



SOCIETY OF ACTUARIES

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SOCIETY OF ACTUARIES RESEARCH

I. INTRODUCTION

Over the past couple of years, the Society of Actuaries (SoA) has altered radically its perception of its research role. An issues management process has been put into place to identify and prioritize research activities. A management process has been established to approve research projects and to oversee progress. With such a structure in place a number of research projects have been initiated.

The research activities of the SoA go well beyond new research projects. A revitalization of the experience studies and library activities also has occurred. In addition, several special projects which deserve mention have been undertaken.

II. RESEARCH PROJECTS

A. Economic Statistics for Pension Actuaries

A current listing of "References for Pension Actuaries" was prepared and distributed. This reference guide covered U.S. topics and was developed as an extension of the Economic Statistics project. Another listing with an emphasis on Canadian issues was prepared and distributed. An annual update of the Economic Statistics is in preparation and will be printed and disseminated shortly. The Committee on Pension Research acts as the Project Oversight Group (POG). Ron Gebhardtsbauer is the Committee and POG Chairperson.

B. Actuarial Aspects of Continuing Care Retirement Communities

A bibliography listing all articles identified through the initial data base searches (completed in late 1989) for this project and some additional references subsequently identified has been developed and is available upon request. The researchers have made a recommendation regarding the model to be used. The POG is in the process of reviewing and responding to that recommendation. It is anticipated that the project will be completed in 1991. Faye Albert is the POG Chairperson.

C. Analysis of Interest Sensitive Cash Flow

Over 50 companies have expressed interest in participating in the SPDA pilot study, jointly sponsored with LIMRA. The data request

has been distributed. The target date for submission of data is November 1, 1990. The study will be completed by early 1991. Pete Deakins is the POG Chairperson.

D. Adverse Selection Models

Several proposals were received in response to a Request for Proposal (RFP) for research on the effect of duration of small group medical insurance claims. The POG has recommended a proposal to the Research Management Committee. Bill Bluhm is the POG Chairperson.

E. Analysis of the Correlation of Asset Quality and Credit Risk by Category of Insurance Company Investment

The POG, chaired by Gery Barry, met on several occasions with investment professionals from several companies intending to participate. A set of specifications has been developed and distributed to interested parties. Data submissions are due in by October 15, 1990 for calendar years 1986 through 1989 for private placement bonds and commercial mortgages.

F. Health Data Base

In advance of the March 26 Research Management Committee (RMC), John Bohon, chairperson of the Project Oversight Group, prepared a memorandum summarizing the difficulties of compiling a broad health data base. The issues raised were discussed at the RMC meeting and referred to the April 3 Research Policy Committee (RPC), and subsequently discussed at the April 4 Health Section Council meeting. The Health Section Council suggested that comparative analysis of available data bases would be beneficial. Ed Lew, RMC Chairperson, is currently concentrating his efforts on dividing the project into several parts that could be completed by different groups. One categorization is by different types of health data bases: medical, actuarial, governmental, and other health care organizations.

G. Bond Data Base Feasibility Study

Professor Edwin Elton and Martin Gruber of the Finance Department of New York University proposed the concept of a bond data base to capture information on bonds which are traded by insurance companies. The data which were sought included information on bond covenants, sale or purchase prices, yields and transactions costs. The results of the investigation into the potential development of a bond data base were complicated by the fact that the bond traders within the insurance companies did not like the concept. Bond traders viewed the data base as a means to evaluate their performance and they were the main source of information about the sale and purchase of bonds within their own organizations. Investment managers, data processing personnel and actuaries felt that the idea was a good one. A report on the work of Professors

Elton and Gruber with their recommendations on what to do next will be ready shortly.

H. Validation of Medical Tests.

This research, largely under the direction of Harry Woodman, is concentrating on blood and urine tests. The instructions for this study will be included with the instructions for the annual study of individual life insurance mortality experience. The main problem is getting the companies to contribute data using the new seriatim record format. A second concern is the release of health related data on individuals outside the companies.

I. Lyme Disease

A literature search of current information on Lyme disease yielded an extensive listing. Lyme disease is becoming better known among the general population. Plans to move ahead with the survey of Lyme disease patients is proceeding. Irwin Vanderhoof, the researcher on this project, plans to have a report for the 25th Actuarial Research Conference at the University of Western Ontario in August.

J. Actuarial Aspects of Currency Fluctuations

A Project Oversight Group has been appointed and is beginning the work of developing a detailed description of the project.

