

Reinsurance news

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Results of the 2012 SOA Life Reinsurance Survey

By David Bruggeman

The final results of the 2012 Society of Actuaries (SOA) Life Reinsurance Survey are now available. The survey captures individual and group life data from U.S. and Canadian life reinsurers. New business production and in-force figures are reported with reinsurance broken into the following three categories:

(1) Recurring reinsurance: Conventional reinsurance covering an insurance policy with an issue date in the year in which it was reinsured. For the purpose of this survey, this refers to an insurance policy issued and reinsured in 2012.

(2) Portfolio reinsurance: Reinsurance covering an insurance policy with an issue date in a year prior to the year in which it was reinsured, or financial reinsurance. One example of portfolio reinsurance would be a group of policies issued during the period 2005 to 2006, but being reinsured in 2012.

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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 Reinsurance Section Web page at <http://www.soa.org/reinsurance>.

Reinsurance news

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Call for Articles for next issue of Reinsurance News.

While all articles are welcome, we would especially like to receive articles on topics that would be of particular interest to Reinsurance Section members.

Please e-mail your articles to Richard Jennings (richard.jennings@sunlife.com) or David Xia (dxia@scor.com).

Some articles may be edited or reduced in length for publication purposes.

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The Answers You See and the Answers You Don't See

By Scott Meise

Greetings! This issue I'd like to talk about the answers in front of you and the answers that take a little digging. In England, there is a cartoon called Fireman Sam, and it is hypnotic to my 2-year old son. The show is about a town called Pontypandy in Wales and the people in it. Most of the residents are not high-functioning individuals, but luckily they have a fireman (Sam) at their local station who is usually able to contain the damage they do every episode (which is usually a fire).

The most interesting character in the show is a mischievous child named Norman Price. In the shows we have watched, Norman has:

- Fallen in a well
- Gotten his head stuck in between the bars of a railing
- Gotten stuck up on a mountain
- Accidentally driven off with the fire truck
- Gotten stuck in a wooden birthday cake during a fire
- Gotten stuck to his bedroom door while trying to build a model airplane
- Driven a go-cart into the sea
- Started numerous fires by, among other things:
 - o Cooking sausages
 - o Throwing a paper airplane on a stove
 - o Cooking a scarf in an oven.

It's relatively safe to say that if you see Norman in an episode, he is going to cause great danger (and property/casualty claims) in some way.

This brings us to the answer that's in front of us. It seems as though if Norman's family was to find some incentive to move out of Pontypandy (or if, god forbid, Sam was to respond just a little late to one of his emergencies), that it would be sad, but Pontypandy and its residents would save themselves countless dangers and untold damage going forward. Sam might even be able to take some of the vacation he never gets because he's always responding to the alarm bell.

However, after considering it, there might be more to the story than that. To be fair, if Norman just took a day of leisure and played video games, it wouldn't make for much of a show. The show is predisposed to display Norman when he's causing danger. Also, maybe it's something genetic in the townsfolk and Norman shouldn't be blamed? Maybe Norman just looks young but is really quite old, and causing tens of disasters isn't quite the clip that it seems? Some answers take a little digging.



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It's the same way with my work in reinsurance. Some projects come to us via an RFP or specific request from an insurer. When this happens, it is important to do the best job we can with diligence and pricing to give a quote that is fair to the insurer but also fits within our business model. However, there are also situations where there are solutions to be found that don't jump out at you or aren't the product of a specific request. As reinsurers, we need to stay on top of regulations, accounting and the environment so that we're giving the best solutions to insurance companies that we can. By digging deeper we can provide more value to our clients.

Another example of this is our work in the Reinsurance Section this year. Earlier this year in May and June, we held a Life Intro to Reinsurance Boot Camp and a Health Intro to Reinsurance Boot Camp after the Life & Annuity Symposium and Health Meeting, respectively. We had built up a good amount of content and a good group of presenters, and thought that the demand was there for continuing education and good presentation of reinsurance issues and topics. After discussing it further, another idea that came up is to spread the message more by traveling to different cities with the boot camps to get closer to the actuaries. Over the next year, we'll be working to try to make that happen. By digging deeper, we're doing what we can to provide value consistent with our goals and the goals of our members. By the way, a special thanks to Mike Kaster for organizing and driving the boot camps to completion—it was a lot of work on his part and he drove it through with a lot of creativity and effort!

We hope you enjoy the articles in this issue—of note are the Munich Re Life Reinsurance Survey results, which are always interesting—and keep an eye out for the reinsurance sessions at the annual meeting in San Diego in October, including the breakfast and the networking event. If you get a chance, drop us a line and let us know if you have any questions or comments on what you think about what we're doing and what we could do better. I think we should be able to answer your questions and address any comments—find the answer that's in front of us. Maybe we can come up with something and find the answers that take a little digging! ■

(3) Retrocession reinsurance: Reinsurance not directly written by the ceding company. Since the business usually comes from a reinsurer, this can be thought of as “reinsurance of reinsurance.”

Thanks to all of the survey participants for their support and timely responses this year.

UNITED STATES

The U.S. economy began to slowly rebound in 2012. The markets were up, and reported unemployment rates, while still high, trended lower throughout the year. But, interest rates remained very low and are expected to be low for the next couple of years. Did the improved market conditions elevate consumer trust and lead to more life insurance sales? More importantly, at least for life reinsurers, did the improved economic conditions positively impact life reinsurance production?

Compared to 2011, things were relatively quiet within the life reinsurance industry in 2012. 2011 saw multiple acquisitions within the industry. To quickly recap, in 2011, Pacific Life acquired Manufacturers Life’s retrocession business, Hannover acquired a portion of Scottish Re’s life reinsurance business, and—the largest

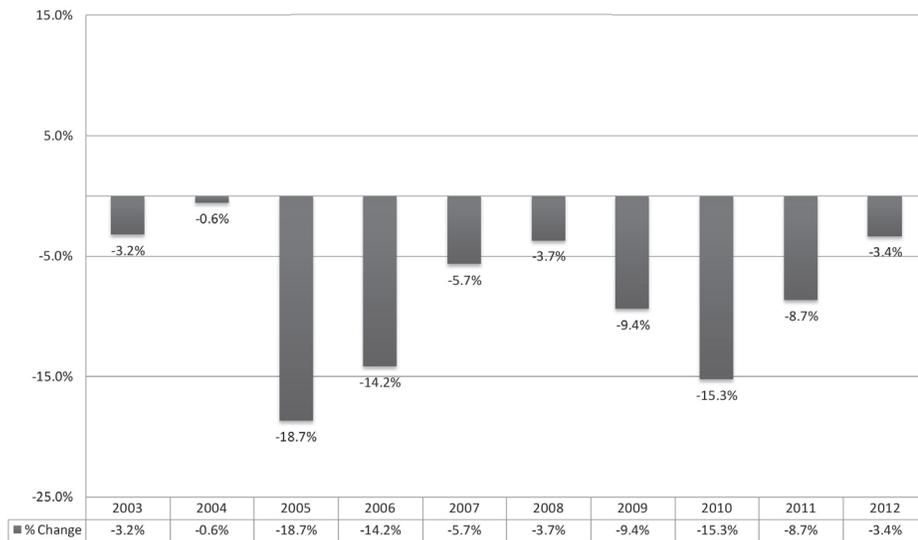
acquisition of the year—SCOR Global Life Re acquired Transamerica Re (a top-five U.S. life reinsurer). While there were no blockbuster deals in 2012, there were still a few announcements that could have a meaningful impact on the life reinsurance market in 2013 and beyond. First, it had been announced that Generali was seeking a buyer for its U.S. life reinsurance business. Based on the 2012 survey results, Generali was the fourth largest recurring new business writer in the United States.

On June 4, 2013 SCOR announced they had entered into an agreement to acquire Generali’s U.S. life reinsurance operations. Based on the 2012 results, this would place SCOR at the top of the recurring new business table, with a 31.5 percent market share. In other news, Swiss Re sold its US Admin Re holding company, Reassure America, to Jackson National. Swiss stated it was time to re-deploy capital to other areas of its business. And, finally, even though this technically was announced in 2013, Aurigen Re took its first step into the U.S. life reinsurance market by acquiring Brokers National Assurance Company from Ameritas Life. This acquisition allows Aurigen to offer reinsurance capacity through a U.S. domiciled reinsurance entity.



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Annual Percentage Change In U.S. Recurring New Business (2003-2012)



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RECURRING

U.S. recurring production fell 3.4 percent in 2012. This makes 10 straight years U.S. recurring production has declined. The level of decrease was not as dramatic as seen in the previous two years (8.7 percent in 2011 and 15.3 percent in 2010), but a decrease nonetheless. From a new business volume perspective, recurring went from \$461 billion in 2011 to \$446 billion in 2012. The table on page 5 shows the annual percentage change in U.S. recurring new business production over the last 10 years.

You see an interesting up-and-down trend over this period. Just when things look like they are going to get better and recurring might actually record an increase, production starts falling again. For example, take a look at 2004 to 2005, or 2008 to 2009. Given the 2012 result, it looks like the market is poised once again to either break back into positive territory or start declining again.

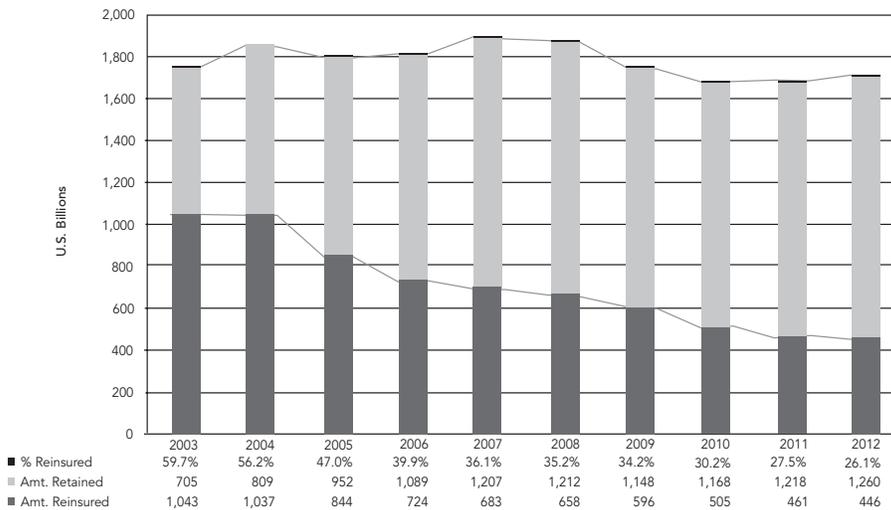
The cession rate is another metric commonly used to measure the life reinsurance market. It is defined as the percentage of new business writings that were reinsured in that year. It basically is an indication of how popular reinsurance is with the direct writers. Based on estimates from LIMRA, direct sales grew by 2 percent in 2012. Using LIMRA's estimate for 2012¹ U.S. life sales and this survey's recurring reinsurance figure, a cession

rate of 26.1 percent is estimated for 2012, which would represent another decrease in the cession rate. Similar to the recurring production figures, it has been a long time since we have seen an increase in the cession rate. The 2012 cession rate is the lowest level the market has experienced since 1995. Stable direct sales and a lower cession rate indicate direct writers continue to retain more of their business—either by moving from first dollar quota share arrangements to excess retention arrangements or by raising their excess retention limits. The graph below shows the cession rates over the last 10 years.

There are a few items worth noting about this graph. While direct sales have been relatively flat throughout the decade, the percentage reinsured has steadily dropped. Since 2003, the amount of reinsured business has dropped almost 60 percent, yet direct sales have only fallen about 2 percent. On an amount basis, the \$446 billion reported in 2012 is the lowest amount since 1996.

For further insight into what is happening to the U.S. recurring market, we need to take a look at the type of reinsurance being written (yearly renewable term [YRT] vs. coinsurance). From a new business perspective, the percentage of coinsurance has been steadily dropping the last few years. It was 37 percent in 2009, the first year the survey started collecting YRT/coinsurance data, and has steadily dropped to where we are today at 27 percent. However, the coinsurance percentage on existing in force is 52 percent, which is almost twice the level seen for new business. This illustrates just how much more coinsurance was written in the early- to mid-2000s compared to more recent years. There is no doubt the declining coinsurance levels over the years have played a large role in the declining recurring levels experienced. There was \$10.2 billion less in coinsurance business reported in 2012 compared to 2011; however, YRT only dropped \$7.2 billion. This means while coinsurance makes up a quarter of the recurring new business, it accounted for more than 50 percent of the overall reduction seen in 2012. Coinsurance is primarily written on level-term products, which, according to LIMRA, experienced a rise in sales of 1 percent in 2012.² Thus, the decreasing coinsurance levels seen during the last few years do not appear to be due to decreasing direct term sales.

U.S. Ordinary Individual Life Insurance Sales



The table to the right shows the recurring results at the company level.

RGA was, once again, the top recurring new business writer. It reported \$87.1 billion in 2012. While this did lead all reinsurers, it does represent a drop of 15 percent from 2011 when it reported over \$100 billion. Swiss Re's new business writings grew by 7 percent in 2012, which allowed it to jump up from third position in 2011 to the second spot in 2012. Swiss reported \$81.2 billion in recurring business in 2012. SCOR was the third leading recurring writer with \$76.5 billion reported in 2012. This represents just a small decrease in production of 1 percent from 2011. Rounding out the top five are Generali and Munich Re. Both of these two companies had production in the low \$60 billion range and market shares around 14 percent each. Generali's \$63.8 billion reported in 2012 was good enough to take the fourth spot. This was, however, a 15 percent drop from its 2011 production of \$75 billion. Close behind was Munich, which reported \$62.6 billion in 2012—a 1.2 percent increase from their 2011 new business writings.

The top five reinsurers continue to make up a sizable majority of the market. Approximately 83 percent of market is captured by these five companies: RGA, Swiss, SCOR, Generali and Munich. However, as noted earlier, with Generali announcing it's up for sale, the make-up of the top five may likely change in 2013.

Hannover's \$40.9 billion reported in 2012 was more than enough to keep it in the sixth spot for U.S. recurring producers. This is a 40 percent increase from the \$29.3 billion reported in 2011 and garnered a 9.2 percent market share in 2012. Hannover's increase distanced it from the remaining five reinsurers that all had market shares below 3 percent: General Re, Canada Life, Wilton Re, Optimum and RGA-Canada. Both General Re and Optimum reported small increases in production (2 percent). Larger swings were reported by Canada Life, with its production falling 44 percent compared to 2011, and Wilton Re, with its 2012 production rising 38 percent over 2011. Collectively, this group of five companies had a market share of 7.4 percent.

