



The Newsletter of the
Society of Actuaries

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THE Actuary

The Impact of AIDS on the Insurance Industry

by David M. Holland

Acquired Immune Deficiency Syndrome (AIDS) will have a tremendous impact on the insurance industry in North America. In "AIDS, HIV Mortality and Life Insurance," Michael Cowell and Walter Hoskins project that, for business currently in force, life claims will amount to \$50 billion over the remainder of this century. Assuming Human Immunodeficiency Virus (HIV) infection decreases to zero by 1997, AIDS claims on individual business currently in force will rise to around 18% of total claims in 1997 (assuming no AIDS claims from issues after 1986.) If HIV testing is not permitted and insurance sales increase at a 5% annual rate, an additional \$20 billion of individual AIDS claims are projected by year-end 2000. These projections do not include AIDS-related claims for disability and health insurance, which would also be substantial.

AIDS is devastating. As of August 31, 1987, 41,366 AIDS cases have been reported to the Centers for Disease Control (CDC); of these, 23,884, or 58%, have resulted in death. Cowell and Hoskins modeled mortality for someone with AIDS by death rates of 45%, 45%, 35% and 25% for years 1, 2, 3, and 4 on, respectively. The resulting life expectancy from diagnosis of AIDS is only about 2.1 years.

A key challenge in measuring the impact of AIDS has been to develop a model to estimate the number of people infected with HIV and to measure the progression from infection through development of AIDS to ultimate death. The Cowell-Hoskins

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The Future of the Actuary/ The Actuary of the Future

by Gary Corbett

The future of the actuary has been a subject of active discussion within the Society for at least the past five years. The March 1982 *Actuary* carried an article by Bill Poortvliet summarizing the conclusions from a survey of actuarial employers conducted in 1982 by the Career Encouragement Committee. One of the conclusions was, "Employers are not focusing on numbers alone; they appear to be looking for actuaries with a broader bent, going well beyond the traditional technical skills."

In an early discussion of the Committee on Planning, actuaries were characterized as being in one of two groups. One group consisted of multi-disciplinary individuals with high communication skills; the other comprised the more traditional numbers-oriented actuaries. During these early discussions, the Committee identified a hypothesis which seemed to supply a common root for the many issues being examined. This hypothesis was: "In a world of increased change, actuaries as a group need to increase their abilities to deal with change. We need greater competence

in such skills as: problem identification, dealing with unstructured situations, applying inter-disciplinary approaches, communications and conceptualization."

Employers were described as wanting people who could sort through a mass of information to identify key problems and who were willing and able to operate within ambiguous, unstructured situations. Problem-solving in such an environment requires analytical skills, which must be combined with the ability to weigh risks and to make decisions. Management and communication skills were also deemed important if an actuary were to advance past the technical level.

As a means of increasing their nontechnical skills, current FSAs can participate in various continuing education activities, and the Society's continuing education program has been responding to this need in recent years. With regard to the development of future Fellows, selection, recruiting and education can play an important role. It is with this in mind that the

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Future of Actuary Cont'd.

Committee on Planning has been working with the Career Encouragement and Publications Committees to increase the emphasis on the nonmathematical and business aspects of an actuarial career, particularly in publications aimed at prospective actuaries.

This year's Committee on Planning transferred its focus from a primarily inward look at the actuary of today to an outward look at the actuary of tomorrow. Jumping ahead to the early years of the 21st century, a century in which our current members will spend most of their collective careers, the Committee has asked such questions as:

- What will, should, or can the role of the actuary be?
- What knowledge, methods and skills will be required of the actuary?
- What are the implications of the above for selection, education, training and research?

These and other important questions have been the subject of extensive discussion this year, including a recent all-day meeting in New York involving noncommittee members Jim Anderson, Roy Anderson, Jim Hickman and Fred Kilbourne. The Committee on Planning has now established a task force to undertake a structured, in-depth study of The Actuary of the Future/The Future of the Actuary. This task force includes employers of actuaries and users of actuarial services. Its charge will be to report to the Board of Governors by October 1988, with recommendations addressing such questions as:

- Should the Society's education (basic and continuing) and research programs be expanded to include disciplines and businesses not currently covered by the syllabus?
- Should the Society ensure that members are educated in non-actuarial areas vital to success?
- Should the Society's education and research programs be expanded to cover nontraditional applications of actuarial science?
- What should be the common core of knowledge possessed by all Society Fellows?
- How should the Society communicate, both within and outside the profession, the changing role of the actuary?

- How should the Society modify its selection methods to attract individuals who are more likely to succeed as actuaries in the future?

The Committee is well aware that many Society members question whether a problem really exists. Some have advised, "If it ain't broke, don't fix it." The May 1987 issue of *The Actuary* published a supplement — "The Value of the Actuary—The Future of the Society," which discussed some of these questions. Although many of the articles were provocative and responses were encouraged, only a few were received. This lack of response, combined with the results of last year's Actuarial Profile Survey, provides evidence that many of our members are not very concerned either about their own futures or the future of the profession. On the other hand, evidence does exist from other sources, such as the FEM White Paper survey, that a significant number of our members do share the Committee's concerns. These concerns include the declining need for actuaries in certain practice areas, the changes in the skills required for an actuary to succeed, and the possibilities of our better serving society in general through broadening the scope of actuarial activity.



The task force, in addressing these concerns and the questions raised will assess the extent to which any significant future problem does exist. We expect the nonactuaries of the task force to help considerably in this regard. The task force will most likely involve additional employers and users in its deliberations.

Within the profession, and particularly within the Society, we are encouraging a wide discussion of The Future of the Actuary/The Actuary of the Future. Past-President Harold Ingraham wrote on this subject in the July issue of the Academy's *Actuarial Update*. At an open forum at the

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Future of Actuary Cont'd.

annual meeting in Montreal. Jim Curtis, Jim Hickman, Bob Shapiro and I had a discussion of The Actuary of the Future, receiving significant audience input. The task force is interested in your views as well. Please direct comments to its chairperson, as shown in the 1988 *Yearbook*. Alternatively, you can send your thoughts to me at my address, and I'll see they are forwarded. (Mr. Gary Corbett, Tillinghast/Towers Perrin, One Atlanta Plaza, 950 E. Paces Ferry Road, Atlanta, GA 30326.)

If the need for actuaries is indeed shrinking either because the need for what we do is declining or because others, be they professionals or general managers, can do the job better, the actuarial profession should not attempt to stem the tide. However, many of us do not accept that society's need for actuarial skills is decreasing; rather, we see many areas that would be better served by an expanded actuarial presence.

Here's to our future. It will be what we make it.

Gary Corbett is with Tillinghast/Towers Perrin. He is the SOA President for 1987-88.

AIDS Cont'd.

model used for financial projections shows a cumulative 900,000 people infected in 1987, rising to 2.5 million by the year 2000. By 2000, the cumulative number of AIDS cases is projected to be 1.6 million, of which 1.3 million would have died.

Compared to the 1980 CSO Basic Male Non-Smoker Table rates, the mortality of someone who currently tests positive for HIV would be in excess of 5,000% of standard. Although the underlying patterns of mortality for someone who is HIV positive are so different from those of someone who is standard that mortality ratios may be questionable, it is clear that the level of mortality is far beyond what is considered insurable, even at the highest substandard rating.

Another expression of the impact of the high mortality to be expected for someone who is HIV positive is to look at the present value of future claims. Cowell-Hoskins determined:

[P]rogression to AIDS and death under the slower SFCC[San Francisco City Clinic]/CDC assumptions produces death claims that, discounted at 6%

AIDS Cont'd.

interest, would require a net single premium of \$515 per \$1,000 issued to an HIV infected individual.

The Cowell-Hoskins paper is a landmark in actuarial literature. Actuarial techniques of numerical analysis, life contingencies and survival models have been combined with tools from biostatistics and epidemiological modeling. From this, the authors have derived practical information about the projected impact of this disease. You are encouraged to study this paper in detail; if you have not received a copy, contact the Society Office Research Department.

In spite of the tremendous advance represented by the Cowell-Hoskins paper, certain factors which should be kept in mind when considering its results are:

1. The model is based on an assumed population at-risk of AIDS of 3 million male homosexuals and bisexuals, plus 750,000 IV drug abusers. These groups represent approximately 90% of the adult AIDS cases reported to date in the U.S.
2. Additional information is needed on the spread of AIDS in the heterosexual population. Reported cases of heterosexual transmission account for approximately 4% of the AIDS victims overall, but 30% of the female cases. Because the heterosexual population is so large, a spread at even a much reduced rate could still result in a large infected population.
3. The model for estimating the number of people infected has been fitted to CDC data of AIDS cases and deaths. Although this is thought to be the most reliable information available, there are problems with underreporting and with delays in reporting to the CDC. A 20% increase in cases has been cited as a possible adjustment for underreporting. In its December 29, 1986, report, CDC showed 29,003 cases had been reported through that date, but from its August 31, 1987, report, 33,475 cases are shown as having been incurred by the end of 1986.
4. As of September 1, 1987, the CDC revised the definition of AIDS to include dementia and emaciation. These cases were previously considered AIDS Related Complex (ARC) rather than AIDS and were not in

the AIDS tabulations. The revised data from the CDC should be carefully studied. (This new information was not available when this article was being prepared.)

