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SOCIETY OF ACTUARIES

REINSURANCE SECTION

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Results of the 2015 Life Reinsurance Survey

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By Harindra Sebastian

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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.

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 email your articles to Richard Jennings (richardcjennings@gmail.com) or Ronald Poon-Affat (rpoonaffat@rgare.com). Some articles may be edited or reduced in length for publication purposes.

Chairperson's Corner

By Dustin Hetzler

We are at a time of acute change in our industry, which is bringing immense opportunity for ... actuaries to contribute.

At the end of this year, the reinsurance industry will see the retirement of A. Greig Woodring, chief executive officer of RGA, concluding 40 years of leadership—both of RGA and in the life reinsurance industry as well. During these years, protection and accumulation products have evolved from basic structures such as deferred accumulation annuities, variable life, universal life, term life, and whole life insurance to versions with complex features such as various guarantees, equity participation capabilities, riders enabling living benefits coverage, and others.

These evolutionary changes have been intertwined with a host of regulatory changes as well.

Even with constant changes and evolution of product and regulation, it does seem we are currently facing a more acute time of change within our industry. Here are some I've watched emerge over just the past several years:

- Obamacare's impact on the health insurance market and health insurance actuaries;
- The development and 2016 implementation of Solvency II;
- Principle-based reserving in the United States, which will start in 2017;
- Canada's Life Insurance Capital Adequacy Test (LICAT);
- Efforts to reach "middle" or "underserved" markets, including Millennials, who rely so heavily on technology to inform and make decisions;
- Wearable technology and wellness;
- New Department of Labor fiduciary rules, and anticipation of expanding fiduciary regulations;
- Start-ups entering and changing insurance markets;
- Big Data;
- Cybersecurity;
- Group supervision, Own Risk Solvency Assessment, IAIS Basic Capital Requirement;
- Federal Insurance Office's Covered Agreements;
- China's C-ROSS solvency system;
- Bermuda's new Solvency II framework;
- Changing reinsurance risk transfer rules in many country jurisdictions;
- Enterprise risk management, leading companies to evaluate which risks, and of what magnitude, are appropriate to retain or offload; and
- The global trend of insurance companies partnering with reinsurers to develop and deliver new product or business solutions.

It probably took me a total of five minutes to think of the items included in the list above, so it is safe to say that the list could easily be expanded quite a bit. Ronald Poon-Affat of RGA and guest Jason Hurley of reinsurer Guy Carpenter provide color to some of the specific change topics in their coauthored editorial.

We are at a time of acute change in our industry, which is bringing immense opportunity for life insurance and reinsurance actuaries to contribute.

I believe we actuaries have a tremendous opportunity to embrace our industry's rapidly changing environment and make significant contributions with our knowledge and experience to our businesses, to enable smart decisions, based on an understanding of the associated risks, and a well-supported path to incorporating recent changes and the changes yet to come. ■

Dustin Hetzler, FSA, MAAA, is senior vice president and chief pricing actuary, Global Financial Solutions with RGA Reinsurance Company in St. Louis, Mo. Dustin can be reached at *dhetzler@rgare.com*.

Editorial: The Intersection of Behavioural Economics and Life Insurance: How might Don Draper have sold Life Insurance

By Ronald Poon-Affat with Jason Hurley by special invitation

Question: If someone from the 1960s suddenly appeared now, what would be the most difficult thing to explain to them about life today? Answer: a pocket-sized device exists that is capable of accessing the entirety of information known to man. Most use it to look at pictures of cats and get into arguments with strangers.

Not even the visionary Don Draper of "Mad Men" could have seen that answer coming.

Looking back to Mad Men's Swinging '60s (which really was not so very long ago), high-risk behaviors were the norm: pregnant women smoked, three-martini lunches were *de rigueur*, drunk driving was common, most cars did not come with seat belts, and few used their seat belts even when standard equipment.

Jumping forward to 2016, many think it's the Internet that made such a tremendous impact on our present lives and behaviors. But really, none of the social oddities cited above were changed by a smartphone app. And how about those ubiquitous little bottles of water? When did it suddenly become a bright idea that without constant hydration people would die of thirst?

The science of behavioral economics could help explain these shifts in social actions and behaviors. Behavioral economics studies how people actually behave in given circumstances—not what they did in the past or say they might do in the future, but how they are likely to behave now. It examines rational and irrational thought as well as unconscious motivations to arrive at a more nuanced understanding of consumer behavior.