K. Options Pricing Models as Alternatives to Cash Flow Testing

The RPC approved this project sponsored by the Financial Reporting Section. A POG has been appointed and is starting to develop a detailed project description.

L. Experience on "Junk" Bonds

Bob Johansen, RMC member, presented a proposal for a pilot study of the experience on "junk" bonds at the March 26 RMC meeting. Junk bond research was also discussed at the April 3 RPC meeting. Duplication of effort with the research undertaken by COVARA will be avoided. The POG chaired by Bob Johansen has met and is formulating a set of activities to initiate the study. These efforts are being coordinated with the Credit Risk project (II.E.).

M. Options and the Management of Financial Risk

A draft form of this book by Professor Phelim Boyle is being revised using comments of the reviewers. The book will be published by the SoA. It is anticipated that publication will be in early 1991.

N. Possible Application of Fuzzy Sets Methods in Risk Analysis

This new project is an attempt to expand the traditional methods of risk analysis by integrating a framework of fuzzy sets theory into the current model. The project will investigate applications of the approximate reasoning methods of fuzzy sets theory to risk analysis and actuarial science. The concept of possibilistic complements the probabilistic approach. The addition of a mathematical theory which is designed to account for the imprecise nature of human thought and perception to the current risk theory model has interesting connotations for actuaries. A POG has just been formed and is beginning to formulate the project description. Barry Watson is the Chair of the POG.

O. Claims Deterioration Study

This project is a pilot study focusing on major medical insurance. Two large insurers have provided data. A preliminary analysis reveals that durational effects are important but exposure year also is critical. Together the combined factors of duration and exposure year appear to account for a statistically significant amount of variation. The POG is revising its data specifications and plans to contact several more carriers for data to continue the study. The analysis is being done at present by Professor Dennis Tolley of Brigham Young University. Professor Tolley is a biostatistician, ASA and heads the BYU actuarial program. Data are analyzed on a super mini-computer. The POG has plans to expand the research from major medical insurance to disability income, medicare supplements, hospital indemnity and other similar product lines.

III. EXPERIENCE STUDIES

A. 1985-86-87 Reports

The typesetting for the *1985-86-87 Reports* is nearing completion and the book itself will be produced later this year. It will contain:

- 1985-86 Standard Ordinary Study
- 1978-83 Large Amount Mortality Study
- 1985+86 Aviation Statistics Survey
- 1984+85 Individual Disability Loss-of-Time Study
- 1985+86 Group Annuity Mortality Study
- 1986-87 LIMRA Lapse Surveys (U.S. and Canada)
- 1986-87 CIA Ordinary Life Mortality Study

The *1988-89-90 Reports* will contain the committee reports that are produced in 1990 and should be available the middle of 1991.

B. Annuities

The 1985+86 Group Annuity study report has been prepared for the *1985-86-87 Reports*. A subcommittee has been set up to produce the

1987+88 study report for the *1988-89-90 Reports*. The specifications for this study have been revised and will expand the study somewhat. These include a detailed record format, active life data, joint and survivor data and data by occupational class. These have been included, on an optional basis, in the request for 1989 data that has just been sent out. It is intended to continue reporting on this study biennially, although data will be requested each year. It is expected that this study will include all ten largest companies in this field in the very near future.

Work is continuing on the 1980-84 Individual Annuity report. There were some seemingly inconsistent data that had to be resolved. This report will be produced in the next few months. Data had previously been requested for the policy years 1984-88 and a request for data for 1988-89 is now being made. Details of the current and continuing reporting of this data are still being worked out.

A request for data for a new Structured Settlements study has been made. This is being done in conjunction with the structured settlements trade association and has had expressions of support from most of the companies active in this market. This data is to be collected later this year with a report to be developed in 1991. This committee has appointed one of its members as liaison with the SPDA Lapse project because of this committee's interest in this area.

C. Annuity Valuation Table Committee

An organizational meeting of this new committee was held on May 24, 1990 to plan the efforts of the next several months. The committee expects, in addition to developing a new group annuity valuation table, to address topics such as projections and their inclusion in a valuation standard, the desirability and need for separate male and female tables, and the margins to be included in the final table. Lindsay Malkiewich is the head of this committee and four other members have been recruited. A few members may be necessary to address specific matters that have yet to be identified.

D. Aviation and Hazardous Sports

The 1985+86 Aviation Statistics report will be in the *1985-86-87 Reports*. The committee expects to have an updated Hazardous Sports Survey for the *1988-89-90 Reports*.

