



**SOCIETY OF  
ACTUARIES**

**PRODUCT  
DEVELOPMENT  
SECTION**

ISSUE 93 • OCTOBER 2015

# Product Matters

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# Product Matters

Issue Number 93 • October 2015

Published by the Product Development  
Section Council of the Society  
of Actuaries.

475 N. Martingale Road, Suite 600  
Schaumburg, Ill 60173-2226  
Phone: 847.706.3500 Fax: 847.706.3599

## SOA.ORG

Published by the Product Development  
Section Council of the Society  
of Actuaries

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# An Overview of Life and Annuity Living-Benefit Riders

By Carl Friedrich

The life insurance industry has expanded its product offerings significantly in the last few years. Some of the most innovative new coverages are provided by riders that can be attached to life insurance policies, and in some cases annuities. These “combination” plans allow base policy values, such as life insurance death benefits and cash values, to be accelerated to the policyholder prior to death in the event of a long-term care need or, under some policies, a chronic illness event. In addition, many of these plans will continue long-term care insurance (LTCi) benefit payments even after the base plan values are depleted. This provides a form of insurance leverage that can result in LTCi benefits that might be double or triple the life insurance death benefit. These riders make life insurance or annuities more useful to the policyholder, providing living benefits to address this under-insured need of our society. At the same time, contrasted with stand-alone LTCi policies, these policies reduce the risk to insurance companies. Policyholders of combination plans share in the LTC risk since they are using their own “assets” first (such as receiving “an advance” on their life insur-

ance benefit) to pay for the first layer of coverage. This factor, and other by-products of these riders such as the reduction in lapse activity on the underlying base plans, make these products a win-win proposition for insurers and consumers alike.

A 2015 Society of Actuaries Report titled “Life and Annuity Living Benefit Riders: Consid-

erations for Insurers and Reinsurers,” available on the Society of Actuaries website ([www.soa.org](http://www.soa.org)), covers a wide range of living benefit riders with medically related triggers on life or annuity products. This article will cover several of those.

## CHRONIC ILLNESS ACCELERATED DEATH BENEFIT RIDERS

The first products covered are chronic illness riders attached to life insurance policies that provide for Accelerated Death Benefits (ADB) to be paid under conditions prescribed by the rider. Insurance laws and regulations and tax laws govern these plans. The purchase of accelerated benefit chronic illness riders, if structured prop-

erly, may allow chronic illness benefits to be free of federal income tax, subject to certain IRS rules and limits.

Most plans require that for benefits to be paid, the insured must be certified by a licensed health care practitioner to be chronically ill, which often starts with the requirement that the insured is unable to perform two or more activities of daily living (ADLs), or suffers from a severe cognitive impairment. State insurance laws require a series of provisions to be met under these chronic illness plans:

- A lump sum payout option is required, commonly but not always interpreted by regulators as annual lump sums (often spreading the pay-



CONTINUED ON PAGE 5

CHAIRPERSON'S CORNER

# Serving Others

By Jim Filmore

**H**ow often have you heard someone say that they received more than they gave when participating in some form of volunteering? In my experience that outcome is common especially when the volunteer activity involves interaction with others and goes beyond just a financial donation.

My company is in the midst of an eight week health and wellness challenge. The concept is simple: form teams and compete both against other teams and yourself to be healthier. The criteria that the program utilizes are a balance between simplicity and effectiveness. The categories are water, fresh fruits and vegetables, exercise, sleep, and weekly volunteering. The first four categories should be obvious to most people. However, one may question why volunteering belongs as a main criterion for a health and wellness program as at first it appeared out of place to me. However, upon further reflection, I realized that volunteering is an important component of a well-rounded program of health and wellness as I will explain below.

When the program launched, a few individuals from our pricing and marketing areas decided

to form a team and take on all challengers. We stocked up on fruits and vegetables and regularly re-filled our water bottles throughout the work day. We then searched for volunteer opportunities in our local community that were flexible in terms of accepting people to help outside of normal business hours. During the first week, we volunteered with the Atlanta Community Food Bank. It was eye-opening for all of us to find out how much this charity does for our local community. Our group washed and sorted fresh fruits and vegetables which the food bank then sells at cost through three local farmers' markets that they organize. They told us how the program is focused in some of the poorer sections of town to help make fresh fruits and vegetables more affordable to those who otherwise may defer to eating less nutritious meals. At the end of our volunteer assignment, we felt good about what we had accomplished. We also learned to appreciate those who consistently give their time and energy to help others and to ensure that our local community is thriving.

This experience reminded me that one of the greatest gifts that we can give ourselves is to serve others. Serving others could involve talking to elderly peo-



ple who are in nursing homes, serving meals to those in need, fostering homeless animals, or volunteering with a section of the Society of Actuaries (hint, hint). This article will be published around the end date of my three-year tenure of service on the Product Development Section Council. While my official capacity on the council is coming to a close, I will take with me numerous relationships that have been formed or enhanced over that time period. I also now have expanded my knowledge of multiple topics that can be applied in my daily personal life and work life. My overall investment of service on the council has figuratively yielded a tenfold return.

I encourage everyone to find a way to serve others. You may very well find that both your personal well-being and your professional life will grow and prosper as a result of your service.

Thank you for allowing me this time to serve as the chairperson of the Product Development Section Council! ■



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outs over two to four years). The SOA report included a survey of direct writers, and among 23 plans, 17 offer a single lump sum, and 20 offer periodic payouts (eight annual, 14 monthly, and other variations).

- The product may not be marketed as LTCi. This relates to the fact that although some chronic illness riders may pay benefits in largely the same situations as LTCi, they do not meet the consumer protection requirements to qualify as LTCi and do not provide the full range of benefits as LTCi. For example, chronic illness benefits are constrained to the life insurance death benefit, and inflation related benefit increases are not generally available on these plans.
- Allowable pricing methods include a dollar-for-dollar death benefit reduction approach with upfront charges, a discounted death benefit approach, and the lien approach, which will be explained below.
- Terminal illness benefits are included on most plans with chronic illness riders (and required under some regulations).

So how do these ADB riders work? Under the discounted death benefit design, the riders are “free” with no extra cost upfront, but when medical trigger requirements are met, a portion of the life death benefit is paid out. However, only a discounted portion of the reduction to the death benefit is paid to the policyholder. For example, if the policy has a two year annual lump sum ADB rider on a

\$250,000 life insurance policy, upon the first claim the death benefit would be reduced by \$125,000 (\$250,000/2 years), and upon the second claim if the insured is still chronically ill, the remainder of the life policy would be used up. The actual payments to the insured would each be less than the two \$125,000 reductions to the death benefit, and those amounts will be dependent on the age of the insured and the mortality assumptions and factors in use by the insurance company at that time. At younger ages, the payout amounts may be fairly small percentages of the reductions to the life insurance face amounts. For example, the policyholder might only receive \$100,000 in total as accelerated benefits over the two year period as opposed to the \$250,000 they would have received if they kept their coverage (and paid premiums) until their death.

Under the lien approach, normally offered without an upfront charge, benefits are not discounted, but a lien is placed on the policy values and lien interest is normally charged to the policyholder, so this works essentially like a loan to the policyholder.

For riders with charges upfront, most notably the dollar-for-dollar death benefit reduction approach, a portion of the life death benefit is paid periodically, and the policyholder receives the full amount equal to the reduction in the death benefit. The charges for these riders are often only 10 percent to 15 percent of the cost of the base plan, which many might

view as more attractive than dealing with the uncertainty of what benefits might be paid under the discounted death benefit approach.

The SOA survey of insurance companies issuing chronic illness riders revealed that these riders are attached to a variety of base plans, with the most common being universal life, whole life, and indexed universal life. As noted above, triggers usually require licensed health care practitioner certification, and the inability to perform two of six ADLs or cognitive impairment, but seven plans out of 23 also require permanent nursing home confinement. Fourteen of 23 require an expectation of permanence of the condition, which is more restrictive than most LTCi requirements.

The study also involved interviews with reinsurers. More reinsurers are moving to participate in full in these coverages, but various concerns were expressed. The biggest concern is with the discounted death benefit method. There were comments about low percentage payouts under certain circumstances, and whether insurers were able to provide enough information to consumers to avoid unrealistic policyholder expectations. It was noted that in the past, very few people have taken a discounted death benefit offer unless they were relatively healthy and the discount was not that substantial. Some reinsurers went so far as to question whether chronic illness discounted death benefits can work well without underwriting at the time of claim,

which would allow companies to provide a payout appropriate to the insured’s actual medical condition at that point.

#### LONG-TERM CARE INSURANCE ACCELERATED DEATH BENEFIT RIDERS

Another type of living benefit covered in the report was LTCi Riders that provide an acceleration of life insurance benefits. These are very similar to chronic illness riders, with a few key differences.

They are governed by LTCi laws and regulations, with some exemptions from normal LTCi rules. Most qualify as tax qualified LTC under IRC 7702B, so benefits are generally tax-free subject to some IRS limits.

Under an LTCi ABR, a specified portion of the death benefit is eligible to be paid each month on claim with a proportionate reduction to cash values when traditional LTCi triggers are met (two of six ADLs or cognitive impairment, **with no permanence requirement**). This difference in trigger requirements relates to different regulations that govern chronic illness ADB riders and LTCi ABR riders. Allowed benefit structures include the dollar-for-dollar death benefit reduction approach, or the lien approach, but the discounted death benefit approach is not allowed.