Therefore, could the insurance industry utilize behavioral economics as a way to potentially increase consumer desire to buy life insurance?

IRRATIONAL EXUBERANCE

Life insurers generally assume clients will purchase protection because it is the logical thing to do.

Developers of such products are generally actuaries—rare individuals who think logically, are comfortable with large amounts of money, understand the time value of money, think about the future, practice deferred gratification, and have an unshakeable belief in the existence of the rational consumer.

Unfortunately, people are not always logical, rational, objective, self-interested, and/or cost-benefit-calculating. People are emotional; they like to live in the moment and make irrational decisions. They smoke, drink excessively, overeat mindlessly, under-exercise, max out their credit cards and then pay only the minimum, engage in unprotected sex, and more. People are also regrettably quick to form new irrational habits, such as texting while driving. All of these actions have no real up side and only serve to reduce life expectancy and quality of life.

Even when consumers are presented with hard data confirming the irrationality of their actions, such as calorie counts of favorite indulgences, accident statistics for texting drivers, or depressing information about the ills of smoking displayed prominently on a cigarette pack, bad habits still persist. However, it does appear that forcing smokers to stand outside a bar in order to have a cigarette might be a more persuasive smoking deterrent.

Traditional economic theory says consumers should relish choice. However, recent economic research has produced an alternative school of thought about the economics of decision-making, summarized by an excellent article in *The Atlantic* that says the complete opposite.[1] First, it said, making choices can be physically exhausting (decision fatigue). Second, it suggested that having too many choices can make consumers less likely to reach a conclusion due to fear of making a wrong decision so frequently no decision is made (choice overload). Third, it reminds us that humans are social animals, likely to let their friends, families and tribes do their thinking for them (confirmation bias). Clearly, all of these elements can work against the rational decision to buy life insurance.

RESPONSIBLE PARENTING AND INSURANCE

Social norms today for responsible parenting are numerous. They include: having a seven-seat mini-van with umpteen airbags; making sure one's child wears protective gear when cycling, rollerblading or skateboarding; mandatory seat belt use; making sure a child's cell phone has their parents' phone numbers on speed dial as well as a GPS tracker; a constant supply of BPA-free water bottles … the list goes on and on.

Is it possible to envision life insurance protection as part of a "responsible parenting" list? Spending US$100 a month on family life insurance protection might seem an obvious way to ensure loved ones can continue to live without financial hardship. How can our industry be convinced to go about this? How about appealing to a parent's natural protective instinct? Parents can be

> Life insurers generally assume clients will purchase protection because it is the logical thing to do.

encouraged to take financially protective responsibility for their families. With each policy sale, an appealing giveaway, such as an umbrella, an oversized coffee mug or back-window car sticker that announces, "World`s Best Parent—my family is protected with ABC Insurance," can enhance a transaction's feel-good quotient. Additionally, people have been shown to be more likely to keep a commitment to maintain a positive self-image if such a commitment is made publicly.

One example of a fun and successful giveaway already associated with insurance companies is the stuffed meerkats (a very in-demand toy) being given away currently by the U.K.-based Comparethemarket.com to anyone over age 16 who buys insurance. Another, the plush toy AFLAC duck, has become a collector's item, and was even specifically requested from the company by President George W. Bush as these were his dog's favorite chew toy.

TEMPTATIONS

Behavioral economics taps into the business of understanding what tempts consumers to make purchases. Will the next smartphone, for example, prompt consumers to ditch their current smartphones more quickly as well as check them more (or less) often during the day? Will the next version of Facebook elicit more views and more clicks for advertisers? Will Mercedes Benz's luxurious 2017 cars tempt drivers to trade in their perfectly good 2012 models? The economic value of luxury objects is totally emotional, and based on how a consumer might feel when owning and using these objects (don`t even get us started on the irrational temptation of new running shoe models).

The history of insurance suggests that risk transfer probably started around the third millennium B.C., making insurance one of the world`s oldest professions. Still, I would be surprised if anyone ever lined up at midnight in the freezing cold to buy a new insurance policy when it first became available, or if anyone not in the business was ever tempted to toggle between the live video streams at the Worldwide Developers Conference (when Apple usually announces its new products) and Monte Carlo's Global Reinsurance Conference to hear about new risk coverages or updates to present policy benefits. In contrast, for many it can be almost irresistibly tempting to buy a lottery ticket—and even queue in the cold for the pleasure of it.

