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Actuarial Meetings

Jan. 12, Baltimore Actuaries Club
Jan. 17, Chicago Actuarial Club
Jan. 18, Seattle Actuarial Club
Feb. 9, Baltimore Actuaries Club
Feb. 15, Seattle Actuarial Club
Feb. 21, Chicago Actuarial Club

HEALTH INSURANCE SPECIALTY MEETING REQUEST FOR PAPERS

by Robert E. Hunstad

You are invited to write a paper for publication in the *Transactions*. Papers on health insurance are specifically sought to enhance the program for a 1979 special topic meeting of the Society of Actuaries.

Past specialty meetings, co-sponsored by the Program Committee and the Committee on Continuing Education and Research, have provided educational opportunities for our members. Another purpose of the Society's continuing education effort is to encourage the development of actuarial literature. This special call, made by the Committee on Health and Group, is to encourage your individual contribution to our literature.

The final program for the 1979 special meeting on health insurance will be determined, in large part, by the subjects covered in papers submitted in response to this call. Topics are limited to health insurance, but could cover any s ecific subject within that general category.

Procedures for submitting papers are outlined on pages 13 and 14 of the *Year Book*. To assure that papers are available for the meeting, deadlines have been established. Potential authors are asked to submit an outline of their proposed paper to the Executive Director by July 1, 1978. Information received by this date will be used in the initial program planning. Completed papers must be submitted no later than September 15, 1978, to permit adequate time for review, editing, printing and distribution prior to the meeting. Submission of manuscripts and outlines in advance of these deadlines would help the review process of the Committee on Papers.

Additional information may be obtained from Stephen T. Carter, Chairman, Committee on Health and Group.

JOINT LIFE ANNUITY FORMULATIONS

by Samuel H. Cox

An appendix to Harold Cherry's article, "The 1971 Individual Mortality Table" (*TXA XXIII*, 1972, p. 475), contains a FORTRAN program which produces annual payment, joint life immediate annuity rates. The program has been modified by the author to compute other types of two life annuities including those designated "qualified joint and survivor annuities" in the Employee Retirement Income Security Act of 1974. The modified program is also capable of determining rates based on modes of payment other than annual. Copies of the modified program are available from the author.

The major modifications allow for frequency of payment other than annual, computation of single life in addition to joint rates and for other than straight joint life annuity forms. In allowing for frequency of payment other than annual, the problems reported in *The Actuary* by Hermann Edelstein (January 1977) and Dave Becker, Imen Bojrab and Lee Buchele (April 1977) were avoided by using the type of approximation suggested by John A. Mereu (also in *The Actuary*, April 1977). Mr. Mereu suggested using the uniform distribution of deaths (UDD) hypothesis for evaluating $\ddot{a}^{(m)}_{x:\overline{n}|}$; applied to immediate and continuous annuities this gives, respectively,

$$a^{(m)}_{x:\overline{n}|} = \frac{id}{i^{(m)}d^{(m)}}\, a_{x:\overline{n}|} + \frac{d^{(m)} - d}{i^{(m)}d^{(m)}}\,(1 - {}_nE_x)$$

and

$$\bar{a}_{x:\overline{n}|} = \frac{id}{\delta^2}\, a_{x:\overline{n}|} + \frac{\delta - d}{\delta^2}\,(1 - {}_nE_x).$$

This approximation amounts to assuming that ${}_{k+t}p_x$ is a linear function of t $(0 \le t \le 1)$ for integral values of k and x. The algorithm uses the same method to approximate $a^{(m)}_{xy:\overline{n}|}$. That is, ${}_{k+t}p_{xy}$ is assumed to be a linear function of t. This results in the following approximations:

$$a^{(m)}_{xy:\overline{n}|} = \frac{id}{i^{(m)}d^{(m)}}\, a_{xy:\overline{n}|} + \frac{d^{(m)} - d}{i^{(m)}d^{(m)}}\,(1 - {}_nE_{xy})$$

$$\bar{a}_{xy:\overline{n}|} = \frac{id}{\delta^2}\, a_{xy:\overline{n}|} + \frac{\delta - d}{\delta^2}\,(1 - {}_nE_{xy})$$

If the interest only functions are evaluated with $i = 0$, then the more common approximation result:

$$a^{(m)}_{xy:\overline{n}|} = a_{xy:\overline{n}|} + \frac{m-1}{2m}\,(1 - {}_nE_{xy})$$

$$\bar{a}_{xy:\overline{n}|} = a_{xy:\overline{n}|} + 1/2\,(1 - {}_nE_{xy})$$

(*Continued on page 5*)