E. Credit

The approach taken by the committee chairman over the past year or so has started to pay off and this committee expects to be able to make some definite plans for the future later this year, including a variety of activities for committee members to pursue and the expectation of data on credit insurance in a few years.

F. Group Life and Health

The Group Life Subcommittee of the Group Life and Health committee has sent a request for data for a current group life study to fifty of the top group life companies and has received positive responses from over twenty of these. These requests involved letters to three position levels in most companies and was assisted by letters of support from the ACLI to their group officer contacts. The subcommittee is now doing three things in anticipation of receiving data in the fourth quarter of this year:

- preparing detailed validity checks to be performed on contributions
- preparing computer reports to validate the data received
- developing computer reports to serve as the basis for the written report on this study.

The subcommittee is committed to producing at least a preliminary report by the summer of 1991 if the contributions are received as expected.

The Group LTD Subcommittee is preparing a letter that will be sent to the top group LTD companies to determine the feasibility of proceeding with a current group LTD study. It has been determined that it is not possible to bridge the gap between the last study and the present. It also is quite possible that only a termination or recovery study will be developed at this time, with the incidence study being deferred for a year or two.

G. HIV Research

This committee intends to undertake the same four projects identified previously:

- Individual Claims Experience Study
- Individual Test Experience Study
- Experience and Trends Tracking
- Insurance Claims Projection

However, progress has been made on only the first of these where a subcommittee is working with the ACLI to work out the detailed design of a study of seriatim AIDS claim data.

H. Individual Health

The 1984+85 Loss-of-Time study has been prepared by this committee for the 1985-86-87 Reports. Because of insufficient contributions, the next study in this series is expected to be a 1986+87+88 study that would appear in the 1991 Reports. However, a number of major new contributors have indicated a willingness to contribute in the near future, with the result that the prospects for this study have improved. A study of Canadian disability experience is planned.

I. Individual Life

About two-thirds of the contributing companies have contributed data to the 1986-87 study and the rest of the companies are being contacted and requested to speed their contribution. It is expected that both the 1987-88 and the 1988-89 contributions will be requested in 1990. If companies are able to respond, this will bring this study to a current basis.

Plans are being made to extend the data collection under this study to include Long Term Care riders. This will provide a base of data for these benefits as this benefit becomes more prevalent and as companies comply with this request. Some companies have indicated a difficulty in providing some of the specialized data requested by the committee (aviation and large amounts have particularly been mentioned), but the committee intends to persist with these efforts for the time being.

J. Long-Term Care

Six contributions to the Long-Term Care study have been received through mid-May with one more expected. This data is mostly still at the validity check stage, but will be available for validation and analysis shortly. At that point this committee will start to find out first hand how feasible a comprehensive report on long-term care will be.

K. Medical Impairment (Study Committee)

Work is continuing on the text of *Medical Impairments, Volume II*. Publication details will be addressed shortly as the book is expected to be ready for publication in 1991. This will be a companion to *Medical Impairment Study, 1983, Volume I*, that was published in 1986.

L. Medical Risks (Book)

The second edition of *Medical Risks* is now expected to be available in mid-August. A prepublication offer at a substantial discount was mailed with the July/August *The Actuary*. The same offer is being made to ALIMDA members. MIB is providing one copy to each of its members. This book is a greatly expanded second edition of the book previously published by the Society and ALIMDA in 1976.

There is a significant common thread between the previous two activities, although the main thrust of the two are different. In the Impairment Study, the long term implications on mortality of evaluations and decisions made in the underwriting process are studied. In *Medical Risks* the main thrust is to evaluate studies that have been done outside the insurance industry and to cast them in life table form that are useful to actuaries and medical

directors. The necessity of maintaining ongoing research in both these areas is being addressed within the Research function.

M. Retirement Plans

This committee has been planning its work for the next two years following the excellent response to its request for data for a 1985-89 study. Plans call for the data to be received in the fall of this year, the report prepared by the second quarter of next year and an update to the UP-84 Table prepared by the fourth quarter of next year.

Nine consulting firms have indicated an interest in providing data on over twenty plans. Participation has also been promised by the US government actuaries and the Canadian government has also promised to provide data.

N. Projects

The remaining copies of *100 Years of Mortality* were offered for sale in the May *The Actuary*. Previously copies had been made available to libraries specializing in insurance and related areas.

Work is continuing on typesetting the tables of the standard ordinary study via computer. After the general layout of the first six tables were set up, several revisions were made to produce output from the typesetter that were satisfactory for printing, with such items as dashes of the proper size and placement being specified. This knowledge is now being applied to the rest of the standard ordinary tables and will be applied to the tables of the other studies.