U.S. Ordinary Recurring Reinsurance (U.S. Millions)

Company	2011		2012		Change in Production
	Assumed Business	Market Share	Assumed Business	Market Share	
RGA Re. Company	103,108	22.4%	87,115	19.5%	-15.5%
Swiss Re	75,912	16.5%	81,188	18.2%	7.0%
SCOR Global Life Re (US)	77,505	16.8%	76,547	17.2%	-1.2%
Generali USA Life Re	74,993	16.3%	63,820	14.3%	-14.9%
Munich Re (US)	61,922	13.4%	62,654	14.1%	1.2%
Hannover Life Re	29,275	6.3%	40,885	9.2%	39.7%
General Re Life	12,696	2.8%	12,961	2.9%	2.1%
Canada Life	15,543	3.4%	8,668	1.9%	-44.2%
Wilton Re	4,826	1.0%	6,684	1.5%	38.5%
Optimum Re (US)	5,002	1.1%	5,124	1.1%	2.4%
RGA Re (Canada)	392	0.1%	37	0.0%	-90.6%
TOTAL	461,174	100%	445,683	100%	-3.4%

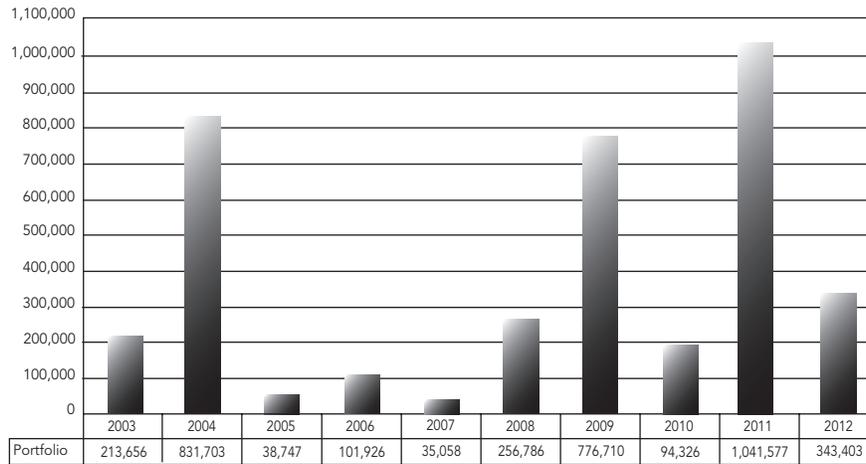
PORTFOLIO

Sizable U.S. portfolio writings were reported in 2012, especially considering there were no acquisitions within the reinsurance industry in 2012. The large amounts seen in the graph below for 2004, 2009 and 2011 are mainly a result of acquisitions within the industry (e.g., a reinsurer acquiring another reinsurer's block of business). The 2011 portfolio result was primarily from the SCOR acquisition of Transamerica. Interestingly, the 2004 and 2009 increases are due to the same block of business being moved around. In 2004, Scottish Re acquired the ING Re block, and then, in 2009, Hannover acquired the same block from Scottish Re. To get back to the current results, the \$343 billion reported in 2012 likely represents the highest level of portfolio business that did not involve an acquisition within the industry. In other words, most of the 2012 portfolio business is believed to have come from in-force blocks of direct writing companies. There were three U.S. writers reporting sizable portfolio writings in 2012. Those were RGA (\$190 billion), Canada Life (\$110 billion) and Hannover (\$44 billion).

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Given the low interest rate environment and the current capital/reserve requirements, some direct writers appear to be more open to reinsuring existing in-force business. With interest rates expected to remain low over the next couple of years and principle-based reserving (PBR) still likely at least a couple of years away, it is possible more block opportunities will arise in 2013 and 2014.

Portfolio (\$ Millions)

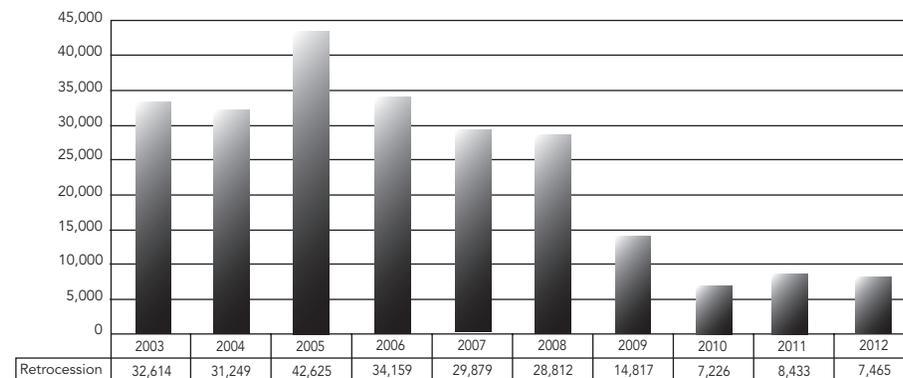


RETROCESSION

U.S. retrocession levels appear to have stabilized after recording dramatic decreases since the mid-2000s. 2005 was the high-water mark for retrocessionaires, reaching \$43 billion in new business, compared to 2012 when \$7.5 billion was reported. This is quite a drop in a small period of time. The 2012 production was down 11 percent versus 2011, but this is relatively minor compared to the 50 percent reductions experienced in 2009 and 2010.

With direct writers and reinsurers retaining more business, the piece of the pie has been getting smaller and smaller for retrocessionaires. Most are especially sensitive to the increased concentration of the reinsurance market. A change in retention of just one of the top reinsurers could have significant impact on overall retrocession production. There were three companies reporting U.S. retrocession business in 2012. Those were, in order of production, AXA Equitable, Berkshire Hathaway and Pacific Life. Production was closely distributed among these companies, as each reported between \$2.4 billion and \$2.6 billion in new business.

Retrocession (\$ Millions)



//THERE IS OPPORTUNITY FOR INCREASING DIRECT LIFE SALES, BUT THE QUESTION IS HOW TO TAP INTO IT.//

CANADA

While there are some similarities between the U.S. and Canadian markets, there are a few striking differences that make the Canadian market unique: (1) the number of players in the market, (2) the level of cession rate, and (3) the level of coinsurance business written.

Overall, recurring business in Canada dropped slightly in 2012. New business production went from \$153.1 billion in 2011 to \$148.8 billion in 2012. This 2.8 percent drop is very similar to the decrease experienced in the United States. According to LIMRA, direct sales in Canada rose 5 percent in 2012.³ An increase in direct sales and decrease in reinsurance would suggest the Canadian cession rate fell in 2012. However, unlike the United States, the Canadian cession is much higher. Using industry estimates for Canadian 2012 direct sales and the results of this survey, it is estimated the Canadian cession rate is somewhere in the 65 percent range. This is considerably higher than the 26 percent seen in the United States. Another major difference compared to the U.S. market is practically all of the reinsurance in Canada is on a YRT basis. There was very little coinsurance business written in 2012. Only 3.5 percent of the recurring Canadian new business was reported to be on a coinsurance basis.

RECURRING

The table to the right shows the Canadian recurring results by company for 2011 and 2012. There were no changes to the players in the market or the relative ranking from 2011 to 2012. The same three companies are at the top: RGA, Munich and Swiss Re. These three companies have dominated the Canadian market for quite some time. In 2012, the collective market share of these three companies was 81 percent. RGA's 2012 production was stable compared to 2011. It posted a very small increase and captured 33 percent of the market. Both Munich and Swiss reported recurring decreases of around 12 percent. Munich maintained a 28 percent market share and Swiss held 20 percent of the market. The other three players in the Canadian market—SCOR, Optimum and Aurigen—have nibbled a little bit of the market share away from the top three.

Canada Ordinary Recurring Reinsurance (\$CAN Millions)

Company	2011		2012		Change in Production
	Assumed Business	Market Share	Assumed Business	Market Share	
RGA Re (Canada)	49,122	32.1%	49,290	33.1%	0.3%
Munich Re (Canada)	48,131	31.4%	42,439	28.5%	-11.8%
Swiss Re	33,762	22.1%	29,466	19.8%	-12.7%
SCOR Global Life (Canada)	10,814	7.1%	12,867	8.6%	19.0%
Optimum Re (Canada)	5,791	3.8%	7,446	5.0%	28.6%
Aurigen	5,465	3.6%	7,317	4.9%	33.9%
TOTALS	153,085	100%	148,825	100.0%	-2.8%

Each of these companies reported sizable increases in 2012—ranging from 19 percent for SCOR to 34 percent for Aurigen.

PORTFOLIO AND RETROCESSION

It was very quiet on the Canadian portfolio and retrocession front in 2012. Only two companies, Aurigen and Munich Re, reported any portfolio business. Munich reported \$386 million and Aurigen reported \$362 million, for a total of \$748 million. On the retrocession side, the three retrocessionaires—Berkshire Hathaway, Pacific Life and AXA Equitable—collectively reported 37 percent less business in 2012 versus 2011. The leading retrocession writer was Berkshire with \$438 million, followed by Pacific Life with \$374 million, and AXA reported \$71 million. Collectively, this adds up to \$883 million. In 2011, these same three companies reported \$1.4 billion.

CONCLUSION

The table to the right (bottom) provides a summary of the overall results from the survey. The takeaways for each reinsurance category are:

(1) Recurring production was down again in 2012. Both the United States and Canada reported decreases of around 3 percent.

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(2) Despite no major acquisitions within the industry in 2012, strong portfolio writings were reported in the United States.

(3) Retrocession production fell in the United States and Canada.

Life Reinsurance New Business Production

	U.S.			Canadian		
	2011	2012	Change	2011	2012	Change
Ordinary Life						
Recurring	\$461,173	\$445,683	-3.4%	\$153,085	\$148,825	-2.8%
Portfolio	1,041,577	343,403	-67.0%	56,270	748	-98.7%
Retrocession	8,433	7,465	-11.5%	1,410	883	-37.4%
Total Ordinary	1,511,183	796,551	-47.3%	210,765	150,456	-28.6%

U.S. figures are in \$US Millions, Canadian figures are in \$CAN Millions

Recent industry reports have shown there is opportunity for increasing direct life sales, but the question is how to tap into it. A recent Swiss Re study opined there was a mortality protection gap of \$20 trillion in the United States.⁴ One way direct writers are attempting to reach this untapped source for sales is developing products specifically for the middle market. In fact, two recent industry studies estimate there is as much as a \$10 trillion life protection gap in the middle market alone. Attaching chronic illness/LTC riders to life policies also seems to be a hot topic right now for direct writers hoping to generate more sales. As mentioned earlier, 2013 may also see additional in-force block opportuni-

ties for reinsurers. Principle-based reserving is also moving forward, but is still at least a few years away. How it will impact life reinsurance production in the United States is a question many have on their mind.

Some industry experts are predicting U.S. life sales will be flat for the next few years as the country works its way out of a sluggish economy. Low interest rates are expected to continue in the near future, which should impede direct sales, especially variable products. These same experts expect to start seeing improvements in life insurance sales by 2016. Others in the life insurance industry are slightly more hopeful as they are predicting small increases in life sales in 2013 (3 to 4 percent range). Meanwhile, Moody's has placed a negative outlook on the U.S. life market primarily due to low interest rate environment and anemic economic growth expectations. If these predictions prove correct, the life reinsurance market will do well to maintain current production levels.

Complete survey results can be found in the Publications section of the Munich Re website, www.marclife.com.

DISCLAIMER:

Munich Re prepared the survey on behalf of the Society of Actuaries' Reinsurance Section as a service to section members. The contributing companies provide the numbers in response to the survey. These numbers are not audited, and Munich Re, the Society of Actuaries and the Reinsurance Section take no responsibility for the accuracy of the figures. ■

Longevity Risk and Reinsurance

By Gavin Jones

WHAT IS LONGEVITY RISK?

Longevity risk is the risk of populations living longer than expected—for example, through medical advances or declining health risks such as smoking. It is a global challenge driven by the ongoing substantial increases to postretirement life expectancy and is systematic in nature.

Longevity risk affects:

- Governments who have to fund promises to retired individuals through pensions and healthcare from a shrinking tax base
- Corporate sponsors who fund retirement and health insurance obligations to former employees accrued over many years
- Individuals who may have reduced or no ability to rely on governments or corporate sponsors to fund retirement.

As governments and corporations consider how to manage these risks, the insurance sector provides a natural home for the combined asset and liability management challenge of funding longer lives—as illustrated by recent transactions by General Motors and Verizon.

Globally the aggregate value of private defined-benefit pension liabilities totals US \$23 trillion.¹ The uncertainty of these liabilities has been crystallized in a low interest rate environment, creating financial motivation for risk transfer. Though the balance sheet of the insurance and reinsurance sector is part of the solution to these stretched liabilities, the scale of the issue is likely to exhaust insurance market capacity at some point in the future.

RISK TRANSFER AND LONGEVITY REINSURANCE

Longevity risk can be transferred in a number of ways. The simplest is equivalent to the single premium immediate annuity (SPIA) whereby a risk holder pays a premium to an insurer and passes both asset and liability risk. For a pension plan or insurer, this involves a large transfer of assets to a third party, with the possibility of material credit risk exposure.

It is perfectly possible to eliminate the longevity risk only, while retaining the underlying assets via (re) insurance of the liability. Here, instead of paying a single premium, the premium is spread over the likely duration of the liabilities of 50 or 60 years, aligning premiums and claims and moving uncertain cash flows to certain ones. (See illustration below)

Beyond management of the systematic risk that has been a key driver of pension plan de-risking, there has been reinsurance activity in the U.K. for individual annuities. In markets with compulsory annuitization at retirement (such as the U.K. and Canada), there is opportunity for underwritten annuities where annuitants in ill health gain additional income. Reinsurers support primary companies both in assuming risk and also in supplying underwriting services and expertise. In 2012, nearly US \$6 billion of immediate annuities were transacted through the enhanced annuity market in the U.K.—the majority of which included some form of reinsurance. The longer-term impact is to introduce significant exposure to selection in the individual annuity market.