5. Although the Cowell-Hoskins model is consistent with other models, such as the one by Jeffrey Harris at M.I.T., some other models have produced significantly different results. For example, a report prepared by the RAND Corporation states that the CDC:

figure is now thought by many to be too low, particularly because it employs a very conservative estimate of HIV (Human Immunodeficiency Virus) incubation or latency, which determines how many seropositives convert to symptomatic AIDS over a period of time. Others think that underreporting of AIDS cases is even more egregious than the official corrections would suggest and that the extent of heterosexual transmission has been underestimated. Thus, although 220,000 cases might serve as a low-range estimate, case load numbers of 400,000 and 750,000 in 1986-1991 are more credible mid- and high-range estimates.

There appear to be little hard data supporting the RAND report; until more data become available, the CDC estimate must be considered more reliable.

Major research facilities outside the insurance industry are developing a number of models. These facilities have tremendous resources and support; with additional and more refined data, we hope that more sophisticated and accurate models can be developed.

6. The Cowell-Hoskins financial models were fitted to AIDS experience collected by the ACLI/HIAA for 1986. Data received after publication indicate actual experience may have been higher than previously thought.
7. The financial numbers are based on a model which assumes that the rate of infection will decline to zero by 1997. This reduces the ultimate

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AIDS Cont'd.

risk group by approximately one-third. The model is further based on the assumption that the insured population which is HIV positive will ultimately grow to only 58% of the total risk group (around 40% of the infected population, assuming infection remains constant).

8. The emergence of AIDS-related claims will be affected by the extent to which insurance companies are able to test applicants for HIV infection. Limitations in risk selection may result in substantial increases in claims.
9. In addition to claims from AIDS itself, increased claims can be expected for people who have the HIV infection and who will incur claims for sickness and death from complications of this infection without necessarily having reached full clinical AIDS.
10. Further developments in treatment may affect the course of the disease. Although somewhat advantageous from a life insurance point of view, such treatments may increase claims for health and disability insurance.

Overall, the Cowell-Hoskins assumptions could have been more pessimistic in a number of areas. From the point of view of human compassion as well as concern over financial impact, it is hoped that events will be more favorable than the projection indicates. However, my impression is that Cowell and Hoskins were striving for as fair a presentation as possible and these projections should be considered as a likely scenario.

Although the Cowell-Hoskins paper represents the opinion of the authors only, the Society of Actuaries AIDS Task Force encouraged and supported this work and is pleased to have Mike Cowell as a Task Force member. However, this is only one phase in our review of the impact of AIDS on the insurance industry, and further deliberations will take place. The Task Force would like to receive your comments on either the Cowell-Hoskins paper or any aspect of projecting the impact of AIDS on the insurance industry. Please send them to me at my *Yearbook* address.

David M. Holland is Executive Vice President and Chief Actuary at Munich American Reinsurance Company. He is chairperson of the SOA AIDS Task Force and a member of the Board of Governors.

The Canadian Institute and Its President

Deborah Poppel, features editor of *The Actuary*, recently interviewed J. Dickson Crawford, who is beginning his term as President of the Canadian Institute of Actuaries.

Poppel: *What is the major role of the CIA?*

Crawford: The chief role of the CIA is to make sure that the public receives high quality actuarial services in Canada. We focus on three areas: providing consistent admission procedures, defining acceptable standards of practice, and monitoring compliance with these standards. The CIA also provides opportunities for actuaries to meet and discuss different areas of practice, new developments, and research.

Poppel: *Does this mean the CIA is similar to the American Academy of Actuaries?*

Crawford: Yes, it carries out a similar role in standards development and interacting with the public. However, the CIA has been able to achieve unique recognition of the FCIA in statutes for both pension and insurance valuations. In the U.S., the Academy has achieved recognition of the MAAA, but it is not a unique position.

Poppel: *How does one become a member of the CIA?*

Crawford: There are three requirements: (1) affiliation—nearly all Fellows of the CIA are Fellows in the SOA, the CAS, or the Faculty or Institute in Great Britain; (2) education—for example, completing the Canadian specialty under the SOA or CAS syllabus; and (3) experience—a three-year period of Canadian experience is required.

Poppel: *What are the main differences between U.S. and Canadian actuarial practices?*

Crawford: The main differences in practice are driven by legislative and regulatory differences. For example, ERISA means that pension actuaries face a different set of rules in the U.S. In Canada, each province sets its own pension regulation. The growing body of legislation in both our countries has been following increasingly divergent tracks, which would make it difficult

for an actuary to practice competently in both countries.

Poppel: *Do you think there is the appropriate level of interplay between actuaries in the U.S. and Canada?*

Crawford: Yes, we cooperate to a great extent on the education and examination process. We have joint seminars and symposia, for example, for valuation actuaries, casualty actuaries and consultants. We share results of research studies.

Poppel: *The unification of the U.S. actuarial profession, specifically, of the multitude of actuarial bodies, is currently under discussion. Does such an issue exist in Canada?*

Crawford: We are participating in the task force established by the Council of Presidents. We have been fortunate in Canada to have had a unified profession since 1965 when the CIA was created. We believe it has been of great benefit to Canadian actuaries.

With unification goes the responsibility to ensure that all actuaries in Canada see the CIA as responsive to their particular needs, whether they are French or English: life, casualty or pension; employed by an institution or in private practice. One practical example of this thinking is found in our second guiding principle on education, which states that an FCIA shall be examined on the basic theory, concepts, and standards required for all the major areas of actuarial practice. To accomplish this we are working actively with the SOA and CAS to ensure both the content and flexibility to enable a Canadian actuary to meet this goal, whichever society is chosen as the route to Fellowship.

Poppel: *What are the big issues currently facing the Canadian actuary?*

Crawford: The biggest issue is the trend toward increasing explicit standards of actuarial practice.

Poppel: *What are the forces behind this trend?*

Crawford: More competition in recent years has thinned our profit margins and increased risk to insurance companies. In a broader context, some trusts and regional banks have failed, resulting in a general concern over the

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Canadian Institute Cont'd.

security of financial promises, and a resultant concern that regulators will intervene to prevent additional losses. Canadian actuaries must continually demonstrate that our standards are appropriate in theory and practical application.

Poppel: *Does an increase in standards constrain the actuary's freedom of professional judgment?*

Crawford: That concern has been raised by some Canadian actuaries. Others feel just as strongly that different times and different public expectations require a different response from our profession. It's a balancing act; we need to put fences around the corral to tighten things up, but leave in enough flexibility so that actuaries can and must use professional judgment.

Poppel: *What is the role of the CIA in all of this?*

Crawford: The CIA is trying to take an assertive role in developing more explicit standards of practice. We have a series of committees charged with developing standards and making sure they are given sufficient hearing.

Poppel: *When will new standards be in place?*

Crawford: Some are already in place. Standards for transfer values under pension plans are approaching the end of a one-year trial period. Along with several valuation technique papers, drafts of two major papers dealing with scenario testing for solvency standard purposes and provisions for adverse deviations in life company reserves have just been sent to valuation actuaries for comment. These will be debated and revised over the fall and winter, leading to adoption in mid-1988 for application in 1989.

Poppel: *How in practicality will the new standards work? Who will make sure they are followed?*

Crawford: The CIA will be responsible for monitoring to make sure that standards are being followed. How exactly that will be done is still being debated. The regulators clearly have a strong interest in making sure that standards are being followed, and they will rely to a great extent on members of our profession.

Poppel: *What implications does this have for the future of the profession in Canada?*

Crawford: The implications are profound. All these developments are reinforcing the fundamental respon-

sibilities that actuaries have to clients, employers, regulators and, most importantly, to society as a whole. The role of the valuation actuary employed within a life company is unique. He or she is typically a senior member of the management of the company but at the same time is accountable to the public through the regulatory process. The effective balancing of this dual role will be a key to the acceptability of the position of the valuation actuary.

This is a time of change and transition which presents the profession with important opportunities. While there are always risks at times like this, I am confident that actuaries in Canada will measure up to the challenges ahead.

New Funding Rules for Pension Plans in Canada

by Michael Cohen

The last couple of years have been busy for pension plans in Canada, with the passage of federal and provincial acts improving minimum standards for plans under federal jurisdiction (for example, those of banks, interprovincial and international transportation and telecommunication) and those under provincial jurisdictions in Alberta, Nova Scotia and Ontario. While these acts, which are essentially uniform in most aspects, contain many features of actuarial interest, I will describe changes to the detailed funding rules for defined benefit pension plans found in the regulations of these various acts.

Let me begin by summarizing the previous rules, which, of course, are still required in jurisdictions where the new-style pension benefits acts are not yet in force. An actuarial valuation is required every three years. The actuary is required to calculate the current service cost, using an acceptable actuarial cost method and going-concern actuarial assumptions, including an assumption regarding salary increases and indexation, in plans where this is relevant. The actuary is also required to calculate any unfunded liability caused by benefit increases, basis strengthening or experience losses. If any such unfunded liabilities were to be revealed, those caused by benefit

New Funding Rules Cont'd.

increases or basis strengthening could be amortized as a level dollar payment over a period not exceeding 15 years, while experience losses were to be amortized over 5 years or less.

