



SOCIETY OF ACTUARIES

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NEW INVESTIGATION OF BUILD AND BLOOD PRESSURE

by Edward A. Lew and Courtland A. Smith

(Messrs. Lew and Smith are Chairman and Secretary, respectively, of the Ad Hoc Committee on the New Build and Blood Pressure Study).

In 1974 the Society of Actuaries and the Association of Life Insurance Medical Directors appointed an Ad Hoc Committee on a New Build and Blood Pressure Study to produce a sequel to the Build and Blood Pressure Study 1959. Reports on the preliminary findings were made to the sponsoring organizations at their annual meetings in October, 1978. Final review of the figures is expected by fall. It is planned to publish the results of the Study in two volumes: one on build late this year and the other on blood pressure early in 1980. Members of the Society will be advised when they may place orders for these volumes through the Society's office.

The main investigation focused on medical issues of 1950-71 traced from anniversaries in 1954 to anniversaries in 1972. It covered about 4,500,000 policies of which 650,000 were on lives with borderline or definite overweight or elevated blood pressure. The study was carried out separately for men and women, both by number of policies and by amounts of insurance. Four basic mortality tables by sex, based on number and amount, were derived from the corresponding standard experience of the companies in the study and not from the contemporaneous experience of the companies contributing to the Recent Issues Investigation. A prodigious amount of effort was needed to check, tabulate and analyze the vast amount of information assembled. Much of this work was accomplished at the Center for Medico-Actuarial Statistics of the MIB.

In assessing the results of the study, the following points should be kept in mind:

(a) The period covered by the main study saw the beginning in the early 1960's of a continuing decline in death rates from heart disease, a decline which over 15 years has been estimated at 25 percent for insured men and 15 percent for insured women.

(b) Over the period covered by the study underwriting has become more

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THE UNIVERSE OF ANNUITIES CERTAIN

by Robert L. Brown

As a review of general annuities, I like to have my students fill in the first three rows of the following table. Each entry represents the present value of payments which total \$1 per annum over 25 years at 4% per annum. We consider different payment frequencies and different interest conversion frequencies as follows:

$i \backslash P$	Annual	Semi	1/4 ly	Continuous
Annual	$a_{\overline{25} 4\%}$	$a_{\overline{25} 4\%}^{(2)}$	$a_{\overline{25} 4\%}^{(4)}$	$\bar{a}_{\overline{25} 4\%}$
Semi	$\frac{a_{\overline{50} 2\%}}{s_{\overline{2} 2\%}}$	$50¢ \cdot a_{\overline{50} 2\%}$	$50¢ \cdot a_{\overline{50} 2\%}^{(2)}$	$50¢ \cdot \bar{a}_{\overline{50} 2\%}$
1/4 ly	$\frac{a_{\overline{100} 1\%}}{s_{\overline{4} 1\%}}$	$50¢ \cdot \frac{a_{\overline{100} 1\%}}{s_{\overline{2} 1\%}}$	$25¢ \cdot a_{\overline{100} 1\%}$	$25¢ \cdot \bar{a}_{\overline{100} 1\%}$
Continuous	A	B	C	D

The solutions to the fourth row can be expressed in some extremely interesting ways. For example, in Box C we can come up with three logical and correct answers corresponding to the entries in the column above; namely,

Box C

- 1) $\frac{1-v^{25}}{i^{(4)}}$ defined as $\delta = .04$
- 2) $50¢ \cdot \frac{(1-v^{50})}{i^{(2)}}$ defined as $\delta = .02$
- 3) $25¢ \cdot \frac{(1-v^{100})}{i}$ defined as $\delta = .01$

The same can be said for Boxes A, B, and D.

In fact, it can be said that there are an infinite number of logical and correct answers for Boxes A to D. (While it is possible to find an infinite number of correct expressions for the other twelve boxes, those listed are the only logical ones).

The proof of equivalence for the expressions in Boxes A to D is simple since

all we have really said is: $e^{\frac{m(\delta)}{m}} = e^{\frac{n(\delta)}{n}} = e^{\delta}$ for all m, n, and δ . □