Software is being evaluated for the project to develop an index of tables and experience studies material. This project has suffered delays because of the high work load in the library, but will be emphasized with the intention of completion this summer.

It is planned to make the data from the 1986-87 standard ordinary study available for sale on diskette when this study is completed later in 1990.

IV. LIBRARY

A. Services

The Research Librarian submits a monthly report to the Director of Research and Executive Director. These reports give a capsulized account of special and internal projects and statistics on five service areas. The year-to-date totals for the service areas for the last three years are below.

<u>SERVICE AREA</u>	<u>JULY 1990</u>	<u>JULY 1989</u>	<u>JULY 1988</u>
Circulation	170	152	119
Interlibrary loan	81	35	34
Literature searches	50	49	9
Reference requests	1329	1104	781
Reference searches	23	20	18

Sixty-two percent of the reference requests were answered for Society members, staff and research projects.

B. Internal Projects

1. Acquisition. 25 new books were ordered.
2. Collection Development. 36 new books were processed and/or cataloged and added to the collection. A list of all items added to the collection is sent to the staff quarterly. The binding of paperbound copies of the *Journal of the Institute of Actuaries* continues. One set of back issues of *The Actuary* was sent to the bindery. Additional donations from Murray Projector have been received; they will go in the circulating collection and archives.
3. Review of Literature. The Review Committee met for the first time in June. The procedure for reviewing the archives was established and it was agreed that each department of the Society should be invited to have a representative on the committee. The Committee was established in 1987 and includes all staff actuaries and the Director of Research. This Committee will probably meet biannually.
4. Archives. The preservation and restoration of the archives continues. 24 books and pamphlets have been restored, including volumes of *Transactions*, *Actuarial Society of America* and *Board Minutes of the ASA and AIA*. An inventory of the archives was given to the Review Committee. They were asked to evaluate and rank the book and pamphlet portion of the archives so restoration could continue. The final decision on archives should be completed by the end of the summer. The review of the uncataloged books has begun and recommendations will be submitted to the Director of Research. Cataloging should begin in the Fall.
5. Serials. The collection continues to grow. 175 journals are received of which 134 are routed to 42 staff members.
6. Personnel. The Library Technical Assistant position was approved for part-time for 1990-1991. Brenda Molifé, a college student with prior library experience began working in June. Since she will be returning to school in the fall,

advertising for her replacement has begun. The position should be filled by the end of September.

C. Other Projects

Acting on the recommendation of Harry Panjer, the International Relations Committee approved the sending of materials to Jahangirnagar University in Bangladesh. A letter was sent to verify the acceptance of the materials and a response was received. Materials will be mailed shortly.

A listing of international actuarial organizations was compiled. The collection of journals from international associations was reviewed and letters to obtain missing issues and/or establish a reciprocal exchange of publications have been sent. An article on the international collection was prepared and submitted to the Communications Department for an upcoming *The Actuary*.

The Continuing Care Retirement Community literature search was prepared for distribution to the membership.

An article on the breakfast held for international guests at the Centennial Celebration was submitted to the Communications Department. This article will be included in the *1989 Centennial Celebration Proceedings of the Actuarial Profession in North America*.

Information on copyright, international standard book numbers (ISBN), cataloging-in-publication (CIP) and permissions have been supplied for both members and staff.

The application for membership in the North Suburban Library System was submitted and accepted. Judy Yore, Administrative Assistant in the Research Department agreed to be the Society representative.

A program to begin to restore the group pictures from the archives was approved. An estimate of the cost was obtained. Restoration should begin by the end of the year.

The update of the Futurism Library has been completed and will be distributed to the Futurism Section membership by the end of the year.

V. SPECIAL PROJECTS

Special projects are activities that are not directly related to research projects, experience studies or library services, but are efforts supported by the SOA research staff. To a large extent, these projects are of a research nature.

A. China Program

The coordination of activities having to do with the actuarial program with Nankai University in the Peoples Republic of China has been completed through the instruction phase of the program. The final part is to have academic advisors for the students' theses. Actuarial texts have been supplied and instructors selected for different courses. The program was suspended for a time after the killing of demonstrators and crack down by the government in June 1989. The program was resumed in the Spring of 1990 to help the students, all of whom returned to school.

B. Valuation Actuary

The Committee on Valuation and Related Areas (COVARA) is planning to examine some current studies on junk bonds. They plan to critique the works to determine points of similarity and differences as well as to extract information which would be useful for actuaries to have when considering the assets of their companies. Plans also are being made to update the Valuation Actuary Handbook. In addition, COVARA is reviewing some of the previous work of a more theoretical nature in order to make it more practical.