It should be noted that acceptable valuation methods in Canada include the unit credit method, the entry age and attained age methods, and aggregate methods. This latter family of methods fits less well into the regulatory scheme, since unfunded liabilities by origin are difficult to identify.

These rules have served well, however. Few plans have terminated with unfunded liabilities since the original inception of pension benefits legislation in the mid-1960s, and funding levels in most plans are high. Indeed, a large percentage of plans are fully funded on a going-concern basis. Nonetheless, it was felt that some manipulation was possible. For example, with a little foresight prospective experience deficiencies could be turned into basis strengthening, thereby extending the amortization period. It was also felt that more flexibility could be given to well-funded plans, while tightening up on other plans, such as flat-benefit plans. The latter have traditionally been of concern to pension regulatory authorities (and no doubt to the plan actuaries as well).

The essence of the reform is to permit 15-year amortization of all types of going-concern unfunded liabilities, however caused, on a percentage of payroll basis, and a level dollar amount, subject to meeting a solvency valuation test. If, however, the plan has a solvency deficiency, this deficiency must be funded over 5 years, with the balance of the going-concern unfunded liability, if any, funded over 15 years. Current service costs would be calculated on a going-concern basis as before.

Liabilities for the solvency valuation would be calculated on a unit credit method, using reasonably current interest rates (either streamed or blended to reflect current and long-term expected rates) but without termination rates or salary increase assumptions. The retirement age assumption would be expected to reflect experience should the plan actually terminate. In addition, if any special benefits were triggered by plan termination, these should be valued as well.

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New Funding Rules Cont'd.

Assets would include invested assets, of course, valued on a market-related basis. The assets would also include the value of future amortization payments, limited to those due in the 5 years following the valuation. All amortization payments, however, could be taken into account 1) in respect of past service granted on the initiation of a plan, and 2) in respect of amortization arising under the old legislation. (The former (1) is so that the establishment of new plans with past service benefits would not be discouraged, and the latter (2) would serve as a transitional measure to avoid retroactive application of the solvency valuation test.)

The general effect of these new rules is to ensure that plans continue to be well-funded on a going-concern basis, while also ensuring that any greater flexibility permitted in funding going-concern unfunded liabilities will not have a negative effect should the plan terminate. In addition, the rules will generally ensure that all plans are targeted to be fully solvent on a termination basis within 5 years.

In my estimation few final average plans will show solvency deficit, since valuation on current interest rates without salary scales will more than overcome any strengthening effects of the solvency basis. The effect on career average plans is less certain, but also not expected to be significant, because these plans tend to be well-funded already. Flat benefit plans, however, will have their funding flexibility cut back severely, in many cases. This is because a greater number of elements in the basis will need to be strengthened, compared to those where some weakening would be possible. Principal among these would be a generous early retirement provision. Furthermore, many of these plans increase accrued benefits on a regular basis through collective bargaining and amortize the cost of these increases over the maximum period. The effect of these rules could be to reduce this period to 5 years in some cases.

In summary, new funding rules are now in effect in the federal jurisdiction and Alberta and will shortly be in effect in Ontario, Nova Scotia and possibly Quebec. These rules will permit greater flexibility in funding pension plans, while at the same time introduce funding standards on a plan

termination basis which will ensure 1) that plans are either able to meet all their obligations on a plan termination, or 2) that plans at least are targeted to be in this position within 5 years. The aim is to allow flexibility so that plan sponsors are encouraged to increase benefits, while safeguarding, to the extent possible, the rights of pension plan members.

Michael Cohen is Director of the Pension Benefits Division at Financial Institutions Canada. He is also a member of the CIA Pension Standards Committee and the Joint Task Force of the Canadian Institute of Chartered Accountants and the Canadian Institute of Actuaries, which is investigating pension accounting issues for the public sector.

Non-Traditional Marketing Meeting to be Held

On December 10, 1987, the Non-Traditional Marketing Section will jointly sponsor a seminar with the Direct Mail Insurance Council (DMIC). The meeting will be held in Hartford, Connecticut, and will be hosted by The Travelers. A dinner for all meeting participants will take place on December 9.

The title for the meeting is "Relationship Marketing: The Essential Strategy for Successful Direct Marketing of Insurance." Speakers from both the DMIC and our Section will explore the total value of an insurance customer and not simply the profit potential from the sale of one product to the customer. Michael Shumrak and Jay Jaffe will represent our Section.

The meeting marks the first time that the Non-Traditional Marketing Section has jointly sponsored a seminar with a non-SOA group. We hope this will be the first of several sessions with groups whose membership along with our membership will benefit from an exchange of ideas.

The seminar is open to all SOA members. Section members will receive a special notice describing the meeting. Anyone else desiring further information about the meeting should contact Jay M. Jaffe, Actuarial Enterprises, Ltd., Suite 333, 600 Central Avenue, Highland Park, IL 60035 (312/831-6603).

"Travel Time" Under the New Examination System

by M. David R. Brown

With the implementation of the new Flexible Education System (FES) for the Associateship exams, there has been concern on the part of students, employers and the E&E Committee that the new system may result in longer "travel time" to progress through the examinations. The Spring 1987 exam results showed a sharp drop in the number of new ASAs to a total of 88 from the level of recent spring exam administrations (about 250). This prompted the Society education staff to investigate whether the new system is hindering or helping candidates' progress through the system. The results of this investigation were as follows.

A total of 767 candidates could have become ASAs by passing all exams for which they were registered. Here is what happened to them:

- (a) 159 did not write all exams for which they registered.
- (b) 88 became ASAs.
- (c) 99 failed all the exams they wrote.
- (d) 103 would have become ASAs under the old system since their combined scores would have passed them, but they failed one or more "sub-parts."
- (e) 151 would not have become ASAs but did pass two or three of the four "sub-parts" of former Part 5.
- (f) 167 would not have become ASAs but did pass one of the four "sub-parts" of former Part 5.

Categories (a), (b) and (c) were not affected by the introduction of FES. The 346 candidates in these categories (45.1% of the total) are in the same position under the new system as they would have been under the old.

Category (d), with 12.9% of the total, was adversely affected by the introduction of the new system, but categories (e) and (f), with 41.5%, were favorably affected. Individuals in the categories now lack one to three sub-parts to complete their ASAs under the new system; many of them will

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"Travel Time" Cont'd.

probably sit for at least one Fellowship exam this fall as well as the remaining Associateship exams.

It is still too soon to say that the number of new ASAs will correct itself in the next few exam sittings, but that scenario would be consistent with the available evidence. In any event, the spring 1987 results indicate that more than three times as many candidates benefited from the new system compared with the number who were adversely affected.

The E&E Committee will continue to monitor this situation and the general effect of the new system on "travel time" through the exams.

M. David R. Brown is a Consulting Actuary at Eckler Partners, Ltd. He is an Associate Editor of *The Actuary* and recently finished his term as SOA Vice President in charge of Education and Examination.

New Books Added to SOA Library

The following is a partial list of additions to the SOA library. Members may borrow library books by contacting the Research Librarian at the Society office.

Andrews, George H. *Actuarial projections for OASDI program of the United States of America*. 1987.

CCH *guide to employee benefits under 1986 tax reform*.

EBRI. *The changing profile of pensions in America*. 1985.

Employee benefit plans: a glossary of terms. 1987.

Fabozzi, Frank J., ed. *Advances in futures and options research, vol. 1, parts A & B*. 1986.

Granger, C.W.J. *Forecasting in business & economics*. 1980.

Levy, Haim, ed. *Research in finance, vols. 1 & 2*. 1980.

Meares, Charles. *Looking back: a memoir of New York Life*. 1985.

Mehr, Robert I. *Fundamentals of insurance*. 2nd ed. 1986.

Mehr, Robert I. and Gustavson, Sandra. *Life insurance: theory and practice*. 4th ed. 1987.

Library Donations

The SOA Library greatly needs back issues of the *Astin Bulletin* published by the IAA. All issues will be appreciated. Please send to: Society of Actuaries, Attn: Librarian, 500 Park Boulevard, Itasca, IL 60143.

Universal Life Reserves — Should Long-Term Sufficiencies Offset Short-Term Deficiencies?

by Douglas C. Doll

In June 1987 the American Academy of Actuaries' Universal Life Task Force (under the Committee on Life Insurance) issued a report on the topic of Universal Life Valuation and Nonforfeiture. One of the valuation issues discussed in the report was whether long-term sufficiencies should offset short-term deficiencies.

I would like to describe that issue in this article. I hope my thoughts will stimulate discussion about when, if ever, such offsets are appropriate for statutory valuations. Except for direct quotations from the report, any opinions given are mine and not the opinion of the Task Force.

