80.6	100.6	90.2
<b>40-49</b>	92.2	87.7	96.1	90.9
<b>50-59</b>	81.8	98.2	98.8	91.0
<b>60+</b>	84.0	104.3	99.4	90.4
<b>Total</b>	86.4	91.3	98.4	90.9

Compared to the 2001 VBT, the corresponding increases in mortality ratios were 10.5% on paramedicals between issue ages 40-49 and 50-59, followed by a 6.1% increase between issue ages 50-59 and 60+, and 0.6% on nonmedicals.

**Policy Amount Band (Table 1)**

<b>1995-96 Select Period Experience by Amount Band Males, Females, Smokers and Nonsmokers Combined</b>		
<b>Amount Band</b>	<b>1975-80 Basic Table</b>	<b>2001 VBT</b>
<b>Under \$25,000</b>	94.3	110.2
<b>25,000 - 49,999</b>	84.0	104.7
<b>50,000 - 99,999</b>	74.5	96.6
<b>100,000 - 249,999</b>	63.7	89.3
<b>250,000 - 499,999</b>	54.5	79.3
<b>500,000 - 999,999</b>	57.5	84.1
<b>1,000,000+</b>	53.5	75.2
<b>Total</b>	66.5	90.4
<b>250,000+</b>	55.0	79.1

By amount band, mortality ratios based on the 1975-80 basic table decrease steadily from under \$25,000 to the \$250,000-499,999 bands, dropping from 94.3% to 54.5% then remaining relatively level at higher amount bands. Much of the reduction in mortality with increase in policy amount reflects both the use of more comprehensive underwriting requirements relative to those used to screen and classify risk for smaller amount bands as well as a decreasing prevalence of smoking with increasing level of socioeconomic status. Since the 2001 VBT employs smoking-distinct mortality rates, the resulting improvements in mortality ratios with increase in amount band may be attributable to use of more comprehensive underwriting requirements and socioeconomic factors other than smoking.

## II. 1991-96 Select Period Experience (Including Sex-Distinct Experience)

### Overall

The overall select mortality experience for the five-year period from 1991-96 was 73.3% of the 1975-80 Basic Table (Table 7) and 101.0% of the 2001 Valuation Basic Table (Table 7). This result reflects a very slight decrease in overall mortality compared to the 1990-95 results of 73.6% of the 1975-80 Basic Table.

Additional evidence of this finding is reflected in male and female mortality for the five-year period from 1991-96, which is 71.9% and 79.6% of the 1975-80 Basic Table, respectively (Table 7). This is compared to 72.0% and 80.8% for the respective male and female results for the 1990-95 period. Male and female mortality for the five-year period from 1991-96 is 102.0% and 97.1% of the 2001 Valuation Basic Table (Table 7).

### Issue Age (Table 14)

<b>1991-1996 Select Period Experience by Issue Age</b>		
<b>Males, Females, Smokers and Nonsmokers Combined</b>		
<b>Issue Age</b>	<b>1975-80 Basic Table</b>	<b>2001 VBT</b>
<b>0-19</b>	74.2	113.1
<b>20-29</b>	77.8	102.8
<b>30-39</b>	62.6	97.9
<b>40-49</b>	68.9	103.8
<b>50-59</b>	76.4	101.6
<b>60+</b>	81.9	99.3
<b>Total</b>	73.3	101.0

The overall mortality ratios for policy years 1-25 based on the 1975-80 Basic Table and the 2001 VBT are 73.3% and 101.0%, respectively. Using the 1975-80 Basic Table as a reference, the comparable ratio for the 15-year select period associated with the 1990-95 period was 73.6%.

**Policy Year (Table 8)**

<b>1991-1996 Select Period Experience by Policy Year Males, Females, Smokers and Nonsmokers Combined</b>		
<b>Policy Year</b>	<b>1975-80 Basic Table</b>	<b>2001 VBT</b>
<b>1-2</b>	59.3	93.9
<b>3-5</b>	67.1	102.9
<b>6-10</b>	78.8	103.8
<b>11-15</b>	79.1	96.9
<b>16-20</b>	74.9	99.1
<b>21-25</b>	82.3	107.0
<b>Total</b>	73.3	101.0

There is a drop in mortality from 79.1% in policy years 11-15 to 74.9% in policy years 16-20 which coincides with the beginning of the ultimate period for the 1975-80 Basic Table. Compared to the 2001 VBT, as would be expected, there is no significant drop in mortality for policy years 16 and later since the 2001 VBT has a 25-year select period.