CONCLUSION

Life insurers are presently looking at how they can increase sales by leveraging Big Data and predictive modeling in order to identify customers with both a higher-than-average “propensity to buy” and a lower “probability to claim” risk profile. They are also investing in automated underwriting systems that use sophisticated decision-tree logic and looking at how social media can be leveraged as a distribution channel. However, we would argue that these new initiatives are based on the traditional theory of the consumer and don’t necessarily consider how insurers can improve how we engage and interact with the customer.

We are certainly not suggesting life insurers abandon these new sales initiatives. Rather, we are asking if behavioral economics could help attract a heretofore untapped base of new clients who might not fit into the decision-making mold of the presumed rational consumer. Logically, life insurance is a good thing, but even scientifically targeted clients might have a raft of rational-sounding reasons not to buy, such as: they don’t trust advisers and insurers; insurance agents are intrusive; the process takes too long; life insurance is expensive; and the benefits are confusing. These issues need to be addressed. Might it not be more effective to shift a sales conversation from offering a US$1 million death benefit (a big confusing number) upon death, to offering a payout of half the customer’s current salary until a child’s 18th birthday?

If we think our potential customers never allow emotions to interfere with their decisions, then our present portfolio may be the best that we can achieve. However, if we think emotions do play a role, then there is definitely room for improvement. Going forward, it would be great to see Behavioral Economics 101 included in the Society of Actuaries’ syllabus under Product Development. Maybe this might lead to seeing responsible families strolling around clutching their life insurance policies right next to their water bottles.

The views expressed regarding recognizing irrational behaviour and the revised SOA syllabus are solely their own and do not reflect the views of either their employers or the Society of Actuaries. ■

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Q&A With Greig Woodring

By Reinsurance News

Greig Woodring is chief executive officer and a director of Reinsurance Group of America, Incorporated, and retired president of the company. He has served as the company's CEO for 30 years.

Prior to assuming the role of president and chief executive officer of RGA in 1993, Greig served as executive vice president of General American Life Insurance Company (now GenAmerica Financial LLC) in charge of all reinsurance business.

Greig joined General American in 1979 as an actuary, and assumed responsibility for General American's reinsurance business in 1986. Before joining General American, he was an actuary at United Insurance Company in Chicago, Illinois. General American's reinsurance division led to the formation of RGA. Greig led the company through its initial public offering in May 1993. Since then, after more than 20 years of his leadership, RGA has grown to become one of the world's leading life reinsurers, with offices in 26 countries and revenues of $10.4 billion for the year ended Dec. 31, 2015.

Greig is a fellow of the Society of Actuaries and a member of the American Academy of Actuaries. He received his Bachelor of Science (BS) degree in Mathematics from the University of Michigan, his Master of Science (MS) in Mathematics from the University of Illinois and his MBA from Washington University in St. Louis.

Q: YOU HAVE BEEN A PART OF THE LIFE REINSURANCE INDUSTRY FOR 36 YEARS. IS THIS A GOOD TIME TO BE A LIFE REINSURER?

A: This is a great time to be a life reinsurer. The life reinsurance business is one that becomes more relevant and important when companies and environments are changing. There hasn't been a time in my memory when companies and environments are changing as much as they are today. We are seeing technological changes, demographic changes, regulatory changes, and stresses on primary companies. All of these provide opportunities for life reinsurers.

Q: RGA HAS GROWN FROM BEING A U.S.-CENTRIC COMPANY TO ESTABLISHING ITSELF AS A TRUE GLOBAL PLAYER. WHAT ARE SOME OF THE KEY DIFFERENCES BETWEEN DOING BUSINESS IN A SINGLE MARKET, VERSUS GLOBALLY?

A: There are some differences and some similarities. Every market is different; local skills and knowledge are important. Yet there are some skills and expertise that are transferable and can be used on a global basis. It has really been a learning experience for us to find out how to maximize the benefits of having local, experienced teams in a given market, and how to help them draw upon the global expertise and information available to them by their peers in other countries. You may have a critical mass of local talent, local experience, and local knowledge, and at the same time you are able to deploy global resources that bring the best-in-class skills to the region when required.

