SOCIETY OF ACTUARIES Long Term Care Insurance Section

Long-Term Care News

ISSUE 36 AUGUST 2014

Mechanics and Basics of Long-Term Care Rate Increases

By Missy Gordon and Stephanie Moench

WHAT IS DRIVING THE NEED?

For those familiar with the long-term care (LTC) insurance industry, the misses of the past in terms of pricing assumptions and the need for rate increases have been well established. This has often led to double-digit rate increases—sometimes triple-digit. However, for those who are less familiar with the mechanics of LTC insurance, the reason for the large increases can be perplexing or even seem like a conundrum—how is there a need if, for example, the historical loss ratio is low or the company collects more premiums because policyholders are persisting? To help understand the situation, this article walks through the mechanics of issue age rating and pre-funding to clarify some of the common misconceptions about LTC rate increases. It then discusses how misses in some of the key pricing assumptions drive the need for a rate increase.

COMMON MISCONCEPTIONS

Misconception 1: These products are annually renewable

LTC insurance is guaranteed renewable and priced on an issue age basis. The premiums are expected to cover costs over the future life of the insured

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Actuaries
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This newsletter is free to section members. Current issues are available on the SOA website *(www.soa.org).* To join the section, SOA members and non-members can locate a membership form on the LTCI Web page at *www.soaltci.org.*

Long-Term Care News

LTCI Section Update

By Jim Berger

The agenda of the LTCI section council has been full with several actual or potential research projects, some assistance to regulators, and the general planning that is part of the role, e.g., newsletters, meetings, and webcasts.

The research activity has seen the publication of two works on the volatility of LTCI. These works can be found on the section page of soa.org. The section is participating in funding for a broad SOA project on Metrics & Measures that will have the LTCI perspective embedded in its output. Also, we have been vetting several other potential projects, choosing to fund some and not others as we manage the section budget funded by section dues.

An interesting opportunity has come our way to exchange LTCI information with the French Institut des Actuaires. The French LTCI product has similarities to the U.S. version and, of course, differences. Differences range from design to valuation to industry experience studies. Etienne Dupourqué and Nefissa Sator will coordinate this project. If you would be interested in participating, they would be glad to hear from you.

As we move through summer, the meeting season is coming upon us. LTCI sessions are planned for the September DI & LTC Insurers' Forum in Baltimore, the October Annual Meeting in Orlando, and, of course, the March 2015 ILTCI at the Broadmoor in Colorado Springs.

Bob Hanes will take over as section chair at the time of the Annual Meeting along with three new section council members. Coming to the end of their three-year terms will be Sevi Desai, Missy Gordon, and Heather Majewski. Please thank them when you see them for the service they have provided to you through the section council.

Thanks to Beth Ludden for editing the newsletter this time. She will turn over the role to Sheryl Babcock for the next editions. And finally, thanks to Steve Schoonveld for his just-completed service as editor for many editions of the newsletter.

I'm proud to serve with all the people mentioned and unmentioned above. ■

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Beach Reading

By Beth Ludden

Just in time for summer, the LTC section is presenting you with a smorgasbord of topics that should appeal to all tastes and keep you revved up for Fall.

There is a synopsis of the sessions held at this year's Intercompany Long-term Care Insurance conference held in Orlando. Reading through the overviews made me realize how diverse the topic of long-term care really is. It should also whet your appetite for next year's meeting in Colorado Springs.

Reflecting on that diversity in this issue we have articles from a wide-array of authors (read Bob Hanes piece on why membership in the LTC section is not just for actuaries!) including Congressman Bill Owens who reminds us why LTC insurance is important to the country at large, Lory Phillippo, CEO of Circle Center Adult Day Services, who provides us with an insightful article about the power of adult day services and Tom Riekse, Jr., a managing general agent, who shares his views about the changing landscape of long-term care sales.

Of course we have many excellent articles from highly regarded actuaries like Eric Stallard, Missy Gordon, Rachel Brewster and Roger Loomis. Roger, in particular, has shown his literary side as he promotes the interesting research that constitutes the 'volatility' study. An actuary who has read Joyce? Who knew?

In conclusion I want to thank Jim Berger and Steve Schoonveld for giving me (a non-actuary) the opportunity to be the editor of this issue as well as all who are on the committee. It does take a team to bring each of these issues to publication. I would encourage all who read the newsletter to get involved. It really is fun.

Best wishes for a great summer! ■

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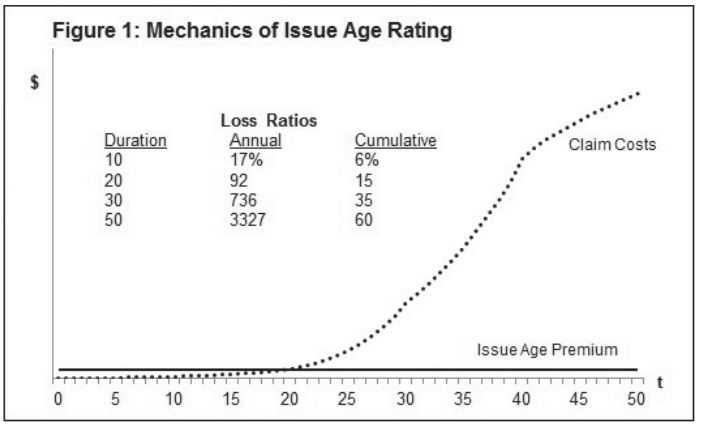

and are level unless a rate increase is pursued. In contrast, other health insurance products may be annually renewable and rated by attained age, meaning they are priced such that premiums are expected to cover the costs for only one year, after which they increase because of aging or trend. If LTC insurance were rated by attained age, the rates would follow the shape of the claim cost curve and the annual loss ratios would be more uniform instead of very low in early durations and extremely high in later durations. Figure 1 provides an illustrative example.

Additionally, attained age rates for annually renewable products are driven by the morbidity assumption because the rates are only intended to cover the cost for one year. Therefore, if experience unfolds differently from what was expected, it can be seen quickly (with a lag), and adjustments can be made to the next year's rates. However, for LTC products, it may be many years before a miss in the morbidity assumption unfolds in the experience because the average LTC claimant age is around 80 but the average issue age is only about 55. Also, because LTC is priced over the future life of the insured, the assumptions for persistency and interest are key to ensuring that the company has enough reserves to pay future claims. Misses in these assumptions have a critical impact on performance, but again may not unfold in the experience or affect the historical loss ratio for several years. Furthermore, rate increases on more recently priced LTC policy forms cannot be pursued until performance has deteriorated to be more than moderately adverse.

Filing for a rate increase early is critical to the performance of LTC products, but to date the industry has not been conducive to the annual rate increases of some other health products. To consider LTC rate increases annually may require a shift in thinking (and regulation) regarding LTC rates and the basis for which a rate increase is determined. For example, adjusting LTC premiums annually would require frequent analysis and early detection of trends in the experience or industry rather than waiting several years until the experience has clearly deteriorated from the original expectation.

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Misconception 2: Using historical loss ratios to determine performance is appropriate

In early policy years when claims are low, a portion of premiums received are set aside to pre-fund expected future claims. This pre-funding aspect of LTC insurance results in low historical loss ratios, which can cause several misconceptions, including that the company has experienced significant profits or that there is time to wait and see how experience will unfold before deciding whether a rate increase is needed. While evaluating the need for a rate increase based on historical loss ratios may be appropriate for medical insurance, this method does not capture the pre-funding component of LTC premiums.

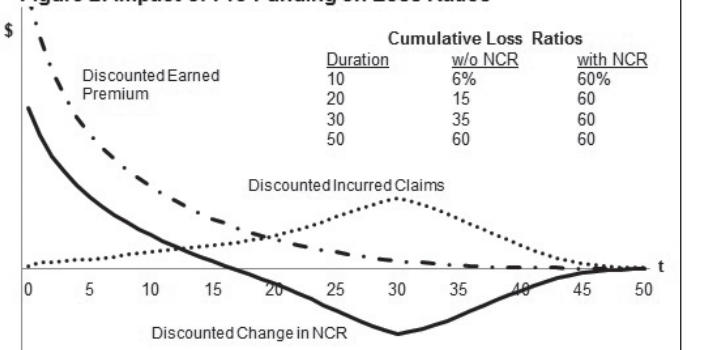
Contract reserves are established as a regulatory requirement to capture the portion of premiums designated to fund future claims. In later years when claims are high, the company releases the contract reserves to cover those claims. As a result, when looking at historical cumulative loss ratios, the change in contract reserves should be considered in the numerator of the loss ratio calculation. Over the life of the policy the change in contract reserves is zero, thus the lifetime loss ratio is equivalent to that based solely on incurred claims and earned premiums. Because the contract reserves represent a liability, by capturing the change in contract reserves in the numerator of the loss ratio calculation, the historical loss ratios increase significantly. The cumulative loss ratio is constant in all durations when using a natural reserve (i.e., pricing assumptions and net level premium method) rather than statutory reserve (i.e., includes reserve margin and one-year full preliminary term method).

Figure 2 provides a graphical illustration of the above concept. The claim and premium lines in Figure 2 are the same as those in Figure 1, except that they capture the impact of persistency and interest discounting. This impact is significant as can be seen by the fact that at time zero, these lines are at the same point as those in Figure 1.

Misconception 3: Companies have time to "wait and see" how experience will unfold

As mentioned above, there is often a misconception that, because of the low historical loss ratios for LTC insurance, a company has time to wait and see what happens before pursuing a rate increase. However, as more time passes without a rate increase, the future premium base to which the rate increase would be applied continues to shrink. Deferring the rate increase just five years to wait and see how experience unfolds may double the rate increase needed to produce the same lifetime loss ratio that would have been achieved had the increase been implemented today. Waiting too long could even result in a triple-digit rate increase that provides virtually no financial relief because of how little premium remains. A key consideration is how to strike a balance between early implementation and the amount of experience (company-specific and/or industrywide) needed to determine whether a rate increase is necessary.

Figure 2: Impact of Pre-Funding on Loss Ratios



ASSUMPTION CHANGES THAT DRIVE THE NEED FOR A RATE INCREASE

Morbidity

Morbidity can vary based on a myriad of factors including issue age, duration, gender, marital status, benefit period, elimination period, covered benefits, and level of reimbursement. The morbidity assumption may also vary between companies depending on the degree of underwriting and claim adjudication practices.

As mentioned above, because the product is priced on an issue age basis and because there is a large discrepancy between the average issue age and average claimant age, misses in the original morbidity assumption may not become credibly apparent for many years based solely on company experience. Furthermore, as the experience in early years primarily reflects the underwriting selection period, the early performance of the block relative to original pricing may be indicative of differences in the underwriting selection assumption but not necessarily in the ultimate morbidity level.

Because of the low frequency nature of LTC claims, company-specific experience is often supplemented with industry experience to increase credibility. When LTC insurance was introduced, the morbidity assumption was based on population data, but over time the assumption has been updated to reflect insured data. Over the past decade, we have seen the morbidity curve steepen, with the claim costs at younger ages decreasing and those at older ages increasing. This better understanding of the

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expected future morbidity levels, particularly those related to the tail of the claim cost curve (i.e., the high costs at the oldest claimant ages), may result in the need for a rate increase.

Persistency

LTC rates are priced to be in effect over a period of 50 or more years, so the assumption for persistency is crucial to assuring that the company has enough reserves to pay claims. Misses in this assumption can have a substantial impact on performance—but, as with misses in the morbidity assumption, they may not become evident for several years.