The report includes the following paragraphs:

The issue of prefunding cash value increases in reserves has been addressed by the NAIC on more than one occasion in the past several years. So far, an explicit requirement for such prefunding has not been stated either in the Standard Valuation Law or in an Actuarial Guideline. We note that some actuaries believe the Standard Valuation Law should be interpreted to require such prefunding. Two arguments in favor of such prefunding are as follows: (1) "Life insurance and endowment benefits" includes intermediate cash values as part of the benefits; and (2) the Standard Valuation Law prescribes reserves for indeterminate premium plans must be computed by a method "consistent with the principles of this Standard Valuation Law." The method prescribed for policies providing uniform premiums and benefits provides adequate reserves for short-term as well as long-term benefits.

When benefits and/or premiums become non-uniform, additional methodology is required to assure short-term benefit reserve adequacy.

Arguments against such prefunding include: (1) "life insurance and

endowment benefits" does not include intermediate cash values; (2) standard actuarial practice does not include such reserve considerations; and (3) the "good and sufficient" portion of the actuarial opinion is sufficient to require adequate overall reserves.

Consider the simple example of a policy where the policy value and the cash surrender value both equal \$1.00. If the guaranteed interest rate is 4% and the policy matures in 10 years, the guaranteed endowment is \$1.48. The present value of this endowment, at a 6% valuation rate, is \$.83. Let's now change the guaranteed interest rate to 10% for two years, and 4% thereafter. The guaranteed endowment becomes \$1.66 and the present value at 6% becomes \$.92. Note that adding the 10% interest guarantee increased the calculated reserve from \$.83 to \$.92, but that the "final" reserve was unaffected, because it was equal to the \$1.00 cash surrender value in both cases. What happened in the second case was that the interest "sufficiencies" in years 3 through 10 are more than enough to offset the "deficiencies" in years 1 and 2.

The Universal Life Model Regulation has the same effects. A valuation basis more liberal than the ultimate product guarantees produces future "sufficiencies" that can be used to offset short-term "deficiencies." For example, a plan with an interest guarantee of 10% for 3 years and 4% thereafter may have no extra reserves created by the 10% guarantee if the valuation interest rate is 5%. The 1% sufficiencies beyond year 3 will offset the deficiencies in the first 3 years.

The Universal Life Task Force took note of its scope as described in its December 1986 preliminary report: "A key criterion for evaluating proposed revisions will be that they produce

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Universal Life Cont'd.

results consistent with results for otherwise similar fixed benefit fixed premium plans. Consistent results would imply that methodology is consistent with the Standard Valuation and Nonforfeiture Laws."

Although the Task Force noted that "the traditional reserve methodology in certain cases may cause short-term reserve inadequacy," it did not find requirements for additional reserves in these cases for fixed premium plans. Therefore, the Task Force recommendation was: "We believe that the appropriate place to address the general issue of cash value prefunding is not in the Universal Life Model Regulation, but in a regulation, guideline, or law applying to all types of life policies. Whether and how this can be accomplished is beyond the scope of our report."

Recently, regulators have become concerned about reserve adequacy of universal life, especially single premium universal life. What causes short-term deficiencies for universal life? Anything that increases the cash value quickly. The most common causes are short-term guarantees of current mortality and interest credits, the grading off of surrender charges, and the payment of persistency bonuses, e.g., returning mortality charges at the end of a given policy year.

Short-term deficiencies are not unique to universal life. They can occur on traditional whole life policies, for example, if cash values are graded from minimum to net level over a short period of time. They can also occur on graded premium whole life products that mimic term insurance in the early durations. For these policies the gross premiums in the early durations may be less than statutory mortality, but net premiums may be less than gross premiums when calculated on a present value to maturity basis. (Actuarial Guideline IV prohibits using long-term sufficiencies to offset short-term deficiencies for term insurance, but its scope says that it is applicable only to term life insurance without cash values.)

The regulators have attempted to deal with the issue of short-term deficiencies on a problem-by-problem basis. When the 1980 amendments to the SVL were adopted, the "modified premium whole life" version of deposit term was considered a valuation

problem—a special paragraph was added to Section IV of the SVL to require deposit term reserves to grade to the cash value at the end of the term period.

The committee developing the new valuation law, although focusing primarily on valuation actuary/cash-flow testing requirements, will have to deal with the issue of short-term deficiencies. However, it may be several years before a new valuation law is adopted. Meanwhile, we can expect to see several regulatory proposals to address specific concerns. A general solution would be one that directly requires reserves to be large enough so that there are not short-term deficiencies. Proposals to date have attempted either to address specific sources of short-term deficiencies or to eliminate sources of long-term sufficiencies. For example, the NAIC's Actuarial Task Force had proposed an extra reserve requirement for product guarantees more liberal than the minimum valuation basis. This proposal currently is on hold. The California Insurance Department is proposing to eliminate one source of long-term sufficiencies on universal life by requiring the valuation interest rate to be no larger than the interest rate guaranteed in the policy. The Indiana Department of Insurance has included the same requirement in a bulletin dated July 27, 1987.

It would be interesting to have some response to this article on the following:

1. Are reserves for short-term deficiencies currently required by the SVL? By standard actuarial practice?
2. How should such extra reserves be calculated? Should all products be covered?
3. May the valuation interest rate exceed a product's guaranteed interest rate? Note that this currently is accepted practice for annuities.

Responses to these questions may be sent to me at my *Yearbook* address. I will write a follow-up article for *The Actuary* if responses are sufficient.

Douglas C. Doll is with Tillinghast/Towers Perrin. He is chairperson of the AAA Universal Life Task Force, under the AAA Committee on Life Insurance.

Recent Changes in Course 150 – (Actuarial Mathematics)

by Curtis E. Huntington

Candidates for an Associateship Examination were presented with written-answer questions (previously called essay questions) for the first time in more than 15 years last May. Labeled as an "experiment," the questions appeared on the Course 150 examination in Actuarial Mathematics (previously called the Part 4 examination in Life Contingencies).

Since the subject of contingency mathematics in the areas of life and health insurance, annuities, and pensions forms the foundation for most actuarial work, both students and members have expressed an interest in the background of this development.

Essay questions used to appear regularly on the Life Contingencies examination. Extensive analysis of the results on both the multiple-choice and the essay portions were performed by E&E Committee members. It was determined that final pass results based solely on the multiple-choice paper were not significantly changed when the essay results were added. Because of the sizable time commitment required from volunteers to create these twice-a-year examinations, the decision was made in 1971 to eliminate all essay questions from the Associateship examinations.

Since then, several things have changed. In 1984, the textbook for this subject was changed to the new *Actuarial Mathematics* text that uses a stochastic approach integrating life contingencies into a full risk theory framework. (Note: The new textbook has just been produced in a casebound edition and is available from the Society for \$65.) Second, calculators have been allowed. Third, a Flexible Education System (FES) has been implemented for the Associateship designation (formerly Parts 1 through 5). And, finally there has been a perceived significant deterioration in communication skills evident on Part 6, the first essay examination.

Along with these developments, several topics in Actuarial Mathematics do not lend themselves to being

Continued on page 9 column 1

Course 150 Changes Cont'd.

tested in a short multiple-choice format. Thus, the E&E Committee proposed, and the Education Policy Committee approved, the introduction of written-answer questions asking for a written solution onto Course 150.

In addition to allowing for in-depth testing of specific areas of knowledge, the E&E Committee leadership felt it desirable to have at least one Associateship examination contain some form of written answers.

Students were advised of the requirement of written-answer questions in a study note prior to the May 1987 examinations. The study note included eight sample questions and solutions. The questions selected were written by the Examination Committee at the same time the examination was being set. Students were informed that the solutions were illustrations of answers expected of a well-prepared student and that other solutions might receive full or partial credit.

The May 1987 examination contained six written-answer questions, and candidates were allowed 1 1/2 hours to answer them. The questions and model solutions are contained in study note 150-132-87, currently available from the Society.

Was the experiment a success? Course 150 Chairperson, Jeffrey Beckley said, "Yes and no." Yes, because the new material supplied the Examination Committee with additional information, including the fact that the multiple-choice and written-answer sections were not as highly correlated as they had been in prior years. No, because students performed relatively poorly on the written-answer questions.

Many students turned in blank pages for more than one question, either indicating a lack of knowledge of some subjects or an inability to properly allocate time among the several questions. Furthermore, many students who did answer questions did not follow the format and structure shown in the sample answers.

One question on the May examination involved a changed mortality rate at one particular age. Students were given a formula for the 20th year terminal reserve and asked to show that it was a correct formula reflecting the changed value. According to Beckley, even though the answer was given and the solution merely required a development of that answer, the

modal score earned on that question was zero, and the mean was less than 0.3 out of 5 points.

Although results were disappointing, the E&E Committee has decided to continue with written-answer questions on Course 150. The Committee will continue to evaluate performance of candidates on the two pieces of the examination and will consider imposing minimum standards sometime in the future if the performance on the written-answer section does not improve.

Students preparing for the November 1987 examination are urged to carefully review the model solutions provided in the study notes. In addition, students may find it helpful to read "Techniques for Preparing for and Writing Exams" which appears in RSA 11, No. 3 on pages 1291-1321.