Q: REGULATORY CHANGES CONTINUE TO CHANGE THE WAY INSURERS AND REINSURERS WORK. HOW HAVE REGULATORY CHANGES IMPACTED RGA? DOES REGULATORY CHANGE OFFER AN OPPORTUNITY OR A THREAT TO REINSURERS?

A: While some regulatory restrictions naturally present challenges to both insurers and reinsurers alike, I believe that some of them present more opportunities than threats. For instance, there are opportunities for reinsurers to help companies with regulations such as Solvency II, which can put capital strain on direct insurers.

Q: MANY FINANCIAL COMPANIES ARE NOW BEING CHALLENGED BY "DISRUPTION" OF THEIR TRADITIONAL BUSINESS MODELS BY ONLINE COMPETITORS. HOW HAS THE LIFE REINSURANCE MARKET BEEN AFFECTED?

A: Life reinsurance has been affected in the sense that, if our clients are impacted by something, we're impacted as well. Disruption has had an impact on the life reinsurance industry because the different ways to assess risk are changing, as is the use of data for underwriting. There is a likelihood that these changes could increase the uncertainty surrounding underwriting decisions. What this means is that we need to be adaptable and nimble, and to evaluate what is working and what is not working as we continue to deal with disruption in a proactive way. I think the future shape of underwriting and other life insurance processes will be forged in the next five to 10 years, so it's important that we be constantly aware of what is going on in the industry.

Q: WHAT ARE THE IMPLICATIONS OF TECHNOLOGY IN THE LIFE REINSURANCE SECTOR?

A: There are two types of technology that we think about when we think about technology's impact on our industry. The first is information technology, such as data, analytics, and information gathering. Because they substitute for tried-and-true protocols, these kinds of technology may introduce new risks, and a speed of change with which we need to keep up. The life reinsurance industry can actually benefit companies that are trying to deal with these changes. This is because life reinsurers tend to see the whole market and have visibility to the trends across many sectors. In addition to information technology, there's also technology on the medical side to consider, such as ways to test and treat disease earlier. To give you an example, cancers at 'stage zero' and 'stage one' are almost universally curable. If we can detect cancers before they get past those early stages, deaths from cancers are dramatically decreased. As medical technology improves, so does the outlook for life insurance.

Q: WHAT ARE THE IMPLICATIONS OF WEARABLE WELLNESS TECHNOLOGY IN THE LIFE REINSURANCE SECTOR?

A: The people who adapt to this new technology for wearables and embedables are a self-selecting group of health-vigilant people. They are concerned about staying in good shape and tend to be generally healthy. As these technologies become more prevalent I think you'll see that we are starting to transform our knowledge of what is happening in our own bodies. Rather than relying on a yearly checkup, people may now be able to stay more regularly in tune with their own health, and as a result, may be able to pick up on potential issues earlier and increase the probability of staying healthy longer. Here again, the outlook for life insurance improves as people get healthier.

> I would tell them to prepare for change. ... the insurance industry ... has been extremely static and steady to this point.

Q: IF YOU WERE GIVING CAREER ADVICE TO SOMEONE JUST STARTING OUT IN THE INSURANCE INDUSTRY, WHAT WOULD YOU TELL THEM?

A: I would tell them to prepare for change. I would say that the insurance industry, compared to other industries, has been extremely static and steady to this point. The forces that are aligned to cause change and disruption are coming from both inside the industry, by regulators and government officials, and from outside, by consumers who want to conduct business and make purchases digitally. All these factors are mounting to a considerable extent and we all need to prepare for continued change.

Q: WHAT CAN LIFE REINSURANCE COMPANIES CONTRIBUTE TO THE GLOBAL ECONOMY?

A: Life reinsurers are a step removed from direct-to-consumer life insurance companies, but we believe we have an important role to play in the overall life insurance space. Life insurance is a great benefit to society. It serves an important need to consumers around the world. Life reinsurance tends to make the offerings of insurance companies better, if life reinsurers do their jobs well. Even though we are removed from consumers in some ways, we view ourselves as being an important part of the life insurance industry and providing the same protective shield to human society that life insurance offers.

Q: WILL INSURERS AND REINSURERS PLAY A ROLE IN IMPROVING LIFE EXPECTANCY WORLDWIDE?

A: I certainly hope they will. I hope that the life insurance companies of the future (and, by proxy, the life reinsurers) will think of themselves as being missioned to keep people healthy and to extend peoples' lives. Rather than simply writing a check to cover a traumatic event, ideally, life insurance and reinsurance companies of the future would actively work to improve the well-being and health of their customer base and the population base. ■

Results of the 2015 Life Reinsurance Survey

By Harindra Sebastian

The SOA Life Reinsurance Survey is an annual survey that 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 three following 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 2015.