Intuitively, one might expect that higher persistency implies that the company is collecting more premiums than originally anticipated and thus it is a good thing! However, while higher persistency means that people value the coverage and/or are living longer, higher persistency results in significantly higher claims over the life of the product than were originally expected. This is because there are more policyholders in later years that are exposed to the extremely high claim costs that comprise the tail of the claim cost curve. As a result, the reserves held by the company will likely not be sufficient to cover the increase in future costs, despite the additional premiums received in early years.

Years ago, when the product line was new and there was little to no experience on which to base the lapse assumption, ultimate lapse rates may have been extrapolated from other product lines. Lapse rates of 3 percent or higher were not uncommon. However, it has become evident that policyholders understand the value of LTC insurance and as a result are lapsing at a much lower rate than originally anticipated. Mortality has also improved (i.e., lower death rates) over the years. Therefore, many of the rate increases on older LTC products are driven by higher persistency.

Interest

Because of the pre-funding component described above, the interest assumption is key to ensuring that the contract reserves grow enough to support the company's future liabilities.

As a result of the economic recession that began in December 2007, many companies' long-term investment earnings rates are much lower now than they were at the time of original pricing. When the premium comes in or assets in the portfolio mature, the company invests or reinvests the money at the new money rate. This rate is dependent on the current interest rate environment. Therefore, if the interest rate environment has declined (as is currently

the case), the higher interest rates that were previously being earned on the older assets are replaced by the lower new money rates. This contributes to the need for a rate increase because the contract reserves held by the company to back its LTC liabilities earn less than originally expected.

Policyholders are exposed to a similar risk if you consider an alternative where individuals choose to self-fund their LTC needs instead of purchasing LTC insurance. In this case, they too would be exposed to the risk that their funds might not grow to the level needed to pay for their expected future LTC claims.

Looking forward

While understanding the mechanics behind an LTC rate increase may not make these increases any easier to stomach, there is cause for optimism.

The industry has generally seen relatively low shock lapse that is due to rate increases, which may suggest that policyholders understand the value of the product. Policyholders may have gotten a "good deal" because they had been essentially receiving a discount until the time of the rate increase. They may even continue receiving some discount going forward if the rate increase implemented is less than that needed to bring the premiums up to what they should have been if original pricing had used the revised assumptions.

As the LTC industry continues to mature, the assumptions used in pricing new business reflect the knowledge gained from past misses, which in turn reduces the future potential for some of the large rate increases seen to date. Furthermore, the rating methodology could even begin to shift toward earlier or more frequent smaller increases, rather than one large rate increase several years after the product was originally priced. ■

U.S. and French Long-Term Care practionners would benefit from the experience and knowledge of each other's market. This cross leveraging of best practice will ultimately improve both their own and the global experience of the LTC risk.

To that end the Society of Actuaries and the Institut des Actuaires are initiating a program to exchange information. Should you be interested in either participating in its activities, or being kept up to date about them, please do not hesitate to contact me. A trip to Paris is not planned at this time.

Etienne Dupourqué, FSA, MAAA, *etienne@dupourque.com*

Understanding Adult Day Services

By Lory L. Phillippo

Lory L. Phillippo, MPH, OTR/L, is CEO of Circle Center Adult Day Services, a licensed non-profit adult day health center in Richmond, Va. She can be reached at *lphillippo@circlecenterads.org.*

Long-term care insurance has covered a wide array of home and community-based services for well over 20 years, however many in the industry may not appreciate the significance of all of those services since many are under-utilized policy benefits. One benefit that stands out in this regard is Adult Day Services (ADS), Adult Day Health Care (ADHC) or Adult Day Care.

Many may believe that they understand Adult Day Services since the name seems self-explanatory, i.e., care and supervision of adults during the day. That simplistic definition does not do justice to what is really going on in the 4800 adult day service centers in the United States today.

ADULT DAY DEFINED[1]

Adult day centers provide a coordinated program of professional and compassionate services for community-living adults in a group setting. Services are designed to provide social and varied amounts of health services to adults who need supervised care in a safe place outside the home during the day. They also afford caregivers respite from the demanding responsibilities of care giving. Adult day centers generally operate 8-12 hours a day during normal business hours five days a week. Some programs offer services in the evenings and on weekends. Although each facility may differ in terms of features, the following core services are offered by most adult day centers:

Social activities—interaction with other participants in planned activities appropriate for their conditions

Transportation—door-to-door service

Meals and snacks—participants are provided with meals and snacks, those with special dietary needs are offered special meals

Personal care—help with toileting, grooming, eating, ambulation and other activities of daily living

Therapeutic activities—physical, cognitive and emotional activities and support for all participants.

In general, there are three types of adult day centers:

- social (which provides meals, recreation and some health-related services)
- medical/health (which provides social activities as well as more intensive health and therapeutic services)

- Specialized (which provide services only to specific care recipients, such as those with diagnosed dementias or developmental disabilities.)

Adult day centers are regulated by the individual states, not nationally, so the service varies state-to-state and across centers in a given state. With Medicaid covering adult day as a long-term care option in most states, an increasing number of centers offer robust health and therapeutic services with multidisciplinary staffing on a par with nursing homes with the added benefit of going home every night. This service capacity makes them ideal providers for long-term care insureds.

Clearly there is more going on in adult day than just a safe and services-rich place for an adult that needs to be cared for. The benefits for program participants are many: new friends, just-right activities, organizing structure and routine, vigilant health monitoring, help when you need it. What are the benefits if any to families/caregivers and insurers?

FAMILIES/CAREGIVERS

As noted above adult day services allow a caregiver to obtain respite from their care giving responsibilities or continue to work either full or part time concurrent with care giving responsibilities. What is not evident from the definition above is the amount of information and support that caregivers receive when their loved one is in an adult day environment. One of the stated goals of ADS is to keep family members at home for as long as possible. Those served in adult day centers generally have multiple diagnoses and managing their chronic conditions is a challenge to family and providers alike. To this end adult day allows family members to have regular interactions with center professional staff regarding the situation and needs of their relative. The goals are better care coordination between home, center and other providers and help for the family be more effective in their own caregiving. Interaction with center staff and other families also helps a family maintain perspective on issues they face, learn how other caregivers cope and manage, explore resources available, and understand the significance of and actions to be taken when changes are observed. Regular staff interaction with the family also affords broader insight into the condition and personality of both the client and their family than the attending physician can reasonably achieve in an office visit. ADC staff can and will assist the family with communicating behaviors or symptoms that are intermittent and difficult to describe to the attending physician or specialist that can lead to a particular diagnosis and more appropriate care plan.

Many adult day centers offer support groups for caregivers who are going through the same experience, helping families to feel less isolated and relieved that others are in a similar situation. Helping family caregivers learn from more experienced peers and have reasonable expectations as to 'what's next' can increase feelings of being in control and reduce anxiety and stress. This reduction in stress has been documented in a study by researchers at Penn State and the University of Texas at Austin. The study was undertaken because of the noted adverse health impact that care giving has due to the long hours required and demanding duties. In the study caregivers of family members with dementia who attended ADS at least two days a week were asked to collect their saliva five times each day & were phoned each evening by a researcher to talk about their daily stressors and their mood. The results suggest that caregivers of family members with dementia who use adult day care services at least two times a week report less stress and actually have increased DHEA-S levels on the day following the adult day service visit. DHEA-S controls the harmful effects of cortisol and is associated with better long-term health.[2]

INSURERS

All this seems very positive for the patients and their families but what might be the positives for long-term care insurers?

There are two key benefits to continuing to provide coverage for ADS in a long-term care contract for

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"The cost of ADS is considerably less regardless of jurisdiction than most other long-term care services including home care."

insurers. The first is delayed utilization of home care or admission to a facility whether assisted living or nursing home, and the second related benefit is the cost.

Let's look at the idea of delayed utilization of other covered options. There was a recently published study in the *Journal of Applied Gerontology*[3] that went beyond just looking at delays in nursing home placement but included any facility placement. The study was conducted on a population served by the Fraser Health Authority in British Columbia. Patients are typically assessed for ADS as part of a home health program and are required to pay a nominal fee for participation in ADS. The results of the study showed hazard ratio for institutionalization for moderate users (>18 days but <96 days over 12 months) of ADS to be .58 times lower than the low group (≥ 1 day<19 days) and .61 times lower for the high users (≥96 days) as compared to the moderate group. Clearly use of adult day in sufficient amounts delayed use of other options. More details of the study criteria can be reviewed in the article referenced.

The cost of ADS is considerably less regardless of jurisdiction than most other long-term care services including home care. A quick look at Genworth's annual Cost of Care study shows a comparison of one of the most expensive states in the nation New York:

Facility care in New York would be a little over twice as expensive for assisted living and over five times as expensive for a semi-private room in the nursing home as compared to five days per week of adult day services.

In conclusion, there is a benefit in most long-term care policies that allows policyholders to utilize adult day to remain in their home environment longer, provide relief to family caregivers and avoid or delay the cost of expensive home care or facility confinements. Thinking about ways to encourage more communities to support adult day services, and encourage their use where appropriate by policyholders should be an important part of thinking about long-term care risk, product development, education of insureds and their family members, product marketing materials and care management now and in the future. ■

ENDNOTES

[1] *National Association of Adult Day Services, http://nadsa.org/learn-more/about-adult-day-services/*

[2] *Penn State. "Adult day-care services boost beneficial stress hormones in caregivers." Science Daily, 24 March 2014.*

[3] *Kelly, R., Puurveen G., Gill,R., "The Effect of Adult Day Services on Delay to Institutional Placement", Journal of Applied Gerontology, 2014, page 1-22.*

[4] *https://www.genworth.com/corporate/about-genworth/industry-expertise/cost-of-care.html.*

Comparison: Annual Care Costs in 2014[4]			
	New York - State Median	Long Island, NY	Manhattan, NY
Home Care			
Homemaker services	$47,934	$48,048	$45,760
Home health aide	$50,336	$48,048	$48,048
Adult Day Health Care			
Adult day health care	$19,500	$32,630	$46,337
Assisted Living Facility			
Private, one bedroom	$44,205	$65,280	$62,760
Nursing Home Care			
Semi-private room	$124,100	$151,475	$164,250
Private room	$130,670	$158,775	$164,250

*State Median is the median cost for care across the entire state.

Paying for Long-Term Care, a Surprising Option

By Congressman Bill Owens, NY 21

Millions of older Americans are currently in need of long-term care (LTC), or assistance with activities of daily living provided in an individual's residence or in a facility. As baby boomers continue to retire and demand continues to grow, policymakers are working to find ways to address this burden on our health care system.

The number of Americans over age 65 increased from 35 million in 2000 to 40 million in 2010, a 15 percent increase, and is projected to increase to 55 million by 2020. There are some questions about whether the long-term health of Americans under age 50 will reduce or increase the need for long-term care, because of the nature of new illnesses that have developed and the potential for longer lifespans requiring longer periods of care, as reported by Sabrina Tavernise in the New York Times on Jan. 9, 2013.

Medicare and Medicaid will help pay for only a limited amount of LTC services and there is no dedicated federal public LTC program. The average cost of a private room in a nursing home was $7,000 a month in 2010, or $84,000 per year. The average cost of a home health aide was $21 per hour, resulting in over $60,000 a year in cost.