MOTIVATION FOR RISK TRANSFER
In the transfer of longevity risk for a given pension plan or insurer, there are two main components:

- i) Current levels of mortality (base mortality), which are observable but vary substantially across socio-economic and health categories and are diversifiable across individuals; and

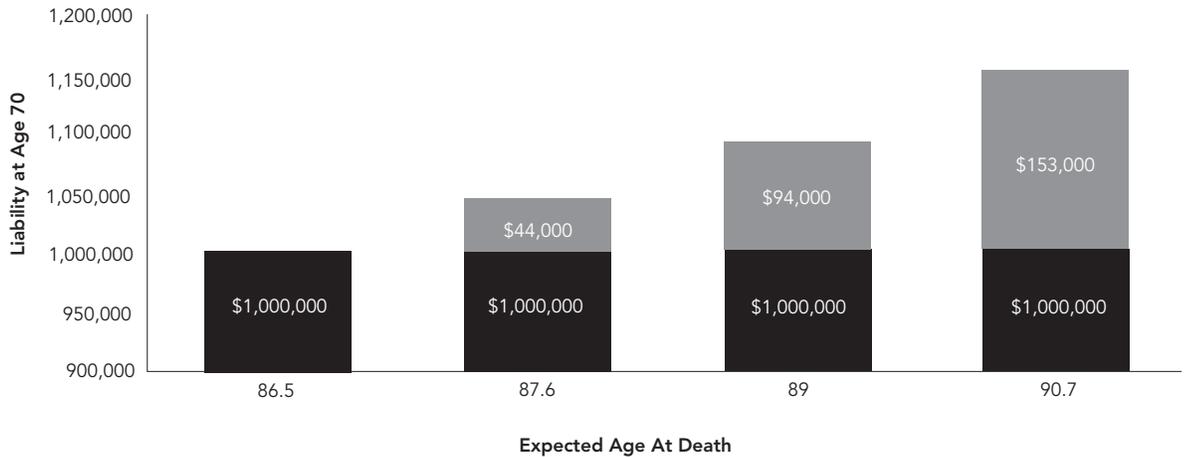


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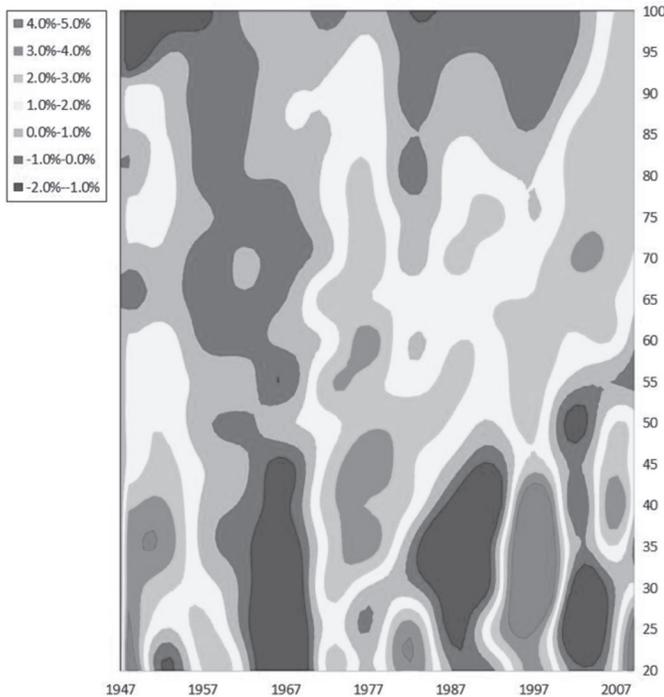
Liability Sensitivity to Longevity



ii) Longevity trend risk, which is systematic in nature as it applies to populations (e.g., improvements in medical treatment), and therefore does not diversify between longevity exposures for a holder of the risk.

The most direct offset available to the systematic mortality trend risk is through holding exposure to increasing mortality; for example, through appropriately selected books of life insurance policies.

For a pension scheme or an insurance company, one reason to cede risk is uncertainty around the exposure to that risk, particularly due to the systematic nature. The graph above illustrates the incremental impact of increasing expected age at death of a longevity liability for a 70-year-old at a 4 percent discount rate.²



A more detailed view of the risk is to look at the mortality improvements by calendar year and age. The graph to the left shows U.S. male mortality improvements now running in excess of 2 percent a year at postretirement ages. A long-term difference of 1%pa is equivalent to a one-year difference in life expectancy at normal retirement ages.

U.S. tables such as RP-2000 have included the use of projection scale AA where improvements vary by age. The Society of Actuaries (SOA) has recognized that Scale AA is based on outdated data that does not capture the level of improvement that has been observed recently. They have therefore released proposed revised improvement tables (“Scale BB”). However, these expect mortality improvements to rapidly return to lower long-term improvements relative to improve-

Source data: www.mortality.org, Swiss Re analysis

ments calculated on the U.S. population from the Human Mortality Database (HMD) and the evidence of the Social Security Administration (SSA). (See charts to the right)

The SOA³ estimates that a move to Scale BB may increase pension liabilities by the order of 3 percent, using a 6 percent discount rate. Lower discount rates push up the value of long-dated guarantees and increase the financial impact of uncertainty, with the SOA estimating a 2 percent drop in discount rate increasing the impact by 20 to 30 percent.

In the U.K., the Institute of Actuaries has moved away from providing a single improvement table given the lack of certainty around such a calibration. Instead, they require that actuaries make a decision themselves as to the appropriateness of a projection table.

The increasing recognition of uncertainty has led to substantial research and development across actuarial, demographic and statistical disciplines. These include a wide range of statistical models developed from the Lee-Carter model, and have enhanced the focus on the ability to develop prospective models that take account of possible future medical advances. In an economic capital environment, new modeling can lead to substantial capital implications.

RISK APPETITE AND REINSURERS

One question that arises is the rationale in acquiring such a long-term and uncertain risk.

Life insurers and reinsurers hold exposure to long-dated mortality risk through long-term or permanent life insurance products. There, in addition to the underwriting and pandemic risk, is substantial exposure to adverse mortality trend development.

It is unlikely that the same lives would be covered under both mortality and longevity insurance policies, but at a larger level the exposure to mortality trend should be partially offsetting. This generates anti-correlation, reducing risk and economic capital requirements across a portfolio incorporating both liabilities.

Male Annual Mortality Improvements				
Age	Scale AA	Scale BB	HMD (2000-2010)	SSA (2000-2007)
65	1.4%	1.2%	2.1%	2.4%
70	1.5%	1.5%	2.6%	2.8%
75	1.4%	1.5%	2.5%	2.6%
80	1.0%	1.5%	2.6%	2.3%
85	0.7%	1.5%	2.6%	2.1%

Female Annual Mortality Improvements				
Age	Scale AA	Scale BB	HMD (2000-2010)	SSA (2000-2007)
65	0.5%	1.2%	2.1%	2.4%
70	0.5%	1.2%	2.1%	2.0%
75	0.8%	1.2%	1.8%	1.6%
80	0.7%	1.2%	2.2%	1.6%
85	0.6%	1.2%	2.0%	1.4%

It is notable that though the risk transfer market is active in the U.K. with investment banks often acting as intermediaries, the vast majority of the risk is passed to the reinsurance market either directly or via banks or insurers.

Date	Pension Plan	Principal	Risk Holder	Size
2009	Babcock International	Bank	Reinsurance	GBP 1.2bn
2009	RSA	Bank	Reinsurance	GBP 1.9bn
2009	Royal County of Berkshire	Swiss Re		GBP 1.0bn
2010	BMW	Bank	Reinsurance	GBP 3.0bn
2010	British Airways	Bank	Reinsurance	GBP 1.3bn
2011	ITV	Bank	Reinsurance	GBP 1.7bn
2011	Rolls-Royce	Bank	Reinsurance	GBP 3.0bn
2011	British Airways	Bank	Reinsurance	GBP 1.3bn
2011	Pilkington	Insurer	Insurer and Reinsurer	GBP 1.0bn
2012	AkzoNobel	Swiss Re		GBP 1.4bn
2012	LV=	Swiss Re		GBP 0.8bn
2013	BAE Systems	Insurer	Insurer and Reinsurer	GBP 3.2bn

This underlines the illiquid nature of the risk and the perceived value of anti-correlation to the reinsurance market.

CONTINUED ON PAGE 14

Overall, the global volume of longevity risk is larger than the ability of the insurance sector to absorb it. For this, as with other risks, the capital markets provide the largest available form of capital—already exposed to the risk indirectly as holders of government debt or of equity in corporations with pension plan exposure. Attracting investors to a new long-duration asset class is a challenge that requires further development by the industry. One example is Swiss Re's 2010 Kortis bond, which covers the difference in mortality improvements between U.S. lives at insured ages and U.K. lives at postretirement ages. Subsequently, Aegon has also used an index-based instrument to protect against adverse longevity trends for the Netherlands population. These approaches represent the initial phase of development of capital market instruments for longer-tenor mortality trend risk transfer by using population indices, a more transparent means of transacting risk.

CONCLUSION

Longevity risk materializes when substantial accumulations of longevity crystallize exposure to mortality trend. This is different from mortality risk where the underwriting risk at individual policy level motivates risk transfer separately from any trend considerations. For longevity, the focus of risk transfer has been for in-force transactions with a material defined liability.

Longevity is a structural demographic risk that is currently held in a variety of hands, but arguably least efficiently as a material liability for corporate sponsors with defined-benefit pension plans.

The insurance sector is a natural home for these risks as a holder of large volumes of long-dated mortality trend risk. The underwriting assessment in setting base mortality and appropriately allowing for trend are at the core of the reinsurance skill set. The risk is carried most efficiently on the insurance balance sheet where, under an economic view, the partial anti-correlation of mortality and longevity may provide compelling capital benefits. But ultimately the structural challenge of an aging society cannot be solved by insurance alone. The industry needs to work with other stakeholders to provide certainty to the retirement benefits of our aging populations. ■

END NOTES

- ¹ International Monetary Fund 2012.
- ² 100% UP94 with Scale AA improvements.
- ³ SOA—Mortality Improvement Scale BB report.

Pandemic Risk

by Doris J. Azarcon

Recent increasing focus on tail risk has brought more attention to pandemic risk. Life insurers are recognizing that pandemics pose one of the most important tail risks in their operations. Financial losses from a 1-in-200-year pandemic could rival those from a major earthquake or major storm.

We will present recent perspectives on the understanding and measurement of pandemic risk:

- Pandemics are caused by different pathogens. A pandemic risk model should consider all the potential sources of pandemic risk.
- There are several approaches to modeling pandemic risk. Stakeholders should select the approach that is appropriate to the intended use and the available resources.
- A pandemic may impact different groups in different ways. Age, underlying health condition and socio-economic status may drive pandemic-relevant factors such as (1) access to, or availability of, high-quality medical facilities and personnel; (2) ability to isolate persons, even temporarily, from exposure to the general population; and (3) individual ability to withstand or survive an infection. Understanding these relationships could help in designing public health measures, risk mitigation programs and capital planning processes.

- Issuing mortality index-linked securities is one approach used by insurers in the management of extreme mortality risk. In order to succeed, a company will require robust models that reflect the nature and magnitude of the risk appropriately.

THE NATURE OF PANDEMICS TODAY

There are accounts of pandemics going back to 400 B.C. The most significant outbreak in the last hundred years was the 1918 influenza pandemic, also referred to as the Spanish flu. Medical science has been successful in eradicating some diseases or in developing pharmaceutical interventions designed to combat the spread of known infectious diseases. However, new diseases continue to emerge from new pathogens or from mutations of existing viruses. It is likely the new and unknown disease or strain that will cause the most extreme pandemic threat in the future. Understanding is limited or nonexistent, and the availability of pharmaceutical intervention is uncertain. In addition, the speed and success of pharmaceutical development and production are difficult to predict.

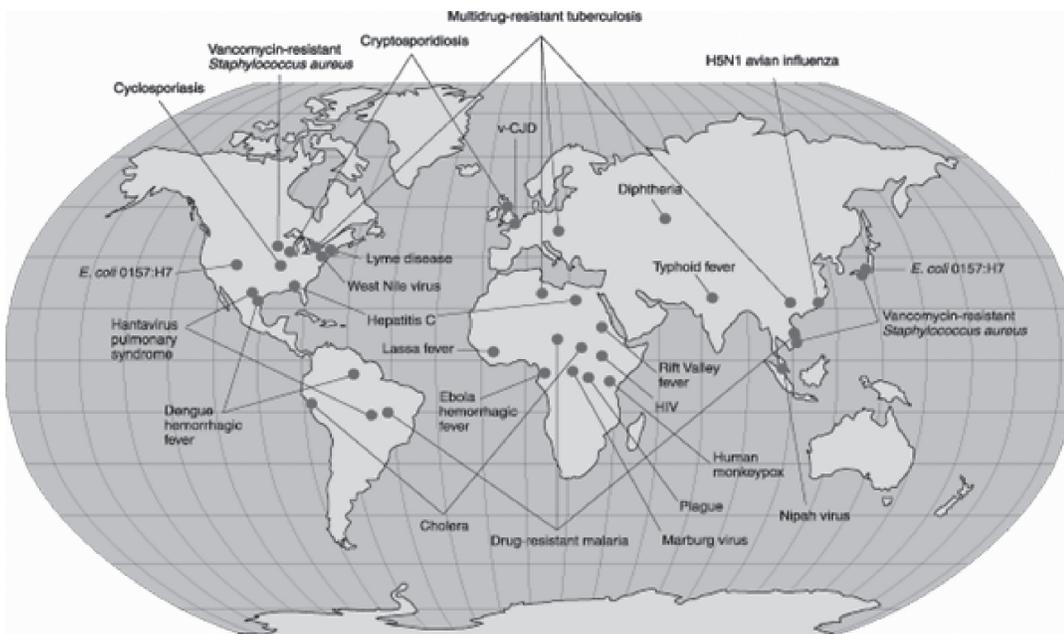
Figure 1 shows examples of emerging and re-emerging infectious diseases as provided by the National Institute for Allergy and Infectious Diseases (NIAID), an agency



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Figure 1: Global Emerging and Re-emerging Infectious Diseases



of the National Institutes of Health (NIH) in the United States.

A pandemic would affect the world differently today than in the past. Global travel is faster, more affordable and readily accessible. This allows infectious disease to spread more rapidly, often before any symptoms of infection have occurred. The emergence of drug-resistant strains of bacteria has added to the potential increase in mortality due to a pandemic. On the other hand, modern communication tools, particularly the Internet and mobile communication, accelerate the sharing of information, aid in better surveillance, and result in earlier and speedier deployment of public health measures, including quarantines and vaccine production and distribution. Improvements in virology have led to better detection of viruses and the subsequent vaccine development. Vaccines and antibiotics were not available during the 1918 pandemic; these, combined with antivirals and other medications, serve to reduce the incidence and severity of an infection, and have helped reduce mortality in a pandemic.

Figure 2 (below) shows how the decline in infectious disease relative mortality has contributed to 60 percent of the overall decline in mortality from 1900 to 2008.

CHARACTERISTICS OF PANDEMICS

Classical epidemiology defines a pandemic as “an epidemic occurring worldwide, or over a very wide area,

crossing international boundaries and usually affecting a large number of people.”² A pandemic is defined not by the severity of the disease but rather by its spread.