(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 would be a group of policies issued during the period 2005–2006, but being reinsured in 2015.

(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."

Individual life figures are based on net amount at risk, while the group numbers are premium-based. The figures are quoted in the currency of origin (i.e., U.S. business is provided in USD and Canadian business is provided in CAD).

Also note that, while we reach out to all of the professional life reinsurers in North America, there may be companies that did not respond to the survey and are not included.

HIGHLIGHTS

The table below provides a summary of the most recent survey results:

Significant Decrease in U.S. Individual Life New Business Driven by Portfolio and Retrocession

Total individual life reinsurance new business in the U.S. for 2015 was $543 billion USD. This represents a 37 percent decrease compared to 2014. While the recurring new business did decrease slightly, the bulk of this change is due to a reduction in portfolio deals by $108 billion and a one-off retrocession deal in 2014 worth $194 billion. Recurring new business reported for 2015 was $407 billion, which decreased by 4 percent compared to 2014. While the life insurance market is reporting an increase of 5 percent, the cession rate decreased from 26.8 percent in 2014 to 24.4 percent in 2015, which led to the 4 percent decrease in reinsured new business volume.

Increase in Canadian Individual Life New Business by 11 Percent

In Canada, individual life reinsurance new business increased from $143 billion CAD to $158 billion, driven by an increase in the recurring life market of 9 percent.

Modest decrease in Group life business

Group business decreased overall in both the U.S. and Canada, with total in force group premiums decreasing by 5 percent to

Table 1: Reinsurance Landscape

	Individual Life New Business Volumes ($ billions)			Group In-force Premiums ($ millions)		
	2014	2015	% Change	2014	2015	% Change
U.S.						
Recurring	422	407	-4%	691	728	5%
Portfolio	238	130	-45%	1,486	1,405	-5%
Retrocession	203	5	-98%	72	0	-100%
Total	**864**	**543**	**-37%**	**2,249**	**2,134**	**-5%**
Canada						
Recurring	142	153	8%	105	101	-4%
Portfolio	0	3	n/a	1,136	1,098	-3%
Retrocession	2	2	0%	0	0	n/a
Total	**143**	**158**	**11%**	**1,241**	**1,199**	**-3%**

$2.1 billion in the U.S., and decreasing by 3 percent to $1.2 billion in Canada. The decrease in both countries was driven by reductions in portfolio business. While recurring new business premium continues to increase in the U.S.--increasing by more than 50 percent since 2011 to $728 million—the corresponding business in Canada is relatively stable at about $100 million.

UNITED STATES – INDIVIDUAL LIFE

RECURRING

The U.S. life insurance industry sells about $1.6 trillion of new individual life insurance face amount volume per year. About a quarter of this amount was reinsured in 2015, which represents a 4 percent decrease in volume reinsured compared to 2014. As shown in Figure 1, while the cession rate (i.e., the proportion of business ceded by direct writers to reinsurers) decreased by more than 50 percent over the last decade, the trend has clearly slowed down and the decrease has been less than 12 percent in the last four years. While the cession rate was stable at about 27 percent since 2011, the 2015 results showed a decrease of more than two percentage points to 24.4 percent.

The decrease during 2015 was driven by a decrease in coinsurance business, which dropped by 11 percent, compared to a 1.6 percent decrease in yearly renewable term business. The trend of relatively large decreases in coinsurance is consistent with prior years as well—coinsurance decreased by 62 percent since 2008, whereas YRT only decreased by 13 percent over the same period.

This is even more significant if you consider that the volume of life insurance issued has only decreased by 10 percent over the same period. While the reinsured portion has changed over time, the overall amount retained by direct writers has remained at about $1.2 trillion since 2007.