There are a number of studies and a significant body of information to analyze as we move forward in an effort to provide affordable long-term care for those who need it. These include a report issued by the Commission on Long-term Care (CLTC) dated Sept. 30, 2013, which contains significant data and analysis that properly focuses on the need to assess home- and community-based services, as well as long-term care facilities, and Governor Cuomo's North Country Health Systems Redesign Commission, which issued recommendations on restructuring delivery of care in eight northern New York counties, including a significant section on the structure and maintenance of LTC, including home-based services and long-term care facilities. The Congressional Research Service (CRS) also issued a report on February 1, 2010, entitled "Long-term Care, Financing Overview and Issues for Congress." In 2007, CRS reported that the expenditures by Medicaid for long-term care represented 48.5 percent of the total of $233.4 billion expended nationwide for LTC. All three of these reports focus on several areas, including workforce, delivery systems, and financing.

As we look for vehicles to finance LTC, a number of private insurance companies are developing options to offer a rider on a life insurance policy that allows for a partial draw down of the death benefit to pay for long-term care. According to the New York State Department of Financial Services, the purchase of long-term care policies is actually declining. The number of individuals with life insurance is also declining. Federal and state policymaking should raise awareness about the importance of purchasing a long-term care policy, and development of public policy that facilitates the purchase of LTC insurance riders is also extremely important. A $500,000 life insurance policy with a rider resulting in 50 percent of the death benefit payable in advance for long-term care would significantly reduce the cost to individuals for long-term care, as well as to Medicaid, which according to the Commission on Long-term Care currently pays 62 percent of the cost of LTC versus private insurance, which pays approximately one-third.

There are a couple of concepts that I believe should be considered as these policies are developed, including: allowing IRAs and 401(k)s to purchase the insurance and to distribute the long-term care benefit on a tax free basis, obviously precluding taking a deduction for that care for an individual income tax return; allowing Health Savings Accounts (HSAs) to purchase long-term care insurance, also with the same tax impact as previously described regarding IRAs and 401(k)s; allowing IRAs and 401(k)s to be treated as capital assets and excluded if an individual secures long-term care insurance coverage for a minimum of three years, whether that coverage pays for in home care, care in a facility, or any combination thereof for that three year period.

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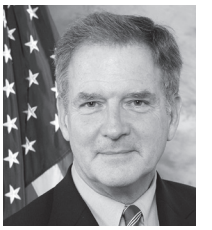

William "Bill" Owens is the U.S. Representative for New York's 21st congressional district.

Urging individuals to seriously consider long-term care insurance, particularly using vehicles such as life insurance riders is a reasonable approach to addressing the looming long-term care crisis that may well substantially reduce the $233 billion spent in 2010 for this care. As we work to address this issue, reducing Medicaid expenditures, preserving assets, and providing appropriate care for aging Americans should be our top priority.

Congressman Bill Owens has represented New York's northernmost Congressional District since November of 2009 and has lived in the North Country for over 30 years. After graduating law school, Bill served as a Captain in the Air Force stationed at Plattsburgh Air Force Base and then built a successful North Country law practice. Throughout his life in Plattsburgh, Bill has worked closely with his community to promote economic development and recruit businesses from Canada to Upstate New York. Bill has long been concerned with the funding of long-term care particularly its impact on local real property taxes. ■

RETIREMENT SECURITY & LONG-TERM CARE MONOGRAPH

The Society of Actuaries Committee on Post-Retirement Needs and Risks, working closely with the SOA Long Term Care Section, issued a call for papers in 2013 titled: "Managing the Impact of Long-Term Care Needs and Expense on Retirement Security: A Holistic and Multi-Generational View."

In the fall these papers will be issued as a monograph designed to explore several aspects of the relationship between retirement security and long term care. The collection of papers will offer ideas about making the long-term care financing and management better. They cover a variety of topics and should be helpful in thinking both about what individuals need to do today and about the structure of the long-term care system. The papers will be of interest to a range of audiences including individuals, advisors, financial service companies, and policymakers.

Many of these papers will be presented at the 2014 Society of Actuaries annual meeting in three sessions to be held on Wednesday Oct. 29, 2014. We encourage you to come to the annual meeting sessions and participate in the discussion. Look for the monograph on both the Committee on Post-Retirement Needs and Risks and the LTCi Section websites.

LTC Section Membership Advantages

By Bob Hanes

INTRODUCTION

As readers of this newsletter know, the Society of Actuaries sponsors a wide variety of professional interest groups, such as the Long term Care Insurance (LTC) Section, to "encourage and facilitate career and professional development." An important feature of these groups is membership is not restricted to actuaries. Of the 1,442 active LTC Section members, 665 or 44 percent are in non-actuarial professions. The impact then of this contingent on the continued viability and relevance of the LTC Section is significant.

BENEFITS OF MEMBERSHIP

All members of the LTC Section need to be reminded of the benefits of membership and that cross-pollination of different skill sets and subject matter expertise fills all sails. As the LTC industry shifts its focus from repricing and de-risking its maturing blocks to providing more flexible and properly priced products, cross-functional teams will be required to lead the way. The LTC insurance business has been an exciting journey so far and with the continued challenge of developing products that will satisfy the consumer, the industry, and the regulatory community in front of us, it's only going to get better.

One of the important by-products of this shift will be the learning opportunities afforded. For instance, the actuaries provide access to a broad spectrum of the different technical aspects of the LTC marketplace. A prime example is the growing popularity of hybrid LTC products. Whether it is an annuity or life insurance product married with an accelerated and/or an extension of LTC benefit, the mechanics and risks need to be explained by the actuaries and then understood by all players so that the product is properly marketed, underwritten, sold, administered, and valued. Being directly connected to a group such as the LTC Section then allows for free, frequent, and direct exchange of information to help poise a new and innovative LTC product or other venture for success.

JOIN THE CONVERSATION

The LTC Section publishes 3-4 issues of *Long term Care News* annually, each of which contains a variety of articles on current LTC issues, trends, regulatory updates, etc. Other outreach efforts are now underway to expand the communication channels within the section. So, the "ask" of you is to take advantage of your membership to join the conversation via the newsletter, email, and/or LinkedIn. (Links to these channels can all be found on the LTC Section webpage: http://www.soa.org/ltc/) This way you can make use of the different skill sets found among the LTC members to help you with your LTC projects, challenges, and opportunities. ■

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2014 ILTCI Conference Recap

The 14th Annual Intercompany Long-Term Care Insurance (ILTCI) Conference was held March 16 –19, 2014 at the Rosen Centre Hotel in Orlando, Fla. The theme of this year's conference was "Sharing News, Exchanging View, Forging Solutions." The conference was co-sponsored by the Long-term Care Insurance (LTCI) Section of the Society of Actuaries and also benefited from the support of another 34 corporate sponsors. The main objective of the conference is to provide an information sharing and collaborative environment for insurance professionals, regulatory authorities, insurance educational institutes, actuaries and other special groups with an interest in Long-term Care Insurance. There were numerous opportunities for professional networking to foster personal connections with other industry professionals.

The 14th Annual ILTCI was the highest attended ever—drawing over 900 attendees who had an opportunity to attend 43 sessions organized into eight tracks, including actuarial; alternative products; claims & underwriting; legal, compliance & regulatory; finance, management & operations; marketing; policy & providers and sales. The excellent mix of content was delivered by over 100 speakers.

The exhibit hall played host to 50 exhibitors including insurance carriers, third party administrators, actuarial consulting firms, reinsurers, underwriting, claim and operational support vendors and providers, technology firms, insurance and health associations among others.

Pre-conference sessions offered on Sunday included the CLTC Master Class offered by Harley Gordon as well as the Society of Actuaries LTCI Section Think Tank where John O'Leary, Roger Loomis and Ron Hagelman presented the findings of ***Land this Plane: A Delphi Research Study of Long-Term Care Financing Solutions.*** This project was sponsored and supported by two of the SOA's professional interest sections: the LTCI Section and the Forecasting and Futurism Section. Using the Delphi method, this study recursively polled a diverse group of actuaries, public policy experts, regulators and insurance industry executives, to explore their opinions on a wide range of Long-Term Care (LTC) financing issues and potential solutions. The full report can be accessed here: *http://www.soa.org/files/research/projects/research-2014-ltp-ltc-report.pdf.*

The Executive Committee of the ILTCI threw their support behind a community service project this year. The Health Care Center for the Homeless (HCCH) provides quality health care services that improve the lives of the homeless and medically indigent people in the Orlando community. Conference attendees brought donations of needed supplies which form the basis of care packages that HCCH assembles and delivers to the homeless. Over 500 items were collected—from deodorant to body wash, from toothpaste to socks. The Health Care Center for the Homeless was most grateful for our contributions.

On Monday morning, Keynote Speaker Chris Gardner, delivered an inspiring and moving account of the obstacles he overcame in his life to kick off the start of the conference. The amazing story of his life was published as an autobiography, *The Pursuit of Happyness* and was the inspiration for the movie of the same name. He spoke about the keys to self-empowerment, beating the odds and breaking away from a childhood marked by poverty, domestic violence and family illiteracy. He credited his mother with providing him with strong "spiritual genetics" and held the audience's rapt attention as he shared being a caregiver to his long time companion, Holly who passed away after a long battle with brain cancer.

ACTUARIAL TRACK SUMMARY

The 2014 Actuarial track featured a nice mix of technical and focused discussion sessions. Technical sessions concentrated on first-principle modeling, the development and use of utilization rates that are linked to inflation and interest rates, and the latest results from the morbidity improvement study. The morbidity improvement presentation

included new information on the rates of improvement for cognitive impairments as well as total lifetime disability.

Another session attempted to answer the question, "How can the inherent riskiness of different product designs be measured and compared?" An interactive session on rate increases was held and a new session "Actuarial Open Mic" allowed attendees to discuss earlier sessions more in depth in addition to consideration of many new topics. The actuarial track concluded Wednesday morning with a professionalism session that covered many items of importance for actuaries as well as a number of intriguing case studies.

ALTERNATIVE PRODUCTS TRACK

The Alternative Products track developed five sessions for the 2014 conference, which addressed both current alternatives to long-term care insurance, and examined the potential for new products based on emerging trends in how aging Americans are dealing with the need to pay for these services. One session also examined innovations in other countries.

Two sessions reviewed products and options that are now available for impaired seniors who have not planned ahead. The session "Current Alternatives" focused on short term care and combination products. The speakers provided an overview of the key elements of each product, including regulatory requirements. They shared the pros and cons of these alternatives from both a consumer and insurance company's perspective. The speakers also discussed the status of the niche markets that they serve, and the opportunity and obstacles for expanding the market for these alternatives in the future. The session "Short-term Planning for LTC" examined several options that seniors can turn to when they are faced with the need to pay for care. The speakers discussed different sources of advice, and innovative strategies to leverage assets and stretch family resources to cover this financial need.

To the extent that people don't buy long-term care insurance, how are they solving this problem when they need assistance? The session "Middle Market Success Stories" examined the concerns and motivations of middle-income families. Speakers focused on the growing prevalence of chronic conditions, and stressed that as a result, the set of everyday tasks that are encompassed under LTC is expanding in scope and duration. The need for appropriate messaging for the middle market was highlighted. These insights provided a framework to discuss potential new solutions for this market, including recommendations from the new SOA LTC Delphi Study. The session "Home Equity Release Products" examined the potential for using housing wealth as a way to pay privately for LTC. Speakers reviewed a range of options to access home equity for LTC, including ways that this asset could provide a wrap-around for LTC insurance. They also discussed the potential for bringing in new sources of funding through the capital markets.