**Comparison of Medical, Paramedical, and Nonmedical Experience (Table 9)**

<b>1991-96 Select Period Experience by Underwriting Basis and Sex 1975-80 Basic Table</b>			
	<b>Medical</b>	<b>Paramedical</b>	<b>Nonmedical</b>
<b>Male</b>	69.6	68.2	83.9
<b>Female</b>	83.3	79.5	76.5
<b>Combined</b>	71.4	70.1	81.7

<b>1991-96 Select Period Experience by Underwriting Basis and Sex 2001 VBT</b>			
	<b>Medical</b>	<b>Paramedical</b>	<b>Nonmedical</b>
<b>Male</b>	97.1	99.8	117.1
<b>Female</b>	85.6	101.0	107.3
<b>Combined</b>	95.1	100.0	114.7

Table 9 shows similar mortality ratios for medical and paramedical business at 71.4% and 70.1% of the 1975-80 Basic Table. Nonmedical business continues to produce a higher level of mortality at 81.7% of the table. Using the 2001 VBT produces the following results for medical, paramedical and nonmedical issues: 95.1%, 100.0%, and 114.7% respectively. It is interesting to note that, according to the 1975-80 Basic Table, male medical mortality is more favorable than female medical mortality, whereas, when the 2001 VBT is applied, the results are reversed such that female medical mortality is better than male medical mortality.

**Underwriting Basis and Policy Year (Table 14)**

<b>1991-1996 Select Period Experience by Underwriting Basis and Policy Year 1975-80 Basic Table</b>				
<b>Policy Year</b>	<b>Medical</b>	<b>Paramedical</b>	<b>Nonmedical</b>	<b>Combined</b>
<b>1-2</b>	60.3	52.4	69.7	59.3
<b>3-5</b>	58.3	66.3	81.4	67.1
<b>6-10</b>	80.0	77.0	79.6	78.8
<b>11-15</b>	75.9	80.2	86.2	79.1
<b>16-20</b>	69.2	77.4	95.6	74.9
<b>21-25</b>	77.4	80.0	101.2	82.3
<b>Total</b>	71.4	70.1	81.7	73.3

<b>1991-1996 Select Period Experience by Underwriting Basis and Policy Year 2001 VBT</b>				
<b>Policy Year</b>	<b>Medical</b>	<b>Paramedical</b>	<b>Nonmedical</b>	<b>Combined</b>
<b>1-2</b>	89.9	85.3	113.2	93.9
<b>3-5</b>	87.1	105.1	123.1	102.9
<b>6-10</b>	102.7	102.4	107.8	103.8
<b>11-15</b>	90.8	99.3	110.7	96.9
<b>16-20</b>	93.3	101.5	118.8	99.1
<b>21-25</b>	101.7	103.3	126.5	107.0
<b>Total</b>	95.1	100.0	114.7	101.0

According to the 1975-80 Basic Table, the lowest mortality ratios continue to be observed in the first 5 policy years. There is a considerable increase in mortality reflected in the gender-combined results for policy years 1-2 compared to policy years 3-5 where the mortality ratios are 59.3% and 67.1%, respectively. This jump in mortality after the 2-year contestable period is also seen in the 2001 VBT results. Mortality ratios associated with the 2001 VBT are 93.9% and 102.9% for policy years 1-2 and 3-5, respectively.

Nonmedical experience shows a wearing off of the underwriting selection process occurring in policy years 16 and beyond, whereas, medical and paramedical experience appears to retain its value into later durations. Comparing results to the 2001 VBT reveals nonmedical mortality in excess of the underlying table.

These mortality ratios, associated with nonmedical results, may actually understate the true differential between medically examined business and nonmedical applications as other underwriting tools currently employed (e.g. blood, urine, saliva testing, etc.) may occur in conjunction with nonmedical applications. These underwriting tools, not significantly reflected in the results here, will tend to reduce the differences seen in nonmedical business compared to medically and paramedically examined policies.