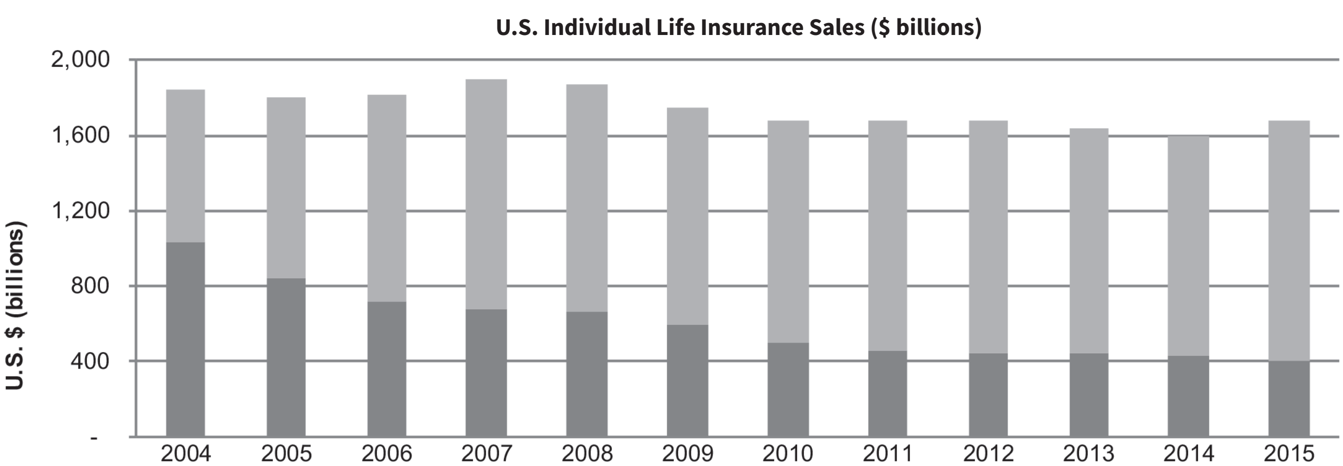
The top five companies in the reinsurance market continue to represent almost 90 percent of the market share (see Table 2 on page 12). SCOR continued to reinsure the most new recurring new business, with 2015 volumes at $97 billion. That being said, SCOR's new business volume decreased by $17.2 billion. This represents a 15 percent drop and was the largest decrease by volume and proportion of any of the top five reinsurers. Swiss Re, which reinsures the second most recurring individual life business in the U.S., also had a relatively large decrease in recurring new business volume of $9.4 billion, corresponding to an 11 percent decrease. The combination of decreases in reinsurance volume for these two reinsurers represent the majority of the market decrease from $422 billion to $407 billion.

Of the top five reinsurers, Munich Re experienced the largest increase in new business volume during 2015, adding $3.1 billion (4 percent). In addition to Munich Re, RGA also reported an increase in new business volume of $0.8 billion (1 percent). Outside of the top five reinsurers, Aurigen, Canada Life and Optimum Re reported the largest increases of $7.7 billion (i.e., a 58 percent increase), $2.1 billion (22 percent) and $1.0 billion (14 percent) respectively.

PORTFOLIO

Given the nature of portfolio deals, large variations from year to year are expected. In 2015, new portfolio business decreased from $238 billion in 2014 to $130 billion. The decrease was the result of a reduction in portfolio business for Hannover Re and Canada

Figure 1: U.S. Recurring Cession Rate



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
% Reinsured	56%	47%	40%	36%	35%	34%	30%	28%	26%	27%	27%	24%
Amt. Retained	809	952	1,089	1,207	1,212	1,148	1,168	1,211	1,234	1,197	1,164	1,263
Amt. Reinsured	1,037	844	724	683	658	596	505	461	445	443	427	407

Life, which both reported sizable portfolio amounts in 2014. The large producers of new portfolio business in 2015 were RGA, reporting $89 billion, and SCOR, reporting $38 billion.

As shown in Figure 2, compared to prior years, there were no large acquisitions of life reinsurers that affected the results in 2015. The spikes in the 2011 and 2013 figures reflect SCOR's acquisition of Transamerica Re and Generali respectively, while the 2009 spike was the Hannover Re acquisition of an ING Re block that was previously purchased by Scottish Re in 2004.

Overall, portfolio reinsurance deals were at their lowest levels since 2011 and it will be interesting to see whether this lower level continues into next year.

RETROCESSION

Retrocession has experienced a significantly decreasing trend in new business over the last 10 years, reducing from $43 billion in 2005 to $5 billion in 2015. The exception was in 2014, when new business was significantly higher due to a one-off retrocession deal where Pacific Life agreed to accept a $194 billion block from RGA. The primary retrocessionaires in 2015 were Berkshire Hathaway Group and Pacific Life.