Speakers in the session "International Market" discussed financing solutions that are working in the United Kingdom, France and Israel, within the context of their demographic realities, care delivery

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systems, family and consumer attitudes. The speakers also reviewed the market for private LTC insurance and products provided outside of the United States, along with public programs in their respective countries.

CLAIMS & UNDERWRITING TRACK SUMMARY

The Managing Younger Claimants session focused on looking at the underwriting and claim aspects of younger claimants. In particular primary diagnoses, claim types and tools utilized to effectively manage these claims and mitigate the risk of long-term claims. A case study was also presented.

The Provider Eligibility panel session discussed the provider challenges with facility and HHC claims. Challenges with facility providers included buy-ins for CCRCs, billing, licensing of an ILF apartments as an ALF and varying state regulations for defining facilities. Home health care challenges that were addressed included independent care providers, proof of payment, assignment of benefits and home health care agency fraud.

The Using Claim Data for Business Benefit panel discussion focused on using analytics and claim data to predict claims history. Predictive analytics was defined and variance and sensitivity elements to improve the modeling were discussed. Claim and provider profiling could assist with detection of fraud when certain variables are evaluated. Finally, risk assessment and stratification into tiers enables claims to be weighted regarding potential for fraud, thereby reducing risk.

FINANCE, MANAGEMENT AND OPERATIONS TRACK SUMMARY

The Finance, Management and Operations track held six informative sessions at the ILTCI Conference covering a wide variety of currently hot topics. Three management sessions were offered.

The "Build vs. Buy" session discussed the elements of the in source vs. outsource decision, preparing a useful cost/benefit analysis and tips to successful management of a TPA or consulting arrangement. This session sparked spirited dialogue during the Q&A as both vendor and insurer carrier attendees gained an understanding of the other's point of view.

During the "Applications for Business Intelligence, Predictive Analytics, and Big Data" session, the panelists described the types of data that now can be collected and analyzed with efficiency never previously available, and provided thoughts to attendees on how operational and financial performance may be improved through analysis and consolidated reporting of data.

"Key Tools of Organizational Change Management" attendees participated in a case study of a potential LTC organizational change, including participating in role play activities in order to apply concepts and tools learned during the teaching component of the session. The attendees were also provided additional take away resource materials to further review on their own time.

One Finance session was offered, "Accounting: Rewrite of the Rules of the Road (IFRS/FASB)," co-sponsored by the Actuarial track. This session provided attendees with estimates of the impact on LTC financial statements for the potentially dramatic changes to US GAAP basis financial reporting basis that may happen as early as 2018. The session provided impetus to attendees to become engaged in the dialogue now before the standards are finalized and implemented.

Two Operations sessions were offered. During the "LTC Automation: Gains, Glitches and Going Forward" session, industry experts representing both home office insurer carrier personnel and distributors discussed how technologies have been used within LTC operations to encourage growth. Honest dialogue about both future potential opportunities as well as mistakes made in the past regarding automation efforts took place.

Finally, during our "LTC Customer Service for the 21st Century" session, our panelists enabled attendees to understand how to target improvement in customer service to the senior segment today and in the future, including how to alter service delivery methods to meet the changing dynamics of an increasingly online customer base.

LEGAL, COMPLIANCE & REGULATORY TRACK SUMMARY

This track included six sessions that tackled a broad spectrum of issues facing companies today.

The "Premium Rate Increase and Pricing Issues" session, not surprisingly, was standing room only. This session included a healthy discussion by company experts and a representative from the CA Department of Insurance regarding how we arrived at the current state of LTCI regulation, and current developments at the NAIC specific to changes con-

templated to the Model Regulation. Views were offered by company representatives about the factors they take into consideration when making rating decisions, including the operations impact of rate actions.

The "Watch Out! Protect Your Company from LTCI Insurance Fraud" session gave participants valuable insights on fraud investigation methods; findings, legal and litigation issues surrounding fraud issues; and advice from a company Special Investigations Unit leader on what red flags to look for in claims and new business processing.

The "Interstate Compact – Your Path to Approval across the States" session was led by the Director of the Interstate Compact and provided valuable information for participants regarding how to most effectively take advantage of the Compact filing process. This included tips and perspectives from Compact reviewers, a discussion of how the Compact standards interact with individual state requirements, a specific focus on filing combination products through the Compact, and a precursor to future developments and improvements to the Compact standards.

The litigation review session, in which presenters Michael Rafalko and Lisa Simmons played litigation "Mythbusters" with the audience, was well-attended and involved clarification of the most important litigation myths facing the industry, relating to such key issues as class actions, premium rate increases, significant claims disputes and extra-territorial jurisdiction.

The session "Privacy Requirements and Risks: A Proactive approach," given by Stephen Serfass and Angela Rodriguez, was also a hit. The session gave participants an overview of the most significant privacy and security risks faced by companies in today's evolving regulatory landscape.

Finally, "The Rise of Technology," presented by Nolan Tully and Wesley Stayte, covered the risks and rewards of data aggregation and analysis. The session looked to the future of how the industry can use "big data" to its benefit.

MARKETING TRACK SUMMARY

The 2014 marketing track featured an eclectic mix of sessions that included a heavy dose of product innovation, current public and private issues, and outside experts who have not traditionally been part of marketing panels.

The track started with a unique in-depth discussion with two of the nation's leading long-term care experts, Judy Feder from Georgetown University and the Urban Institute and Mark Warshawsky, the republican co-chair of the Long-Term Care Commission. Mark and Judy represented opposite sides of the debate on public and private answers to long-term care funding on the LTC commission. In the session, the panelists explored their significant differences, but also found areas of agreement setting a theme for the track and the conference.

Along similar lines but with a distinctly unique viewpoint-was a session that explored a progressive state government and their plan for confronting the issues of long-term care financing today and tomorrow. The session, entitled "Incremental Visualization: long-term care product innovation in Minnesota" featured Minnesota's Lieutenant Governor, Yvonne Prettner Salon kicking off the presentation with a look at why Minnesota—and other states—need to develop an action plan for funding the long-term care now. The Lieutenant Governor was followed by Loren Coleman, Assistant Commissioner for Continuing Care Services, and LaRhae Knatterud, Director of Aging Services, who discussed in detail, Minnesota's innovative approach to re-vitalizing long-term care funding in the state.

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"Squaring the Circle: The American Long-term Care Insurance Program" featured a total solution approach developed by industry veteran Paul Forte, CEO of Long-Term Care Partners. The session combined an outstanding presentation by Paul with very thoughtful bi-partisan critiques by two of Washington's top health and long-term care policy analysts-Larry Atkins, staff director of the Long-Term Care Commission and executive director of the Long-Term Care Quality Alliance and Stuart Butler, the health and long-term care expert at the Heritage Institute. The session was expertly moderated by Gretchen Alkema, senior vice president for the SCAN Foundation, and turned out to be one of the most popular at the conference.

Eileen Tell produced the outstanding session, "Price Sensitivity on Long-term Care Insurance." In that session Jeremy Pincus, principal of the Forbes Consulting Group discussed the results of a "hot off the presses" study that helps explain the surprising decision-making process that consumers go through when purchasing long-term care insurance, and the implications for positioning and marketing products. Jeremy was joined in the session by Clark Heitkamp, of United Actuarial Services who discussed a number of methods for making long-term care insurance more affordable.

Last but by no means least, Steve Schoonveld and Suzanne Schmitt of Lincoln Financial discussed the marketing rationale for and the role of hybrid products and similar combination products as viable alternatives for long-term care funding. Suzanne unveiled some very sophisticated analysis of the target market both by demographics and psychographics, and Steve provided the business and actuarial rationale for the success achieved by "combination" products today, under what he calls "room under the tent" theory. In other words, one solution does not cannibalize another.

The session, "Non-Intrusive Referral Program Using Any Social Media Platform" not only provided a brief overview of social media platforms like LinkedIn, Facebook, Twitter and Pinterest, but it also presented simple activities and ideas for producers that make utilizing these platforms easy. The session provided ways to leverage these activities in multiple social networking settings. It also provided the key takeaways a producer needs to remember when working in the social media landscape and four things they should consider when developing their action plan.

POLICY & PROVIDERS TRACK SUMMARY

The Policy and Providers Track sponsored four sessions this year. "Hot Topics Dialogue with Providers" was a highly interactive session that involved a roundtable discussion with stakeholders from the insurer side and the provider community. Topics included implementation of technology to better assist the policyholders and providers, increasing the partnership with insurers and providers and better coordination of care and communication between the insurer, policyholder and provider teams. The highlight of this session was the energetic discussion centered around what the product and industry would look like if we could start over right now from square one. This great team session was filled with ideas that participants intend to continue discussing with their companies after they return.

Another session, "Palliative Considerations in Late Stage Chronic Illness" featured two medical doctors as the speakers. Dr. Stephen Holland from Univita Health presented his study, "The Impact of CalPERS Long-Term Care Program on End-of-Life Medical Care Costs." This study concluded that the use of CalPERS LTCP reimbursed services and case management did have a positive impact on costs in the last year of life. The attendees then heard from Dr. Marc Kaprow, a hospice and palliative care veteran, from United Healthcare of Florida. Dr. Kaprow defined the differences between hospice and palliative care for the audience, and then discussed the strategies of care planning for patients with chronic illness as it related to palliative care.

Dr. Gretchen Alkema presented on "Aging and Community Redefined with an Eye toward the Future" as the third session on the new strategic framework for the SCAN Foundation that includes multiple options that are viable for long-term care needs in 2014 and beyond. Participants heard about family, vulnerable adults, varying support models, decision making and other options to help families finance LTC expenses. The SCAN Foundation is a dynamic leader as they promote the goal of a coordinated and easily navigated system of high-quality services for older adults that preserves dignity and independence.

In the final session, "Managed Medicaid: Understanding the Basics from an Industry Leader," Paula Tietjen, RN, MSN, CPHQ, executive director of long-term care for United HealthCare Community

Plan of Florida, educated the audience on the terminology buzzing around in the managed Medicaid space and the roles of case management, state and federal government and providers. Participants asked many questions to learn more about how the Florida managed care programs are leading the country in innovation and cost-effective solutions that focus on chronically ill people in both home and facility based settings.

The concluding general session, "The Future of the Industry" tackled the elephant in the room—does the long-term care insurance industry have a future, given its current challenges, missed assumptions and plummeting sales?

It was standing room only to hear the messages delivered by three skilled presenters, Dr. Marc Cohen of LifePlans, Maria Ferrante-Schepis of Maddock-Douglas and Genworth CEO Thomas McInerney.

Dr. Cohen provided a level set of the current state of the U.S. long-term care insurance market; highlighted market exits by carriers and associated implications and closed with the challenges and opportunities that lay before us. The number of insured lives has been relatively flat since 2005 and sadly, annual sales of individual LTCI have been declining since 2002. Conversely, combination products are growing in popularity, but only serve the needs of approximately 500,000 insureds. Claims experience has deteriorated in recent years, contributing to carriers exiting the market. The single most important reason that companies have fled: capital requirements and not hitting profit objectives. As of 2013, the majority of LTCI policies are now administered by companies who are no longer in the market. Dr. Cohen made the case that there needs to be a market "re-set."