Two parameters used by epidemiologists to describe a pathogen and its impact on a population are transmissibility and virulence. A widely used measure of transmissibility is the Basic Reproduction Number (R_0), the mean number of secondary infections caused by a primary infection in a totally susceptible population without intervention. If $R_0 > 1$, the infection is highly likely to spread if there is no intervention. If $R_0 < 1$, the infection will not spread into a pandemic.

Case Fatality Ratio (CFR) is a measure of virulence used in models concerned with the mortality impact of a pathogen. It is the proportion of infections that result in death during a particular period.

Severity and timing of manifestation of symptoms are factors that may impact continued spread of a disease. Early manifestation of serious symptoms increases the likelihood of detection, possibly resulting in earlier implementation of containment efforts that reduce the risk of exposure to the rest of the community. The 2003 SARS outbreak was quickly brought under control after the initial spike in infections. Containment measures were effective due in large part to specific characteristics of the SARS virus, namely the relatively short infectious period before serious symptoms appeared.^{3,4}

Numerous studies have focused on the varying effects of an outbreak on different populations. Insurers are interested in age, time since policy issuance, health condition and socio-economic status, and their impact on pandemic mortality since these factors may distinguish an insured portfolio from the general population. Findings from research focused on the general population should be evaluated with care when applied to insured business.

Infectious diseases have been found to have varying impacts on different age groups. Typically, seasonal influenza causes the worst impact on the youngest and

Figure 2: Top Causes of Death in the United States, 1900 and 2008 (crude deaths per 1,000)¹

	1900		2008
All Infectious Diseases	5.8	Cardiovascular Diseases	2.6
Cardiovascular Diseases	2.4	Cancer	1.9
Accidents	0.7	Lower Respiratory Diseases	0.5
Kidney Diseases	0.6	Accidents	0.4
Cancer	0.6	Alzheimer's Disease	0.3
Senility	0.5	Diabetes	0.2
		All Infectious Diseases	0.2
Total	17.2	Total	8.1

// INSURERS NEED TO CONTINUE TO ... FULLY UNDERSTAND HOW A PANDEMIC WILL IMPACT THEIR BUSINESS AND DEVELOP STRATEGIES TO ADDRESS THE RISKS. //

the oldest age groups. However, during the 1918 influenza pandemic, the younger working ages suffered severe mortality, just as much or even more than the youngest and oldest age groups. Figure 3 below shows the “U-” and “W-” shaped combined pneumonia and influenza (P&I) mortality, by age at death, per 100,000 persons in each age group for the United States, 1911 to 1918.

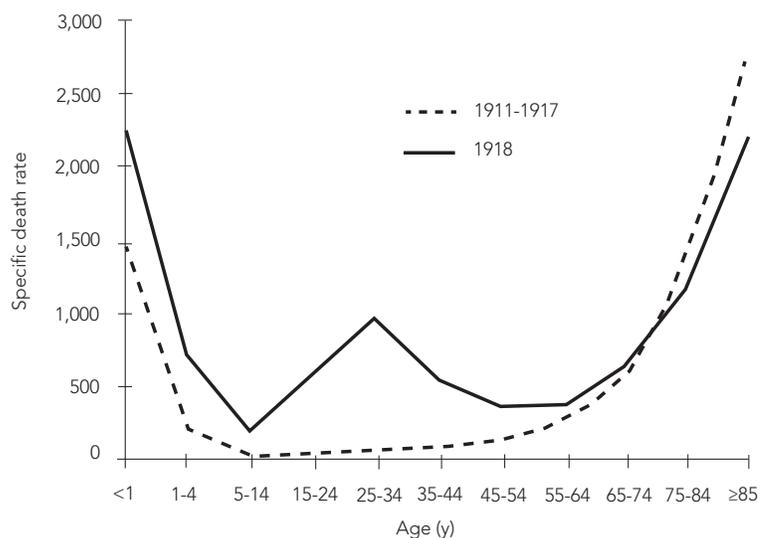
The age profile of an insured block is generally different from that of the general population and may also vary significantly among different markets and insurers. It is important to have the ability to properly reflect the pandemic impact by age or age group in order to determine the true impact on a block of business.

There continue to be many studies on the relationship of underlying health condition to the mortality risk in a pandemic. Scientists have studied the 1918 pandemic and the 2009 H1N1 pandemic and have found that certain pre-existing conditions sharply increased the risk of death from a severe infectious disease. These conditions include: respiratory and cardiovascular diseases, liver diseases, diabetes, kidney diseases, neurological diseases, immune system deficiency and obesity.⁵ Other studies have analyzed the risk of other infectious diseases for people with different pre-existing conditions such as those listed above.⁶

Risk selection or underwriting drives the underlying health condition of an insured population. In the United States, various preferred, standard and substandard risk classes are widely used to segment the applicants. Most of the conditions that increase the mortality risk during a pandemic are screened out by preferred underwriting programs. Thus, a portfolio that is heavily weighted toward preferred risks is likely to have a different pandemic risk profile from the general population or even from another insured block with a different base mortality risk profile.

The ability of an insurer to understand its own book of business and how a pandemic might affect it would provide excellent tools for risk and return optimization as well as aid in the most efficient use of capital.

Figure 3: Age Impact of Seasonal vs. Pandemic Influenza



MEASURING PANDEMIC RISK

Epidemiological models are used to understand the dynamics of the spread of a pandemic. Pandemic models tend to be very complex with uncertainty in numerous inputs, assumptions and outputs. Some of the sources of uncertainty are:

- Nature of pathogen,
- Pandemic preparedness and efficiency of medical response,
- Behavioral factors.

In general, the transmissions that occur from each infection (R_0), the length of each stage of a disease and the ability to identify symptoms tend to have the most impact. Various containment measures such as quarantine, travel restrictions and social distancing have been found to have varying degrees of impact on the timing of the spread and on the severity of an outbreak.

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Two characteristics of pandemic modeling need to be pointed out. First, pandemics are rare events, and thus intrinsically difficult to predict. Modeling will help us understand pandemics, but models have to be used wisely. Second, using solely historical pandemics to infer future pandemic risk is not sufficient since the frequency of pandemics is quite small (much less than earthquakes or tropical storms). Furthermore, significant advancements and developments in society and medicine have come about since these past events have occurred. These have to be taken into account when evaluating historic data.

Deterministic epidemiologic approaches offer several advantages, including the following:

- Ability to add different interventions and to compare the impact of various interventions;
- Insight provided on the dynamics of transmission; and
- Ability to start with a simple model with minimal parameters and no interventions and to add parameters to determine incremental impacts of various parameters.

Deterministic models do not readily provide insight into probabilities and uncertainty; however, they can be used as a framework for combining with simulation approaches. Such combined models can provide insight into probabilities, which in turn aid in understanding the behavior in the tail. Various stochastic versions of epidemiological models have been developed. Computational costs are usually driven by the number of stochastic simulations, allowing stochastic models to more easily introduce complexity without exponentially increasing computing power demands.

Modeling and measuring pandemic risk are necessary in order for an insurer to be able to manage its risks and determine its capital needs. Approaches in managing pandemic risk include:

- Reducing the exposure by limiting the in-force volume within a given risk limit;
- Purchasing tail stop-loss coverage;
- Selling mortality catastrophe bonds;
- Arranging mortality swaps;

- Selling the risk by utilizing non-recourse embedded value securitization;
- Diversifying and hedging the risk—for example, by writing longevity business; or
- Any combination of the above.

CURRENT ISSUES

The research community recently lifted its year-long self-imposed moratorium on research into lab-created viruses. Much of the debate centers on the biosafety levels required in the laboratory. Recent research presents increased risk of accidental or malicious escape from the laboratory.

Since early April, Chinese public health authorities have been reporting a number of confirmed cases of human infections of avian influenza (H7N9) virus, resulting in 17 deaths as of this writing.⁷ It is too early to tell if the virus is transmissible among humans; authorities are closely watching individuals who came in contact with the confirmed cases. In addition, recent flu or flu-like cases are being investigated to determine if they were caused by the H7N9 virus.

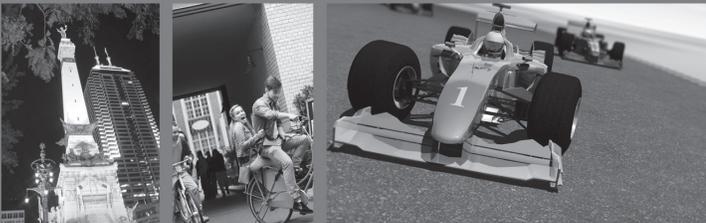
Virus surveillance and reporting has improved exponentially in recent years. The U.S. Centers for Disease Control (CDC), the World Health Organization (WHO) and national governments work together to ensure timely sharing of information. Google and other Internet search entities are able to use tracking technology to identify or predict outbreaks. Virus and disease tracking stations have been set up in various parts of the world, particularly in parts of Africa and Asia where many emerging infectious diseases originate.

CONCLUSION

We will continue to see the emergence or re-emergence of pandemics. Various experts in a wide range of fields are working to further the knowledge and understanding of pandemics and their impact on society and capital markets. Insurers need to continue to keep up with these developments in order to fully understand how a pandemic will impact their business and develop strategies to address the risks. ■

END NOTES

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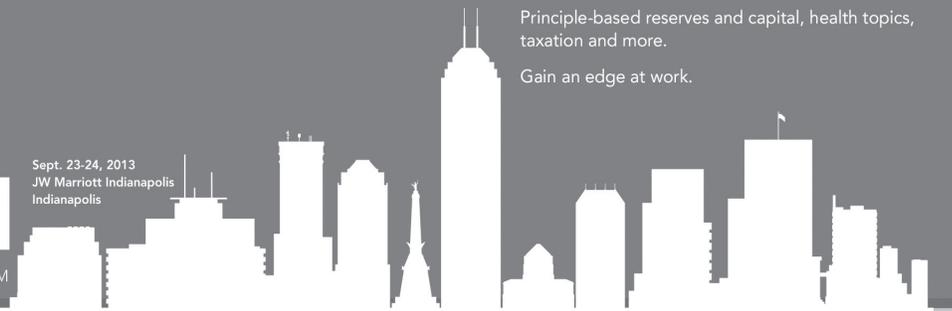
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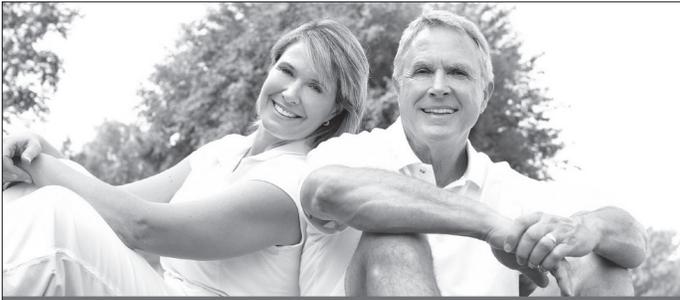
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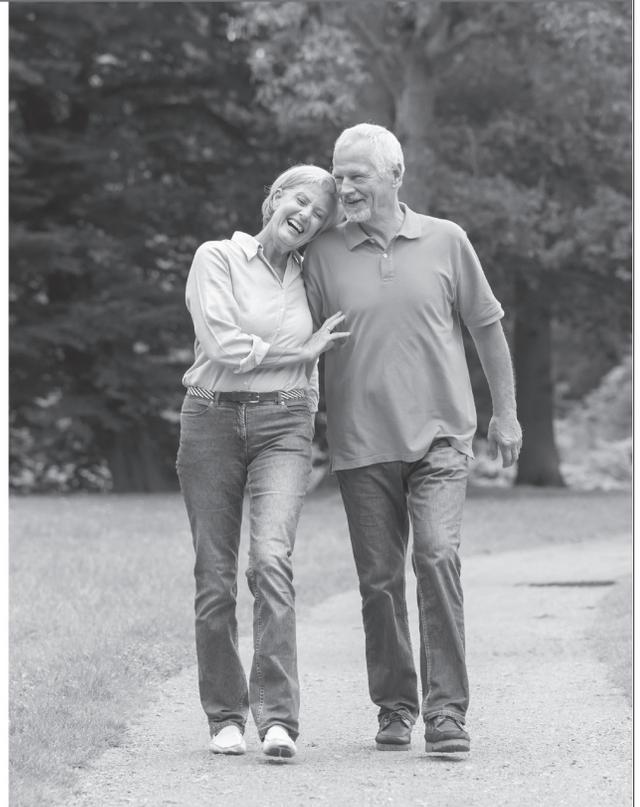
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Interview with Peter Schaefer, CEO of Hannover Life Reassurance Company of America

by Reinsurance News

Mr. Schaefer, thank you for taking time out of your busy schedule to speak with us. Could you begin by telling us about your background and your role at Hannover Life Reassurance Company of America?

I grew up in the suburbs of Buffalo, N.Y. (which means I'm still a long-suffering Buffalo Bills and Buffalo Sabres fan). I graduated from the University of Pennsylvania in 1982 with a B.S. in Economics majoring in actuarial science and insurance. After graduation, I worked in the pension consulting field for two years. Given the impact of the changes occurring related to defined-benefit plans, I decided to refocus my career toward life insurance and joined The Penn Mutual Life Insurance Company. After 15 great years, I had the opportunity to join Hannover Life Reassurance Company of America (HLR America) as chief actuary and moved with my wife and two children to Orlando. Two years later, HLR America's president and CEO retired, and I was selected to replace him.

We understand that you are a fellow of the Society of Actuaries. Could you tell us about your career path? What are some of the highlights of your career that you remember most? Are there any individuals who inspired you or were a figure in your career growth?

Like most actuaries, I was always good in math. When I was a junior in high school, my calculus teacher gave me a pamphlet describing careers in mathematics. That's where I first learned what an actuary was and the career sounded interesting. I looked for a college that offered an actuarial science program, and that's one of the reasons I ended up at Wharton.

Throughout my career, I've had opportunities to work on interesting and diverse projects. Penn Mutual's actuarial development program emphasized not only passing exams, but also developing the skills necessary to become an industry leader. When I started there, one of our leading agencies operated out of the home office building. This gave me the chance to learn about the sales process for our industry's products and to understand the impact this industry has on our customers. I'm very proud to be a part of an industry that pays out nearly the same level of benefits to the American people as Social Security.

At Hannover Re, we're one of the largest, most successful reinsurers in the world. We have more than 5,000 insurance clients in about 150 countries. A highlight for me is the opportunity to work closely with my Hannover Re colleagues around the world to take advantage of our global expertise to bring creative and innovative solutions to our customers.

What would you describe to be the biggest challenges for actuaries to transition from traditional actuarial roles to management? How were you able to make this transition?