There are three potential types of payout structures. Expense reimbursement plans pay benefits that are capped at the lesser of the maximum payout specified in the rider, such as 2

percent or 4 percent of the face amount every month, or at the level of LTC expenses actually incurred. Indemnity plans or disability plans pay an amount specified in the policy without regard to actual LTC expenses incurred. The indemnity design does require proof that formal care is being received (i.e., receipts from providers), while the disability model does not. Under the disability model, the insurance benefits are paid even if the only care is being provided by family members or other informal care providers.

Most LTCi riders are expense reimbursement or indemnity, which lowers the cost of coverage compared to a disability model. In contrast, all chronic illness riders are based on the disability model due to regulations.

The SOA survey on LTCi ABR riders indicated that universal life is the most common base plan. Five of eight companies use an indemnity structure and two use a disability model under plans where only an acceleration rider is included. However, this section of the survey does not include those products that also include an Extension of Benefit rider (EBR), which continues coverage after the full face amount is depleted and which may result in LTCi benefits that are double or triple the life insurance death benefit if catastrophic LTC expenses are incurred, which leads us to the next set of living benefits.

#### LIFE/LTCI LINKED BENEFIT PRODUCTS

The products that include both an accelerated LTCi benefit,

These riders make life insurance or annuities more useful to the policyholder, providing living benefits to address this underinsured need (coverage for long term care or chronic illness) of our society.

as well as additional benefits (EBRs) that are payable without reducing the base plan values, are sometimes called “linked-benefit” products, and can feature a life insurance or an annuity base plan. All LTCi regulations apply to the EBR provisions/riders. From the SOA survey on life/LTC linked-benefits, four are attached to single premium products only, one is attached to both single and recurring premium plans, and two are attached to recurring premium products only. Five of seven use the expense reimbursement model, and two use an indemnity structure. They are all required to offer inflation benefits and nonforfeiture benefits to applicants. Reinsurers are increasingly providing support for LTCi accelerated death benefit riders, but there is still only limited support for the EBR and inflation benefit provisions that these plans offer.

#### ANNUITY/LTCI LINKED BENEFIT PRODUCTS

The annuity linked-benefit plans work much like the life linked-benefit plans, but the amounts paid out during the accelerated benefit period under most designs are a percentage of the annuity cash

value at the time of initial claim (with surrender charges being waived), as opposed to a percentage of a life insurance face amount. In contrast, some plans base the LTCi benefit on a multiple of the initial premium going into the policy. These policies include an extension of benefit feature, as do life linked-benefit plans. This feature continues the monthly LTCi benefits, after the account value is depleted, for an extension period specified in the policy so long as LTCi claim requirements are still met. Inflation benefits are also offered. Not all survey respondents answered the question of what design their policy used, but two indicated that benefits were based on account value at the time of claim, and two said that LTCi benefits were based on a multiple of initial premium. Essentially all of the annuity linked-benefits feature a single premium base plan. One is a variable annuity contract, and the other respondents reflected a mix of book value annuities or market value adjusted annuities. Three of five plans reported the use of an expense reimbursement structure, and two feature an indemnity design.

#### CONCLUSION

In summary, there is widespread interest and participation by both direct writers and reinsurers in living benefit riders. A wide variety of regulations apply, and favorable tax treatment of benefits can be realized by policyholders under several structures, subject to certain limitations. Behind the scenes, reinsurers are working more with direct writers to provide complete reinsurance mechanisms to support this business. Sales information gathered from the survey was somewhat fragmented. However, from data gathered in the survey for 2013, plus other sources, the authors estimate chronic illness sales (total policy premium) to be \$1.2 billion in first year premium, sales with LTCi riders on life business to be over \$2 billion in first year premium including base plan and rider totals, and annuity linked-benefit business to be over \$300 million and climbing. In addition, a number of companies are reporting that a growing percentage of their life insurance sales include some form of living benefit rider. This is a very positive sign for the industry and consumers alike, and one that should continue as additional innovative solutions emerge to cover the risks of long-term care or chronic illness. ■



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# What's Trending in the Universal Life Market? More of the Same

By Susan J. Saip

Trends in the universal life (UL) market of the past few years continued in 2014 and into 2015. Sales in this market have been driven by indexed universal life (IUL) and living benefit riders on UL/IUL products. UL/IUL continues to garner the biggest market share (measured by annualized premium) of total individual life sales (37 percent<sup>1</sup> as of March 31, 2015). IUL sales accounted for 52 percent<sup>1</sup> of total UL/IUL sales in the first quarter of 2015. These facts demonstrate the ongoing importance of UL/IUL products in the U.S. individual life market. Milliman's

eighth annual survey of leading UL insurers delves into the issues and challenges of these products, allowing companies to benchmark their practices against the competition. For purposes of the survey, sales were defined as the sum of recurring premiums plus 10 percent of single premiums. The scope of the Milliman survey included UL with secondary guarantees (ULSG), cash accumulation UL (AccumUL), current assumption UL (CAUL), and the indexed UL (IUL) counterparts of these products. The definition of these product types is as follows:

**UL/IUL with Secondary Guarantees:** A UL/IUL product designed specifically for the death benefit guarantee market that features long-term (guaranteed to last until at least age 90) no-lapse guarantees either through a rider or as a part of the base policy.

**Cash Accumulation UL/IUL:** A UL/IUL product designed specifically for the accumulation-oriented market where cash accumulation and efficient distribution are the primary concerns of the buyer. Within this category are products that allow for high-early-cash value accumulation, typically through the election of an accelerated cash value rider.

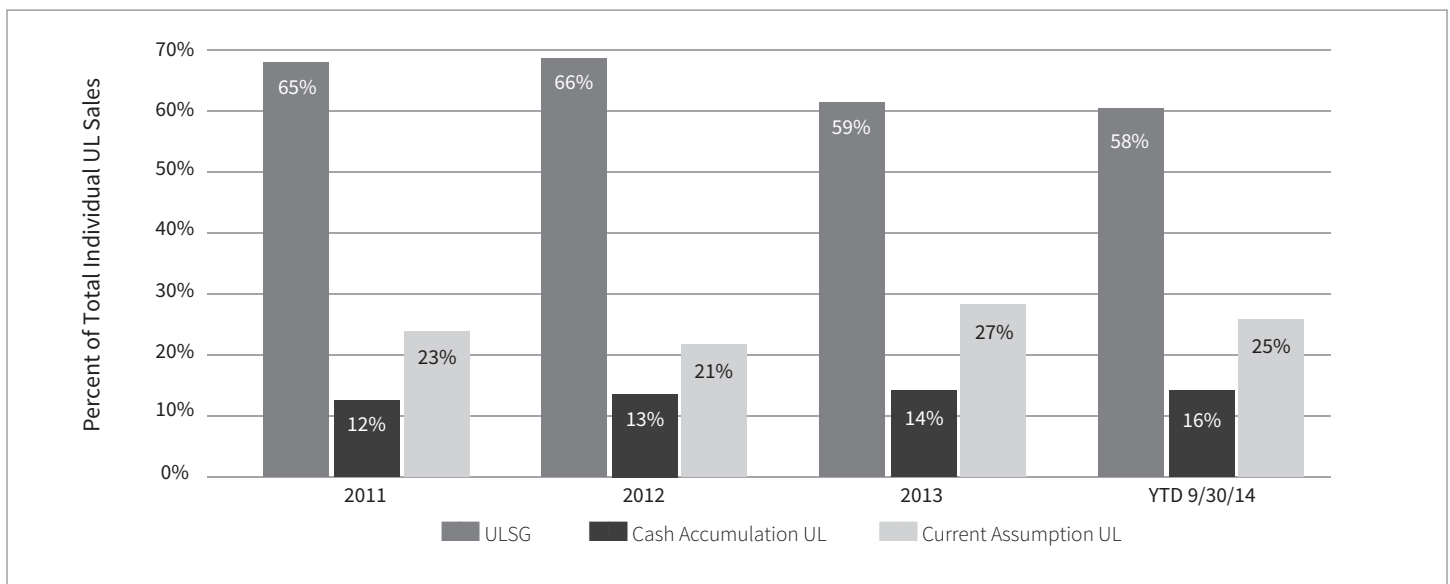
**Current Assumption UL/IUL:** A UL/IUL product designed to offer the lowest cost death benefit coverage without death benefit guarantees. Within this category are products sometimes referred to as "dollar-solve" or "term alternative."

Survey results are based on responses from 29 carriers of UL/IUL products. This article provides a summary of the key findings of the survey.

## UL SALES

The mix of UL sales (excluding IUL sales) reported by survey participants for calendar years 2011 through 2013, and for 2014 as of Sept. 30, 2014 (YTD 9/30/14) are shown in Figure 1. Individual company results were varied, but nine participants reported at least a 25 percent shift from or to any one UL product when looking at the YTD 9/30/14 product mix relative to that of 2013. Nine of the 29 participants reported movement to ULSG products, nine to AccumUL products, and eight to CAUL products. Sales of ULSG products were discontinued by five participants. One participant began selling ULSG products, and one began selling AccumUL products.