Maria Ferrante-Schepis continued with the theme of a market reset by making the case for change and innovation in order for the industry to continue to be viable. Her dynamic presentation made the case that the long-term care insurance industry may be ripe for a "Napster moment." That is, when someone who has no business being in your business reinvents your business (and puts you out of business). She cited firms like Amazon, NetFlix and Travelocity who have "napstered" others. She also articulated persistent and pervasive market tensions that exist within the insurance industry in general—for example, the premise that traditional insurance sales approaches are becoming outdated, insurance options are overwhelming and asked whether insurance has become irrelevant to the next generations of consumers. There are other models that are emerging as reasonable substitutes but we can change our approach to make insurance work in our favor.

Finally, Tom McInerney, CEO of Genworth provided his thoughts on this subject. When he joined Genworth in January 2013, he expected that Genworth would join the ranks of carriers who had already ceased sales of new business. But he undertook a comprehensive look at the long-term care insurance business and concluded the industry was viable, but change was essential. Genworth believes the way we price LTC insurance and manage the risks over time needs to change significantly. He made the point that the industry can't continue to operate the way it has been because "it doesn't work." He implored the regulatory community to act promptly to ensure that new products in the market reflect current experience and assumptions. Furthermore, he made the case that no one should be surprised that the best minds cannot accurately predict, over a 30 year time horizon, morbidity, mortality, interest and lapse rates. He believes many carriers in the industry waited too long to take action when emerging experience was incongruent with original assumptions and recommends carriers annually evaluate results against assumptions. When necessary, carriers should be able to seek smaller rate increases which should be more easily accepted and understood by policyholders. He also urged the regulatory community to grant timely approval of these increases and to remove the uncertainty related to whether rate increases will be granted when actuarially justified in order to help stabilize the industry.

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Before departing for home, conference attendees had an opportunity to enjoy the exhibit hall closing reception and perennial favorite "casino night" Tuesday night. Wednesday morning, there was an opportunity to attend the Post Conference SOA Professionalism Course, the Advance Sales & Marketing Program for CLTC Designated Professionals as well as a session presented by the Alzheimer's Association, "Alzheimer's Disease: the What, the How and the Hope." This session covered the latest in Alzheimer's disease research and resources and support for all stages of the disease.

The 15th Annual Intercompany Long-Term Care Insurance Conference will be held March 22–25, 2015 at The Broadmoor in Colorado Springs, Colo.

If you are interested in learning more about the conference or to view session Power Point presentations, visit http://www.iltciconf.org.

Note: The introduction and closing sections for this article was provided by Conference Chairman Karen L. Smyth, vice president, Long-term Care Administration, The Prudential Insurance Company of America. Track chairs provided reports on their respective tracks: David Benz and Peggy Hauser for actuarial, Vincent Bodnar and Barbara Stucki for alternative products, Jacquie Carreno, Joan Stear and Jennifer Vey for claims & underwriting, Michael Rafalko and Rodney Perkins for legal, compliance & regulatory, Loretta Jacobs, Yolanda Austin and Jeffrey Condit for finance, management & operations, John O'Leary and Jonas Roeser for marketing, and Sharon Reed and Gary Boldizsar for policy & providers. ■

Update on the LTC Morbidity Improvement Study*

By Eric Stallard

Actuaries have long recognized that improvements in LTC morbidity combined with declines in mortality rates can have profound consequences for lifetime disability and LTC/LTCI costs. The *LTC Morbidity Improvement Study* was undertaken to evaluate changes over time in morbidity/disability associated with activities of daily living (ADL) and cognitive impairment (CI), and their impact on lifetime morbidity/disability using data for aged Medicare enrollees from the 1984 and 2004 National Long-term Care Survey (NLTCS).

This article summarizes the presentation of the study made at the 2014 *ILTCI Conference* held on March 16–19, 2014 in Orlando, Fla.[1] For more than two decades, the NLTCS has served as the main actuarial resource for information on LTC morbidity/disability and mortality rates among the non-insured general population aged 65 years and older. The bottom line was that there were large declines in ADL and CI disability during 1984–2004, both separately and combined, based on the HIPAA ADL and CI triggers; moreover the declines for the CI trigger were substantially larger than for the ADL trigger. These changes are readily apparent in Figure 1 which displays the age-specific prevalence rates for 1984 and 2004 for the ADL and CI triggers separately (Fig. 1A and Fig. 1B) and combined (Fig. 1C).

Also shown at each plot is the best-fitting exponential function. These functions show that the age-specific prevalence rates were approximately exponential in form, especially the 2004 rates. The main deviations from the exponentials occurred at the highest age, 95+, where the relative rates of increase slowed down compared to the increases at younger ages.

The prevalence rates were defined as the fraction of each respective population who on any given day in 1984 or 2004 would be deemed to have met the HIPAA ADL and/or CI triggering criteria. Actuarial theory indicates that the prevalence rates are determined by the incidence and continuance rates in effect at the indicated time period but they are conceptually and numerically distinct from the incidence rates. Importantly for our study, the prevalence rates are easier than the incidence rates to estimate from survey data such as the NLTCS and can be estimated with much greater precision.

Indeed, precise estimation of changes over time in ADL and CI morbidity/disability rates was the major goal of the study. The sample sizes were 21,399

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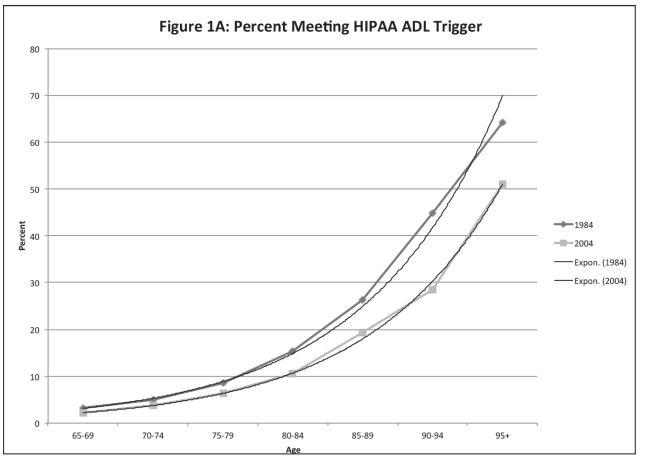
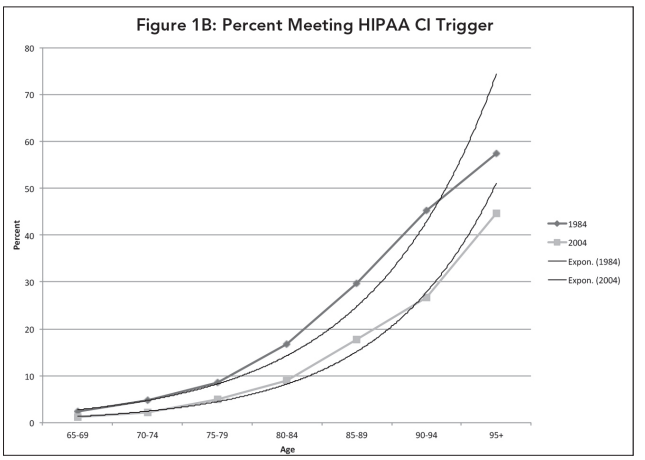
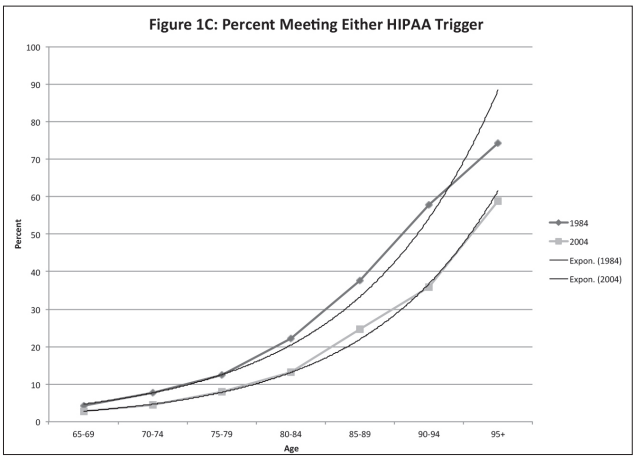
Figure 1 – Percent of Population Meeting HIPAA ADL, CI, and Combined ADL/CI Triggers, United States 1984 and 2004, Unisex, Age 65 and Above, by Age







in 1984 and 15,993 in 2004; individual survey participants were differentially weighted to account for differences in the individual probabilities of selection into the NLTCS sample. The sensitivities of the estimates to alternative weighting protocols were also assessed as part of the study.

MORBIDITY IMPROVEMENT

The source data for Figs. 1A, 1B, and 1C are shown in Tables 1–3, respectively, along with age-specific measures of change, summary measures of disability and change in disability, standard errors of the summary measures, and the associated t-statistics.

The primary measures of change were the reductions in the age-standardized disability rates based on the 2004 NLTCS weighted unisex population—indicated by the row labels: 2004 ASDR. For the ADL trigger, Table 1 shows that the prevalence rate reduction was 3.26 percent, from 11.42 percent in 1984 to 8.16 percent in 2004, a relative decline of 28.5 percent, and an average annual rate of decline of 1.67 percent per year. The standard error of the change was 0.33 percent and the associated *t*-statistic was 9.85 (absolute value), which was highly statistically significant ($p << 0.001$); the *t*-statistic was in the range 8.225–16.45, indicating "high precision" of the associated estimate, but the t-statistic was not large enough to meet the more stringent cutpoint of $t > 32.90$ associated with the Longley-Cook standard for "full credibility." The separately estimated disability rates for 1984 and 2004 did meet the Longley-Cook standard.

The commonly used cutpoint of $t > 1.96$ for testing the statistical significance of an estimated change—achieved when the 95 percent-confidence interval excludes the 0-value—yields change estimates with very low precision when, as often occurs in published studies, the associated *t*-statistics are in the range 1.960–3.291, or equivalently $0.001 \leq p < 0.050$. Moreover, assessing the precision of the estimates requires the t-statistics to be reported, which is often not done.

The relative change in the 2004 ASDR provides a reasonable summarization of the relative changes in the age-specific disability rates; an alternative summarization is provided by the relative change in the 1984 ASDR which is slightly smaller: 28.3 percent vs. 28.5 percent. Thus, the ASDR changes are mildly dependent on the choice of the standard population. In contrast, the change in the overall totals without standardization avoids this mild dependency but provides a highly biased estimate of the relative change in the age-specific disability rates: 11.5 percent vs. 28.5 percent.

The corresponding calculations for the CI trigger (Table 2) showed that the prevalence rate reduction was 4.96 percent (2004 ASDR), from 11.65

percent in 1984 to 6.69 percent in 2004, a relative decline of 42.6 percent, and an average annual rate of decline of 2.74 percent per year. The standard error of the change was 0.32 percent and the associated *t*-statistic was 15.53, which was also highly statistically significant ($p << 0.001$); the *t*-statistic indicated that the associated estimate also had high precision.

The corresponding calculations for the combined ADL and CI triggers (Table 3) showed that the prevalence rate reduction was 5.94 percent (2004 ASDR), from 16.03 percent in 1984 to 10.09 percent in 2004, a relative decline of 37.1 percent, and an average annual rate of decline of 2.29 percent per year. The standard error of the change was 0.37 percent and the associated t-statistic was 16.27, which was also highly statistically significant ($p << 0.001$); the *t*-statistic indicated that the associated estimate also had high precision.