I think actuarial training provides a tremendous foundation for moving into a leadership role in the insurance industry. It's understandable that because of the necessary time commitment for most actuarial students, passing exams is often the singular focus. Even so, for those who want a role beyond technical actuarial work (and technical actuarial work can make for a great career), it's never too early to begin to focus on developing the skills needed to reach the desired level. Often this "soft" skill development revolves around communication and influence. As my career developed, I've had the opportunity to work with great leaders, both on company projects and industry projects. Without exception, I've found these people willing to answer any questions I had and to give me constructive feedback on what I could have done better. It has been, and continues to be, of great value to my career.

Hannover Re's U.S. life reinsurance business has grown considerably in the last few years, notably with the purchase of ING and Scottish Re's life reinsurance portfolio. How has this changed your company, and how have these changes affected you?

First, the acquisition more than doubled the size of the organization—both in terms of premium and people. Second, we added locations in Denver, Colo. and Charlotte, N.C. Third, and most importantly, we added the talent, expertise and infrastructure to become a major player in the mortality risk reinsurance market. At the time of the acquisition, we changed from a



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CONTINUED ON PAGE 22



functional organization structure to a business unit structure. We have three business units:

1. Financial Solutions is our most diverse business unit, covering all forms of transactions that help our customers finance their reserves and capital.
2. Mortality Solutions addresses the traditional life mortality risk reinsurance market.
3. Senior Markets focuses on the reinsurance of products sold in the rapidly growing senior citizen markets, primarily Medicare-related products.

From a personal standpoint, the change in the positioning of Hannover Re in the United States has led me to become much more active in industry affairs. I currently serve on the board of directors of the American Council of Life Insurers (ACLI) as well as co-chairing its Executive Task Force on Global Solvency. I can't overstate the value that I've gotten from working closely with other CEOs around the life insurance industry, our state insurance commissioners and the great team at ACLI.

Could you talk about the challenges you have faced from the integration of these recent acquisitions? What were your success criteria?

As this was both a strategic and transformational acquisition, the integration was extremely important. We looked at this integration in two pieces.

The piece people most often focus on is the system and technology integration. Although HLR America had been a small player in the mortality risk reinsurance market, we did have thousands of treaties that we were administering on a legacy system. The infrastructure that we acquired included a robust, state-of-the-art administrative platform, and it was an obvious decision that we would retire the legacy system. The team who joined us had the experience of two conversions to the acquired system and that made the transition quite smooth. The best decision we made was to rely upon their experience and expertise. We had a very granular project plan and, thanks to the team's dedication and hard work, completed the conversion on time and under budget.

In the long run, the most important part of the integration was to create "One Hannover." That is, while we have multiple locations, we can't think of ourselves and our customers can't think of us as multiple companies. We made a conscious effort to avoid falling into the "we/they" trap by location—actually raised some money for charity with a fine system. From the customer perspective, the acquisition significantly enhanced our value proposition. We took advantage of the time we had between deal announcement and deal close to develop a very detailed plan to communicate our vision to our customers so that immediately after close, we could be meeting with clients to discuss their needs and how HLR America could help them be more successful.

Do you foresee your company continuing to grow through acquisitions, organic production, or a balance of the two?

For the reasons discussed earlier, our transaction with Scottish Re was strategic and materially changed Hannover Re's position in the U.S. life reinsurance mar-

// HOW DO WE TRAIN NEW UNDERWRITERS IF WE AUTOMATE THE UNDERWRITING OF THE LESS DIFFICULT CASES? //

ket. Going forward, we'll continue to review potential acquisitions of reinsurance portfolios as they become available, but I would doubt there would be another strategic acquisition. We will certainly focus on the organic growth, which in our Financial Solutions business unit includes the reinsurance of in-force portfolios to monetize their embedded value.

Where do automated underwriting systems such as Merica-US fit in your U.S. marketing strategy?

Automated underwriting systems such as Merica-US fit into our U.S. marketing strategy in a way that complements Hannover Re's overall value proposition. Over the past few years there has been an increased focus on simplified, or alternative, underwriting methods to penetrate the middle market. Our strategy has been to provide leading-edge mortality solutions to our clients that currently participate, or are considering participating, in this market space. Merica-US gives us a unique opportunity to work with clients and develop solutions and processes to address the middle market. Based on our experience with Merica-US, we are in a position to assist our clients in the development of a simplified or alternative process regardless of whether or not Merica-US is the ultimate solution chosen to automate the process. Our experience with Merica allows us to understand the many different facets of a simplified or alternative approach—i.e., application questions and development, claims philosophy, etc.—and the ultimate associated mortality.

Do you believe that automated underwriting systems will replace traditional underwriting in the future, or will there still be a need to have a large staff of underwriters?

Automated underwriting is being used and will continue to grow in all life underwriting processes, not just the middle market or simplified issue markets. My opinion is if you do not automate, your expenses will fail to be competitive. The majority of cases in the future will go through some form of automated underwriting process to determine which cases can be issued automatically and which need to be referred on

to underwriting for further review. This will cut down on the number of cases going all the way to underwriting and allow the company to reduce expenses or focus their underwriting resources on what matters the most—the larger cases and the older issue ages. The most valuable tool in underwriting remains the doctors' reports for impaired or high amount cases. Automating the review of the attending physician's statement (APS) is still a difficult process, but even this is being improved with newer technology.

Will underwriters go away? No. Large face amounts and the highly impaired or difficult cases will be referred to an underwriter. We will just focus the professional underwriters on the abnormal or difficult cases, and they will not do routine "clean" cases. We might need fewer underwriters, but the underwriters we have will be required to be more educated and higher trained. As a reinsurer, we will only be able to automate so much as the cases we review are usually impaired or difficult cases, but we are looking at ways to screen cases to better utilize the underwriters' time. This dynamic will create a new challenge for the industry: How do we train new underwriters if we automate the underwriting of the less difficult cases?

How does Hannover Re view the longevity reinsurance market and its potential as an avenue for growth in the United States?

Hannover Re pioneered the enhanced annuity in the U.K. nearly 20 years ago. We continue to work to develop this concept in the United States. We do recognize the phenomenal growth of the individual longevity market in the U.K. has been driven by the tax structure, which incentivizes annuitization at retirement.

Longevity hedges for defined-benefit pension plans have also grown rapidly in the U.K., and Hannover Re has been an active participant. I do expect this market will grow in the United States with a lag period relative to the U.K., as I think our pension plans may first need to rationalize the investment earnings assumptions in their valuation.

CONTINUED ON PAGE 24

How is the current low interest rate environment affecting Hannover Re's products and pricing, especially with respect to longevity reinsurance?

The Federal Reserve, through its quantitative easing programs, has driven interest rates to the lowest levels in the history of our country. Fed leaders acknowledge that this is a tax on savers, but believe this to be necessary to stimulate economic growth. As the life insurance industry is both a long-term savings and protection industry, this obviously puts pressure on our products and pricing.

The current low interest rate environment ramps up the pressure on all companies to become more efficient. While dealing with these issues ourselves, it does provide the opportunity for reinsurers to provide solutions that can make our customers more successful. Often the most important efficiencies can be gained through finding more effective ways to finance capital and reserves and, thus, reduce the level of investment earnings needed to achieve the company hurdle rate.

Also, from an underwriting perspective, we've already discussed the benefits of automation. Beyond automation, another opportunity is to modify the underwriting protocol. Because of the breadth and depth of experience reinsurers can access, it is often possible to reduce the cost of underwriting requirements and improve the expected mortality. That's a great win-win result.

What other headwinds in the U.S. life reinsurance market are you experiencing, and how are you adapting? There are three issues I'd like to address here. First is the flat to declining trend in life insurance sales. This has been a key contributor to the decline in the cession rate to below 30 percent. The good news for Hannover is that we staffed our team in 2009 for a 25 percent cession rate, but everyone, including the American people, will be better off if life insurance sales begin to grow. The second issue relates to the changes in our health care system. It's about three years since "Obamacare" was signed into law, and a significant percentage of the rules are yet to be determined. The changes here will have a cascading effect on the entire health insurance industry. As a health reinsurer, we are following events closely and have various plans at the ready depending

on the developments. Finally are the tax, regulatory and accounting changes on the horizon. I've heard this described as "10-dimensional chess" and think that is an apt characterization. This is certainly taking up an ever-growing amount of resources, and with the uncertainty around the implementation dates, the planning is certainly challenging.

Recently, the Obama administration has suggested that U.S. insurance premiums ceded to foreign entities should not be fully deductible under U.S. tax laws. How would a change in U.S. tax policy that eliminated the benefit of ceding premium to low-tax jurisdictions affect the reinsurance market overall and Hannover Re in particular?

This proposal has been discussed for a number of years and has generally focused on property/casualty business. I think there is a very small chance that it will ever be enacted. In any case, there are a couple of fundamental flaws with the proposal as it seems to be based on the incorrect notion that the sole purpose for ceding premium to foreign entities is to find a jurisdiction with a lower tax rate (of course, today, the United States has the highest corporate tax rate in the industrialized world). First, of the 10 largest reinsurers in the world, only two are headquartered in the United States. I recently attended a panel discussion with a number of state insurance commissioners from coastal states with significant windstorm risk. As they discussed the difficulty in assuring their residents and businesses had adequate access to windstorm insurance, they all agreed that the capital provided by foreign reinsurers was irreplaceable. Second, insurance works best and is most cost-effective when the ultimate risk taker is able to diversify its book of business across uncorrelated risks. This reduces the capital required to support the business and leads to lower prices for consumers.

What are your priorities now? What are your plans for the future?

When I took over as CEO, we had 26 critical success factors. Not a single person in the company could name half of them. We brought our management team together and came up with a list of five essential success factors we needed to focus on to be successful.

//SOMETIMES THE GREATEST VALUE WE CAN PROVIDE TO CLIENTS IS TO HELP THEM TO AVOID A BAD TRANSACTION.//

They still drive our plans today. First, being a part of the Hannover Re family brings more than tremendous financial strength; it gives us the opportunity to bring to our customers in the United States solutions that have been tested around the world. It also gives Hannover Re's customers around the world the benefit from our experiences here in the United States. Second, we have to market our solutions to our customers. Wolf Becke, who retired at the end of 2011 after heading the worldwide life business of Hannover Re for over 20 years, had a saying: "Our customer is our employer." We have to live that every day. Third, our analysis of opportuni-

ties has to be excellent. Sometimes the greatest value we can provide to clients is to help them to avoid a bad transaction. Fourth, we have to stay on top of our business. With one of the largest mortality databases in the world, I think it's clear how this can benefit our customers and Hannover Re. Also, for our Medicare business, rates are updated annually. We participate actively in this process. Finally—the piece that brings it all together—we must recruit and retain great employees, and we can only do this by making Hannover Re a great place to work. ■

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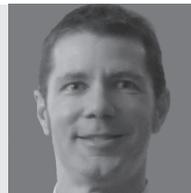
Elections open **August 19** and will close **September 6 at 5 p.m. CDT**. Complete election information can be found at www.soa.org/elections. Any questions can be sent to elections@soa.org.

Life Reinsurance Treaty Construction: A Preview

By Steve Stockman and Tim Cardinal



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Procuring reinsurance and negotiating rates and treaty provisions are often an integral component of the life product development process. Reinsurance bears directly on the product's risk management, the product's competitiveness, and the long-term profitability of the block. The Society of Actuaries (SOA), the Reinsurance Section and the Committee on Life Insurance Research sponsored a report on "Life Reinsurance Treaty Construction." The report is based on questionnaire responses, telephone interviews, participant research assignments, follow-up email correspondence and an in-person roundtable discussion. The report documents participants' points, counterpoints, counter-counterpoints and insights distilling dozens of hours of discussions into 300 participant comments.

The report's purpose is to increase awareness of the importance of many reinsurance treaty terms/provisions; identify common treaty structures, practices and/or solutions in reinsurance treaty construction and negotiation; and illustrate how treaty terms have evolved over time. The report appendix contains samples of past language and current language to illustrate how provisions have evolved and we hope will prove to be a valuable reference.

Shared knowledge may facilitate the success of future reinsurance treaty negotiations to the mutual benefit of reinsurers and direct companies. Lessons shared may enable both sides to reach better solutions more efficiently, enhancing current processes and treaty language, reducing the length of time needed to complete negotiations, and improving the administration and execution of treaties.

The report presents underlying themes followed by highlights on contentious provisions and issues including cedants cherry-picking recaptures, reinsurers raising premium rates, cedants' administrative and reporting weaknesses impacting reinsurers' financial statements through errors and omissions (E&O), reinsurers denying coverage on claims, and both cedants and reinsurers exceeding tolerance risk limits.

BEHIND THE SCENES

A questionnaire was used to identify contentious issues and provide talking points for the telephone inter-

views with each participant. Fourteen interviews were conducted in a span of eight days with questions and follow-up questions. On one call, we would hear clearly articulated reasons and stories why their position and perspective on an issue was right and the other side's position was untenable, unreasonable and unfair; and the other side should be more accepting or willing to change their position or move along the spectrum. Later the same day, on the next call, we would hear the exact opposite alongside an equally passionate and persuasive story. Our reactions were we couldn't wait to see what would transpire during the roundtable discussions.

Participant comments provided through the questionnaire and interviews were useful and insightful, and allowed participants to see the thought process of other treaty negotiators. However, the rich exploration of issues was only possible through engaging dialogue and debate. A non-pressure, non-negotiation setting allowed participants to share and listen to other perspectives without the need to compromise, negotiate or persuade. The roundtable discussions alternated between describing, explaining, debating, clarifying, expounding, disagreeing, defending, developing, supporting, brainstorming and laughing. The authors used a documentary approach to capture these dynamics. Some issues provoked strong disagreements on the nature and intent of the provision. Throughout the roundtable, these differences were constructive and met with professional respect.

PERSPECTIVES

The report's centerpiece is *Section 5, Perspectives: Treaty Provisions*, which documents participants' comments and authors' observations. The following provisions are presented documentary style:

1. Facultative Reinsurance
2. Reinsured Risk Amount
3. Late Reporting
4. Claims
5. Reductions, Terminations and Changes
6. Changes of Plan (Conversion, Exchanges, Replacements)
7. Premium Accounting
8. Recapture
9. Change in Legal Control
10. Errors and Omissions (E&O)

//IT'S NOT AS IF WE'VE BEEN BRILLIANT WITH FORESIGHT IN ANTICIPATING FUTURE ISSUES; WE MOSTLY REACT TO BAD SITUATIONS.//

11. Change in Rating/Financial Control
12. Offsetting/Netting Provisions
13. Automatic Binding Limits
14. Miscellaneous Provisions

We encourage readers to see the report for an interesting read.

OBSERVATIONS

Central themes emerged during the interviews and roundtable dialogues. A few of the report's observations follow.