**Figure 1**  
UL Product Mix by Year



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In 2013, the average percentage of ULSG sales (based on policy count) with the selection of no lapse guaranteed (NLG) premiums to age 90 or longer was 81.3 percent, with a median of 100.0 percent. The average reported for YTD 9/30/14 was 78.2 percent, with a median of 99.0 percent. Percentages ranged from 3.7 percent to 100 percent, and in general, were

slightly higher than percentages reported in last year's survey.

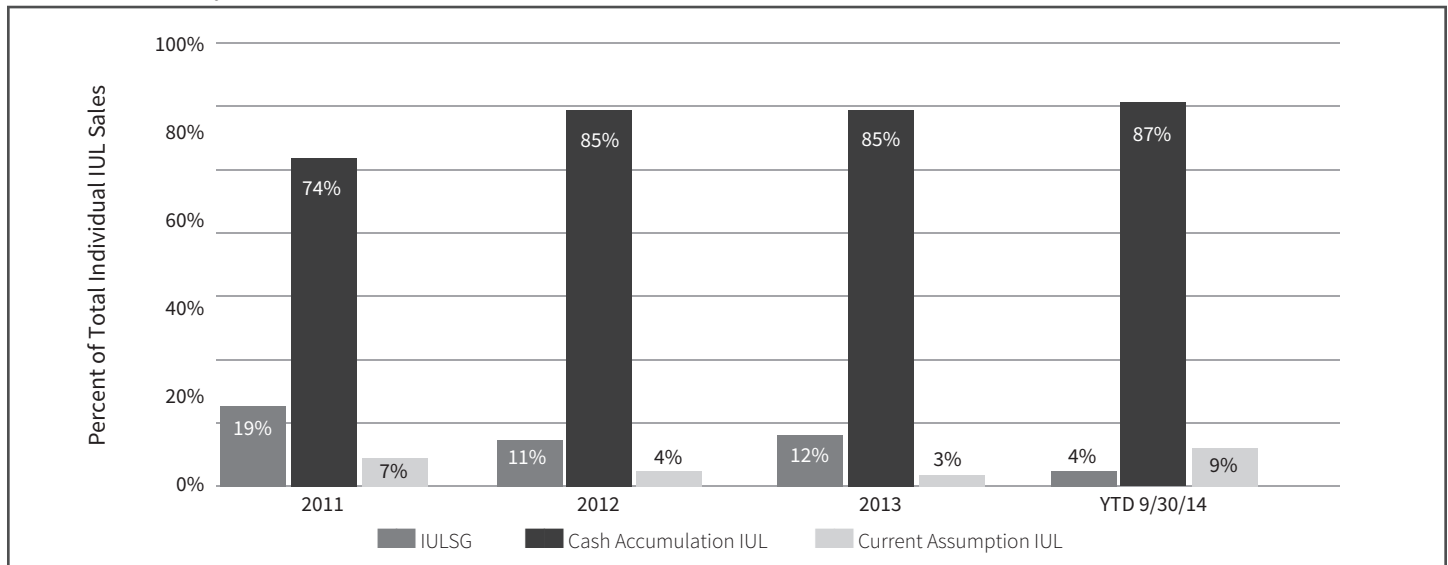
### INDEXED UL SALES

The continued trend of increasing IUL sales is evidenced by the percentage increase in the IUL market share from 2011 to YTD 9/30/14. Total IUL sales as a percent of total UL and IUL sales combined for survey participants increased from 25 percent in 2011 to 45 percent

during YTD 9/30/14. AccumIUL sales increased from 70 percent to 82 percent of total cash accumulation UL/IUL sales and CAIUL sales increased from 5 percent to 17 percent of total current assumption UL/IUL sales. The recent increase in IUL sales is attributed to the increasing number of new entrants in the IUL market in recent years, policyholders' interest in the upside potential

and downside protection offered by IUL products, and the attractiveness of IUL illustrations. Overall survey statistics suggest that companies plan to focus more on cash accumulation IUL and current assumption IUL products and less on universal life with secondary guarantees. The significance of AccumIUL products within the IUL market is illustrated in the graph in Figure 2.

**Figure 2**  
IUL Product Mix by Year



### LIVING BENEFIT RIDER SALES

Accelerated death benefit riders on individual life insurance policies have been popular for many years. More recently, the triggers for these benefits have expanded from terminal illness, to chronic illness and long-term care. Under chronic illness riders, payment of the death benefit may be accelerated if the insured has a chronic illness condition. Requirements to trigger the benefit typically

utilize a combination of activities of daily living (ADLs) and cognitive impairment, or permanent nursing home confinement.

Chronic illness riders are typically filed under the Accelerated Benefits Model Regulation 620. For long-term care (LTC) accelerated benefit riders, payment of the death benefit is accelerated if the insured has a chronic illness condition triggering long-term care (i.e.,

ADLs, cognitive impairment). LTC accelerated benefit riders are typically filed under Long-Term Care regulations. Other legal and design differences exist between chronic illness and long-term care accelerated benefit riders as well.

Fifteen of the survey participants currently offer a chronic illness accelerated benefit rider on either a UL or IUL chassis. During the first nine months of 2014 sales of policies with

chronic illness riders as a percent of total sales were 17 percent for UL products. Since more new IUL products have been developed recently, and many of these include a chronic illness rider, a greater share of chronic illness riders on an IUL chassis was seen (45 percent). YTD 9/30/14 sales with chronic illness riders as a percent of total sales for UL and IUL products separately by product type are shown in the table in Figure 3.



**Figure 3**  
Chronic Illness Rider Sales as a Percent of Total Sales

YTD 9/30/14 UL Sales With Chronic Illness Riders as a Percent of Total UL Sales (Weighted By Premium)			
Total Individual UL	ULSG	Cash Accumulation UL	Current Assumption UL
17%	17%	37%	5%
YTD 9/30/14 IUL Sales With Chronic Illness Riders as a Percent of Total IUL Sales (Weighted By Premium)			
Total Individual IUL	IULSG	Cash Accumulation IUL	Current Assumption IUL
45%	31%	44%	58%

Three different approaches can be used for the payment of chronic illness accelerated death benefits. Under the discounted death benefit approach, the insurer pays the owner a discounted percentage of the face amount reduction, with the face amount reduction occurring at the same time as the benefit payment. This approach avoids the need for charges up front or other premium requirements for the rider, because the insurer covers its costs of early payment of the death benefit via a discount factor. Eight of the 15 participants that reported UL/IUL sales with chronic illness riders provide a discounted death benefit as an accelerated benefit.

Six additional participants reported their chronic illness rider uses a lien against the death benefit to provide the accelerated

benefit, and one survey participant uses a dollar-for-dollar death benefit reduction approach. Under the lien approach, the payment of accelerated death benefits is considered a lien or offset against the death benefit. Access to the cash value (CV) is restricted to any excess of the CV over the sum of the lien and any other outstanding policy loans. The gross policy values continue as if the lien did not occur. That is, future premiums/charges are unaffected, and the gross CV continues to grow as if the lien didn't exist. In most cases there are lien interest charges that are assessed under this design.

Under the dollar-for-dollar approach, there is a dollar-for-dollar reduction in the death benefit and a pro rata reduction in the CV based on the percentage of the death benefit accelerated.

This approach always requires an explicit charge. Note that a recent SOA study reported a higher mix of plans using the dollar-for-dollar reduction approach.

The aging population and high cost of medical care have drawn attention to long-term care (LTC) needs. One solution for LTC needs is the use of LTC riders attached to UL/IUL policies (linked benefits) as an alternative to standalone LTC policies. During YTD 9/30/14, sales of policies with LTC riders as a percent of total sales were 18 percent for UL products and 9 percent for IUL products, both at peak levels. Figure 4 shows sales of LTC riders as a percent of total sales reported by survey participants for UL and IUL products separately by product type.

Few companies in the UL/IUL market offer both chronic illness riders and LTC riders; only three of the survey participants offer both chronic illness and LTC accelerated benefit riders. Nearly 86 percent of survey respondents expect to market either an LTC or a chronic illness rider within the next 24 months.

**PROFIT MEASURES**

As has been reported in the past, an after-tax, after capital statutory return on investment/internal rate of return (ROI/IRR) is the predominant profit measure reported by survey participants. The median ROI/IRR is 12 percent for all UL product types, except it is 10 percent for AccumUL, and 12.5 percent for IULSG.