SENSITIVITY ANALYSIS

The sensitivities of the estimates to three alternative weighting protocols are shown in Figure 2. The first (Duke/PNAS Weights; Fig. 2A) was the protocol used in generating Figure 1 and Tables 1–3; this protocol was developed at Duke University by Kenneth Manton, the principal investigator of the NLTCS. The second (Unadjusted Cox Weights; Fig. 2B) was generated using an alternative set of weights developed at Battelle, Inc., by Brenda Cox and colleagues. The third (Adjusted Cox Weights; Fig. 2C) reflects our reconciliation of differences between the first and second protocols. The plots show that the use of the Cox weights primarily impacted the 2004 disability rates, modestly reducing the rate of morbidity improvement.

The differences between the three weighting protocols are shown in Table 4. The annual rate of decline of 2.29 percent under the Duke/PNAS weights declined to 2.01 percent under the adjusted Cox weights and 1.88 percent under the unadjusted Cox weights. The associated *t*-statistic of 16.27 under the Duke/PNAS weights declined to 14.54 under the adjusted Cox weights and 13.71 under the unadjusted Cox weights. All three weighting protocols indicated that the rates of decline were highly statistically significant and the rate estimates had high statistical precision.

The *t*-statistics in the rightmost two columns indicated that the adjusted Cox estimate was just outside the 95 percent-confidence interval for the Duke/PNAS ($t = 1.97$ vs. the 1.96 cutpoint) whereas the unadjusted Cox estimate was substantially further away ($t = 2.88$). Thus, the sensitivity analysis answered the question of whether the estimated

Table 1

Percent of Population Meeting HIPAA ADL Trigger, United States 1984 and 2004, Unisex, Age 65 and Above, by Age and Totaled Over Age, with Two Modes of Age Standardization

	1984	2004	Change	% Change	Annual Rate of Decline; 20 yr.
65-69	3.27	2.20	-1.07	-32.8	1.97%
70-74	5.04	3.81	-1.22	-24.3	1.38%
75-79	8.55	6.35	-2.20	-25.7	1.47%
80-84	15.27	10.61	-4.66	-30.5	1.80%
85-89	26.22	19.39	-6.83	-26.1	1.50%
90-94	44.92	28.58	-16.34	-36.4	2.24%
95+	64.18	51.08	-13.10	-20.4	1.13%
Total	9.22	8.16	-1.06	-11.5	0.61%
1984 ASDR	9.22	6.61	-2.61	-28.3	1.65%
2004 ASDR	11.42	8.16	-3.26	-28.5	1.67%
		Standard Error			
Total	0.20	0.23	0.30		
1984 ASDR	0.20	0.19	0.28		
2004 ASDR	0.24	0.23	0.33		
		t-statistic			
Total	46.31	36.20	-3.52		
1984 ASDR	46.31	33.94	0.00		
2004 ASDR	47.13	36.20	-9.85		

NOTE: ASDR denotes age-standardized disability rate; the 1984 ASDR and 2004 ASDR results were age-standardized, respectively, to the 1984 and 2004 NLTCS weighted unisex population.

Source: Author's calculations based on the 1984 and 2004 NLTCS; see Table 1.8 in the Final Report.

Table 2

Percent of Population Meeting HIPAA CI Trigger, United States 1984 and 2004, Unisex, Age 65 and Above, by Age and Totaled Over Age, with Two Modes of Age Standardization

	1984	2004	Change	% Change	Annual Rate of Decline; 20 yr.
65-69	2.31	1.22	-1.09	-47.1	3.13%
70-74	4.78	2.26	-2.52	-52.7	3.67%
75-79	8.60	4.93	-3.67	-42.6	2.74%
80-84	16.77	9.07	-7.70	-45.9	3.03%
85-89	29.70	17.70	-12.00	-40.4	2.55%
90-94	45.16	26.69	-18.48	-40.9	2.60%
95+	57.48	44.67	-12.81	-22.3	1.25%
Total	9.24	6.69	-2.56	-27.7	1.61%
1984 ASDR	9.24	5.21	-4.03	-43.6	2.82%
2004 ASDR	11.65	6.69	-4.96	-42.6	2.74%
		Standard Error			
Total	0.20	0.21	0.28		
1984 ASDR	0.20	0.17	0.26		
2004 ASDR	0.25	0.21	0.32		
		t-statistic			
Total	46.75	32.62	-8.98		
1984 ASDR	46.75	30.79	-15.49		
2004 ASDR	47.52	32.62	-15.53		

NOTE: ASDR denotes age-standardized disability rate; the 1984 ASDR and 2004 ASDR results were age-standardized, respectively, to the 1984 and 2004 NLTCS weighted unisex population. The CI trigger used 3+ errors on the Short Portable Mental Status Questionnaire (SPMSQ).

Source: Author's calculations based on the 1984 and 2004 NLTCS; see Table 2.16 in the Final Report.

Table 3

Percent of Population Meeting Either HIPAA Trigger, United States 1984 and 2004, Unisex, Age 65 and Above, by Age and Totaled Over Age, with Two Modes of Age Standardization

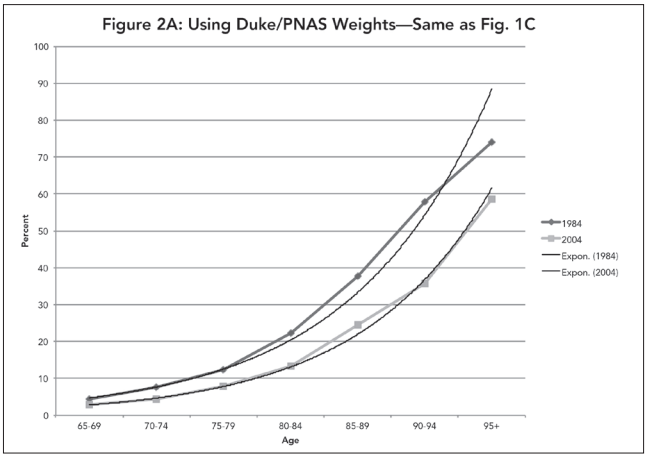
	1984	2004	Change	% Change	Annual Rate of Decline; 20 yr.
65-69	4.30	2.82	-1.48	-34.4	2.09%
70-74	7.70	4.39	-3.31	-43.0	2.77%
75-79	12.47	7.88	-4.59	-36.8	2.27%
80-84	22.29	13.25	-9.04	-40.6	2.57%
85-89	37.66	24.60	-13.06	-34.7	2.11%
90-94	57.86	35.79	-22.07	-38.1	2.37%
95+	74.15	58.70	-15.45	-20.8	1.16%
Total	13.05	10.09	-2.96	-22.7	1.28%
1984 ASDR	13.05	8.16	-4.89	-37.5	2.32%
2004 ASDR	16.03	10.09	-5.94	-37.1	2.29%
		Standard Error			
Total	0.23	0.25	0.33		
1984 ASDR	0.23	0.21	0.31		
2004 ASDR	0.27	0.25	0.37		
		t-statistic			
Total	57.26	41.15	-8.85		
1984 ASDR	57.26	38.31	-15.68		
2004 ASDR	59.14	41.15	-16.27		

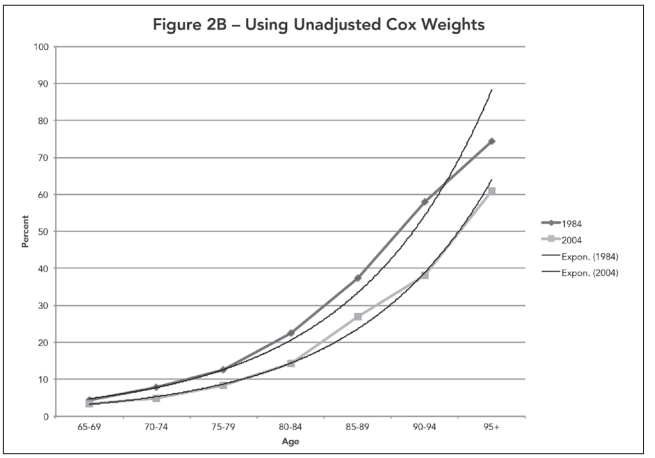
NOTE: ASDR denotes age-standardized disability rate; the 1984 ASDR and 2004 ASDR results were age-standardized, respectively, to the 1984 and 2004 NLTCS weighted unisex population. The HIPAA triggers are based on 2+ ADL Impariments or 3+ errors on the SPMSQ.

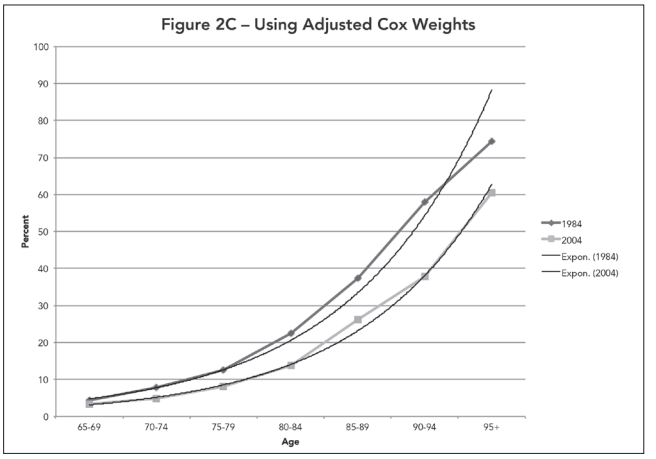
Source: Author's calculations based on the 1984 and 2004 NLTCS; see Table 2.21 in the Final Report.

CONTINUED ON **PAGE 26**

Figure 2 – Alternative Estimates of the Percent of Population Meeting the HIPAA Combined ADL/CI Triggers, United States 1984 and 2004, Unisex, Age 65 and Above, by Age







large declines in ADL and CI disability during 1984–2004 were robust with respect to reasonable alternative survey weighting protocols: they were. The sensitivity analysis also showed that the adjusted Cox protocol produced estimates near to or within the 95 percent-confidence intervals for the corresponding Duke/PNAS estimates, indicating that our reconciliation of the differences between the Duke/PNAS and the Cox protocols was successful.

COMPRESSION OF MORBIDITY

Morbidity improvement is a necessary but not sufficient condition for the reduction in lifetime morbidity—termed the compression of morbidity by James Fries in his classic 1980 article "Aging, natural death, and the compression of morbidity" in the *New England Journal of Medicine*—under current conditions of continual mortality improvement. The main concern is that increasing numbers of persons will survive to advanced ages where the prevalence of morbidity is much higher and the potential exists for increased lifetime risk of such morbidity.

We use the term survival increment to represent the increased lifetime disability that would occur, solely due to reductions in mortality under the assumption that age-specific morbidity rates remained constant. Similarly, we use the term morbidity decrement to represent the reduction in lifetime disability that would occur, solely due to reductions in morbidity under the assumption that the age-specific mortality rates remained constant. If we set the morbidity rates for the survival increment to their 1984 values and the mortality rates for the morbidity decrements to their 2004 values, then it can be shown that the net change in lifetime morbidity between 1984 and 2004 is equal to the survival increment minus the morbidity decrement, which may be positive, negative, or zero, depending on the relative sizes of the survival increment and the morbidity decrement. Thus we have the following condition:

For the compression of morbidity to occur, the morbidity decrement must exceed the survival increment.

Table 5 displays the expected lifetime years of disability, their changes, and the component survival increments and morbidity decrements, for the combined HIPAA ADL and CI triggers under the three alternative weighting protocols shown in Figure 2. In each case the morbidity decrements far exceed the corresponding survival increments. The *t*-statistics for the morbidity decrements were 16.25, 13.67, and 14.48, respectively, indicating that the estimated morbidity decrements were statistically highly significant and had high precision. The *t*-statistics for the net changes were 11.53, 8.83, and 9.68, respectively, also indicating that the estimated net changes were statistically highly significant and had high precision.