C. Actuarial Principles

A discussion draft of fundamental actuarial principles was prepared and distributed to members of the profession. Numerous comments have been received, reviewed and compiled for the Committee on Actuarial Principles. The Committee will prepare a report for the September Executive Committee meeting. Preparation of a presentation for the annual SoA meeting in Orlando is underway. An exposure draft will follow.

D. Actuarial Research Clearinghouse

The publication of ARCH is a research activity. Working with the editors, each edition of ARCH is prepared, printed and distributed. Over the past several months the staff has caught up with the 1989 volumes and is preparing the 1990 edition of ARCH.

E. Electronic Bulletin Board System

The discussion about a possible electronic bulletin board system for the SoA has gone on for some time. With assistance from Lincoln National Corporation's R&D Section, a hardware configuration has been designed. The MMB Teamate software has been selected. A demonstration module is being prepared for the Executive Committee meeting in September. The purpose of such a bulletin board is to be used as an information management system. Users will have read only and some write to options. Security levels are assigned to access codes giving different menus from which to chose options. The

bulletin board also can have electronic mail for committee members to exchange information or to review current reports.

F. Initiatives to Strengthen Relations with Colleges and Universities

The Board approved several initiatives to strengthen relations with Colleges and Universities. Letters announcing these initiatives have been sent to academic SoA members, College and University contacts and Presidents of Colleges and Universities on the SoA's primary list of Colleges and Universities offering an actuarial science curriculum. An article has been prepared for the September issue of *The Actuary*, and a press release is being developed. A discussion memo on implementation guidelines is being prepared for the September Executive Committee meeting.

G. Actuarial Education and Research Fund

The AERF is staffed by the Research Department. AERF sponsored research projects are monitored and overseen. Funds are disbursed and administrative and other financial matters handled. Each year the AERF awards the Halmstad Prize and the Practitioners Award and conducts the Individual Grants Competition.

FLOW OF RESEARCH PROJECT FROM CONCEPTION TO COMPLETION

STAGE:	<u>1. IDEA</u>	<u>2. INITIAL APPROVAL</u>	<u>3. SPONSORSHIP</u>	<u>4. PROJECT APPROVAL, FUNDING AND ASSIGNMENT</u>
ACTIVITY:	Input/Issue/Concept/ Problem - Conceptualization of research activities	Ideas considered and sponsors sought for ideas to be pursued. Rejected otherwise.	Development of basic project description, importance of research, cost estimate, why undertake the effort, + outcome sought, financial support	Sponsored project evaluated and decision made to fund, postpone or reject. Project assigned to RMC or CES
RESPONSIBILITY:	Sections, Committees, BOG, RPC, Individual Members, Outsiders	RPC	Sponsors - Sections, Committees, RPC, RMC, CES	RPC
STAGE:	<u>5. POG APPOINTMENT</u>	<u>6. PROJECT DEFINITION</u>	<u>7. APPROVAL OF ACTIVITIES, IDENTIFY RESEARCHER</u>	<u>8. RESEARCHERS SELECTED</u>
ACTIVITY:	Sponsors contacted as well as RMC/CES for input on POG candidates. POG appointed.	Project activities and purposes specified. How to select the researchers proposed.	POG project approved and/or modified. Approval to begin finding researchers	Recommendations of POG considered and acted upon - Researchers selected
RESPONSIBILITY:	Vice President for Research	POG/Staff	RMC/CES	RMC/CES
STAGE:	<u>9. PROJECT INITIATION</u>	<u>10. PROGRESS MONITORED</u>	<u>11. PAYMENTS</u>	<u>12. PROJECT COMPLETION</u>
ACTIVITY:	Project started	Day to day work and milestones overseen	Researchers paid for work according to payment and progress.	End of project and product accepted/rejected
RESPONSIBILITY:	POG/Staff	Staff/POG - reported to RMC/CES for feedback	POG recommends, RMC/CES decides, Staff initiates payment	POG recommends - RMC/CES decides
STAGE:	<u>13. DISSEMINATION OF RESULTS</u>	<u>14. NEW RESEARCH IDEAS/TOPICS</u>		
ACTIVITY:	Recommendations on how to distribute the results of the research project	Based on outcome of project, new ideas for research may result, process goes to Stage 1		
RESPONSIBILITY:	POG, Staff - RMC/CES decides	POG, Researchers, Staff		