The business of treaties and the nature and degree of the reasons for the departure from the gentlemen's agreement and trust era underlie the evolutionary forces impacting the construction process. Provisions have been evolving, and reinsurance arrangements are increasing in complexity. The consequence has been an increase in operational risk. A result has been diverging viewpoints by ceding companies and reinsurers on existing E&O clauses. The importance of building and nurturing their relationships was stressed as being good business.

The pendulum swings back and forth between guidelines and rules based on developing experiences. Precise legal language can provide clarity to protect one's interests. Guidelines can provide flexibility when rules do not anticipate or address the instance precisely. Precision can imbue clarity while removing ambiguity when the "letter" of the contract rather than the "intent" is enforced. Not every issue can be anticipated in advance. If the rules approach does not address the instance precisely, then each party decides exactly what it means. These interpretations likely do not coincide. One interviewee said, "You want to be loose and flexible but then it is difficult to figure out how it applies to a specific case or dispute, so you want to tighten that up."

Contention can occur during the negotiation process or long after the treaty's consummation. Some contentious issues have everything to do with treaty language and some have everything to do with business operations and practices. Regarding treaty evolution, one participant commented, "It's not as if we've been brilliant with



foresight in anticipating future issues; we mostly react to bad situations.”

All roads may lead to Rome; however, all treaty provisions lead to E&O. The basic question is: Does E&O narrowly apply to specific types of errors under certain conditions with limitations (the preferred reinsurer interpretation), or is it all inclusive (the preferred direct writer interpretation)? During the interviews and the roundtable, discussion on numerous articles and provisions led to a digression on E&O. Both sides are passionately firm in both their business interests and in their positions. Both sides acknowledge various points of the other side but remain opposed on the intent, scope and application of E&O.

CONCLUSION

A reinsurance treaty's long-term nature challenges both parties during the construction process to negotiate intent and then translate and formulate intent into language that pulls together rules, clarity, guidelines and flexibility to pass the test of time. Twenty years ago, reinsurers did not necessarily anticipate the operational risk created from business and administrative practices.

CONTINUED ON **PAGE 28**

United States Secretary of Defense, Donald Rumsfeld said, “There are also unknown unknowns—the ones we don’t know we don’t know.” If intent, language, interpretations, time, practices and known errors cost companies on both sides millions, what about the unknowns? Treaty provisions have evolved as a means to address the known and the unknowns.

Each side agreed there was room for improvement regarding operations and business practices as well as meeting/serving industry needs. Suggestions included facultative notification, more effective audit reviews to address and fix back office and administrative errors, consistency between treaty language and requirements with business practice, a repository to address autobind and jumbo limit compliance, and E&O categories.

The direct company/reinsurer/retro relationship may not be a partnership, but there is no denying the three sides have built strong business relationships. The friendships and the respect each side has for each other were evident prior to and during the in-person roundtable discussion. It is because of the respect and friendships the three sides have for each other that we have no doubt reinsurance treaties will evolve to the mutual benefit of the life insurance industry. ■

REFERENCES

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The Future Is Now

By Jay Biehl and Jason Rickard

Editor's Note: This article was previously published in the September 2012 issue of Best's Review magazine.

Life insurers must carefully address the premium levels for large term in-force blocks that are now entering their renewal periods.

A little more than a decade ago, as Regulation XXX was being introduced in the life insurance industry and term insurance products were being developed with guaranteed level premiums followed by indeterminate or non-guaranteed premium rates beyond that initial guarantee period, not much thought was given to the level of the rates beyond the guarantee period. If anything, the indeterminate rates were set conservatively high, given there would be the option to modify them at a later time.

Over this same time period, more than \$15 trillion of term insurance face amount was sold. Today, the industry finds itself in a situation of stagnant new business growth at the same time that it is seeing significant portions of that business entering the post-level-premium period and potentially lapsing from their books. What was once an issue of the future is now an issue of the present.

This issue was further highlighted in 2009 when the Society of Actuaries (SOA) sponsored a survey and subsequent report on post-level mortality and lapse assumptions and experience. There has been growing realization that companies were moving into a virtual unknown world with very little data and no real strategy to manage their current in-force risk and to properly plan for future risk via product development initiatives. Implications on financial results—of not only how much business was likely to lapse in the coming years, but what would be the mortality profile of those that remained—became a very real issue.

For companies still amortizing deferred acquisition costs during this post-level period on their in-force blocks, the question of whether there would be enough embedded value in the persisting block to avoid recoverability issues has arisen. As companies are trying to conserve as much of their term business at adequate margins as possible, policyowners can be expected to make the logical, if not obvious, decision to either let their policies lapse, convert to permanent insurance, or continue on with the coverage for at least a limited time period.

ADDRESSING THE RISK

With the many reports that have been published over the past couple of years, the industry is slowly beginning to understand the risk associated with these post-level policies and react to the experience that is being gathered. The industry, in order to really address the issue at hand, must start with a common understanding of what is the fundamental business question that it's trying to answer. While each company may have some unique circumstances, most companies operate in the same manner. Each client company is looking to maximize value, whether defined as policyholder or shareholder value, or market-consistent embedded value, or in whatever manner "value" is defined within an organization.

On the surface, the goal of maximizing value would seem to be relatively straightforward. But by digging deeper, it becomes clear that maximizing value is one of the unique and complex issues that the industry faces today. It's worth noting that there are secondary considerations as well, such as continuing the ongoing life insurance contract with policyholders and creating or maintaining workable solutions with the reinsurers of these products that frequently took as much as 90 percent of the underlying risk.

Value creation in the post-level-term period is defined as the confluence of three related but distinct variables. Generally speaking, these variables are considered in a linear fashion. In the first duration after the level-premium period, a sizable increase in premium rates occurs—variable 1. This increase triggers a level of shock lapse—variable 2. This shock lapse leads to a disproportionate number of relatively healthy lives leaving the risk pool, which results in a disproportionate number of relatively unhealthy lives causing a mortality deterioration to occur—variable 3.

The concept and the direction of these variables are very simple to see. The higher the premium jump is, the greater the shock lapse and the higher the mortality deterioration will be. Conversely, the lower the premium jump is, the lower the shock lapse and the lower the mortality deterioration will be. However, directional movement is one thing but finding the point that maximizes value is a very different thing.



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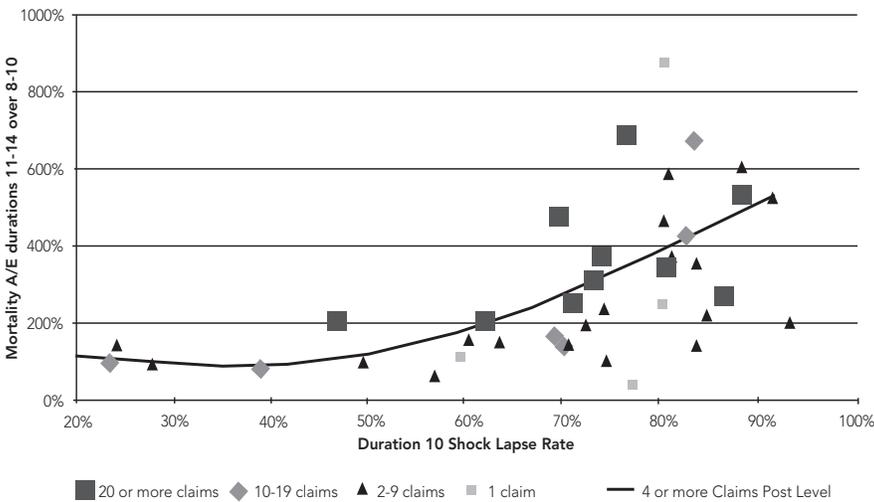
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Adding to the complexity, while experience immediately after the level-premium period has started to materialize, subsequent lapse rates and ongoing mortality deterioration are unclear. This dimension has been of less focus, but it may well be the most important dimension to understand. Not only are there material lapses beyond the first post-level duration, but the resulting mortality for each subsequent duration is a combination of the deteriorated mortality produced by more and more durational lapse implications.

Let's start with the basics to understand the complexity of the issue. The following graph shows the interaction between shock lapse and mortality deterioration. While this graph is derived from Hannover Life Re data, similar graphs have been produced in the SOA's post-level studies.

Shock Lapse vs. Mort. Deterioration by Face
Using 2008 VBT



It might seem like a simple exercise to understand the interaction of the shock lapse and the resulting mortality deterioration, but it isn't that easy. If one works from the right side of the graph to the left and determines the marginal mortality deterioration that occurs with the marginal lapse, the following general pattern develops:

Lapse	Persisters	Relative Risk	Marginal Persisters	Marginal Relative Risk
50%	50%	121%	50%	-124%
60%	40%	182%	10%	-121%
65%	35%	226%	5%	-78%
70%	30%	276%	5%	-4%
75%	25%	332%	5%	94%
80%	20%	392%	5%	211%
85%	15%	452%	5%	336%
90%	10%	510%	5%	458%
95%	5%	562%	5%	562%

The first three columns in the chart are just empirical observations—stringing together the various data points that are available from experience of a variety of companies. The last two columns show the mathematical implications of this data and must be solved from the bottom up.

As an example, the math is:
 $10\% * 510\% = 5\% * 562\% + 5\% * X$
 $X = (10\% * 510\% - 5\% * 562\%) / 5\%$
 $X = 458\%$

This table shows that, at first, the graph appears reasonable. But when the pieces are broken down to the most basic component parts, nonsensical implications can and do occur.

In order to “fix” this problem, one has to think in terms of two solutions:

1. The graph really isn't a continuous curve where the shock lapse and the mortality deterioration are the only two variables in play.
2. The building blocks must make sense, and they are very sensitive to minor movements in the underlying curve.

The answer is partially combined in both statements. While the interaction of lapses and mortality deterioration has been studied and thought about for roughly 30

years, adding the variable of how changes in premium rates will impact these policyowner behavior variables has been contemplated much less.

As noted earlier, for an insurance company to maximize its embedded value of this post-level business, it really comes down to maintaining as many policyowners at the highest rate possible without increasing the aggregate level of claims. Generally speaking, the manner in which the industry has gone about maximizing this value is to focus on maintaining an optimal number of policyowners. The more fundamental goal that needs to be achieved in such an exercise is that the aggregate premium revenue must go up if the premium rate decreases.

When a company seeks to increase the number of persisting policyowners by decreasing the premium rates charged, as a consequence they also are increasing the amount of claims that will be incurred. This is because the companies will have the same policyowners that were going to persist before, plus additional policyowners, some of whom will result in a death claim. A simple example (looking at the first duration post level) demonstrates this dynamic. (See chart below)

In this example, a company currently has a jump in its post-level premiums of 10 times the level premium and currently is experiencing an 85 percent shock lapse rate. The company desires to increase the persistency rate by lowering premiums and considers three options: lower the premium jump to 7.5 times the level premium (Option A), six times (Option B), or four times (Option C).

Option A results in no aggregate increase in collected premiums and a modest increase in claims. Option C shows an increase in aggregate premiums, but this is more than offset by the additional expected claims. Option B produces an aggregate premium increase by more-than-aggregate claims and thus generates the optimal results among the three options. Clearly, the results of such an example are dependent upon the assumptions used, and the assumptions used are dependent on a number of very specific factors, such as:

- The level of conversion activity that occurs.
- The conversion language in the term policy.
- Which products are available for conversion.
- Whether the policyholder is “orphaned” or has an agent actively involved.
- The size of policy and/or premium, where absolute amounts tend to trump percentage changes in the premium rate.

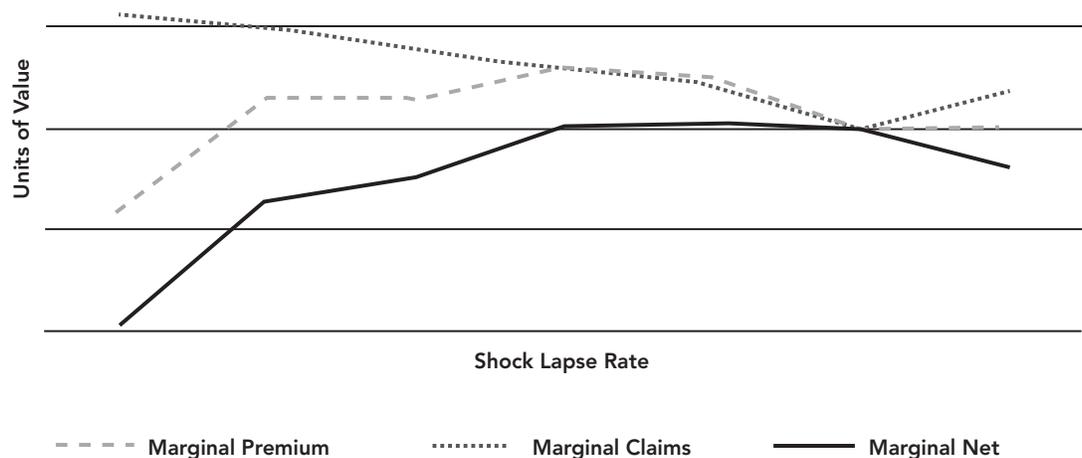
There can be a wide range of premium levels and associated shock lapse rate assumptions that produce roughly the same amount of total profit. It can be very difficult to significantly leverage any reasonable scenario into substantially higher profit expectations. The following graph shows an example of the interplay between the variables across a broader spectrum of premium rates and shock lapse assumptions. (See chart on pg. 32)

The dark blue line represents the difference in marginal net income. The base case is defined at the intersection of the three lines. There is a fairly wide range where very

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	Premium Jump	Persisting Group	Mortality Deterioration	Unit Premium Decrease	Persistency Increase	Unit Mortality Decrease	Aggregate Change in Premium	Aggregate Change in Claims
Baseline	10	15%	520%					
Option A	7.5	20%	405%	25%	33%	22.1%	0%	4%
Option B	6	28%	310%	20%	38%	23.5%	10%	5%
Option C	4	40%	215%	60%	167%	58.7%	7%	10%

Change Marginal Values



little actually occurs to the bottom line. Perhaps as interesting, though, is that large reductions in the post-level-premium rates appear to produce less-favorable results than do more modest reductions in premium rates.

It should be noted, however, that this is where the secondary goals come into play. A lower premium multiple may not materially move the profit picture, but it would certainly allow more policyholders to remain in force. In addition, the ceding company and the reinsurers may be in different positions relative to a given premium/shock lapse/mortality deterioration combination. Given that, historically, the reinsurance marketplace has assumed a sizable portion of the risk with these products, it certainly makes sense for the client company and the reinsurer to work together, and, in fact, may be contractually required.

EXPECTATIONS TO CONSIDER

Looking at durations beyond just the shock lapse duration presents an even more challenging exercise of determining what policyowner behavior to expect. With less and less homogeneous experience upon which to

base assumptions, a certain amount of reason must be used to ensure that the assumption for persistency is not overly optimistic.