Thus, the evidence supporting the morbidity compression hypothesis was very strong, based on the assumption that the term "morbidity" could be operationalized using the HIPAA ADL and CI triggering criteria. Moreover, the effect size was large and the alternative estimates had high statistical precision—the relative reduction in expected lifetime years of disability was in the range of 22–28 percent, or 24–28 percent with the unadjusted Cox estimate eliminated.

DISCUSSION

Our analysis raises several critical questions: Will morbidity compression continue indefinitely? Will it reach a stable lower limit? Or will it reverse direction and become a morbidity expansion? How will these changes interact with mortality?

In a 2011 article in the *Journal of Aging Research*, Fries and colleagues observed that the morbidity compression seen over the past 30 years was achieved without a coherent health-promotion strategy in place. Fries argued that continued morbidity compression was not inevitable, but it could be made to continue into the foreseeable future using a four-part health-promotion strategy consisting of 1. Primordial prevention (risk factor elimination), 2. Primary prevention (risk factor reduction), 3. Secondary prevention (disease specific), and 4.Tertiary prevention (morbidity treatment/reduction).

If such a strategy were implemented in whole or in part, one would also expect further reductions in mortality beyond those that would have occurred in their absence, which would further increase the size of the survival increments to be overcome by the concurrent morbidity decrements. Thus, it is the dynamic interplay between survival increments and morbidity decrements that will determine the course of morbidity compression over the foreseeable future. The extent to which these dynamics are shared by the subpopulation of LTC insureds will be of critical importance to LTCI actuaries. Establishing their existence in the general population and measuring their effects with precision are but the first steps in effectively dealing with them. Much more needs to be done. ■

*Support for the LTC Morbidity Improvement Study was provided by the ILTCI Conference Board, the SOA LTCI Section and SOA Special Research Fund; supplementary analyses were funded by the National Institute on Aging through Grants No. R01AG028259, R01AG032319, R01AG034160, R01AG046860, and R01AG007370. Funding for the NLTCS was provided by the National Institute on Aging, most recently through Grant U01-AG07198. The LTC Morbidity Improvement Study was a collaborative effort between Eric Stallard and Anatoliy Yashin.

Table 4

Annual Rate of Decline in the Percent of Population Meeting Either HIPAA Trigger, United States 1984 and 2004, Unisex, Age 65+, by Age and Totaled Over Age, with Two Modes of Age Standardization – Tabulated Using Three Alternative Weighting Protocols

	Annual Rate of Decline (%)			Ratio of Cox to Duke/PNAS		*t*-statistic	
Age	Duke/PNAS Weight	Unadjusted Cox Weight	Adjusted Cox Weight	Unadjusted	Adjusted	Unadjusted	Adjusted
65-69	2.09	1.29	1.29	0.618	0.618		
70-74	2.77	2.26	2.39	0.817	0.862		
75-79	2.27	1.97	2.16	0.870	0.952		
80-84	2.57	2.19	2.37	0.851	0.922		
85-89	2.11	1.64	1.79	0.776	0.850		
90-94	2.37	2.06	2.10	0.868	0.886		
95+	1.16	1.00	1.04	0.859	0.891		
Total	1.28	1.05	1.18	0.819	0.919	1.60	0.72
1984 ASDR	2.32	1.89	2.02	0.814	0.869	2.92	2.06
2004 ASDR	2.29	1.88	2.01	0.823	0.879	2.88	1.97
		Standard Error					
Total	0.14	0.14	0.14	0.972	0.978		
1984 ASDR	0.15	0.14	0.15	0.975	0.981		
2004 ASDR	0.14	0.14	0.14	0.977	0.983		
		t-statistic					
Total	8.85	7.46	8.32	0.843	0.940		
1984 ASDR	15.68	13.09	13.88	0.835	0.886		
2004 ASDR	16.27	13.71	14.54	0.843	0.894		

NOTE: ASDR denotes age-standardized disability rate; the 1984 ASDR and 2004 ASDR results were age-standardized, respectively, to the 1984 and 2004 NLTCS weighted unisex population. The HIPAA triggers are based on 2+ ADL Impairments or 3+ errors on the SPMSQ.

Source: Author's calculations based on the 1984 and 2004 NLTCS; see Table 3.10 in Final Report.

Table 5

Alternative Estimates of Change in Unisex HIPAA ADL/CI Expectancy (in Years at Age 65), United States 1984 and 2004

	Year				
Weighting Protocol	1984	2004	Survival Increment	Morbidity Decrement	Net Change
Duke/PNAS Weight	2.50	1.81	**0.35**	**1.05**	**-0.70**
Unadjusted Cox Weight	2.52	1.97	**0.36**	**0.90**	**-0.55**
Adjusted Cox Weight	2.52	1.92	**0.36**	**0.95**	**-0.59**
Life Expectancy	16.64	18.11	1.48	–	1.48

Source: Author's calculations based on the 1984 and 2004 NLTCS; see Tables 2.27, 3.11, 3.12 in Final Report.

RESOURCES

Cox, Brenda G. and Charles L. Wolters. Technical Report for Contract No. HHSP233200-45006XI: Revised Cross Sectional Weights for the National Long-Term Care Survey. U.S. Department of Health and Human Services, Washington, DC, 2008.

Fries, James F. 1980. "Aging, Natural Death, and the Compression of Morbidity," New England Journal of Medicine 303 (3): 130–35.

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Stallard, P.J. Eric and Anatoliy I. Yashin. 2014. LTC Morbidity Improvement Study: Estimates for the Non-Insured U.S. Elderly Population Based on the National Long-term Care Survey 1984–2004. Schaumburg, Ill.: Society of Actuaries, forthcoming.

The aim of this LTC Section sponsored research is to advance insight into Long-Term Care pricing and experience. The first report, authored by Actuarial Resources Corporation of Kansas, illustrates how the risks of LTC insurance can be understood through modeling its liabilities using a Monte Carlo simulation approach. The second report, authored by PricewaterhouseCoopers LLP, discusses both conceptual and practical aspects of experience volatility and provides a basis for actuaries and management to understand and interpret volatility in LTC insurance experience.

Both reports were produced in response to an RFP from the section titled "Understanding the Volatility of Experience and Pricing Assumptions in Long-Term Care Insurance." Each paper will provide the reader insight into approaches that can be taken to better understand the risk characteristics of LTC insurance products and provide approaches for evaluating experience fluctuations. The following two articles are teasers for Long-Term Care News readers. The completed research papers can be found at http://www.soa.org/research/research-projects/ltc/research-2014-understanding-volatility.aspx.

The SOA would like to thank the following Project Oversight Group members: Steve Schoonveld, chair; James Berger; Sivakumar Desai; Robert Hanes; David Hippen; Perry Kupferman; Alex Silva; Barbara Scott, SOA research administrator; and Steven Siegel, SOA research actuary. Steve Schoonveld, Project Oversight Group Chair.

Lessons in LTC Volatility

By Rachel Brewster

Rachel Brewster, FSA, CERA, MAAA, is a member of PwC's Actuarial and Insurance Management Solutions (AIMS) group. She can be reached at *rachel.m.brewster@us.pwc.com.*

In the fall of 2013, the Society of Actuaries Long-term Care Insurance (LTCI) section commissioned a project to assess the "Volatility of LTC Pricing Assumptions." This project has resulted in two papers addressing this topic. Being involved with the writing of one of these papers has led me to think back over my time working in LTCI and how my views regarding the effect of volatility and uncertainty have evolved over this time. It has been the challenges involved in projecting future assumptions that have drawn me to work with this product.

As all actuaries know, the reasons for possible deviations from expectations are numerous. The main related questions addressed in these papers are: (1) What has driven these larger deviations from expectations for LTCI? (2) How can actuaries differentiate between poor experience being due to the inherent volatility resulting from random fluctuations falling within a reasonable range of current assumptions versus these assumptions not accurately reflecting the future? (3) How does product design affect the results of this volatility? (4) How can this information be used by companies, or regulators, to measure and assess the effects of possible adverse deviations?

The first conversation I ever had involving LTCI was when I was interviewing for an actuarial student rotation position in a LTCI pricing department. During that conversation I discussed with my future boss some of the key challenges involved with this product. I keenly remember discussing lapse rates and how the original pricing assumptions were significantly higher than what was being observed. When most people initially hear about this difference, the questions typically raised are: "Why was the earlier expectation so different from what was experienced? Shouldn't the actuaries have had better foresight?"

Four important factors relating to LTCI that need to be recognized are: (1) even after more than thirty years the product is still relatively immature, (2) the difficulty in aggregating credible amounts of relevant data, (3) changing attitudes toward care, and (4) the challenges of administering its claims.

With life insurance, another common insurance product with a long duration, the data available

to measure mortality is vast and mature. Also, the decision as to whether to pay out a life insurance policy is pretty black and white. On the other hand, LTC benefit eligibility triggers and underwriting have differed by product generation, which together with evolving claim administration practices have resulted in a challenge to aggregate into long-term assumptions. The most comparable product in terms of data would be regular medical insurance, which has a much shorter duration that allows an insurer to incorporate recent experience more quickly into future pricing. These limitations around the data and the product's life cycle need to be recognized by actuaries in the pricing and product design of LTCI policies.

Within the roles I have had working in actuarial pricing departments, I have felt that it was my job as an actuary to identify those product features that provide incentives to take advantage of the product for purposes they were not originally designed to meet, thus encouraging over-utilization by policyholders. For example, within various deferred annuity products, it is important to take into account the likelihood that policyholders will surrender their policies at the most disadvantageous time for the insurance company. In LTCI, it is also important to identify product features that promote similar anti-selective behavior. One of my most memorable LTCI pricing tasks involved pricing a product feature that I thought would be easily taken advantage of, which would have brought with it unanticipated long-term financial consequences to the insurer. In part it may have been memorable due to the fact my bosses had not previously identified this effect, which highlights the challenges that pricing actuaries have in their roles.

These papers provide actuarial concepts, analytical tools, and practical considerations that take into account the wide breadth of experience of the authors, which should generate further dialogue around the basis for and consequences of volatility within LTCI. ■

A Portrait of the Actuary as a Young Man

A FICTIONAL ACCOUNT OF THE VOLATILITY OF LONG-TERM CARE INSURANCE

By Roger Loomis

Roger Loomis, FSA, MAAA, is senior prophet developer at Actuarial Resources Corporation in Overland Park, Kan. He can be reached at *roger.loomis@arcval.com*.

Pete Granger, FSA, was sitting at his desk, catching up on miscellaneous emails. He had booked the LTC reserves the prior evening and spent most of the morning compiling and organizing his work papers that documented the valuation work. It was only 11:30 a.m., but Pete was thinking about lunch. He glanced at the window, and wondered if it was too early to start asking his friends if they were ready to start heading out. It was Thursday and that meant that as far as Pete was concerned, lunch would be at Ricco's Bistreaux in the French Quarter, with its weekly special of Crawfish and Artichoke soup.

Just then, the phone rang. Pete glanced at the caller ID and saw that it was Glen Maitland, the chief actuary. "Hi Pete. Do you have a minute to go over the LTC financial results?"

"On my way." Pete replied. In one motion he hung up the phone, stood up, and picked up the file folder that was waiting on the desk. He walked between the rows of cubicles to Glen's spacious corner office.

