

**TRANSACTIONS OF SOCIETY OF ACTUARIES
1985-87 REPORTS**

DISCUSSION OF PRECEDING REPORT

DOUGLAS DOLL:

For the 1978-83 individual life insurance large amounts study, "large" policies are those with a "classification amount" of \$100,000 or more for issues of 1974 and later and \$50,000 or more for issues of 1954 through 1973.

Expected deaths in the study are based on the 1975-80 Basic Tables, with a modification to extend the select period from 15 to 25 years.

Twelve companies contributed data to this study. These companies contributed approximately 60 percent of the medical select experience to the regular mortality studies, so a large amount of data is included in spite of the small number of companies.

Results by Age

The study has some interesting results. Consider Table 1, which shows actual to expected mortality experience.

TABLE 1

Issue Age	Male			Female		
	Large Policies	All Medical	Difference	Large Policies	All Medical	Difference
20-29	103%	94%	9%	153%	90%	63%
30-39	95	92	3	102	76	26
40-49	84	92	(8)	113	100	13
50-59	84	92	(8)	108	105	3
60-69	89	99	(10)	93	122	(29)
All	88%	93%	(5%)	107%	102%	5%

Clearly, the experience of large polices versus all medical indicates improvement for larger policies at the older ages. The higher ratios for large policies at younger ages are deceptive. The exposure amounts for the "large" policies were as follows:

	Percentage of Exposure	Overall Mortality
Medical	72%	87%
Paramedical	24	98
Nonmedical	3	84

The paramedical exposures undoubtedly are concentrated at the younger issue ages, perhaps explaining why "large" policies have higher mortality at these ages.

The results in Table 1 for females look fairly radical. The exposure for females is only about one-tenth of the exposure of males, so less confidence can be placed in the results. Also, the overall female results (large policies have higher mortality than medical) are consistently illogical with female results in the overall intercompany studies, in which female medical mortality is higher than nonmedical mortality for issue ages under 50.

Results by Duration

The difference in results between male and female lives looks less strange when viewed on a duration-by-duration basis. See Table 2.

TABLE 2

Duration	Male			Female		
	Large Policies	All Medical	Difference	Large Policies	All Medical	Difference
1-2	95%	91%	4%	147%	142%	5%
3-5	92	94	(2)	97	102	(5)
6-10	83	91	(8)	91	92	(1)
11-15	84	95	(11)	92	93	(1)
All	88%	93%	(5%)	107%	102%	5%

Both males and females show slightly higher ratios for large policies in duration 1-2, perhaps indicating antiselection on larger policies. For males, the large policies then become better than all medical, with the improvement increasing by duration. For females, large policies have better mortality than overall medical in later durations, but the difference is smaller than for males.

The "all durations" results for females seem inconsistent with the duration-by-duration results. The reason for this is that the weighting by exposures is different for "large policies" than for "all medical." If we weigh the "all medical" ratios by the "large policies" exposures, the overall ratio would be 108 percent instead of 102 percent, and the large policies overall would have 1 percent lower mortality.

Permanent Versus Term

Approximately 25 percent of exposure was on term policies. Tables 1 and 2 were the combined results of permanent and term. Table 3 compares

permanent with term (male and female combined). For comparison, the results of the 1973-78 study are also shown.

TABLE 3

	1978-83 Study				1973-78 Study
	All Medical	Large Permanent	Large Term	Term Minus Permanent	Term Minus Permanent
Issue Age					
20-29	93%	105%	105%	0%	(14%)
30-39	91	94	96	1	12
40-49	93	85	88	3	12
50-59	93	83	94	11	(13)
60-69	102	87	100	13	(10)
All	94%	87%	93%	6%	5%
Duration					
1-2	95%	102%	97%	(5%)	(2%)
3-5	95	85	107	22	6
6-10	91	83	84	1	14
11-15	95	85	82	(3)	10
16-20	NA	82	92	10	(1)
21-25	NA	88	94	6	0
All	94%	87%	93%	6%	5%

By issue age, the 1978-83 study shows a nice pattern of differences between term and permanent, with permanent clearly having lower mortality at older ages. This pattern is violently contradicted by the 1973-78 study. However, nearly half the exposure in the 1978-83 study is in policy years 1-5. Therefore, one might conclude that the differences in the two studies can be attributed to real differences in products and underwriting standards.

