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# Challenges and Opportunities of Longer Life

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In January 2008, the Society of Actuaries and over 40 other collaborating organizations held the third in the series of Living to 100 and Beyond Symposia. The 2008 Living to 100 Symposium, building on the success of the previous two in 2002 and 2005, gathered together a diverse range of professionals, scientists and academics, in an interactive, multidisciplinary forum for three days of highly engaging sessions. In keeping with one of the motivating factors for the series, the symposium organizers were pleased to have overwhelming feedback that all three of the Living to 100 Symposia have showcased the SOA's goal "to be recognized as the organization of experts in the field of risks and, in particular, the fields of survival and health risks." Based on the strength of the program and the organizational leadership provided by the SOA, the symposium, according to Event Co-Chair Bob Johansen, "has achieved a position of international prestige among not only actuaries, but also demographers, gerontologists, government offices and others concerned with increasing longevity, its implications for the future and possible solutions."

### Significant Issues for the Elderly

While the success of the symposium is a cause for celebration, many of the sessions over the three-day event conveyed a more serious tone and highlighted growing challenges for the elderly in the face of increasing longevity. Among the issues discussed, research from the Society of Actuaries and other sources indicates that many workers and retirees do not plan long term, and there are significant gaps in knowledge on planning for post-retirement risks as well as the risks themselves. Furthermore, the research revealed that the less than optimal strategy of reducing spending remains the favored method of dealing with post-retirement risk, rather than through financial protection products (although supplemental health benefits products are an exception). At

the same time, employers have reduced their commitment to traditional pensions that provide lifetime income, forcing individuals to become increasingly responsible for managing their own retirement funds and making them last longer. This combination of more individual responsibility and greater longevity presents a growing market for financial products to help retirees cope with several risks:

- Guaranteeing sufficient investment returns on retirement assets
- Converting retirement assets into guaranteed lifetime income
- Funding the costs of long-term care
- Supplementing Medicare coverage
- Protecting a surviving spouse through provision of regular and sufficient income
- Converting home equity into retirement income through products such as reverse mortgages
- Managing retirement assets in the event of diminishing mental and physical capabilities through Alzheimer's and other health conditions.

### Topics Covered by the Symposium (... And What Was Missing)

The symposium provided insights into the diverse views of the scientific basis of aging, offering a revealing look into mortality models and data. As well, the sessions included a combination of both biological and health perspectives on aging along with statistical analysis. But open questions remain and were not covered on how to reconcile the differences in viewpoints or provide guidance regard-



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ing how to handle the consequences of extreme longevity scenarios, which might be considered the equivalent of a 100-year weather event.

In addition to the scientific basis of aging, the symposium provided a range of programs dealing with the implications of increased longevity for the private sector, for employers in general and for individuals. One of the sessions highlighted the special issues for women as a result of longevity trends. Other sessions dealt with the need to work longer than planned before retirement and the impact of declining health and disability on the lives of increasing numbers of the elderly population. From an international perspective, there were comparisons of aging data from a number of countries, and the symposium boasted attendees from 15 different countries. Attendees, no doubt, were left with the impression that the issues discussed have global implications.

### The Future of Survival

A primary objective of the Living to 100 event is to showcase the latest in thinking on the science of aging. The 2008 symposium led off with a spellbinding presentation by Dr. Cynthia Kenyon on her work with the *C. elegans* worm and the consequences of dietary restrictions on longevity. Through genetic manipulation, the normal two-week life span of the worm has been extended to four weeks or, as SOA President Bruce Schobel aptly put it in his introduction of Kenyon, “Four weeks has become the new two weeks.” Kenyon also raised a number of social and economic implications that would need to be addressed if such dramatic extension of longevity could be applied to humans.

While Kenyon’s work focused on genetic manipulation as a way of impacting longevity, Dr. Leonard Hayflick, in a later session at the symposium, provided an alternative viewpoint on how this type of manipulation may affect the aging process in humans and its ultimate



applicability—or, more accurately, inapplicability. Related to this, Hayflick further discussed a number of theories on the distinction between the biology of aging, the aging process and age-related diseases. Kenyon and Hayflick’s differing perspectives on the biological questions related to aging reinforced to attendees the complexity of the issues as well as the diversity of opinion in the scientific community—clearly, this was one of the major takeaways of the symposium. Further discussion by the organizing committee after the symposium highlighted the need to understand and think about the range of different opinions on aging, and the related challenges in deciding how a product development actuary best makes use of this information for price-setting, risk evaluation and designing guarantees within products.

### Measuring and Projecting Improved Survival

The challenges of measuring high age mortality and the difficulty in securing reliable data to do so were important motivators for the first Living to 100 Symposium. These challenges persist.