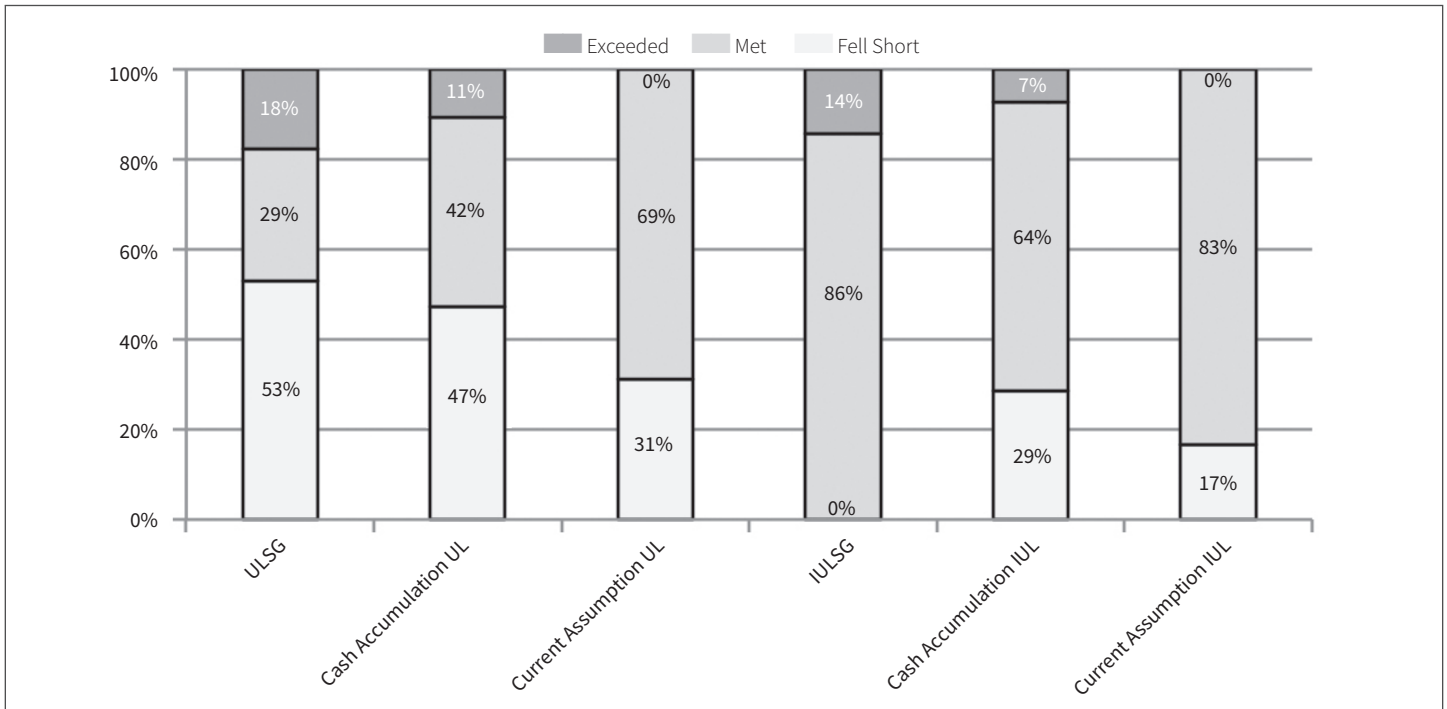
Survey respondents reported their actual results relative to profit goals for 2013 and YTD 9/30/14. In 2013, 53 percent of ULSG participants reported they fell short of profit goals. For the remaining UL/IUL products, the majority of participants were at least meeting their profit goals. The percentage of survey respondents reporting they fell short of profit goals during YTD 9/30/14 for ULSG was 59 percent. Again, for all other UL/IUL product types, the majority of participants were at least meeting their profit goals. The chart in Figure 5 shows the percentage of survey participants reporting they fell short of, met, or exceeded their profit goals by UL product type. Low interest earnings and expenses continue to be the top two reasons given for failure to meet profit goals.

**Figure 4**  
Long-Term Care Rider Sales as a Percent of Total Sales

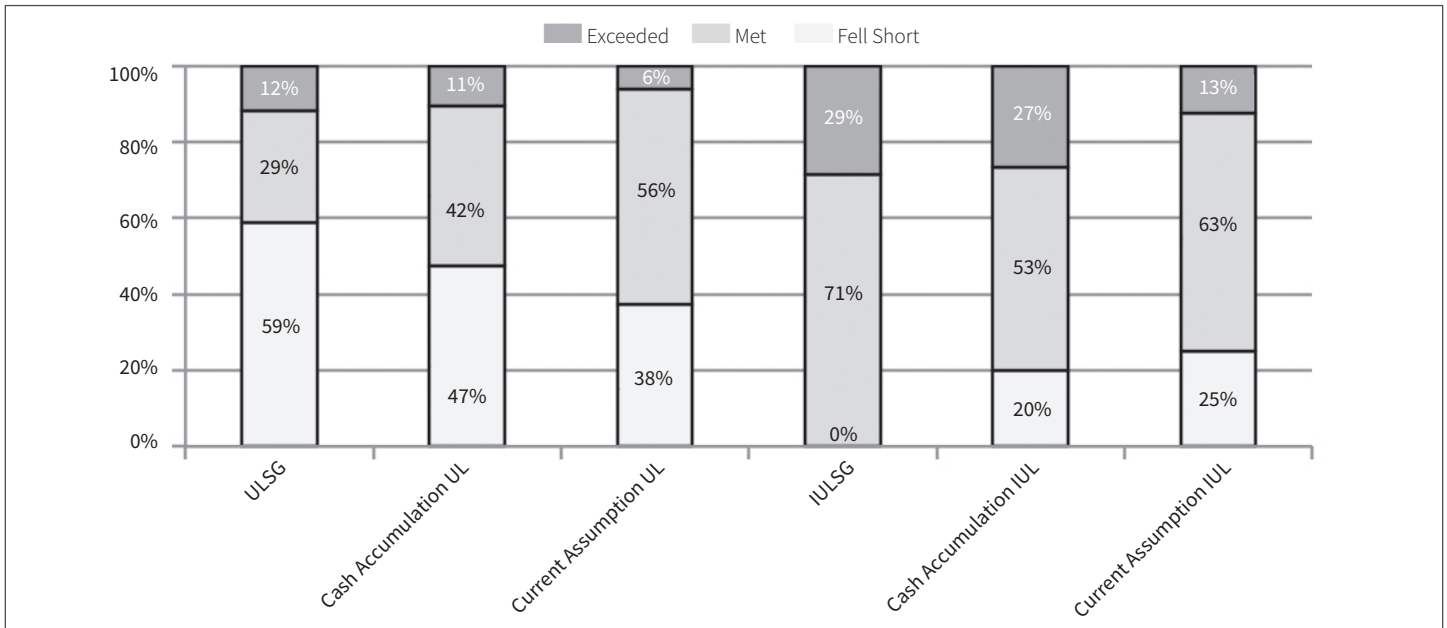
YTD 9/30/14 UL Sales With Long-Term Care Riders as a Percent of Total UL Sales (Weighted By Premium)			
Total Individual UL	ULSG	Cash Accumulation UL	Current Assumption UL
18%	26%	10%	4%
YTD 9/30/14 IUL Sales With Long-Term Care Riders as a Percent of Total IUL Sales (Weighted By Premium)			
Total Individual IUL	IULSG	Cash Accumulation IUL	Current Assumption IUL
9%	22%	9%	3%

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**Figure 5**  
Actual 2013 Results Relative to Profit Goals



Actual YTD 9/30/14 Results Relative to Profit Goals



## PRODUCT DESIGN

Four of the 17 participants reporting ULSG sales repriced their ULSG designs in the last 12 months, and three of those four also reported repricing their ULSG designs in the last 13 to 24 months. Six additional participants repriced in the last 13 to 24 months for a total of nine participants. Four reported that premium rates on the new basis versus the old basis increased, and one discontinued its ULSG product.

Strategies used in light of the low interest rate environment include:

- Intentionally reducing or limiting UL sales by increasing premium rates (11 participants), or discontinuing sales of certain products (11)
- Instituting premium limitations (seven)
- Riding it out (10)
- Launching new designs with reduced guarantees (nine)

## ILLUSTRATIONS

Fourteen of the 29 survey participants are no longer illustrating non-guaranteed elements on ULSG products, up slightly from last year.

Participants reported the median illustrated rate used in IUL illustrations is 7.50 percent, with an average of 7.10 percent.

Participants reported the median illustrated rate used in IUL illustrations is 7.50 percent, with an average of 7.10 percent. Similarly, the median rate one year ago was 7.29 percent, with an average of 7.06 percent. Nineteen of 20 participants reported that the illustrated rate is based on a look-back period, with 11 using a 25-year period, and seven using a 30-year period. Eight participants reported that the illustrated rate applies to both non-loaned and loaned values, and 11 reported that it does not apply to both values.

Survey participants reported if they are currently testing in-force business or using ASOP 24 Section 3.7 to not test when certifying for illustration actuary testing on in-force business. ASOP 24 Section 3.7 applies to illustrations on policies in-force one year or more. Twelve of 25 participants reported they are currently using ASOP 24 Sec-

tion 3.7 to not test when certifying for illustration actuary testing, and nine are testing in-force business. The remaining four participants are using both approaches.

Twenty-one of 28 participants are doing sensitivity testing to see where the disciplined current scale (DCS) breakpoints are (i.e., when the DCS might fail).

Three participants reported they are illustrating utilization scenarios/examples for accelerated death benefit (ADB) riders with a discounted death benefit approach. Four participants are doing so for other ADB riders. The majority of participants that are illustrating ADB utilization reported that the illustrations are in a supplemental illustration, rather than in the basic illustration.

## CONCLUSION

While many trends from the past continue within the UL/

IUL market, it isn't always easy to keep up to date on an industry that constantly presents new challenges and opportunities. Staying abreast of practices that are prevalent in the industry is critical for those insurers striving to compete in this market. Industry data, such as that included in the UL/IUL survey, can help insurers stay ahead of the curve and react as changes occur. A complimentary copy of the executive summary of the June 2015 Universal Life and Indexed Universal Life Issues report may be found at: <http://us.milliman.com/insight/2015/Universal-life-and-indexed-universal-life-issues--2014-survey/>. ■

### ENDNOTE

<sup>1</sup> LIMRA International, Inc.