Curtis E. Huntington is Corporate Actuary with New England Mutual Life Insurance Company. He is a past General Chairperson of the E&E Committee and is presently a member of the Education Policy Committee and the Board of Governors.

Single-Premium Whole Life Insurance

by Gary E. Dahlman

Another old but little-used product is making a comeback. Single-premium whole life insurance (SPWL), with minimal death benefits and current market interest credits, is being sold in considerable volume, particularly in the securities brokerage market. Many general agency and brokerage life insurers have also introduced SPWL products recently.

SPWL sales have accelerated rapidly since the passage of the Tax Reform Act of 1986. While the Tax Act eliminated or significantly reduced the attractiveness of many past popular tax shelters, life insurance was left relatively untouched.

Both fixed (book value cash outs) and variable products are being sold. Sales of SPWL can build a company's assets rapidly, but note also that fixed products retain the disintermediation risk. For this reason we may see a shift to variable products over the next few years.

Background

During the mid-1970s, the sale of single premium deferred annuities

SPWL Cont'd.

with current market interest credits increased dramatically. These sales were fueled by the high interest rate environment and the tax deferral aspects of deferred annuities. Small amounts of SPWL were sold in the late 1970s and early 1980s; however, the lack of a definition of life insurance in the federal tax code discouraged the securities houses from marketing SPWL with a heavy investment orientation.

The situation changed considerably with the passage of TEFRA and DEFRA. Not only was a definition of life insurance added to the tax code which spelled out minimum death benefit requirements for a contract to qualify as life insurance, but changes were also made to the taxation of annuities which increased the attractiveness of SPWL. As a result, brokerage firms and insurance companies began actively developing and marketing SPWL plans, and sales have soared in the past few years.

Product Description

While a few years ago the most common SPWL contracts were traditional SPWL plans with excess interest credits used to purchase paid-up additions, the use of single premium universal life (SPUL) contracts is widespread today. Many of the SPUL contracts in the marketplace have zero current mortality charges (often guaranteed for up to five years).

A popular variation of SPWL is an SPUL contract which makes no specific provision for mortality deductions. The contract's single premium is accumulated with interest only, or with interest less an expense charge. The interest spread is typically wider (i.e., the credited rate is lower) on such contracts since mortality costs must be covered by the interest spread in the absence of a separate mortality charge deduction.

Common to all investment-oriented SPWL contracts are minimal death benefits, which are specified in Section 7702 of the federal tax code, and maximum cash value accumulations.

Most contracts contain no front-end load. Instead, there is a rear-end surrender charge (typically 7-8% initially, grading uniformly to zero after 7-8 years), but with a "money back" provision which provides that

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SPWL Cont'd.

the policyholder will never receive less than his initial single premium. The "money back" feature can be viewed as an extended "free look" provision.

Current interest and mortality (if any) guarantees are typically for one year; however, guarantees of up to 3-5 years are offered (such guarantees generally come with credited rates which are 1/4 to 1/2 of 1% lower than on plans with one-year guarantees).

Some contracts offer bailout provisions similar to those of SPDAs, for example, waiving the surrender charge if the current credited interest rate is more than 1% less than the initial credited rate during the period of the surrender charge. A few companies offer policyholders the choice of contracts with or without the bailout feature. The contract with the bailout feature usually carries a credited interest rate of 1/4 of 1% less than the contract without the bailout feature.

A key provision of many SPWL contracts is zero-cost borrowing of interest accumulations. This preferential borrowing arrangement is accomplished by setting the credited rate on the portion of the policy's account value that is loaned equal to the policy loan interest rate. Non-preferential borrowing of principal (i.e., the original single premium) is permitted, but usually at a net cost of 2-3%.

Markets

Huge volumes of SPWL business have been sold through stockbrokerage firms in recent years. While it is possible for an insurer to deal directly with brokerage firms, the bulk of this market segment is controlled by wholesalers specializing in marketing SPDAs and SPWLs to the brokerage firms. Many brokerage firms, however, have subsidiary life insurance companies, and there is a trend among such organizations towards retaining business in-house.

Banks and S&Ls are another important market segment. Although the sale of insurance and annuity products by banks and S&Ls often results in transfers of deposits to insurers, the commissions on such sales generate immediate earnings and improved ROEs for the banks and S&Ls.

As mentioned, many life insurers have introduced SPWL contracts to their agent and broker distribution systems. In this environment, the SPWL can be used as an investment alternative or, perhaps more typically, as a replacement vehicle (preferably for some other insurer's cash value life insurance policy).

Pricing Issues

Probably the most critical pricing issue is determining the target interest spread a product must achieve to cover expenses (and in some cases mortality) and produce an adequate profit margin. Considerable competitive pressure exists to declare a relatively high initial credited interest rate, since the product is sold primarily on rate.

While sound product management requires that a company protect itself against the possibility of future disintermediation, competitive pressure has forced some companies to invest in somewhat longer maturities, and/or lower investment-grade bonds, than they would otherwise prefer. Much coordination is needed between the investment and actuarial functions, both in the initial pricing and ongoing product management process.

Another critical pricing issue is evaluating mortality risk. Except for larger policies, SPWL business is typically sold on a limited underwriting basis. Whether a separate mortality charge is made, or mortality costs are covered through the interest spread, the pricing actuary must evaluate the underwriting procedures to be employed and estimate the level of mortality expected over the life of the business.

The use of preferred loans can significantly affect profit margins. Most SPWL contracts on the market deliver significantly lower profit margins when policyholders exercise the preferred loan option. Since the preferred loan feature is relatively new, little experience is available on the use of such loans. The pricing actuary must make an assumption about preferred loan utilization and then test the sensitivity of profit margins to either increases or decreases in the assumed utilization rates.

Substandard applicants present a problem for many SPWL plans. While Section 7702 allows the use of multiples of standard mortality tables for

substandard insureds, the minimum death benefits required are such that it is generally not practical to offer this product to highly substandard individuals.

Regulatory Issues

Because, Section 7702 of the federal tax code now includes a definition of life insurance which specifies the amount of death benefit protection necessary for a product to qualify as life insurance, most SPWL contracts sold today try to minimize death benefits to enhance the product's investment orientation. Therefore, a good understanding of Section 7702 requirements when designing an SPWL product is essential. Furthermore, before marketing a product, most securities brokerage firms, and some banks and S&Ls, will require that an insurer provide an opinion letter from a qualified tax counsel stating the product qualifies as life insurance under the federal tax code.

At the state level, the regulatory concerns on an SPWL product are primarily related to proper reserving and to advertising and disclosure in the sales process. The heavy investment orientation of the product in many companies' sales literature is also a concern to the regulators. The key valuation issue is adequate reserves for (1) the bailout feature and (2) extended guarantees of current credited interest rates and mortality charges.

Future Directions

Several insurers recently have introduced single premium variable life products. Most of these products allow policyholders a choice of investment options, such as money market, fixed-income, zero-coupon bond, and a variety of stock funds. Given the investment orientation of the SPWL product, it would not be surprising to see a shift in market share from interest-sensitive products with book value cash outs to variable life and variable universal life products.

Another possibility is the modified guaranteed life insurance product for which the NAIC recently adopted a model regulation. These plans permit insurers to make market value adjustments upon surrender prior to

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SPWL Cont'd.

maturity. It would appear that these products will be less costly to develop and administer than true variable plans. On the other hand, it may be several years before enough states adopt the NAIC model regulation to make it possible for insurers to offer the product on a regional or national basis.

Both variable products and modified guaranteed life insurance give insurers the opportunity to avoid the disintermediation risk, while at the same time offering policyholders attractive fixed or variable investment-oriented life insurance products.

Summary

The 1986 tax reform legislation enacted by Congress eliminated or significantly impaired many frequently used tax shelters. Life insurance escaped relatively untouched, however. As a result, SPWL products, both fixed and variable, now enjoy a preferred tax status which has further enhanced what was already a rapidly growing segment of the insurance market.

In the rush to exploit the market for this tax-advantaged product, many insurers have focused their advertising on the "last great tax shelter" aspect of the product. Not surprisingly, this has been called to the attention of the leading tax writers and their staffs in Washington. Because insurers and other participants in the financial services industry have been calling for the so-called "level playing field," and because of the difficulties facing Congress to reduce the federal budget deficit, it would not be surprising to see legislation proposed to reduce the attractiveness of SPWL, perhaps in the form of a tax on the inside buildup. The danger for the life insurance industry, of course, is that such a tax might not be limited to SPWL products. The industry would obviously mount an intensive campaign against an across-the-board tax on the inside buildup, but one possible scenario is that SPWL might be sacrificed in order to achieve a compromise. Only time will tell.

Gary E. Dahlman is a Consulting Actuary at Milliman & Robertson, Inc. He is the Chairperson of the AAA Committee on Life Insurance and a member of the AAA Universal Life Task Force.

Proposed Health Reserve Standards – A Dissenting Viewpoint

by Robert Shapland

Late in 1983 the American Academy of Actuaries Subcommittee on Liaison with the NAIC Accident and Health (B) Committee accepted the task of developing new reserve standards for health insurance, in response to a request from the NAIC (EX5) Life and Health Actuarial Task Force.