In this regard, Dr. Jean-Marie Robine, a demographer and gerontologist who is probably best known as the co-validator of the oldest verified supercentenarian of all time, discussed the concept of the compression of mortality and morbidity. This phenomenon can be observed when the shape of recent mortality and morbidity curves is compared to curves from a hundred years ago. When viewed side by side, it appears that the curves have moved towards a rectangular pattern



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over time. This movement or apparent compression is sometimes referred to as “squaring of the curve.” The implication of this trend is that increasing numbers of persons born in the same year are living similar life spans, further implying the potential for a fixed maximum life span. Robine concluded that there is probably a limit to the ultimate amount of this compression, and further conjectured on alternative patterns of mortality that may emerge. In either case, questions remain as to whether or not a fixed maximum life span exists when viewed from the lens of mortality trends.

To truly gauge mortality trends, it is vital to measure mortality levels on a precise and consistent basis. Given the fundamental importance that measurement represents for all aspects of the study of longevity, the symposium included presentations from several of the world’s leading thinkers in this area. Included among the topics discussed in the sessions on mortality measurement were data validation techniques and integrity checks. As in many other disciplines, data is the fundamental building block and foundation for new breakthroughs.

The measurement of mortality also bears directly on the projection of future mortality levels. The need for mortality level projections that are thoughtfully developed cannot be overstated for many of society’s key financial security systems. For instance, government social security systems around the world depend on solid mortality projections for planning purposes to ensure long-term fiscal soundness. In recognition of this, an enlightening session was held at the symposium with prominent actuaries from social security governmental agencies in the United States, United Kingdom and Canada, presenting their most recent mortality projections and methodologies. It was readily apparent from this session that these countries are contending with many of the same longevity issues that may ultimately challenge the long-term solvency of their public programs.



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## Product Ideas

It is wonderful that we are able to live longer, but longevity is accompanied by increasing challenges. The challenges and opportunities present themselves across a far-reaching range of stakeholders including society as a whole, financial service companies and other institutions and individuals. For individuals, the challenges primarily concern what they plan to do with their lives, financing of life choices and managing health. For product development actuaries, the focus is largely on the financing concerns, including the funding of retirement income and the appropriate distribution of that income. Furthermore, this focus extends to providing products that will help to manage investment and longevity risk over an uncertain lifetime.

Many financial products are already on the market, some with greater acceptance than others. Mutual funds are developing new approaches to the payout period. Some of the product areas that actuaries may want to think about include:

- Longevity insurance
- Longevity reinsurance
- Combination products
- Products that share risk in different ways, e.g., a product that guarantees a lifetime income but with some adjustment for aggregate mortality risk experience outside of a certain range

## Interesting Material for Product Development Actuaries

Over 30 papers were presented at the symposium in addition to several panel discussions. While all papers are worth taking the time to read, the list below highlights papers and session material that may be of special interest to readers with a product development background:

- Leonard Hayflick’s “Entropy Explains Aging, Genetic Determinism Explains Longevity, and Undefined Terminology

Explains Misunderstanding Both,” which discusses the theory of aging.

- Papers presented in the session titled “Social Insurance Perspectives and Implications.” These papers describe social security mortality projections for the United States, Canada and the United Kingdom.
- Papers discussed in the session titled “Longevity Risk Pricing.” These papers and the topic, in general, may also make for an interesting listserve discussion among Product Development Section members.
- Eric Stallard’s “Estimates of the Incidence, Prevalence, Intensity and Cost of Chronic Disability Among the Elderly” provides an insightful view into expected periods of retirement in various states of health.
- Mike Cowell’s “Health, Wealth and Wisdom—Living Long, Living Well” enlightens readers with an actuarial perspective on health and aging.
- Material from the session “Implications of Longer Life Spans: What Does This All Mean To Us,” which describes the impact of increased longevity on a variety of financial systems and stakeholders.
- Beverly Orth’s “Evaluation of Approaches to Reducing Women’s Longevity Risk” focuses on several alternatives for providing lifetime income.

### Accessing the Information

Complete versions of the papers and material described above as well as others produced for the symposium will be available later this year in an online monograph on the SOA’s Web site at *www.soa.org*. Readers may also be interested in viewing the monographs from the 2005 and 2002 events, also available on the SOA’s Web site.

### Related Material on Post-Retirement Risk Research

Those interested in the research presented at the Living to 100 Symposium on the risks of aging and its implications may wish to read further about related work the Society of Actuaries has completed. A substantial number of research studies have been conducted to gauge what the public knows about post-retirement risks and how they expect to manage these risks as well as a number of other aspects relating to these risks. The findings from this research reveal gaps in the public’s knowledge of these risks and present opportunities for improvement through products and education. The research can be found on the SOA Website at <http://www.soa.org/research/pension/research-post-retirement-needs-and-risks.aspx>. The Web page includes findings from a series of surveys conducted in 2001, 2003, 2005 and 2007 on awareness of post-retirement risks as well as results from several focus groups held to study how the public expects to manage assets post-retirement. Many of the findings from studies appearing on this Web page were presented at the symposium and these studies provide a worthy supplement to the Living to 100 material.

### Final Acknowledgment and Thanks

The symposium organizers wish to thank the Product Development Section for being one of the event co-sponsors. It was truly gratifying to have so many product development actuaries attending the event. In this regard, the organizers would value any comments or suggestions for making future Living to 100 events as worthwhile as possible for product development actuaries and others. Please feel free to contact any of the authors of this article with your thoughts. □