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# Predictive Modeling Techniques Applied to Quantifying Mortality Risk

By Vincent J. Granieri

## 1. INTRODUCTION

Actuaries are familiar with the interaction of art and science in their work. Some view underwriting in the same way, perhaps concluding that underwriting leans more toward art than science. With the advent of powerful computers and predictive modeling tools, it is possible to analyze survival data and produce statistically credible underwriting models that predict relative mortality risk among individuals based on demographic information and relevant conditions. In this paper, we will discuss the use of the Cox Proportional Hazards Model in developing a predictive underwriting model that produces a mortality multiplier for each individual.

Further, we wished to quantify the impact on survival, if any, of certain subpopulations. We were looking to validate the time-accepted concepts of the wealth effect (beyond the scope of this paper) and anti-selection in our population.

### *Cox Proportional Hazards Model*

The Cox Proportional Hazards Model was introduced in 1972 as a method to examine the relationship between survival (mortality) and one or more independent variables, called

explanatory variables. Some advantages of the Cox model are that it can handle many underwritings on the same life and can utilize data that is right censored; i.e. subjects can leave the study at any time or the study can end before all subjects have died. The Cox model does not require knowledge of the underlying (base) survival curve, but we will see that this advantage is also a challenge when analyzing mortality.

Cox Model results are expressed as the logarithm of the hazard so technically, the relative risk factor for each variable is obtained by raising  $e$  to the power of the  $\log(\text{hazard})$ ; e.g. consistent with Gompertz. The relative risk factor is interpreted just as it sounds: it describes the force of mortality relative to the reference. A relative risk factor of two for a condition means the subject is twice as likely to die as another subject who does not have that condition.

As an aside, we utilized the R statistical package to produce our survival models. It is particularly well-suited for this type of analysis. Other popular statistical packages, such as SAS, also contain survival models using the Cox algorithms.

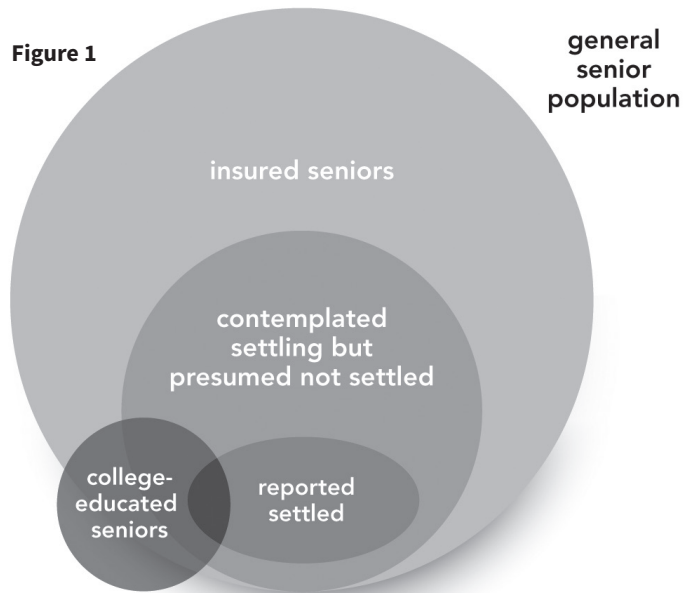
## 2. THE ISSUES

The most important issue was that of the underlying mortality distribution. We already had produced mortality tables that varied by age/gender/tobacco use. What then should we do with the results that also calculated the impact of these variables? We decided to use our existing base tables after reviewing the model results for consistency with them.

It was also very important to ensure that the explanatory variables were truly independent. If not, spurious results would ensue. We also had to re-define certain variables, such as BMI, where the risk was actually related to straying from the ideal BMI measurement, rather than the measurement itself. There were many other issues, too numerous to mention in a paper of this length.

## 3. INPUT DATA

For this exercise, we had available to us over 200,000 underwriting events on 80,000+ unique senior lives, which took place over a 15 year period, primarily in the life settlement market. Figure 1 is a graphic description of the major subpopulations of the universe of senior lives and the populations we studied. At the highest level, there is the general senior population. Some of these seniors have purchased insurance, creating a subpopulation, which can be further broken into two subpopulations; those who actually sold their policies on the secondary market and those who contemplated such a sale, but for some reason, did not conclude the sale. These latter two subpopulations were the basis for our study of antiselection. There is also a small popu-



CONTINUED ON PAGE 14

ulation of college-educated seniors, some of whom can also be associated with the other populations above, which formed the basis for our study of the wealth effect. This data included demographic information such as age, gender, dates of birth and dates of death. It also included various underwriting conditions such as BMI, smoking status and indicators for various diseases. Included were favorable conditions, such as family history of longevity and good exercise tolerance.

#### 4. CREATING COX PROPORTIONAL HAZARDS MODELS

There was significant data preparation involved. We set up the reference population, which we chose to be males who were age-appropriately active, who did not sell their policies and did not use tobacco. Variables were determined to be either continuous (age, BMI), where the condition has infinite possible values, or binary (CAD, osteoporosis), where the condition either exists or does not. This required considerable judgment and depended on the availability and form of the data.

Once the data were prepared, we began the process of determining which conditions were statistically significant in predicting mortality. We underwent an iterative process. The Cox models were run with every variable included at first. We then we reran the models, first eliminating most of those variables with a p-value greater than 0.2. This means we were excluding those conditions

where the probability that the relative risk shown was due to random fluctuation was over 20 percent. These models were again rerun, this time eliminating those conditions with a p-value greater than 0.1. Finally, we reran the models, including only those conditions where the p-value was at most 0.05.

Figure 2 represents partial output from our models, consisting of conditions that were included in all runs even if they did not meet the criteria for continued inclusion above. As we advanced through the process, we felt strongly that these were fundamental variables that clearly impacted survival and should be included in the analysis regardless of their p-values. In reality, only one variable would have been eliminated, presumably due to data

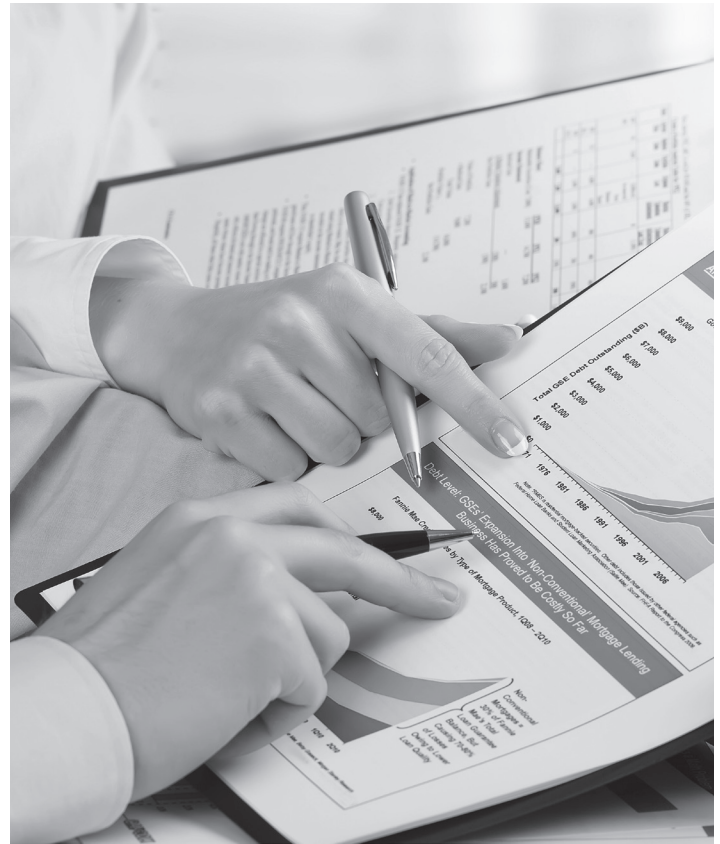


Figure 2

	All (<=0.05)				
	Log (hazard)	Hazard	Lower CI	Upper CI	P-Value
Age	0.077	1.080	1.075	1.085	-
Actual BMI less ideal BMI	0.002	1.002	1.001	1.002	0.000
Recurrent Cancer	0.458	1.581	1.365	1.832	0.000
Female	(0.365)	0.694	0.649	0.742	-
Active for their age	(0.141)	0.869	0.802	0.942	0.001
Sedentary	0.200	1.221	1.054	1.415	0.008
Unknown activity level	0.102	1.107	1.031	1.189	0.005
Family history of longevity	(0.087)	0.917	0.857	0.981	0.012
Family history of super longevity	(0.240)	0.787	0.722	0.857	0.000
College-educated population member	0.267	1.306	1.117	1.526	0.001
Settled population member	(0.370)	0.691	0.650	0.734	-
Current smoker	0.635	1.887	1.693	2.103	-
Discontinued smoking	0.178	1.195	1.128	1.267	0.000
Rare smoker	(0.339)	0.713	0.266	1.911	0.501
Tobacco replacement	0.576	1.780	1.187	2.668	0.005
Unknown tobacco use	0.119	1.127	1.018	1.247	0.021

Reference: Male, nonsmoker, normal activity level

scarcity. Light and dark gray shading indicates that a condition is hazardous/protective, with the 95 percent confidence limits and p-values also shown. For example, the female hazard is 0.694 of that of males (1.0 as males are the reference) and the smoker hazard is 1.887 times that of nonsmokers. For the other explanatory variables, many were eliminated as the p-value criteria became more stringent.