For a block of term policies that is entering the post-level period, if one is working from a previous assumption where premium rates and ongoing cumulative lapse rates are relatively high, discussion of lowering premiums to increase persistency certainly makes sense. However, assuming that significantly more lives will persist as rates continue to rise each year ignores the strong likelihood that policyowners will make a decision to persist not only based on the increase in the premium rate from the premium paid in the prior year, but also based on the affordability of that premium relative to either what they paid during the level period and/or what they could pay by purchasing a new product.

Thus there should be an ultimate convergence in assumptions for cumulative persistency regardless of the pattern of post-level-premium rates being charged—for instance, a large increase followed by more modest increases versus a modest increase followed by progres-

**//WHATEVER THE BASELINE
DETERIORATION ASSUMPTION IS, IF
PREMIUMS ARE LOWERED TO PRODUCE
MORE PERSISTERS, THE NEW MORTALITY
ASSUMPTION MUST MAKE SENSE.//**

sively larger increases, both of which get to the same ultimate gross premium.

The other important consideration is the mortality deterioration model used. Many deterioration models exist, some more sophisticated than others and some fraught with potential deficiencies when it comes to ongoing large lapse rates. The critical issue to address when choosing a mortality deterioration model is that it must produce mortality that makes sense when considering the mortality of the marginal persisting group. That is, whatever the baseline deterioration assumption is, if premiums are lowered to produce more persisters, the new mortality assumption must make sense.

The assumption must consider that it is comprised of the original group of persisters whose mortality assumption doesn't change. The assumption includes the additional persisters whose mortality is no doubt better than the original group but should also be reasonable when compared to, for instance, newly underwritten mortality.

In the end, the issue of having a sound and comprehensive post-level strategy and model is difficult for a variety of reasons. Unfortunately, it is an issue that cannot be pushed forward to address in the future. Financial results are being affected today and will be an important part of how these companies manage their term insurance portfolios for years to come.

The fact is the amount of term insurance business that is or will be entering the post-level period continues to grow each year. Purely optimizing the end result from the insurance company's perspective will be a challenge because it involves embedded options and policyowner behavior that is difficult to predict, not to mention the need to work with reinsurance partners that have a significant stake in a sound strategy as well.

We continue to learn more about this with each passing year, but waiting until the picture is completely clear



will be too late to effectively manage this issue. In addition to the considerations already mentioned, prudent product development decisions today will largely dictate the ability to make effective product management decisions in the future.

KEY POINTS

The Situation: The life insurance industry is experiencing stagnant new business growth at the same time that the amount of term insurance business that is or will be entering the post-level period continues to grow each year.

The Significance: Life insurers are trying to ascertain the lapse behavior of policies in the post-level period and project the mortality profile of the policyowners that remain in force.

Watch For: Life insurers to develop and implement post-level strategies to address these issues. ■

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This session will discuss different tools available to participate efficiently in the middle market. It will also discuss how reinsurers view these tools and pricing impacts.

Reinsurance Treaty Construction and Terms

Session 153 Panel Discussion

Wednesday, Oct. 23

8:30 – 9:45 a.m.

Hear the results of the SOA Reinsurance Section-sponsored study to increase awareness of the importance of many reinsurance treaty terms/provisions; identify common treaty structures, practices and/or solutions in reinsurance treaty construction and negotiation; and illustrate how treaty terms have evolved over time.

Life Insurance Acceleration Riders

By Jim Filmore

Historically, life insurance companies in the United States have given the policyholder the option to accelerate a portion of their death benefit in the case of terminal illness. In those circumstances, terminal illness was typically defined to be where a physician certified that the applicant has a life expectancy of less than 12 months (24 months is used in some states).

In recent years, life insurance companies have started offering acceleration of a portion of the face amount of the life insurance policy to those who are chronically ill or critically ill. This article discusses the more common form of the chronic illness riders found in the U.S. marketplace today as well as considerations to control the risks under that rider.

DEFINITIONS

For the purpose of this article, we will be using the following definitions:

- 1) A **terminal illness rider** is one that allows policyholders to accelerate a portion of their face amount when they have a life expectancy of less than X months. X is typically 12, but is 24 months in some states.
- 2) A **chronic illness rider** is one that allows policyholders to accelerate a portion of their face amount when they are unable to perform two or more activities of daily living (ADLs) without assistance from another person. Activities of daily living are bathing, continence, dressing, eating, toileting and transferring.
- 3) A **critical illness rider** is one that allows policyholders to accelerate a portion of their face amount when meeting the criteria for one or more of the listed critical illnesses. An example of a critical illness is a heart attack or a stroke.

There are other related offerings, such as life/long-term care (LTC) combination products and LTC acceleration riders, that allow the policyholder to accelerate more than the face amount of the policy when meeting certain ADL triggers and/or when staying in a qualified LTC facility. However, those products and riders are beyond the scope of this article.

CHRONIC ILLNESS BENEFIT DESIGNS

Chronic illness riders are typically designed so that the rider benefit qualifies for favorable tax treatment under section 101(g) of the Internal Revenue Code. The most common chronic illness designs are the following:

- (i) Actuarial discounting of the face amount that is being accelerated. For example, \$100,000 of the face amount may be accelerated in a particular year, resulting in a payment of \$80,000 to the policyholder. The other \$20,000 is the actuarial discount that reflects the time value of money for the benefit being paid early along with the premiums associated with the accelerated amount that would have been required to keep the policy in force until the projected date of death. The assumptions and methodology used in the actuarial discounting are one of the keys to a well-designed chronic illness rider.
- (ii) Acceleration benefit is done by holding a lien against the death benefit of the policy in the amount of the cumulative accelerated death benefit plus interest. In this design, the policyholder is still paying the premium for the portion of the face amount that is accelerated. Thus, the cost is the interest associated with the lien. The outstanding lien balance reduces the amount of cash value available for surrender or loan. The death benefit paid is reduced by any outstanding lien balance. This design is primarily utilized when the base policy is a whole life policy.
- (iii) A chronic illness acceleration rider, which charges the policyholder an explicit additional premium at the time the rider is attached to the life insurance policy.

RISK CONTROL MEASURES ON CHRONIC ILLNESS ACCELERATION RIDERS

Common risk control measures applied to chronic illness riders include the following:

- Use of a supplemental underwriting application for any acceleration riders. The supplemental



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underwriting typically consists of questions related to the applicant's medical history with respect to the triggers that are used for the acceleration benefit. For example, it will focus on conditions that may result in morbidity associated with ADL loss that may not be included in a typical life insurance application. It may also probe regarding ADL losses or currently disabilities. The supplemental application may also ask questions related to other living benefit coverage in force (such as LTC or other chronic illness or terminal illness acceleration riders). Those coverage questions are intended to determine if it appears that the individual is over-insured for these benefits (over-insurance may imply that the applicant is intending to anti-select against the writing company).

- Limiting the issue ages at which the chronic illness rider can be added and/or incorporation of cognitive testing at particular issue ages.
- Holding the accelerated amount as a lien against the death benefit and charging interest against that lien OR payment of a discounted amount relative to the face amount that is being accelerated. The discounted amount is the actuarial present value of the amount being accelerated taking into account interest and premium payments based upon a life expectancy assumed for a chronically ill individual at that gender and attained age.

- Limiting both the annual and the maximum acceleration amount to some specific dollar amount. The annual benefit amount is also often limited to ensure that the benefit receives favorable tax treatment under section 101(g) of the tax code. Often policyholders are encouraged to consult their personal tax advisor in advance of making the decision regarding the accelerated death benefit payment so they can review the policyholders' personal circumstances to determine whether the payments qualify for tax-free treatment.
- Requiring that an approved licensed health care practitioner certifies that the policyholder is unable to perform the ADLs that are the triggering events for the benefit payment. The writing company often reserves the right to pay for an independent examination of the insured by a licensed health care practitioner to confirm the validity of the claim. The typical chronic illness acceleration rider trigger requires permanent loss of two or more ADLs. Some chronic illness riders include a benefit trigger related to significant cognitive impairment.
- Defining the loss of ADLs as expected to be permanent can be an important risk control. In the absence of such a definition, an otherwise healthy individual could claim under the rider when there is a situation that involves a temporary loss of ADLs. Such claims are typically not consistent with the reduced life expectancy that is assumed in the discounted face amount or the additional premium payment forms of chronic illness acceleration riders.
- The rider form may have certain exclusions such as some mental or nervous disorders, alcoholism, drug addition, act of war (declared or undeclared), suicide or intentional self-inflicted injury. These exclusions must mirror the base policy language in most states.
- The rider is typically only available on policies that are issued up to some maximum rating (such as Standard or Table D).

// A SHIFT TO INCLUDE LIVING BENEFITS REQUIRES ADDITIONAL ANALYSIS AND RISK CONTROL MEASURES, AS OTHERWISE THE EXPECTED PROFITABILITY ... MAY NOT BE REALIZED. //

- The contestability rights for the writing company with respect to the rider typically follow those of the base policy.
- Limiting the maximum benefit to be less than 100 percent of the death benefit on the life insurance policy.

REINSURANCE PARTICIPATION IN CHRONIC ILLNESS ACCELERATION RIDERS

Reinsurance participation in acceleration riders can take different forms. Terminal illness acceleration riders are often considered to be standard in the U.S. individual life insurance marketplace. Thus, most reinsurers participate in those riders in proportion to their participation in the base policy. There is typically no additional charge for this rider, and the only cost to the policyholder is a small discounting to account for loss of interest between the date of the accelerated payment and the anticipated date of death. It is common for terminal illness acceleration riders to have some cap on the overall face amount that can be accelerated.

Reinsurance participation in chronic illness acceleration riders is more varied. The first question is the product to which the rider is attached. If it is attached to a permanent policy, then one could argue that the policy is likely to ultimately result in a claim if the insured has met the triggers for the acceleration benefit. While that may not be an accurate assumption with all acceleration claims (as one could have a heart attack or stroke and survive for many years), it is not unrealistic to assume the lapse rate on the permanent policy would be at or near zero for those individuals. Thus, the question is whether the discounting used in the payment calculation appropriately takes into account the loss of premiums and interest to the direct writing company and the reinsurer based upon a reasonable life expectancy for a chronically ill individual of that gender and attained age. Reinsurers in the U.S. market today often participate in the acceleration rider if they are able to get comfortable with both the risk control measures used by the writing company at the time the rider is offered and the discounting on the back end at the time the benefit is utilized. Not all reinsurers are comfort-

able participating in the stream of benefit payments made to the policyholder (if that is an option to the policyholder). Consequently, a reinsurer may approve rider participation subject to a one-time payment either upon death or upon lapse of the policy. Reinsurance participation upon lapse of the policy essentially means that their liability has been determined once an accelerated payment has been made (as the rest is simply a timing issue).

If the chronic illness acceleration rider is attached to a term policy, then the calculations are very similar to when it is attached to a permanent policy. However, the percentage of term policies that ultimately result in a claim is significantly lower than the percentage of permanent policies that ultimately result in a claim. Thus, the cost of offering such a rider is greater on a term policy as compared to a permanent policy. In addition, the considerations in the actuarial present value calculation can be more challenging as the life expectancy for the policyholder may extend past the end of the level-term period. Consequently, offering such a rider on a term policy involves greater uncertainty and potentially higher cost than offering such a rider on a permanent policy. A similar argument holds true when contemplating whether or not to allow such a rider to be included upon conversion of a term policy to a permanent policy. In that situation, a possible risk control measure is to require completion of the rider application if the policyholder wants to convert from a term policy without the rider to a permanent policy with the rider. To date, the majority of chronic illness acceleration riders have been offered on permanent forms of life insurance. Market pressures are likely going to encourage expansion of these chronic illness acceleration riders onto term products. Market pressure may also exist to discourage use of risk control measures that may be viewed as intrusive to the applicant. As an industry, we should be careful not to offer such a benefit option without careful thought, as one does not need to go back far in the history of insurance to see examples of how such product creep can be risky. Other questions to take into consideration with respect to

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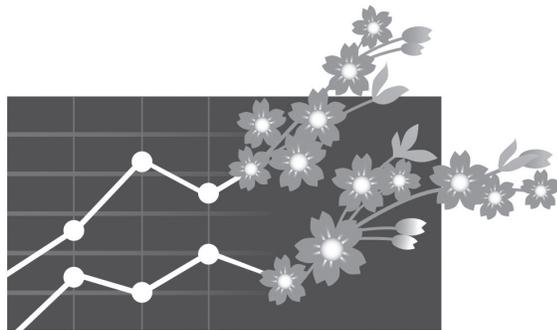
chronic illness acceleration riders include the following:

- If the writing company charges for the rider, then how is the reinsurer compensated? Not all reinsurers have living benefits experience that would allow them to appropriately evaluate and price these risks.
- Should the reinsurer on a yearly renewable term (YRT) basis wait until death to pay its portion of the net amount at risk (NAR)? If so, then what happens to a policy that accelerates a portion of the death benefit and then lapses (that may be a rare situation)?
- Should the rider be offered to all or a certain class of existing policyholders (such as those who

purchased a life insurance policy in the past four years)? If so, then what underwriting should be done to control the risk of anti-selection?

CONCLUSION

Acceleration riders attached to life insurance policies are getting a lot of attention today. However, one should not be too quick to add such a rider without carefully thinking through the pricing implications. Underwriting and risk control features on most life insurance products today are focused on mortality. A shift to include living benefits requires additional analysis and risk control measures, as otherwise the expected profitability of the product may not be realized. ■



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Still LEARN-ing

By Mike Mulcahy

In the July 2011 issue of Reinsurance News, Jeffrey Katz wrote an article on LEARN, the SOA Reinsurance Section's program designed to educate state regulators about reinsurance. He ended his article by saying it was time for the program to grow beyond its initial charge. Over the last two years, the program has indeed grown. But before we get to that, I'll start with a recap of the LEARN program for those who aren't familiar with it.

LEARN stands for Life Education and Reinsurance Navigation. Its original focus was on providing reinsurance knowledge to state regulators (and that is still a priority for the program). The original team of presenters (Sean Burt, Jeff Burt and Jeffrey Katz) put together a comprehensive set of presentation materials on life and health reinsurance, with advice and input from actuaries active on the Reinsurance Section Council and other actuarial and insurance organizations. The topics covered include typical reinsurance topics like: types of reinsurance, treaty provisions, regulation, risk transfer, reserving and audits. The presentation materials are adjusted by current team members to reflect current issues on topics such as principle-based reserves and the Patient Protection and Affordable Care Act. LEARN is focused on education. The program does not attempt to take a position on any disputed issues.