**Exam Type and Issue Age (Table 15)**

<b>1991-1996 Select Period Experience</b>			
<b>Male and Female Combined by Underwriting Basis and Issue Age</b>			
<b>1975 – 80 Basic Table</b>			
<b>By Issue Age</b>	<b>Medical</b>	<b>Paramedical</b>	<b>Nonmedical</b>
<b>0-19</b>	88.5	73.6	73.4
<b>20-29</b>	100.5	57.9	80.5
<b>30-39</b>	60.0	52.2	74.8
<b>40-49</b>	63.8	67.4	82.2
<b>50-59</b>	70.5	77.9	100.0
<b>60+</b>	77.3	93.4	95.2
<b>Total</b>	71.4	70.1	81.7

<b>1991-1996 Select Period Experience</b>			
<b>Male and Female Combined by Underwriting Basis and Issue Age</b>			
<b>2001 VBT</b>			
<b>By Issue Age</b>	<b>Medical</b>	<b>Paramedical</b>	<b>Nonmedical</b>
<b>0-19</b>	132.0	108.0	112.1
<b>20-29</b>	128.1	79.0	105.8
<b>30-39</b>	92.8	83.5	115.0
<b>40-49</b>	97.1	103.1	117.3
<b>50-59</b>	95.2	102.2	129.1
<b>60+</b>	93.9	114.0	110.9
<b>Total</b>	95.1	100.0	114.7

The most favorable nonmedical results occur in the youngest ages. On the other hand, a medical exam's greatest value occurs at the oldest ages. In reality this may reflect adverse experience on those under age 30 who apply on a nonmedical or paramedical basis, but were required to be medically examined due to an adverse medical history. A paramedical exam's value appears to occur in ages 20 through 59 and its value diminishes at the youngest and oldest ages.

### III. Smoker - Nonsmoker Experience

Tables 16-17 present smoker – nonsmoker experience during the 25-year select period for the 1995-96 study period. Tables 18-19 show smoker – nonsmoker experience during the 25-year select period for the 1991-96 study period. Tables 20-21 show the five-year experience by sex. The experience is shown by both issue age and policy year relative to both the 1975-80 Tables and the 2001 VBT.

The ratio of smoker to nonsmoker mortality ratios is included in all the tables. This ratio has been used in the past to compare the level of smoker mortality versus nonsmoker mortality. However, when using the 2001 VBT as the expected basis in this report, this ratio does not have the same meaning and is expected to be close to 1.00 since exposure is now applied to smoking status and sex-distinct rates to determine the expected claim amounts. Since the tables are new, the ratio merely assesses relative fit of the tables for the nonsmoker versus smoker experience data. Therefore, the primary focus of this section will be on patterns observed relative to the 1975-80 Tables. As additional years of data are analyzed and trends can be observed over several years, the 2001 VBT comparisons will become more important.

The chart below summarizes overall results for the one- and five-year study periods (Tables 16 and 18) and a comparison to the 1994-95 Study. The data appear to indicate improvement for both nonsmokers and smokers, but the improvement is greater for smokers. However, this may be driven more by the change in mix of companies in the two studies. Another possible cause is that recent advancements in medicine are more likely to benefit smokers than nonsmokers.

Study Period	1975-80 Basic Table			2001 VBT		
	Nonsmoker	Smoker	Ratio	Nonsmoker	Smoker	Ratio
<b>1994-95</b>	60.4	137.0	2.27	N/A	N/A	N/A
<b>1995-96</b>	55.4	120.2	2.17	88.0	91.7	1.04
<b>1991-96</b>	60.2	133.4	2.22	98.0	104.5	1.07

The chart below summarizes results from the 1995-96 study by issue age, policy duration, underwriting basis, and amount band (Tables 16 and 17).