### Conclusions

The most important conclusion that we drew from this exercise was that despite our best efforts to quantify every aspect of underwriting, there is still considerable judgment brought to bear in that process. However, there is also much useful infor-

mation that predictive models can provide us because of their ability to process large amounts of data quickly and efficiently. We did validate the anti-selection that occurs between those who actually sell their policy versus those who do not. Some results confirmed our clinical judgment; for example, an active lifestyle or family history of longevity are indicators of higher survival rates. Other things went against our clinical judgment; for example, cardiac related conditions, while still hazardous, were no longer as significant as we thought.

Then there were the confounding results. Hyperlipidemia was shown to be protective. We attributed this to the ubiquity of statins. There were a number

of other conditions that were shown to be mildly protective, things such as BPH, sleep apnea, use of blood thinners and benign colon polyps. We concluded that these were indicators of frequent/better quality of health care, which would allow for early detection and mitigation of more serious risks.

### 5. BUSINESS OUTCOMES

This analysis was the basis for changes in our debit/credit underwriting model. We replaced an additive model based only on clinical judgment with one that was more consistent with mortality research and provided us the flexibility to continue to factor in clinical judgment where appropriate. ■



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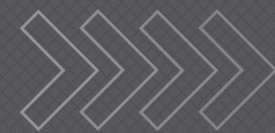


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# Actuarial Guideline 49 (aka Actuarial Guideline YY)

By Donna Megregian

*This article reflects the view of the author and is not representative of the Society of Actuaries, the American Academy of Actuaries or RGA.*

After a lot of hours, hard work, and compromise, April 16, 2015, brought about a new actuarial guideline that was approved by the Life Actuarial Task Force (LATF). This guideline officially will be known as “Actuarial Guideline 49 (AG 49), The Application of the Life Illustrations Model Regulation to Policies with Indexed-Based Interest.” The goal of the guideline is to help bring consistency to the determination of the maximum illustrated index crediting rate on indexed universal life policies (IUL), moderate what some perceived as the potential for IUL products to meet with consumer dissatisfaction, and provide guidance to the illustration actuary.

By Sept. 1, 2015, for all new business and in-force policies issued on or after Sept. 1, 2015, sections 4 and 5 of the guideline must be reflected in illustrations. By March 1, 2016, Sections 6 and 7 of the guideline are effective. This article will highlight the provisions of each section of the guideline.

## BENCHMARK INDEX ACCOUNT

The guideline establishes new definitions that were not contemplated in the Life Illustration Model Regulation (Model Regulation #582 or the Model Reg) or Actuarial Standard of Practice 24 (ASOP 24). One new term is Benchmark Index Account.

Section 3B of AG49 defines a Benchmark Index Account as an Index Account with the following features:

- i. The interest calculation is based on the percent change in S&P 500® Index value only, over a one-year period using only the beginning and ending index values (annual point-to-point approach). (S&P 500® Index ticker: SPX)
- ii. An annual cap is used in the interest calculation.
- iii. The annual floor used in the interest calculation shall be 0 percent.
- iv. The participation rate used in the interest calculation shall be 100 percent.
- v. Index interest is credited once per year.
- vi. Account charges, if applicable, do not exceed the account charges for any other accounts within the policy.

- vii. There are no limitations on the portion of account value allocated to the account.

The S&P 500® along with the other parameters defined were chosen because of its widespread recognition, history, and popularity among IUL products today.

Section 4 of AG49 describes the calculation for what the maximum illustrated credited rate can be using the Benchmark Index Account parameters. The basic calculation is a rolling 25-year average starting on 12/31 of the calendar year that is 66 years prior to the current calendar year, ending 12/31 of the prior calendar year. Illustrations in 2015 would use a starting point of 12/31/1949. This longer term rolling average will prevent wide swings in the maximum illustrated rate year to year on the Benchmark Index Account.

Actuarial judgment is used when parameters do not line up exactly with the Benchmark Index Account. For starters, create a hypothetical supportable index that meets the definition of Benchmark Index Account and reflect the fundamental characteristics of the index account with the appropriate relationship to the expected risk and return of the Benchmark Index Account (Sections 4A and 4C). Regardless of what index or index parameters a company uses (higher floors, different participation rates, different index, etc.), the maximum illustrated rate cannot exceed that which is based on what is defined as the Benchmark Index Account.

Section 5 of AG49 imposes a limitation on how much a disciplined current scale can assume as an underlying earned interest rate. If the insurer engages in a hedging program, the





## What is supportable is up to the illustration actuary and involves all aspects of the product, not just the crediting rate.

assumed earned interest rate underlying the disciplined current scale (DCS) cannot exceed 145 percent of the annual net investment earnings rate of the general account assets allocated to support the policy. If a company has a 5 percent net investment earnings rate, the earned interest rate cannot exceed 145 percent x 5 percent = 7.25 percent. Without a hedging program, the earned rate is limited to the net investment earned rate (in this case 5 percent).

Pop quiz: You have an indexed account with a 1 percent floor and a current cap of 11 percent. How would you apply AG 49 to determine your maximum illustrated credited rate? (Answer in the next edition of *Product Matters!*)

### POLICY LOANS AND ALTERNATE SCALE

Section 6 of AG 49 limits the arbitrage between the loan charged rate and the credited rate on loaned funds under participating loans to 100 bps. Many IUL policies have a participating loan, meaning the loaned amount is credited whatever the other non-loaned funds are credited. The charged rate on the loaned fund may be fixed by the company or variable, but until AG 49, the difference between the charge and credit in some circumstances

created a loan arbitrage, or borrow for less than interest credited. Section 6 mitigates the differential, but does not eliminate the arbitrage completely.

Section 3A of AG 49 defines the Alternate Scale as a scale of non-guaranteed elements currently being illustrated such that:

- i. The credited rate for each account does not exceed the credited rate for the Fixed Account, or, if the insurer does not offer a Fixed Account with the illustrated policy, the average of the credited rate for the illustrated scale and the guaranteed credited rate for that account.
- ii. If the illustration includes a loan, the illustrated rate credited to the loan balance does not exceed the illustrated loan charge.
- iii. All other non-guaranteed elements are equal to the non-guaranteed elements for the illustrated scale.

This Alternate Scale eliminates any excess interest above the current fixed account and any loan arbitrage. Section 7 of AG 49 requires the Alternate Scale and the illustrated scale developed under Section 4 and 5 be shown side by side. Section 7 also requires additional tables to be shown related to the min-

imum and maximum annual credited rates from Section 4 and 20-year historical results for the actual index account using current index parameters. Modifications to illustration systems can take time to put into the correct format which is why this section has an effective date for next year. Because guaranteed scales are also supposed to be shown next to current illustrated scales based on the Model Reg, companies may need to move to a landscape format or create a new page to display the current and the Alternate Scale together.

Pop quiz: I have a variable loan rate that is currently projecting 5 percent, and my benchmark index account is calculated to credit 7 percent. What values can I show in my illustration? (Answer in the next edition of *Product Matters!*)

### OVERALL IMPACT

Some may lobby for an update to the Model Reg, as broader issues related to a nearly 20-year-old regulation (effective in 1997) may need to be addressed more directly than through an actuarial guideline. Loan arbitrage can exist on other products, not just IUL, and companies with potential for arbitrage may want to consider AG 49 and the precedent it sets related to this topic. Bringing consistency and consumer information is in the spirit of the guideline and the Model Reg, however all products and markets may benefit from a refresh of the Model Reg, although that takes time and state approval.

The guideline will not necessarily require products with the

same index parameters to have the same maximum illustrated rate. What is supportable is up to the illustration actuary and involves all aspects of the product, not just the credited rate. The guideline does provide more direction on how companies calculate certain aspects of the parameters that feed into the testing.

At the time of this writing, the American Academy of Actuaries Life Illustrations Workgroup has been working on a supplement to the practice notes to help with some questions companies have related to the guideline. By the time this is published, the supplement should be available through the American Academy of Actuaries website<sup>1</sup>. An update to the practice notes is likely on deck after that.

What about New York you ask? New York has been open to the fact that they intend to create their own guidance related to this topic. At the time of this writing, nothing is known to this author to have been made available for comment. ■

### ENDNOTE

<sup>1</sup> The American Academy of Actuaries has now published the addendum. Available at [https://www.actuary.org/files/IWGPracticeNoteAdd\\_08282015.pdf](https://www.actuary.org/files/IWGPracticeNoteAdd_08282015.pdf).



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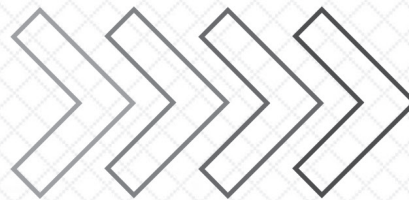
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# Term Conversion Survey Results

By Kyle Proebsting and Lindsay Meisinger

*This article first appeared in the September issue of Reinsurance News. It is reprinted here with permission.*

In 2014, the SOA Product Development and Reinsurance Sections, along with the Committee for Life Insurance Research engaged Reinsurance Group of America (RGA) to undertake a research project on term conversion practices and mortality experience.

