Foreword

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Several issues prompted the Society of Actuaries–sponsored 2005 international symposium "Living to 100 and Beyond" and its predecessor, the 2002 symposium. First was the belief that a symposium could bring together specialists working in the same general areas of high age survival to provide them with an opportunity to get acquainted with their counterparts and to foster collegiality, cooperation and even collaboration. The roundtable luncheon[1] on the last day of the symposium, with various tables dedicated to the discussion of selected topics, was designed with this in mind.

Second, the symposium was intended to provide a platform for researchers to present their findings, methods or problems and elicit discussion by appointed discussants and by attendees for the benefit of all. The call for papers was purposely quite general in its specifications for paper topics.

Third, by publishing the presentations on the Society of Actuaries Web site, the symposium would disseminate knowledge to students and to experts who were not present at the conference. The papers would also be available to persons in related fields whose work would be advanced by or even dependent on relevant papers. In this regard the symposium encouraged papers that addressed social and economic problems arising from increased numbers of elderly persons; this was also the subject of a panel discussion. A summary of this panel discussion is included with the papers.

The keynote presentation by Dr. Thomas Perls, which we were not able to include in this compendium, discussed survival to age 100 or more from a medical doctor's viewpoint and his experience treating centenarians and keeping records of their health and survival. His presentation dealt with real people, putting faces on the cold numbers that demographers and actuaries are accustomed to using.

As an additional feature, Ward Kingkade, Statistician/Demographer for the US Bureau of the Census and member of our Subcommittee, presented a slide show at the Wednesday luncheon. Ward began his presentation by describing the 2000 (U.S.) Census as a "snapshot" of the population of the United States. His short paper and

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[1] Roundtable luncheon topics included the following:
Topic 1: Mortality Investigations and Quality of Data; Rates at very high ages; The effect of improving high age mortality on the use of Extinct Generations
Topic 2: Mortality – Models, Improvement Rates, Population Projections; Effects of emigration and immigration
Topic 3: Increasing numbers of elderly – quality of life, institutionalizing of elder living, shortages of caregivers, plans and suggestions for the future. Inmates or guests or what?; Transportation
Topic 4: Financial impact of increasing numbers of elderly; Effects on social programs and costs, Shortages of medical facilities and professionals. Ways of coping; The necessity of postponing retirement for the benefit of all ages; Pay the healthier elderly to take care of the less fortunate. Of all ages?
Topic 5: Medical approaches to aging – attacking the diseases of old age or old age itself; A multi-pronged approach to postponing senescence;
Topic 6: Progress in prevention and cure of Alzheimer's, Parkinson's and the like.

accompanying graphs provide us with a “snapshot” of Census data that is both instructive and apropos.

The papers covered various aspects of high age survival research and were grouped into sessions of two to four related papers. The following paragraphs describe the subjects included in the different sessions.

Statistics, to be credible, must be accurate. After collecting data from available sources, it is necessary to evaluate the data and derive various ways to identify errors and refine or adjust the raw data. Some aspects of current investigations are described in sessions 1 and 4, "Increased Longevity and the Challenge of Determining q_x at Extreme Ages, Parts 1 and 2," and especially in session 6, "Data Sources, Quality and Analysis." An important addition to the existing knowledge base on this subject is the Kestenbaum and Ferguson paper.

The use of mortality laws and models to analyze and forecast survival rates is discussed in papers presented in sessions 7 and 8, "Mortality 'Laws' and Models, Parts 1 and 2." The papers cover the application of extreme value methodology to high age mortality analyses as well as applications of Lee-Carter and various other models. Interestingly, one paper discusses the use of Makeham-type formulas to produce an all-age mortality table based on available data that did not extend to the higher ages.

As part of the analyses of high age survival and its progression or improvement over recent years, some papers examined longevity itself from different viewpoints, including theories on the existence or nonexistence of an upper limit on survival. Session 3, "Theories of Longevity," provides food for thought. This session includes a paper on the challenging and increasing problem of transportation for the elderly in societies where an automobile is a necessity for traveling even short distances.

Improvement in the survival of a vast majority of the population to retirement age and beyond and the consequent increase in elderly populations in the future can create all kinds of problems, challenges and opportunities, not least of which is providing care for persons suffering from disabilities such as blindness, dementia or severe physical limitations. Session 2, "Impact of Aging Populations, Part 1," discusses some of the effects on the individual annuity and retirement annuity sectors. These and similar topics are further treated in the first three papers of session 5, "Impact of Aging Populations, Part 2."

The fourth paper in session 5 served as an introduction to the panel discussion, "Implications of Increasing Life Spans for the Private Sector." The Society's staff has provided a summary of the panel discussion, and it follows the session 5 papers.

Each session had one or two appointed discussants; their discussions follow the papers in the respective sessions. In general, discussants are free to write what they wish. A typical discussion includes a short review of a paper, calling attention to salient points and pointing out items of disagreement or ideas that should be developed further or clarified. Sometimes a discussant uses the discussion as a platform to expound some of his or her own ideas or theories. Since authors were given the opportunity to revise their papers and submit final versions for publication, it is unlikely that a critical point noted in a discussion will still appear unchanged in the final paper.

This collection of papers is intended to add to the body of knowledge on subjects related to current survival rates, future improvement in survival and the impact of increasing numbers of survivors to retirement and beyond. It is hoped that the work described in these papers will encourage wider dissemination of current knowledge and further study leading to the production of more reliable data and advances in ideas and theories.

On behalf of the symposium attendees and future readers of this compendium, I wish to extend special thanks to the Subcommittee members for the effort and hours they expended to assure the success of the Symposium. They are: Timothy F. Harris, Vice Chair, Robert N. Anderson, Thomas P. Edwalds, Kenneth W. Faig Jr., W. Ward Kingkade, J. Bruce MacDonald and John W. Paddon. Appreciation is also due Society Staff for their extended and extensive efforts.

And finally, the Subcommittee and the Society of Actuaries also wish to thank our attendees, presenters and participating organizations from three continents for their support of this Symposium.