This subcommittee's efforts have resulted in three draft proposals, all widely exposed for comment, and each of which has generated much controversy. The latest draft is being considered for adoption by the NAIC.

My comments here focus on the proposed standards for individual policy reserves.

A given policy reserve formula inherently assumes some underlying rating principles and practices as to the matching of revenues and expenditures, especially the matching of premiums and claims. Much of the controversy generated by this subcommittee's policy reserve proposals has occurred because of the conflict between the rating principles and practices, which underlie the proposals, and those used by many actuaries and insurers.

A wide diversity of rating principles and practices are used by health insurers today. Numerous approaches exist to set initial and renewal premium rates under policies where (1) insurers retain the right to change premiums after issue; and (2) claim costs will increase as the insurance matures.

Claim costs will increase after issue due to aging, wearing off of the impact of underwriting selection, inflation, and anti-selection by continuing policyholders. Both predictable and unpredictable increases in claim costs can be addressed by a wide range of rating practices, including:

1. The short-term morbidity approach, where initial premiums are calculated to cover claim experience for a short period, such as one year, while future premium rates are set to cover future claim experience.

2. Various longer-term approaches, where initial premium calculations recognize some or all of the anticipated trends due to the causes listed above, as well as to enhancements in medical care. Here, insurers might attempt to calculate initial premium rates to cover claims for several years, even to age 65. Or, initial premiums may fund only some of these expected increases over such periods, while relying on later rate increases to cover the rest of the extra costs.

Note that under any of these rating practices, there can be recognition (or not) of past claim experience margins or losses in setting renewal premium rate levels.

An insurer's choice of rating practices, which set forth how to calculate initial and renewal premiums, is based on several considerations:

- the method's ability to cope with changing costs;
- its impact on the insurer's competitive position;
- the comparative risk of loss for that method;
- the degree to which the developing rating pattern might create a deteriorating risk pool; and
- equity between short-term and long-term policyholders.

While each insurer is free to choose its rating practices, legal restrictions exist in the form of state laws that require premiums to be "reasonable in relation to benefits," where "reasonableness" is measured on the basis of anticipated loss ratios.

Depending on the state, anticipated loss ratios are measured:

1. prospectively only over the remaining policy life;
2. prospectively only over the rating period for which premiums are calculated;
3. over the entire policy lifetime; or
4. over the current "rating period," including both the retrospective and prospective portions.

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Health Reserves Cont'd.

Because of the diversity of state rate regulations, an insurer's rating practices can vary by state as well.

Among the several perspectives applicable in developing policy reserve standards, the major one is that these reserves represent the shortfall of future revenues, including future premiums, in meeting future expenditures. In turn, future premiums and their relationship to future claims will depend on the methodology used in their determination, that is, on the insurer's rating practices.

Because of the diversity in methodologies used to determine renewal premium rates under a given experience scenario, as noted earlier, it follows that policy reserves for a given coverage could differ considerably, both by insurer and by state.

The AAA subcommittee's initial policy reserve proposal called for retaining the tabular reserve approach for benefits involving stable and predictable claim costs. For other benefits it visualized only the "lifetime" rating methodology, whereby insurers attempt to realize a premium revenue stream which reproduces their target loss ratio for aggregate experience over the life of the policy form. Under this method, retrospective claims experience below the target loss ratio lowers future premium rate increases in order to produce offsetting prospective loss ratios above the target.

Policy reserves based on this rating concept were labeled "benefit ratio reserves." Net level benefit ratio reserves are initially equal to the excess of the lifetime target loss ratio portion of past premiums over past claims, on a present value basis. As experience develops, the target loss ratio is replaced by the actual anticipated lifetime loss ratio based on past actual and anticipated future experience. These net level reserves are subject to a preliminary term adjustment.

After a round of comments and revisions, this initial proposal was modified by exempting "non-leveling" premium policies from policy reserves altogether, as opposed to recognizing additional reserving methodologies related to alternative rating periods and methods. In this context "leveling premiums" are defined as those that make advance provision for claim costs beyond the year to which the premium applies. This negative

approach, through exemption, continues to ignore rating practices between the lifetime method and the short-term or YRT methods.

Because of its proposed benefit ratio reserve approach, the subcommittee is indirectly suggesting that the "lifetime" rating practice is the only acceptable one where "leveling" premiums are used. I view that as inappropriately supporting the adoption of this rating practice as the sole, legally required practice.

In the final analysis, the latest proposal can be seen to contain two related major flaws:

(1) It fails to properly recognize the impact of various renewal rating practices on policy reserve standards.

In this connection note that the proposal allows pooling of forms for benefit ratio reserve determination based on criteria outlined in its Appendix B (Glossary). However, these criteria fail to require that within such pools, policy forms should be rated via common practices or be pooled for experience rating purposes, requirements that would seem primary if policy reserves were to be consistent with rating practices.

(2) It attempts to install the "lifetime" rating approach by requiring policy reserves to be based on it. This second flaw raises special concerns because the charge given to this AAA subcommittee was to propose reserve standards, not to establish its choice of rating practices.

If any subcommittee members feel that insurers should be barred from using other than the "lifetime" approach to rating renewable policies when incorporating leveling features into their rating practices, let them separately support rate regulations to accomplish that goal so that there is fair and appropriate debate.

While I oppose the "lifetime" approach and could write even more on that subject, that is not the point I'm making. The point is that it is highly inappropriate for a committee charged with developing reserve standards surreptitiously to foster limitations on rating practices.

Aside from this I see several other important problems created by these proposals:

1. The depiction of the benefit ratio reserve as being "simple" in spite of the complexity of the prospective portion of the reserve calculations once experience starts to accumulate.

Insurers would have to predict the present value of future premiums and claims, which would then be combined with retrospective experience in determining a revised lifetime loss ratio. The revised lifetime loss ratio would then be applied against retrospective experience with the result being characterized as producing a "simple" valuation.

2. The inappropriateness of using the lifetime loss ratio in calculating benefit ratio reserves even when the lifetime rating approach is in use.

This problem results because the retrospective reserve calculations, when viewed in terms of their prospective equivalent, inherently assume that the *portion* of future premiums available to pay future claims is the lifetime loss ratio. Basic logic indicates that there is no foundation for this assumption.

The portion of future premiums available to fund future claims is dependent on the amount left over after paying future expenses. Only coincidentally would the portion of future premiums needed for expenses be the complement of the lifetime loss ratio. For example, if the lifetime loss ratio is determined to be 20%, it is unlikely that 80% of future premiums will be needed for future expenses.

3. Basing policy reserves which represent prospective obligations on retrospective experience creates a basic anomaly. The worse the retrospective claim experience, the smaller the policy reserves, and vice versa. This effect is dampened by applying a reevaluated lifetime loss ratio to the retrospective experience, but it still exists.

Unless a reserve proposal for health insurance recognizes (1) the relationship between "reserves" and "rating principles and practices," and (2) its prospective nature, I see it as failing to meet fundamental tests. Therefore, I suggest that the current proposal be amended to focus on prospective valuation with recognition of the impact of the wide range of rating principles and practices in use on this valuation.

Robert Shapland is Vice President and Actuary at Mutual of Omaha Insurance Co. He is a member of the SOA Committee on Health Insurance.

In Memoriam

Kingsley Walton F.S.A. 1962

Recent Ordinary Mortality Studies Show Continuing Improvements

by Harry A. Woodman, Jr.

In the 1983 Reports, the data for standard ordinary issues between 1981-82 and 1982-83 anniversaries are included in separate reports. The data are presented in the same form as previous reports except that, for 1982-83, three new tables compare mortality ratios based on the 1965-70 tables with those based on the 1975-80 tables. The difference in mortality ratios is shown in Table 1.

The next report (1983-84) will have all tables based on the 1975-80 tables and will include data separated into smokers and nonsmokers.

The aggregate mortality ratios show a continuing improvement in mortality, particularly for nonmedical. This result is probably due to an increase in the nonmedical experience of larger amount policies that were given thorough underwriting investigation. The mortality ratios based on the 1965-70 tables for the last three

experience years (males and females combined) are shown in Table 2.

All readers of the 1983 Reports are invited to submit questions, comments or discussions to me as Chairperson of the Committee on Ordinary Insurance and Annuities. If of general interest, they will be

published in the 1984 Reports together with the appropriate responses.

Harry A. Woodman, Jr., is Vice President of New York Life Ins. Co. Besides his work with the Committee on Ordinary Insurance and Annuities, he is Chairperson of the Medical Impairment Study Committee and a member of the Committee on Experience Studies.

Table 1.

Pol. Yrs. 1-15	Males		Females	
	1965-70 Table	1975-80 Table	1965-70 Table	1975-80 Table
Medical	66.3%	90.7%	86.9%	110.9%
Nonmedical	80.4	95.1	56.9	83.5
Paramedical	70.5	92.9	66.2	89.6
Pol. Yrs. 16 & over	72.1%	93.0%	76.9%	95.5%

Table 2.