The project was split into two phases:

- Phase 1 is an assumption survey which is focused on product features and conversion practices.
- Phase 2 is an experience analysis of level term business as it transitions from the term policy into the converted permanent policy.

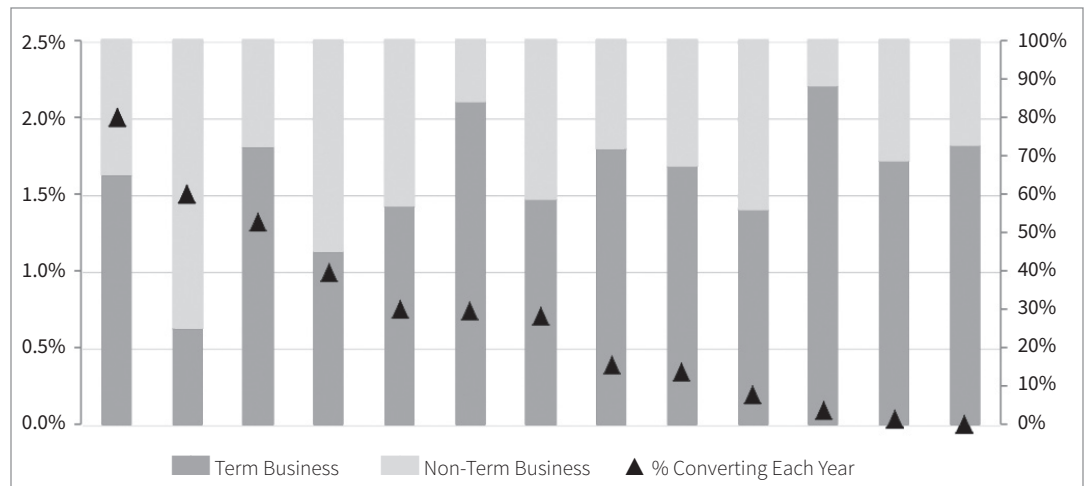
The Phase 1 survey was completed by 21 companies that made up 52 percent of the 2013 term sales in the market. This article summarizes some interesting findings from the survey. The complete survey report can be found at <https://www.soa.org/Research/Research-Projects/Life-Insurance/2015-survey-conversion-assumptions.aspx>. Throughout this article, graphs are pulled directly from the complete survey report for ease of reference for the reader.

## COMPANY INFORMATION

The first section of the survey focused on sales distributions of the participating companies. On average, more than half of the survey respondents' sales in 2013 came from term policies, and approximately one-third of their in-force business is made up of term policies. Approximately 1.1 percent of respondents' term policies converted to permanent business each year. The phase 1 survey results were presented at the 2015 SOA Life and Annuity Symposium which included audience participation via polling questions. These polling questions helped to give further insight

**Graph 1**

Face Amount Issued in 2013  
Companies Providing % of Policies Converging Each Year  
Ordered by % Converting Each Year



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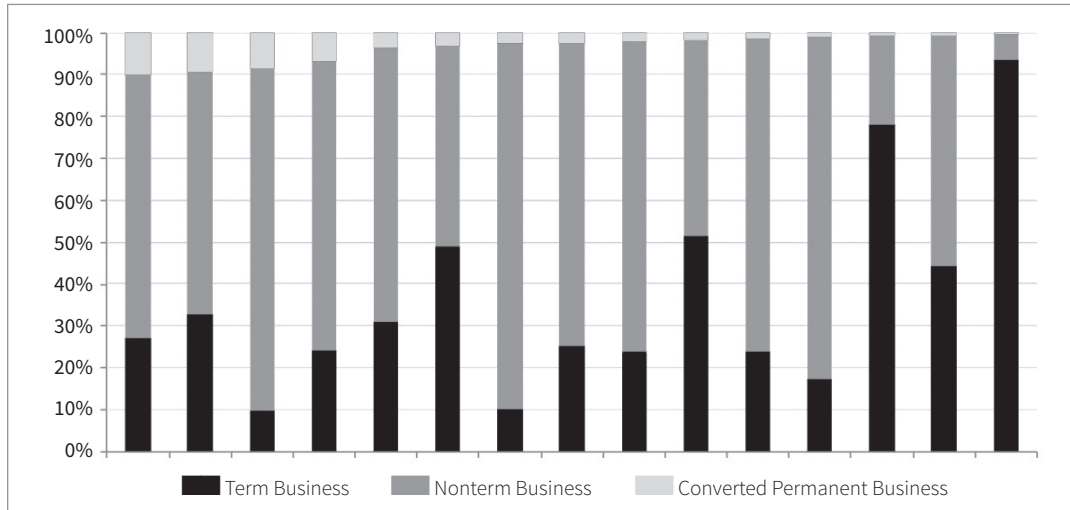
The Phase 1 survey was completed by 21 companies that made up 52 percent of the 2013 term sales in the market.

into the conversion process. The results of the audience polling generally supported the previously mentioned statistic as approximately 61 percent of the attendees indicated that between 0.5 and 3 percent of their term policies have converted to permanent business annually.

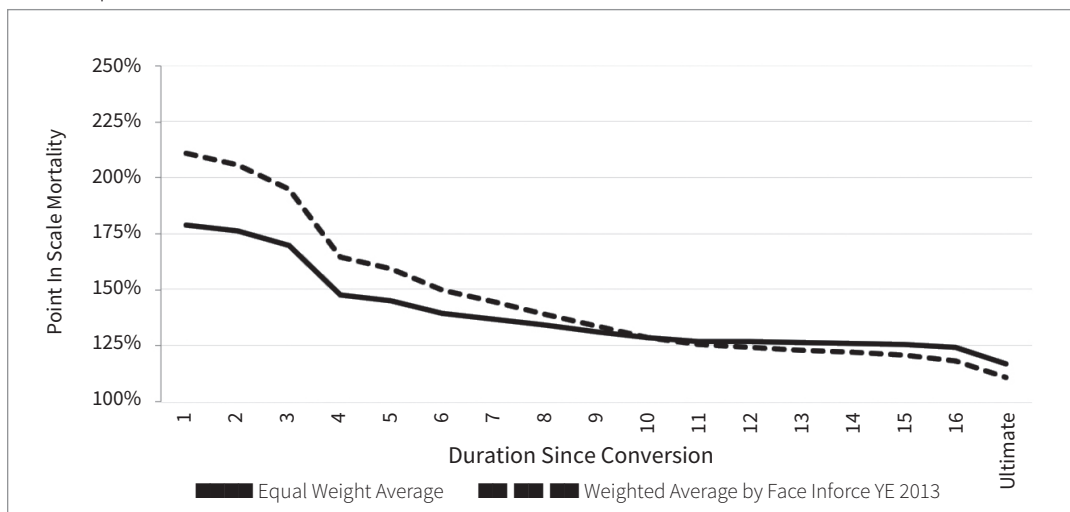
When looking at the data (Graph 1) by policies issued in 2013 supplied by companies who provided a percentage of business converting each year, note the range of converting business is between zero and three percent. Furthermore, the information which has been presented by conversion percentage from largest to smallest does not indicate an apparent correlation between business mix and conversion percentage.

The proportion of in-force policies tells a very similar story in Graph 7. Companies were asked to provide three data points as of year-end 2013, including term business, non-converted permanent business (nonterm), and permanent business converted from term (converted permanent). The mix of in-force business attributed to converted permanent policies ranges from zero to 10 percent of the total in-force business for any given company who responded with each of three data points requested. For some companies, Graph 7 shows the overall percent of converted policies in force is not an immaterial portion of in-force business and should not be overlooked.

**Graph 7**  
Policies Inforce Year End 2013



**Graph 13**  
Multiple of Best Estimate Mortality Expectation for Converted Business  
By Duration Since Conversion  
All Companies



**CONVERSION BEST ESTIMATE MORTALITY**

The survey asked respondents to provide the best estimate mortality expectation for converted business as a percentage of non-converted permanent business issued at the same time of the original term policy, referred to as Point-in-Scale Mortality (PISM). For example, a term policy that converts

in the 8th duration is compared to an underwritten permanent policy that is in its 8th duration.

Seventeen of 21 companies answered this question. Twelve companies provided a flat multiple of PISM. These multiples ranged from 100 percent, meaning no additional mortality for converted business to 200 percent, or two times the mortality for converted business as

a percentage of non-converted business.

The remaining five companies provided mortality multiples which varied by duration since conversion. The multiples started anywhere from 200 percent to 500 percent (well above the flat multiples provided by the other 12 companies) grading down to approximately 150 percent or 100 percent, 10 to 15

years after the policy converted. This indicates that some companies see anti-selective behavior of conversions that is more prominent immediately after conversion and wears off in the later policy durations since the conversion.

The results of all companies were averaged by equal weight as well as weighted by face amount totals as of year-end 2013, shown in Graph 13.

Both averages show the same assumption trend in mortality since conversion: higher mortality immediately upon conversions as a percentage of PISM, grading down to little or no additional mortality after at least 15 years since conversion.