<b>1995-96 Select Period Experience by Smoking Status 1975-80 Basic Table</b>			
<b>By Issue Age</b>			
	<b>Nonsmoker</b>	<b>Smoker</b>	<b>Ratio</b>
<b>0-19</b>	57.6	52.3	0.91
<b>20-29</b>	65.0	111.4	1.72
<b>30-39</b>	50.4	100.3	1.99
<b>40-49</b>	50.6	115.7	2.29
<b>50-59</b>	55.1	133.7	2.43
<b>60+</b>	66.7	133.6	2.00
<b>By Policy Year</b>			
	<b>Nonsmoker</b>	<b>Smoker</b>	<b>Ratio</b>
<b>1-2</b>	48.6	104.9	2.16
<b>3-5</b>	54.0	134.0	2.48
<b>6-10</b>	54.7	125.2	2.29
<b>11-15</b>	60.9	129.1	2.12
<b>By Underwriting Basis</b>			
	<b>Nonsmoker</b>	<b>Smoker</b>	<b>Ratio</b>
<b>Medical Issues</b>	56.6	112.3	1.98
<b>Paramedical Issues</b>	53.1	122.5	2.31
<b>Nonmedical issues</b>	57.8	125.3	2.17
<b>By Amount Band</b>			
	<b>Nonsmoker</b>	<b>Smoker</b>	<b>Ratio</b>
<b>Under 25,000</b>	88.6	124.3	1.40
<b>25,000-49,999</b>	75.4	126.5	1.68
<b>50,000-99,999</b>	62.2	126.9	2.04
<b>100,000-249,999</b>	54.5	117.8	2.16
<b>250,000-499,999</b>	46.1	114.2	2.48
<b>500,000-999,999</b>	52.5	109.5	2.09
<b>1,000,000+</b>	49.5	73.7	1.49
<b>250,000+</b>	49.1	100.0	2.04

### **Issue Age**

The results for the 1995-96 study by issue age reveal that the ratio of smoker to nonsmoker mortality increases by issue age from the earliest ages where it is close to 1.0 until issue ages 50-59 where the ratio peaked at 2.43 and then decreased to 2.00 for ages 60+. A similar pattern is evident in the five-year study period (Table 18), however, the ratio peaks in the 30-49 age groups at 2.34 and then declines slightly between 50-59 to 2.26, and more significantly for issue ages 60+ to 2.05.

Additional breakdowns by sex in the five-year study reveal distinct patterns for males and females by issue age that are described later in this section. The differences seen in the one- and five-year study may be related to both the mix of companies and perhaps a higher percentage of female exposure in the 1995-96 study.

### **Policy Year**

The results for the 1995-96 study show a significantly lower ratio of smoker to nonsmoker mortality for policy years 1-2 and policy years 11-15. The pattern in the five-year study (Table 19) is similar.

### **Underwriting Basis**

The results by underwriting basis for the 1995-96 study show paramedical issues have the lowest ratios for nonsmokers (53.1) and medical issues have the lowest ratios for smokers (112.3). Paramedical issues have the highest ratio of smoker to nonsmoker mortality. The differences are much less significant than by amount bands. This same pattern can be observed in the five-year study (Table 18).

### **Amount Band**

The results for the 95-96 study by amount band show generally decreasing mortality ratios with increasing policy size for both nonsmokers and smokers relative to 1975-80 Table. For nonsmokers the ratio is 88.6% for the smallest policies and decreases smoothly to 49.1% for policies \$250,000+. Smokers also experience significantly lower mortality for higher face amounts, but the pattern of change is different. The band groups below \$100,000 are not significantly different with ratios of 124.3%, 126.5%, and 126.9% respectively. The aggregate ratio for smoker policies \$250,000 and above is significantly lower at 100.0%. The ratio for smoker policies in the \$100,000-\$249,999 range is in the middle at 117.8%. The five-year study did not include this analysis.

## Sex

Breakdowns by sex and smoking status are only available in the five-year study (1991-96) and are summarized below (Tables 20 and 21). The lower mortality ratio for both male nonsmokers and smokers (59.5 and 130.3) versus female nonsmokers and smokers (63.7% and 146.8%) indicates greater mortality improvement for males relative to females. The previous experience report that included five-year averages starting with 1986-1991 and ending with 1991-1995, commented on the deterioration in both female nonsmoker and smoker mortality during this time period. The pattern of the ratio of smoker to nonsmoker mortality varied by sex. For males, the ratio is highest in the 30-39 and 40-49 age groups (2.47 and 2.40) where it is significantly higher than the female ratios (1.80 and 2.06). For females, the ratio of smoker to nonsmoker mortality increases by issue age and is highest for issue ages 60+ (2.56). The percent exposure by sex and smoking status show approximately 72% males and 28% females. Smokers comprise approximately 14% of the population for each sex.