	Policy Years 1-15				Pol. Years. 16 & over
	Med.	Nonmed.	Paramed.	Comb.	
1980-81	69.5%	79.8%	70.1%	71.0%	75.2%
1981-82	67.8	79.2	73.2	70.7	72.8
1982-83	68.0	74.2	69.9	69.6	73.2

Election Committee Invitation

The Election Committee is beginning the preparation of the first ballot for the 1988 election. On that ballot, Fellows are asked to nominate up to six FSAs for Board of Governors positions. To aid them, a list is provided of those who are eligible for election and have met certain specific criteria for committee and other service to the profession. Fellows who have the experience, interest, and time to serve on the Board of Governors, but think our committee might overlook them when compiling the customary first ballot list, are cordially invited to write to me at my Yearbook address before December 15, 1987, summarizing their accomplishments and background.

Richard S. Robertson
Chairperson, Committee on Elections

The Wave Nature of the Transactions

by Douglas A. Eckley

Articles submitted to the *Transactions* of the Society of Actuaries may appear to be received at random intervals, but careful inspection reveals a definite wave pattern. The Committee on Papers first discovered this pattern, and the Editorial Board independently confirmed it.

The flow of papers is currently at or near the trough, presenting actuaries with the opportunity to join the following elite group.

- Paul Volcker and Alan Greenspan
- Niels Bohr and Albert Einstein
- Mark Spitz and the Beachboys
- You

The opportunity, of course, is to observe a wave function and then to do something about it. The previous list can be matched with the following list:

- United States GNP growth

- electrons
- water
- submissions to the *Transactions*

The present trough is untimely, because, along with theoretical topics, many practical topics need analysis, including:

- Asset Models
- AIDS (and infectious disease) models
- Pension Accounting
- Alternatives to the PBGC

Authors of *Transactions* articles contribute to the profession and become part of our history; to most, this is the main benefit. Other benefits include recognition at a Society meeting, eligibility for various prizes, and fulfillment of one condition (two of three are sufficient) for Board of Governors eligibility.

For more information on how to submit a paper for the *Transactions*, consult the Society of Actuaries 1987 Yearbook, page 48.

Douglas A. Eckley is with Tillinghast/Towers Perrin. He is the Editor of the *Transactions*.

Dear Editor:

Life Insurance Taxation

In his article on the Canadian Tax Proposals (September), Robin Leckie said that as far as he was aware, "the inside build-up of regular annual premium life insurance policies is not taxed in any country."

In the U.K., life insurance companies are taxed on their investment income and realized capital gains except to the extent that these are allocated to approved (and hence very tightly controlled) pension business. However, U.K. companies are able to deduct their management expenses, including agents' commission.

Alan H. Fraser

Whither Actuarial Education?

Former SOA President Richard S. Robertson has given a stimulating address, "The Sad State of Actuarial Education in the United States," in *TSA XXXVIII*. I wish to comment, especially on Robertson's plea that FSAs, doing both teaching and research, staff university-college actuarial teaching.

Briefly, my first doctorate was in pure mathematics (Michigan 1967), and I have published in this area. I am now a professor, having taught actuarial science and pure mathematics to undergraduates for many years. I am also an ASA-MAAA and have been a practicing actuary since 1979; previously I worked as an accountant in CPA firms. Finally, I belong to the Indiana Bar, and I am Associate of the Indiana State CPA Society in view of passing the Uniform CPA Exam. Thus, I feel I can speak from both a theoretical and a practical viewpoint.

I shall address (1) the need for FSAs in teaching, and (2) the practicality of FSAs teaching.

(1) *Need*. If the undergraduate actuarial major exists primarily to help pass the ASA exams (especially old parts 1-4), then an ASA with a math Ph.D. can likely teach at least as well as an FSA, since this actuarial coursework ties closely to math. But perhaps, as Robertson urges, we need to do more than simply ready students for the exams. (Of course, some schools do more than that currently, since they require math courses beyond purely actuarial ones.) He speaks of a "broader base," presumably meaning *inter alia* exposure to practical aspects of the actuarial work

in the courses. Here an FSA's background could help, although an ASA with practical experience might do almost as well. Realistically, actuarial courses must still be theoretically oriented (those exams *must* be passed), with perhaps a "practical" course or two. Or the same course might be both theoretical and practical, with the former predominant.

A majoring student could conceivably study for some post-ASA exams, in which case the need for FSA teachers is much stronger. Such a program may phase into a graduate, or combined undergraduate-graduate studies, another question that needs attention. (Should some curricula be purely graduate? What role for research in an undergraduate college? Should research be expected of students?) Since Robertson speaks of actuarial research, perhaps he has graduate studies in mind.

(2) *Practicality*. Vital, as Robertson points out, is funding. I disagree that "whatever we do, our resources are limited," where "our" refers to both the Society and generous actuaries. Most FSAs are not in poverty. If the profession wanted to do something, it could for the few programs (i.e., universities) involved. Perhaps one National Center would suffice for advanced studies and research. Few successful FSAs will want to do teaching-research with the salaries being paid (the lowness of which I can personally confirm).

There is yet a vital point Robertson ignores. The FSA label lacks the prestige in universities of the Ph.D. It is the norm to become FSA sans writing one paragraph of original research. Indeed, it slows exam progress!

Also, though actuaries publish elsewhere, we have but one primary research journal, *TSA*, published once a year. Frankly many papers (those of "survey" rather than "formula" type) would not pass muster in top universities. Contrast math, with many journals issued quarterly or monthly. Many mathematicians view the FSA as they do the CPA—a trade designation. I don't necessarily agree, but it is so. We'll have a tough selling job with the universities.

Thus, either the FSA must bear more prestige, or we must produce combination FSA-Ph.D's. Add the years of practical experience Robertson apparently wants, and the person may be near 40.

Despite all, I agree with much of Robertson's thesis: it surely would be nice to have a group of teacher-researcher FSAs under one roof. But careful groundwork and thought is needed, as Robertson agrees.

Donald P. Minassian

Math Oddities

The views of Edward Scher (September) regarding one of the oddities connected with pi led me to another oddity: if you add two well-known expressions used for pi, you get my favorite approximation. The two that you add are $22/7$ and $333/106$, giving a total of $355/113$.

Some people might question my addition, but it follows the first law of fractions that I learned in grade school: to add two fractions, add the numerators and add the denominators. For example, $3/4 + 7/13$ equals $(3+7)/(4+13)$, or $10/17$.

By adding fractions according to this rule, the approximation to pi is improved from $22/7$ ($= 3.142857$) or $333/106$ ($= 3.141509$) to $355/113$ (3.14159292) compared to the actual value of $3.1415926535\dots$

The error in this last fraction would lead to an error of 11 feet in calculating the circumference of the earth.

The fraction is my favorite because it is so easy to remember. All you need to remember is the sequence 113355, and put a long division bracket between the two 3's. This gives $113 \overline{)355}$.

Charles H. Connolly

Unification

Regarding amalgamation: would the SOA be willing to create a new category of membership to accommodate those who might prefer to resign than be affiliated with ASPA?

James B. Germain

AIDS

I have just read the landmark paper on "AIDS, HIV Mortality and Life Insurance" by Mike Cowell and Walter Hoskins. I am proud to be an actuary when my profession can produce papers of this importance and quality. In spite of limited data, substantial conclusions were drawn that will be of immense help in developing the corporate strategies of many life insurance companies.

I urge all members of the Society to study this landmark paper.

James Lee Lewis, Jr.