**CONVERSION PROCESS**

The conversion process, consisting of topics relating to administration, auditing and experience studies was also surveyed. While three of the 21 respondents indicated that conversions are coded as lapses or surrenders, the remaining 18 companies indicated that conversions are identified by their own individual code in company systems. Once the policy has been converted to a permanent plan, it can be coded as in force or new business. Eighteen of the 19 companies who responded indicated that they track converted policies as new business. Since conversions are technically a continuation of another contract, this administration process may be contributing to the fact that only nine of the 21 companies indicated that they could identify conversion on permanent plans as well as link the permanent

plan back to the original term policy. Some of the companies expressed interest in improving this process.

Conversions are generally administered on the same systems as their permanent and term policies. While every company indicated that conversions and permanent policies are administered together, only 19 of the 21 respondents indicated that conversions and term policies are administered on the same system. For the two remaining companies the term and conversion policies would be administered on a different system depending on what type of product the policy would be converted.

The survey also asked each company if they had the ability to audit their conversion process. Only 10 of the 21 companies had the ability to audit and only three of those companies who audit are doing so on a regular basis (at least annually). Based on the findings of a conversion audit, two companies responded that they have enacted changes. The desire to improve current auditing processes tended to be a general theme among the respondents' additional comments.

**Chart 18**

Conversion Philosophy	
Encourage Conversions	Responses
At any time to every insured	8
At certain points in time for every insured	4
At certain points in time to certain insured	3
We do not encourage conversions ever	4
Not sure	2

When asked about conversion mortality studies, 16 companies indicated that they are able to look at conversions separately from other data, six of which can review their mortality studies with and without conversions. Moreover, 13 of the 16 companies with the ability to look at conversions separately do perform separate conversion mortality studies.

**CONVERSION PHILOSOPHY**

When asked whether or not conversions were encouraged, only four of the 21 companies indicated that they are not encouraged, while two companies were unsure. The remaining breakdown in Chart 18 shows eight companies encouraging conversions to any insured at any time, four companies encouraging conversions to any insured at certain times, and three companies encouraging conversions to certain insured at certain times.

This seemed to be the general consensus at the 2015 SOA LAS presentation as well, as 72 percent of the polling respondents fell into one of the three encouragement camps and only 9 percent claimed their company does not encourage conversion.

One of the hottest topics in the industry today is the idea and implementation of predictive modeling. When asked if predictive modeling is currently used to target conversions no company admitted to be doing so, however, two companies indicated that they have either begun to investigate it as a possibility or potentially will consider it in the future.

Chart 19 shows the majority of the survey respondents indicated that they build the cost of conversion into the term policy either implicitly or explicitly.

**Chart 19**

Conversion Philosophy	
Cost of Conversions	Responses
Implicitly built into the term policy	5
Explicitly built into the term policy	7
Implicitly built into the permanent policy	5
Explicitly built into the permanent policy	2
Not built into either term or permanent policy	1
Conversion has no cost	1

Implicitly refers potentially to embedding the cost into the mortality assumption and explicitly refers to potentially per policy or per unit additional costs specific to conversions charged in pricing. Conversely and interestingly enough, at the 2015 SOA LAS presentation, most polling responses indicated that they believed the cost of conversion would be built into the permanent policy (48 percent total), not the term policy as the survey indicated.

**CONVERSION REINSURANCE**

The survey concluded with a section on reinsurance of converted policies. Almost all

of participating companies (18/20) responded that they reinsure conversions. Two companies out of 17 respondents recapture the conversions and cede them to the permanent pool, while 15 of the companies indicated the conversions stay with the original reinsurance pool regardless of permanent pool participation.

Slightly more than half of the companies (10/18) indicated they are paying separate rates for conversions regardless of participation in the permanent pool. These companies may

recognize the conversion policies should be treated differently than the other reinsured permanent policies. Five (5/18) respondents pay permanent point-in-scale rates upon conversion to reinsurers that are in both the permanent and term pools. The remaining responses are shown in Chart 20.

At the Life and Annuity Symposium a polling question was asked on the structure of reinsurance premiums. The largest portion of respondents, 39 percent, answered that they pay permanent point-in-scale rates. This differed from the survey report results above, where most respondents indicated

**Chart 20**

Conversion Reinsurance	
Structure of Reinsurance on Converted Policies	Responses
We pay separate rates for conversion regardless of permanent pool participants	10
Reinsurers that are not in existing permanent pool are paid based on the reinsurance terms of the original term policy as if it didn't convert	1
Reinsurers that are in both the term and permanent pools are paid permanent point in scale rates upon conversion	5
We do combinations of the above depending on the reinsurer	2

paying separate rates for conversions.

**PHASE 2**


As indicated in the survey, most companies are identifying the conversions in their administration systems, but the issue is tying the permanent policy back to the original term policy. This is the biggest challenge facing Phase 2 of this project in completing a mortality study on converted business when original issue date or durations since conversion is lost.

A goal of the Phase 2 Experience Analysis portion of this research project is to exam-

ine the mortality of converted business. It will be interesting to compare Graph 13 from the Conversion Best Estimate Mortality Section to the actual experience study results as they become available.

The remaining focus of Phase 2 is to analyze the level term business as it transitions into a converted policy. Conversion rates will be compared to the underlying conversion privileges where available.

This analysis is currently ongoing, but a first look at results will be presented at the SOA Annual Meeting in October. ■



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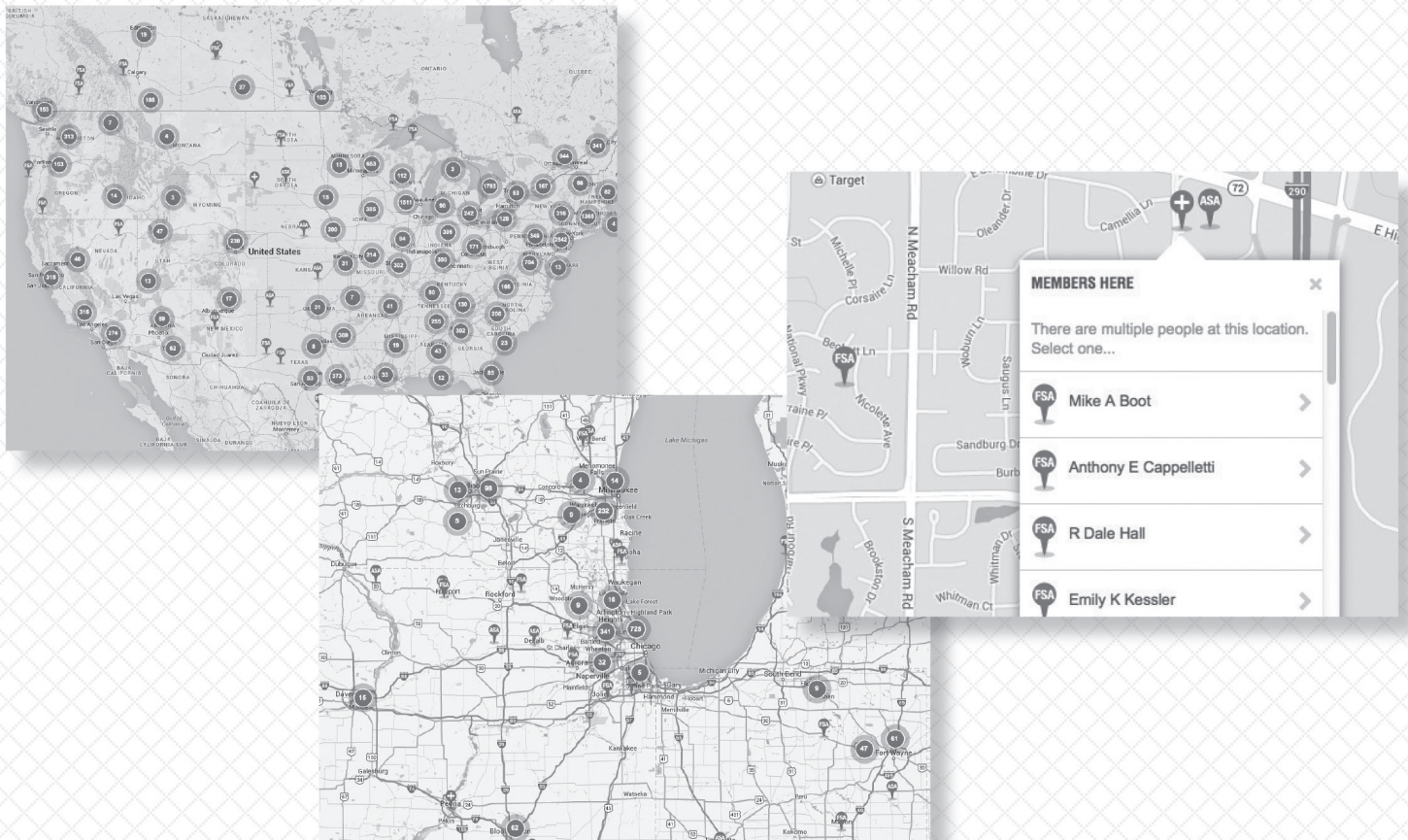
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To use the SOA Explorer Tool, visit [SOA.org](http://SOA.org) and sign in as a member.





# SOCIETY OF ACTUARIES

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