<b>1991-1996 Select Period Experience by Smoking Status, Issue Age, and Gender</b>						
<b>1975-80 Basic Table</b>						
	<b>Males</b>			<b>Females</b>		
<b>Issue Age</b>	<b>Nonsmoker</b>	<b>Smoker</b>	<b>Ratio</b>	<b>Nonsmoker</b>	<b>Smoker</b>	<b>Ratio</b>
<b>0-19</b>	72.1	85.3	1.18	66.0	96.2	1.46
<b>20-29</b>	69.9	121.1	1.73	60.8	106.1	1.75
<b>30-39</b>	50.5	124.6	2.47	49.8	89.8	1.80
<b>40-49</b>	56.0	134.1	2.40	57.3	118.2	2.06
<b>50-59</b>	62.5	138.6	2.22	63.2	156.8	2.48
<b>60+</b>	67.6	123.4	1.83	88.1	225.8	2.56
<b>Total</b>	59.5	130.3	2.19	63.7	146.8	2.30
<b>% Total Exposure</b>	62%	10%		24%	4%	

#### IV. Ultimate Experience (Policy Years 26 and Over)

The experience over the one-year time period for policy years 26 and over is shown in Table 22. Consistent with the 15-year select period in the 1975-80 Tables, previous reports defined ultimate experience as policy years 16 and over. Given the introduction of the 25-year select period in the 2001 VBT, ultimate experience is now defined as policy years 26 and over.

<b>1995-96 Ultimate Experience (Policy Years 26 and Over) by Attained Age</b>			
<b>Attained Age</b>	<b>1975-80 Basic Table</b>	<b>2001 VBT</b>	<b>% of Exposure</b>
25-29	72.0	86.9	2%
30-34	113.2	130.2	2%
35-39	137.4	167.2	3%
40-44	124.7	167.9	4%
45-49	82.9	108.5	8%
50-54	72.1	102.6	12%
55-59	79.3	108.2	13%
60-64	78.3	108.5	13%
65-69	78.5	107.0	13%
70-74	83.6	118.7	12%
75-79	81.4	114.0	9%
80-84	88.1	117.0	5%
85-89	90.4	112.1	2%
90-95	99.9	116.9	1%
<b>Total</b>	<b>84.5</b>	<b>113.3</b>	<b>100%</b>

Results by attained age are above (Table 22). The overall mortality ratio is 84.5% relative to the 1975-80 Table and 113.7% relative to the 2001 VBT. Relative to both tables, results are significantly less favorable for attained ages 30-44. Part of the extra mortality at these ages could be attributable to AIDS. Another cause could be selective lapsation since these policies were originally issued to relatively young policyholders. The data in these early age groups is also limited. Results are also less favorable for attained ages 70 and above.

<b>1995-96 Ultimate Experience (Policy Years 26 and over) by Amount Band</b>		
<b>Face Amount Band</b>	<b>1975-80 Basic Table</b>	<b>2001 VBT</b>
<b>Under \$25,000</b>	86.2%	115.2%
<b>\$25,000 - \$49,999</b>	80.8	110.1
<b>\$50,000 - \$99,999</b>	80.4	109.7
<b>\$100,000-\$249,999</b>	81.4	111.7
<b>Overall</b>	<b>84.5</b>	<b>113.7</b>

Results by face amount bands (Table 22) are summarized above for bands less than \$250,000 since there is insignificant exposure on policies with face amounts of \$250,000 and greater. While the pattern of higher ratios for lower face amount policies is consistent with policies in earlier durations, the differences here are much less pronounced. This is expected given the longer duration since selection.

<b>1991-96 Ultimate Experience (Policy Years 26 and over) By Premium Paying Status</b>						
	<b>1975-80 Basic Table</b>			<b>2001 VBT</b>		
	<b>Premium Paying</b>	<b>Paid Up</b>	<b>Ratio</b>	<b>Premium Paying</b>	<b>Paid Up</b>	<b>Ratio</b>
<b>1991-1996</b>	70.1	80.6	1.15	94.3	106.8	1.13

Table 23 includes results for the five-year study period (1991-1996) and examines ratios of Premium-Paying and Fully Paid-Up policies. A summary of results is listed above. Fully Paid-up policies experienced higher mortality, a trend emerging in previous reports.