Glen's office featured a large leather chair between a desk and credenza, both of which had tall yet neat piles of file folders. In front of the desk was a large area occupied by an empty round table and four matching side chairs. Glen walked around his desk with a single file folder and started to sit down at the round table just as Pete entered the room. Knowing the routine, Pete sat down next to Glen, and they simultaneously opened up their folders, revealing matching reserve reports on top.

Glen got right to the point. "Second quarter results are disappointing. On the LTC line alone, our quarterly profits are $2.1 million below plan."

Glen paused for emphasis. Pete wanted to demonstrate that he'd already analyzed this, so he finished Glen's thought process. "And the plan numbers came from a new projection based on more conservative assumptions that were developed in conjunction with the painful rate increase from last year. If we compare the projection to actual results line by line, we came very close to hitting the projected premiums, commissions, expenses, paid claims, and even investment income. Almost all of the deviation from the plan is due to the reserves being two million higher than projected."

Glen had a frown on his face, but nodded because Pete knew the numbers and had already analyzed this outcome. Glen wasn't an LTC expert, and so far only saw conflicting messages in these numbers. He reasoned that if there were problems related to operations or morbidity that they'd show up in the financials. Premiums and paid claims being very close to plan seemed to establish that the actual experience was fine. But the reserves, other than IBNR, were deterministic and based on the actual experience. "So what's going on Pete? Is there a problem with the reserves?"

"No," Pete answered, "the reserves are consistent with the actual operational experience of the quarter. Let's start by looking at that." Peter turned to a report in his folder that compared the actual new claims, deaths, recoveries, and lapses to what was projected (see Exhibit 1).

Exhibit 1

Key LTC Metrics, 2Q, 2014			
	(1) Actual	(2) Expected	(1)/(2) A/E
New Claims	80	70.4	1.14
Recoveries	17	16.7	1.02
Deaths	56	53.2	1.05
Lapses	151	157.0	0.96

This was a standard report that management was accustomed to seeing, but Pete didn't like it. He thought that point estimates for what was "expected" implied an unrealistic precision to the forecasts that was misleading to senior management.

Glen looked at the report, and quickly noticed that high new claims and somewhat low lapses were likely the main drivers of the unfavorable experience, and that these effects were somewhat offset by favorable mortality. "I hope this news on the incidence rates doesn't last—I'd hate to go back to the regulators and request another 15 percent rate increase."

"Is it really news?" Asked Pete. "After all, we weren't really expecting to see exactly 70.4 new claims this quarter, were we?"

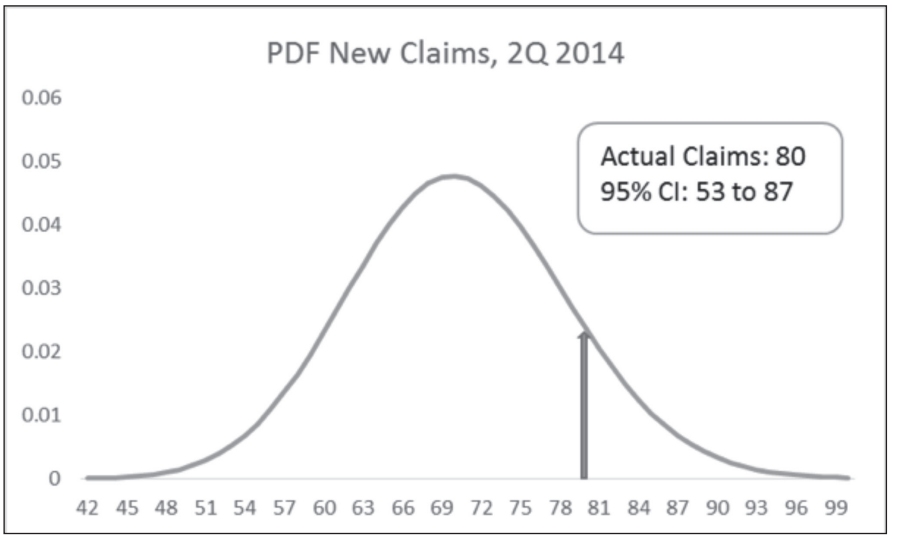
Although he was sure Pete must have understood this, as a reflex Glen began to explain what the expected numbers mean. "Of course we don't expect to get that number exactly. All we're saying is that that is the statistical mean—if all of the other assumptions in the model are correct, then the law of numbers says we'll be close to 70.4 claims."

"That's the real question then," responded Pete, finally getting to his point. "Are 80 claims 'close' to 70.4?" Glen wasn't sure. Pete proceeded to pull out of his stack of reports a graph with a picture of a bell curve (Exhibit 2).

"If we begin with the known number of policies at the start of this period, and if we assume that our incidence rate assumptions are precisely the true probability of each policy going on claim, then this graph shows the probability distribution function of the number of new claims. In essence, we know that if our assumptions are correct, then we can be 95 percent certain that the number of new claims will be between 54 and 87."

"I see that the 80 claims that were incurred is higher than the mean, but well within this distribution," said Glen. "So really, as far as new claims, our

Exhibit 2



CONTINUED ON **PAGE 32**

"Some product designs not only reduce the risk to the insurance company, but also to the people they insure."

actual experience is in fact consistent with our assumptions."

"Exactly," replied Pete. "From a statistical perspective, there is no evidence that our assumed incidence rates are wrong, or that there is an operational problem with claim adjudication."

"Okay. I see that the number of new claims is within the expected range, but what about the reserve increase? Is there a way to set a prediction interval around the change in reserves?"

"Yes, and I've already done the calculations" said Pete, excited that he now had interest in his project. "We put together a model that stochastically forecasts claims, recoveries, deaths, and lapses using Monte Carlo simulation. We did 200 simulations of the development of our entire portfolio of LTC policies. As each policy matured, went on claim, recovered, lapsed, and eventually died, we simulated what the actual cash flows and reserves would be, according to that scenario."

"By modeling the business stochastically this way, we see that every operational and financial metric that is a function of claims, recoveries, lapses, and deaths is a random variable in its own right, with its own PDF. The simulation process allows us to simultaneously estimate the pdf of every one of these variables. We went back and reran the budget forecast this way, as-of Dec. 31, 2013. The simulated results show that the actual 95 percent prediction interval for both profits and change in reserves is the expected value of the metric, plus or minus five million."

"Five million?" Glen responded with surprise. "You are telling me that we could have missed the plan by up to five million dollars and still been able to claim that the results were consistent with expectations?"

"Exactly. If our assumed incidence, lapse, recovery, and death probabilities are correct, we can be 95 percent confident that we will hit our best estimate of the quarter, *plus-or-minus five million*."

"This business is a riskier than I thought."

"Yes and no. Over longer reporting horizons, period-by-period deviations in financial results tend to cancel each other out. Companies in this business need to take a long-term perspective and shouldn't overreact to the monthly fluctuations that are inherent to the risks they are insuring. Actuaries need to do a better job of explaining to management our level of confidence in our forecasts by providing prediction intervals rather than point forecasts."

"Where can I read more about this?"

"ARC just finished a study for the SOA on how to better understand the riskiness of LTC by using Monte Carlo simulation. The paper not only explains how you can use models to better understand the riskiness of a block of business, it also discusses the implications this has for pricing margins and rate increases. It also goes on to discuss how the risk can be mitigated by product designs. Some product designs not only reduce the risk to the insurance company, but also to the people they insure."

Glen was excited to hear more, but his stomach growled. "I'm starved," he said, looking at his watch. "Do you have plans for lunch? If not, we can continue this conversation over a bowl of crawfish and artichoke soup at Ricco's Bistreaux."

"*Understanding the Volatility of Experience and Pricing Assumptions in Long-Term Care Insurance*" is now available at *http://www.soa.org/research/researchprojects/ltc/research-2014-understanding-volatility.aspx.* ■

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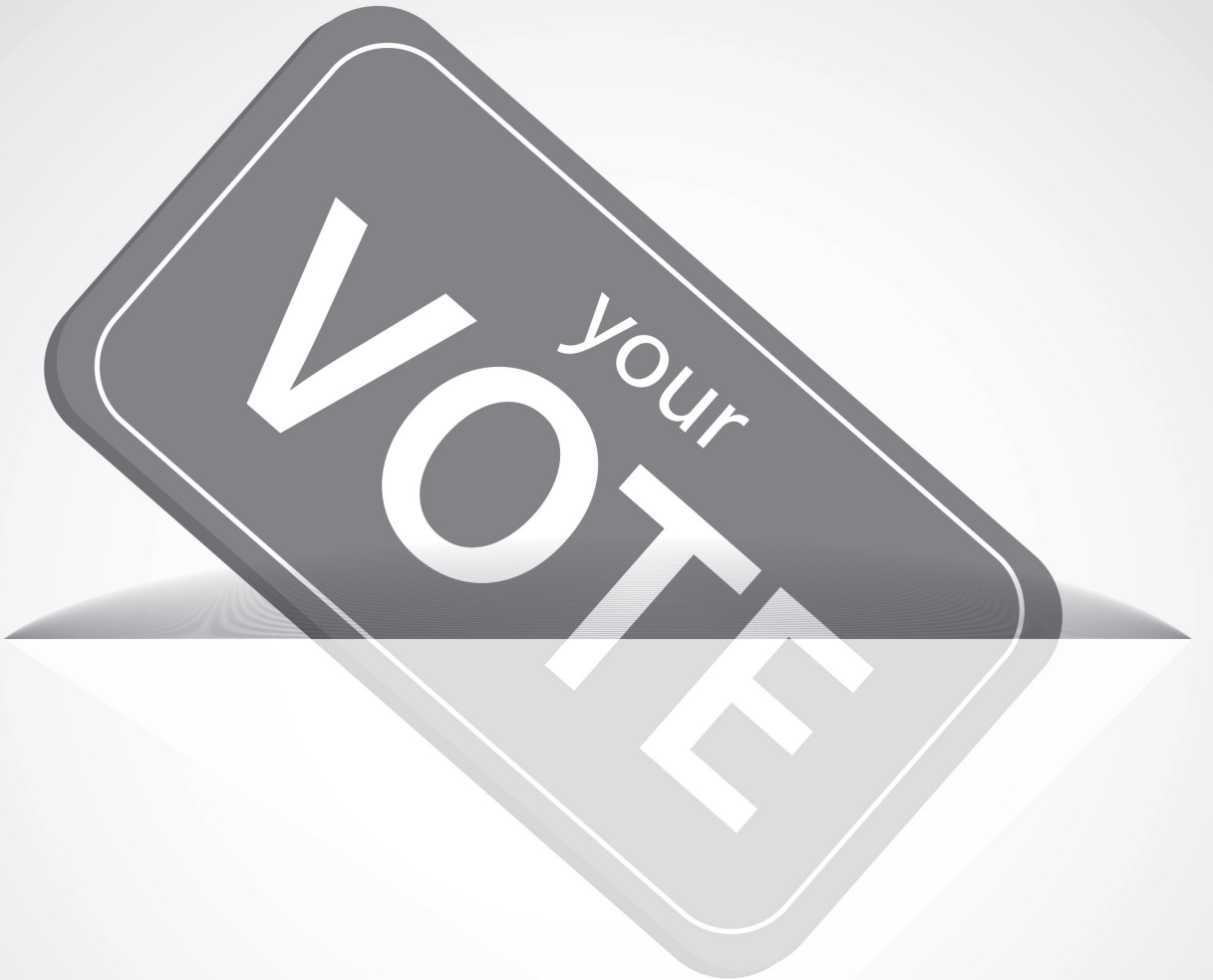

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