HOW LEARN WORKS

Any requests for presentations are directed to the LEARN coordinator on the Reinsurance Section Council. Based on the desired content, a team of presenters is chosen from the current LEARN team. The team then puts together a custom presentation based on the needs of the audience. The team will attempt to answer any questions they are qualified to, but the focus is kept on reinsurance-related issues. When finalized, the presentations can be anywhere from a few hours to as long as a full-day session.

One key to the success of the LEARN program is that the Reinsurance Section Council funds the travel expenses for the LEARN team when they travel to a state department of insurance. All that the department needs to provide is an appropriate meeting room. In addition, continuing education credits may be available

depending on the professional backgrounds of those who attend a LEARN session.

LEARN EXPANDS

So how has LEARN grown from a mere concept by then council Chairman Ronnie Klein in 2009? For starters, it has grown wildly successful at its original goal of educating regulators. From the first presentation by the original team in 2010, the LEARN program has now been presented to regulators from 22 different states, with more presentations scheduled for later this year. As evidence that the program's success is not just quantitative, here are some comments from regulators on some of the presentations made earlier this year:

"Your presentation seemed to me to go very well today and others here have voiced the same thoughts to me. I think the material you covered offered something for listeners at all levels. I found it very beneficial to hear the thoughts of an expert practicing in the subject area rather than just the ideas of a company wanting to do a deal and to defend their structure."

"A big thank you to you and the Society of Actuaries for this excellent and much-needed presentation on Life Reinsurance. I will highly recommend this presentation to my fellow regulators."

"Thank you for presenting the LEARN overview of reinsurance. The training was very informative. We especially appreciated that you used simple examples to explain various complex concepts/topics. What we learned today will definitely help us with future reinsurance reviews."

The LEARN team has also grown. The current list of presenters now includes nine reinsurance professionals: Jeff Burt, John Cathcart, Michael Frank, Carlos Fuentes, Mike Kaster, Jeffrey Katz, David Nussbaum, Tim Robinson and Larry Stern.

In addition to expanding the team, the program has also reached out beyond its original goal of educating



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regulators. In 2012, a LEARN presentation was made to an actuarial club. Team members have also used the LEARN materials as the basis for seminars and sessions at SOA conferences. Most recently the materials were used for the Introduction to Reinsurance Boot Camp seminar after the SOA Product Development Symposium in Toronto.

The council and the LEARN team are proud of what the program has accomplished. We want it to continue to

grow and expand. If you work for an organization that may be interested in a LEARN presentation, or you feel the LEARN team could benefit from your reinsurance expertise, please contact me or another member of the council. We look forward to LEARN-ing about reinsurance with you! ■

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You Could Lose Your Shirt if You Don't Mind Your P's and Qs!

A summary of the SOA research report "Mortality Comparisons and Risk Exposures in the Older Age U.S. Financial Services Market"

By Roger N. Freeman and William H. Bowman

The Society of Actuaries' Reinsurance Section proposed a research study in the fall of 2010 to examine mortality assumptions in the older age U.S. financial services market. It questioned whether some older age individuals might gain an advantage from arbitraging one product against another. If individuals are able to select against the financial services industry, then widespread use of this practice may cause financial harm to individual companies or to the industry as a whole.

The objective of this project was threefold:

1. To educate actuaries and other interested parties on the relative differences in older age mortality expectations in insurance, annuity and pension products.
2. To identify possible reasons for the difference in mortality expectations between the financial service products at the older ages.
3. To increase awareness of implications that any differences in mortality expectations can have on managing mortality risks for older age financial services products.

BEWARE THE LARGE SPIA

For the purpose of this article, we will concentrate here on a situation that would be of particular interest to reinsurers—an individual may purchase a Single Premium Immediate Annuity (SPIA) and use its annual income to pay the gross annual premiums of a life insurance policy. If the individual can do this at a lesser cost than paying a lump sum to the life insurance company, then the companies involved are exposed to arbitrage. Clearly the larger the case size, the more likely arbitrage may be sought and found as such cases are frequently "shopped around."

Based on the contributing companies, in an extreme case, an 80-year-old male may expect to gain as much as 35 percent of the lump sum he might pay to the life insurance company.

Since the degree of arbitrage decreases as issue ages decrease, there are lower exposures at younger ages, but the degree of arbitrage is still significant.

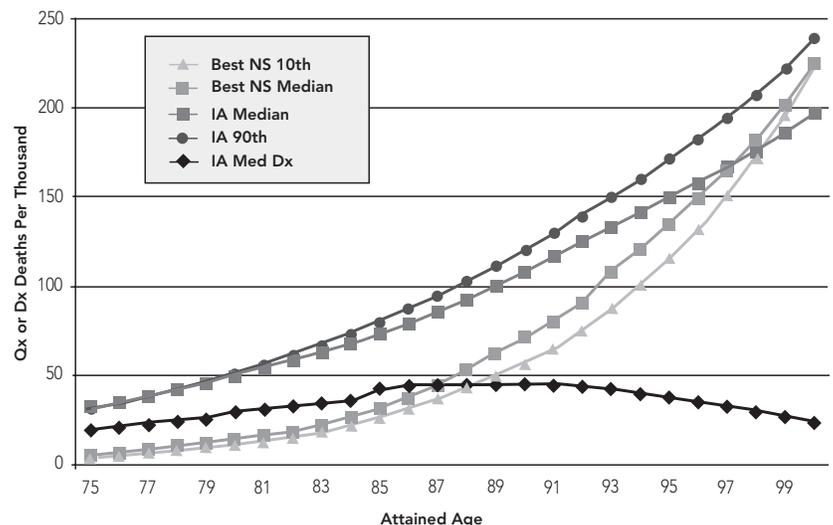
NOT A NEW PROBLEM!

In the Annuity Market News of October 2003, Vol IX, No. 10, an article titled "Underwriting Creeps Onto the Radar" focused on a new market developing for substandard SPIAs. This article pointed out that by "buying the higher payout lifetime annuity to fund the better priced life insurance policy of another [company], an investor can maximize wealth transfer." Roger Freeman was quoted in that article regarding a case where a \$10 million SPIA was purchased using standard mortality and the income used to purchase life insurance at super-preferred rates. The implied arbitrage was 15 percent and one side had to eat that bullet—again, probably the annuity carrier.

LET'S LOOK AT A 75-YEAR-OLD MALE FROM THE STUDY

Start by comparing the median curve for the Best Nonsmoker life insurance to the median Single Premium Immediate Annuity (light gray vs. dark gray). The Dx curve is shown to illustrate relative "pricing weight." Interestingly, the SPIA assumes much higher mortality! This is really no surprise as the SPIA mor-

Issue to Male age 75--mortality assumptions



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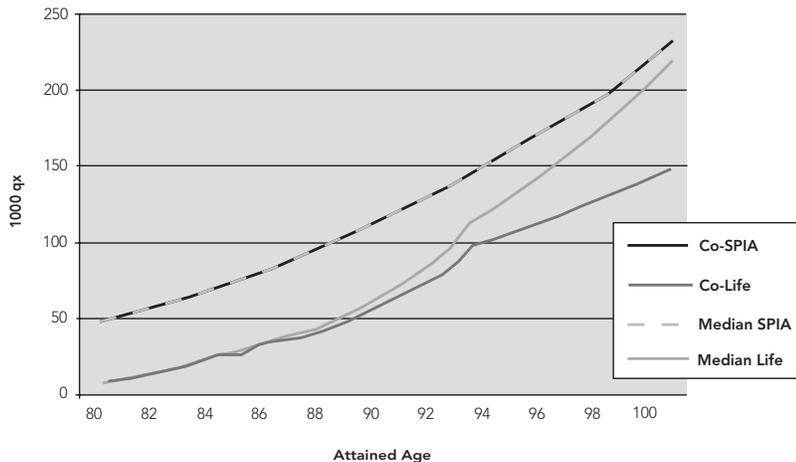
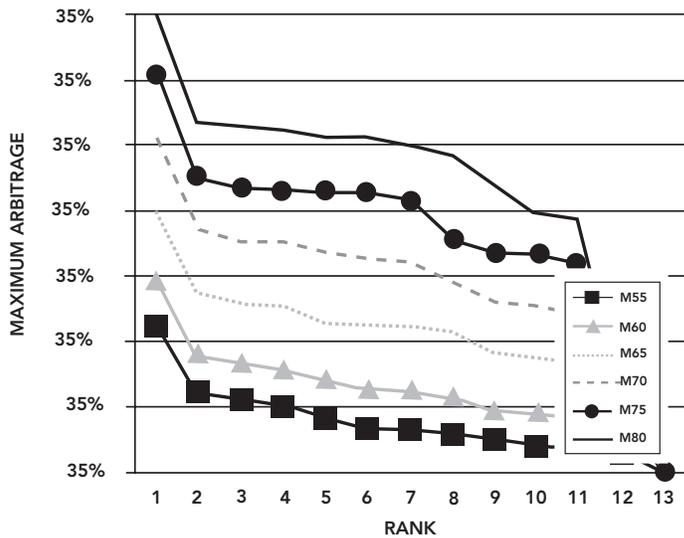
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tality is derived from a very different population. In reality, an arbitrage broker is going to seek out the best pricing for both products, not the median—this is illustrated in the above chart by the yellow and red lines (10th percentile life company and 90th percentile SPIA company). You will see quite a gap!

ARBITRAGE—HOW MUCH DOES IT HURT?

The report goes on to show how much arbitrage exposure exists. You can examine the report to see the methodology used, but the results are illustrated below. We are looking at 13 SPIA companies ranked one to 13 along the bottom of the chart by the level of arbitrage. Most companies are exposed substantially—with a male aged 80 being the worst-case arbitrage scenario

Arbitrage - Spia Company Perspective Males - Maximum



of more than 35 percent. This means that for a \$1 million investment, either the SPIA company (most likely) or the life company (unlikely) could lose as much as \$350,000! Or they are both out part of this!

WHO GETS HURT THE MOST?

Thus, we are looking at a situation that maximizes the arbitrage exposure for these companies, and the question is: Which company’s mortality expectations for the purchaser are more likely to be realized? Since the life insurance company has underwritten the risk to classify the insured in the Best Nonsmoker class, and the SPIA company has not likely done that, it seems that the SPIA company’s mortality assumptions will more often not be realized, and it will see losses from this transaction.

SELF-INFLICTED WOUNDS

Another situation, but no less disturbing, comes when a single company prices its life insurance and annuity products in “silos,” where neither side realizes what assumptions the other is making. This can be demonstrated by looking at the calculations (again, for males at age 80) for a different company (not used in the arbitrage calculations above). In this case, the company’s Net Single Premium (NSP) for Whole Life in the Best Nonsmoker class is \$489.00 for a \$1,000 policy, which is 96 percent of the median value on that measure. Its NSP for its SPIA at that age is \$628.00, equal to the median value. The mortality rates themselves show the potential problem.

Although this company’s SPIA rates are the median rates for all companies, its own life insurance mortality assumptions are far below the median life insurance company assumption. In addition, it has not recognized that its assumptions are inconsistent internally. (See chart, left, bottom)

Unfortunately, this company may realize too late that its mortality assumptions in the two product lines are inconsistent, so it may suffer financial losses before it can correct the situation.

The entire report, discussing methods, calculations, and results, is available on the Society of Actuaries website. In addition, an Excel spreadsheet accompanying the report gives the reader the opportunity to examine different issue ages, both sexes, and different underwriting classes to examine results under multiple scenarios. ■

On the Research Front

The following is a list of current research studies that will pique your interest and keep you informed.

RESEARCH PROJECTS – LIFE INSURANCE

The Individual Life Experience Committee has completed their latest report on intercompany mortality experience by amount of insurance under standard individually underwritten issues. This includes study years 2008-09. The Excel files contain the appendices and pivot tables that provide more detail of the data summarized in the report. If you have any questions, please do not hesitate to email Jack Luff at jluff@soa.org.

COMPLETED EXPERIENCE STUDIES

This report presents the results of the most recent study of individual life insurance lapse experience in the United States conducted jointly by LIMRA International and the SOA. The observation period for the study is calendar years 2007–09. The study is based on data provided by 27 individual life insurance writers and presents lapse experience for whole life, term life, universal life and variable universal life plans issued between 1910 and 2009. An Excel spreadsheet is available which contains supporting source lapse rates for figures within the U.S. Individual Life Insurance Persistency report.

COMPLETED RESEARCH STUDIES

In managing insurance, traditional actuarial methods use past policyholder experience in quantifying future liabilities and risks. In modeling future expectations, many assumptions need to be established that are influenced by policyholder behavior. However, since human behavior is difficult to predict, the use of historical policyholder experience to model future policyholder behavior may not produce the most accurate results as future policyholders may not behave the same as past policyholders. To expand our understanding of the theory of behavioral economics and its application to life and health insurance policyholder and annuitant behavior, the SOA's Committee on Knowledge Extension Research, Committee on Life Insurance Research and the Financial Reporting Section issued a call for papers, inviting actuaries, academics, economists, psychologists, sociologists, researchers and other professionals to explore this topic from a variety of perspectives. The result is a new paper, authored by Louis Lombardi, Mark Paich and Anand Rao of PricewaterhouseCoopers, which presents a new approach, called behavioral simulation, to model policyholder behavior.

NEW REPORT, "RECOGNIZING WHEN BLACK SWANS AREN'T" JUST RELEASED

Read this new research report, sponsored by the Reinsurance and Joint Risk Management Sections and Committee on Life Insurance Research, to better recognize, assess and respond to emerging events. Authored by Guntram Werther of Temple University with the assistance of Thomas Herget, this paper provides a holistic framework for foreseeing large scale, large impact rare events (LSLIREs). The report covers, among other topics, the definition of a black swan vs. LSLIRE; why current recognition methods for these extreme events fail; potential solutions for better foreseeing emerging LSLIREs; and how to improve timing and recognition of the trigger points within an LSLIRE.

NEW REPORT JUST RELEASED ON LIFE REINSURANCE TREATY CONSTRUCTION

Reinsurance treaty negotiations can be a long process that may lead to lengthy, unwieldy documents and negative experiences for the direct writer and/or reinsurer. The SOA's Reinsurance Section and the Committee on Life Insurance Research have just released a new report on Life Reinsurance Treaty Construction. Authored by Steve Stockman and Tim Cardinal of Actuarial Compass, this report discusses the importance of many reinsurance treaty terms/provisions, identifies common treaty structures, practices, and/or solutions in reinsurance treaty construction and negotiation and illustrates how treaty terms have evolved over time. The knowledge from this research will assist individuals involved in reinsurance treaty negotiations to optimize resources and success in future reinsurance treaty development potentially leading to enhancements in current processes and treaty language, as well as a reduction in the length of time needed to complete negotiations. □

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