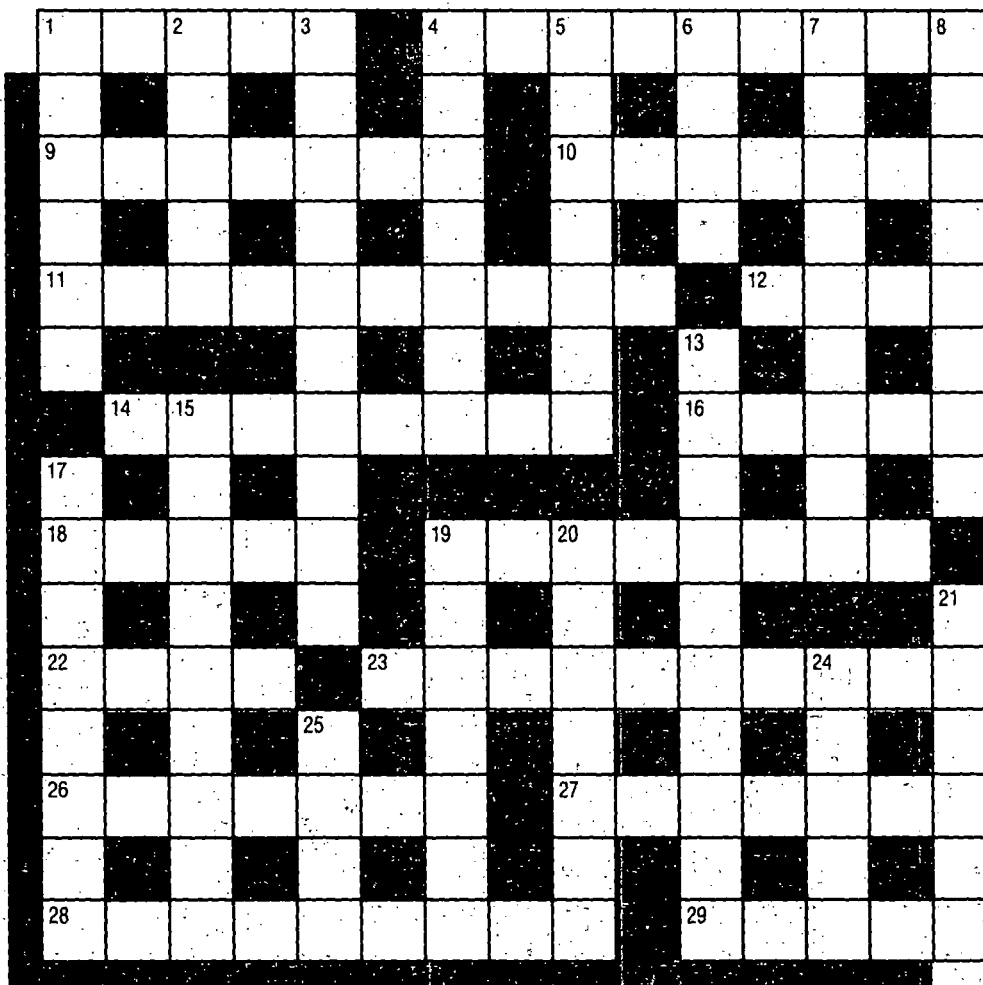
ACTUCROSSWORD

Across

1. So holder of actuarial degree is designated in the Balkans(5)
4. Involuntary act out, I am disturbed (9)
9. Everyone prepared. So soon? (7)
10. After this month nobody missing from this set up (7)
11. Music used in China as a matter of course (10)
12. Like Iowa but bigger (4)
14. Dispatch him, spent and disorderly (8)
16. Type of claim agents often make (5)
18. One might glean financial support from this source (5)
19. A variety of Braille's a free rendering of their attitudes (8)
22. Rebut, reverse, not right for rapid transportation or electron (4)
23. Fashionable ceremonial wear to provide security (10)
26. Musical arrangement in which Elgar left nothing out (7)
27. Safeguard used by worker in order to prevent him bleeding (7)
28. Place of entertainment where crazy nuts get rebates (9)
29. False start stolen by knave (5)

Down

1. Make stiffer interpretation of charts (6)
2. Renounce, but in favor of action (5)
3. Fall due to projection (5,5)
4. Vague date for rearranged amenity (7)
5. Trifle made by knitter (7)
6. State failure, not our one (4)
7. Naval star from South Africa (9)
8. Not living in the cold, but in order (8)
13. Bookmaker (10)
15. Suitable refreshment for penthouse parties (9)
17. Trade was bad in this direction (8)
19. Linked with Eisenhower for Gettysburg address (7)
20. Whispers from the bars (7)
21. Heathens beheaded. Capital! (6)
24. A spark from this could send them berserk (5)
25. Silver ten, one form of 28 (4)



October's Solution

100% SOLVERS — *September:* W Allison, J Braue, J Carr, S Colpitts, C Conradi, S Cuba, F & M David, C DeWeese, Mrs C Edwards, K Elder, B Fortier, R Frasca, C Friedrich, D Friedrich, C Gallo-way, P Gollance, E Goral, J Grantier, M & D Hare,

DIGGIT TEMPORISE
 OLEI H A S M N
 GREAT BEAR TOPIAZ
 S A U H T E U Y
 TUMI S T A H O D L L U M
 A E T A P S E
 REDSTARTS AGES
 S A O V T A G E P
 MISS FRIGHFUL
 S N M T N R O
 EYEWASH ESCH EAT
 N X M E Y A E I
 ADAMS ORAFTSMAN
 T O E O R O A U
 ESTRANGED HANDS

R Hohertz, HTI Hogs, A P Johnson, O Karsten, J Keller, D Kendall, D Leapman, W Lumsden, J Mair & R Reed, B Mowrey, R C Martin, H Migotti, R A Miller, E Portnoy, B Rickards, P Sarnoff, N Shapiro, G Sherritt, J & B Uzzell, A Whiton, D S Williams.

ACTUCROSTIC

- A. Interweave; twist; confuse. 40 81 160 183 142 19
- B. Bottom of the barrel; remainder. (2 wds) 180 110 20 152 43 202
- C. Congress, when working, is _____ (2 wds) 82 137 30 216 122 87 171 13 82
- D. My favorite possession is _____ (3 wds) 6 32 124 182 50 206
116 70 96 138 214
- E. Descriptive of a selfish driver. (2 wds) 11 100 46 217
128 204 71 113 179 229 27
- F. Units for scoring team bridge matches. 224 90 154 38
- G. Mount Everest (2 wds) 123 208 39 168 69 228 12 52 96 145
- H. All over the place; helter-skelter. (3 wds) 34 215 172 126 199 72 151 161 102 189
89 58 1
- I. Turkoman carpets. 61 166 21 223 88 135 111
- J. Al Jolson's favorite person (or song). 115 28 163 56 194
- K. Sidewise; askant. 7 174 118 150 41 94 185 65
- L. Store-bought clothes. (hyph) 4 140 85 26 68 127 158
207 190 117 45
- M. Former; age-old; ancient. 42 186 8 133 76 106 177 64 209 25
- N. Enchants; fascinates. 57 146 114 35 78 225
- O. Reconsideration; second guess. 143 170 188 22 106
167 51 79 3 157 197 210
- P. Liberal and progressive side. (2 wds) 226 5 166 60 36 104 139 200
- Q. Hostile or contrary action. 2 92 141 176 195 155 53 120 24 219
- R. Stupidest; most leisurely. 47 159 187 17 73 131 211
- S. To watch out for or be vigilant. (5 wds) 132 222 206 91 220 59 193 31
147 77 10 164 101
- T. To the bitter end. (3 wds) 67 203 93 112 175 54 14 162 148
- U. Tasks still to be done. (2 wds) 18 218 136 66 227 103 121 84 48
- V. Sympathy; affinity. 213 80 44 119 99 161 144
- W. A unanimous, silent, negative vote. (3 wds) 37 109 153 221 212 97 184 15 192
83 201 129 43
- X. A roof window. 86 16 149 29 130 191
- Y. Encourage; inspire. 49 196 9 125 75 33 169 106
- Z. Enthusiastically line up with. (2 wds) 134 55 173 74 96 178 196 107 156 23

	1	H	2	Q	3	O		4	L	5	P	6	D	7	K	8	M	9	Y	10	S	11	E		12	G	13	C	14	T		15	W	16	X	17	R	18	U	19	A			
20	B	21	I	22	O	23	Z		24	Q	25	M	26	L		27	E	28	J	29	X		30	C	31	S	32	D	33	Y	34	H	35	N		36	P	37	W	38	F			
39	G	40	A	41	K	42	M	43	B		44	V	45	L	46	E	47	R	48	U	49	Y		50	D	51	O	52	G		53	Q	54	T	55	Z		56	J		57	N	58	H
59	S	60	P	61	I	62	C	63	W		64	M	65	K		66	U	67	T	68	L	69	G	70	D	71	E		72	H	73	R	74	Z	75	Y		76	M	77	S			
78	N	79	O	80	V		81	A	82	C	83	W		84	U	85	L	86	X		87	C	88	I	89	H		90	F	91	S		92	O	93	T	94	K	95	Z				
96	D	97	W	98	G	99	V		100	E	101	S	102	H	103	U		104	P	105	Y		106	M	107	Z	108	O		109	W	110	B	111	I	112	T		113	E	114	N		
115	J	116	D		117	L	118	K	119	V	120	Q	121	U	122	C	123	G		124	D	125	Y	126	H	127	L	128	E	129	W	130	X	131	R	132	S	133	M	134	Z	135	I	
136	U	137	C		138	D	139	P	140	L		141	Q	142	A	143	O	144	V		145	G	146	N	147	S	148	T	149	X	150	K		151	H	152	B	153	W	154	F	155	Q	
156	Z	157	O		158	L	159	R	160	A		161	V	162	T	163	J		164	S	165	I	166	P		167	O	168	G	169	Y		170	O	171	C	172	H	173	Z	174	K		
	175	T	176	D	177	M	178	Z	179	E	180	B	181	H	182	D	183	A		184	W	185	K		186	M	187	R	188	O	189	H	190	L	191	X		192	W	193	S	194	J	
195	Q		196	Z	197	O		198	Y	199	H		200	P	201	W	202	B		203	T	204	E	205	D	206	S		207	L	208	G	209	M	210	O		211	R	212	W			
213	V	214	O	215	H	216	C		217	E	218	U	219	Q	220	S		221	W	222	S		223	I	224	F	225	N		226	P	227	U	228	G	229	E							

LAST MONTH'S SOLUTION: E(xposure) Draft, (Life Insurance Company) Valuation Principles - "The initial ten-year period had been marked by a gradual shift in the accepted actuarial valuation function away from (the application of) present value factors based on static assumptions to a consideration of both asset and liability cash flows under alternative patterns of future experience assumptions." Society Committee on Life Insurance Company Valuation Principles.