It is difficult to discern a pattern in the term versus permanent results by duration. The better results for term in durations 1-2 may be the result of tighter underwriting on large term policies against the kinds of risk that cause immediate claims. The higher mortality in durations 3-5 is not unexpected, although the large differential is disturbing. It is somewhat surprising that term mortality has not deteriorated more in the later durations, given the higher lapse rates on term. The favorable term experience in durations 6-15 is a mystery. However, note that the policies in these durations for the 1978-83 study would have been issued in years 1964-77, which is prior to the time that competitive ART policies became popular. Therefore, it may not be prudent to rely on these results as indicative of expected experience on today's issues.

Results by Policy Size

Table 4 summarizes the results by policy size.

TABLE 4

Policy Size (000's)	Large Permanent	Large Term	Term Minus Permanent
50-99	89%	101%	12%
100-199	91	93	2
200-249	87	88	1
250-499	85	88	3
500-999	84	97	13
1000+	79	96	17

These results might indicate some antiselection for very large term policies. The amount of data for very large policies is not large; there were only 348 claims on term policies of \$500,000 and larger.

Conclusion

There would appear to be a strong case for assuming a significant decrease in mortality for large male permanent policies (not for females and not for term). A decrease of 10 percent appears reasonable. When making this assumption, however, you should consider whether your other assumptions already have incorporated this improvement, for example, your nonsmoker and preferred discounts.

Also, a reduction for large policies would require an increase for the smaller policies, such that the aggregate mortality assumption remains the same.

ROBERT J. TIESSEN:

Congratulations are due to Douglas Doll and the Society of Actuaries for the continuing effort to understand mortality under large-amount policies. However, we must recognize that there are large differences between the results of the large amounts study and general industry experience on what most people would refer to as large amounts. While the top one or two dozen companies can contribute a representative sample of life insurance sold at regular amounts, the majority of large-amount policies are sold by companies that do not contribute to any of the intercompany studies. The exclusion of many of the medium-size brokerage-oriented companies that write a great deal of large-amount business from these studies must be recognized as making their results potentially unrepresentative. Another factor is the use

of \$100,000 (previously \$50,000) as a definition for a large-amount policy. Policies of these amounts were usually issued on a nonmedical basis during the study period for ages under 40 and sometimes even to age 45 or 50.

The large amounts study indicates that mortality antiselection is present in various areas. These include female mortality where large-amount policies, even when medically examined, have poorer mortality than non-examined small-amount policies. The higher mortality rate for term business and especially term policies over \$500,000 is another example of antiselection being present.

Another indication that the large-amount experience of the larger companies may not be representative of the general large-amount market can be obtained by comparing the reinsurer mortality survey published in the June 1989 *Reinsurance Section Newsletter* with the results of the Society's large amounts study. The reinsurers' mortality study contains many caveats and was based on a smaller data base. Although various subdivisions are given, I believe it would be safe to say that reinsurance mortality was between 75 percent and 80 percent of the 1965-70 Basic Tables. This corresponds to approximately 100 percent of the 1975-80 Basic Tables, which were used in the Society's large amounts study. Male large-amount mortality in the Society study was 88 percent of the 1975-80 tables.

While the more intense medical underwriting of large-amount policies should produce better results for this business, I believe that other factors, such as increased lapse rates, increased antiselection and greater nonmedical risks among the wealthy (foreign travel, exotic sports), may more than offset this advantage.

I would also like to echo the comments of Douglas Doll with respect to making sure that your aggregate mortality assumption remains the same if you reduce mortality for large-amount cases. Also, the impact of differences in the current insurance situation, such as smoker/nonsmoker distinctions, from those present during the study period must be considered.