CANADA – INDIVIDUAL LIFE

RECURRING

The Canadian market represents about $240 billion CAD of individual life insurance new business sold in 2015.[2] Of this volume, an estimated 63 percent (i.e., $153 billion) is reinsured. This is a significantly higher proportion compared to the U.S., where approximately 24 percent is reinsured.

The Canadian reinsurance market has grown over the last decade, increasing by 19 percent since 2005 (see Figure 3). The increase is attributed to growth in the individual life insurance market, which increased by 40 percent over the same period. Taking into account the increase in overall market, the proportion of business ceded has decreased from 75 percent to 63 percent over the same period.

The primary participants in the Canadian market are RGA, Munich Re and Swiss Re, which together represent 75 percent

Table 2: US Recurring Individual Life Volume ($ millions CAD)

Company	2014		2015		Change from 2014 to 2015
	Assumed Business	Market Share	Assumed Business	Market Share	
SCOR Global Life	114	27%	97	24%	-15%
Swiss Re	90	21%	80	20%	-11%
Munich Re	70	17%	73	18%	4%
RGA	67	16%	68	17%	1%
Hannover Life Re	43	10%	41	10%	-5%
Aurigen	12	3%	19	5%	58%
Canada Life	9	2%	11	3%	22%
General Re Life	11	3%	10	2%	-9%
Optimum Re	7	2%	8	2%	14%
Total	**422**	**100%**	**407**	**100%**	**-4%**

Note: Wilton Re did not report in 2015, and has been excluded from these figures.

Table 3: Canada Recurring Individual Life Volume ($ millions CAD)

Company	2014		2015		Change from 2014 to 2015
	Assumed Business	Market Share	Assumed Business	Market Share	
RGA	46	32%	49	32%	7%
Munich Re	42	30%	40	26%	-5%
Swiss Re	26	18%	25	16%	-4%
SCOR Global Life	12	8%	18	12%	50%
Aurigen	10	7%	14	9%	40%
Optimum Re	7	5%	7	5%	0%
Total	**142**	**100%**	**153**	**100%**	**8%**

of the market (see Table 3). RGA has risen to the top of the Canadian market over the last few years, and continued to grow by 7 percent in 2015—reporting $49 billion of recurring new business. Munich Re and Swiss Re showed reductions in recurring new business of 5 percent and 4 percent respectively.

SCOR and Aurigen reported large increases in 2015, which, combined with RGA's increase, drove the overall increase of $11 billion.

PORTFOLIO AND RETROCESSION

There were no Canadian portfolio deals in 2014, and in 2015 Aurigen reported new portfolio business of $3.3 billion.

As it relates to retrocession, similar to the U.S. market, Berkshire Hathaway and Pacific Life are the primary players in Canada.

UNITED STATES – GROUP LIFE

The U.S. group business represents a total of $2.2 billion of in-force premium in 2015, of which recurring premiums make up $0.7 billion, and portfolio represents $1.4 billion.

The recurring in-force premiums in the U.S. market have increased steadily, accounting for a cumulative 53 percent increase since 2011, growing from $476 million to $728 million over that period (see Figure 4).

As shown in Table 4, the top three reinsurers in the U.S. group insurance market for recurring business are Swiss Re, Munich Re and RGA, which together make up 89 percent of the market. These reinsurers grew in 2015 by a combined total of 6 percent, contributing to the overall increase of 5 percent in the recurring space. Swiss Re, the top reinsurer by premium, increased by 3.4 percent to $328 million of recurring in-force premium. Munich Re and RGA, the second and third largest, increased by 11 percent and 8 percent, respectively.

Figure 2: U.S. Portfolio Business Trend

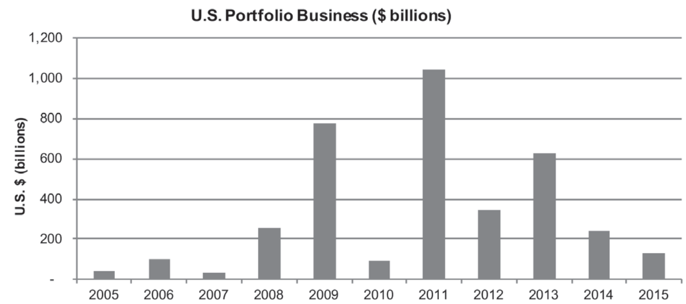


Figure 3: Canada Recurring Cession Rate

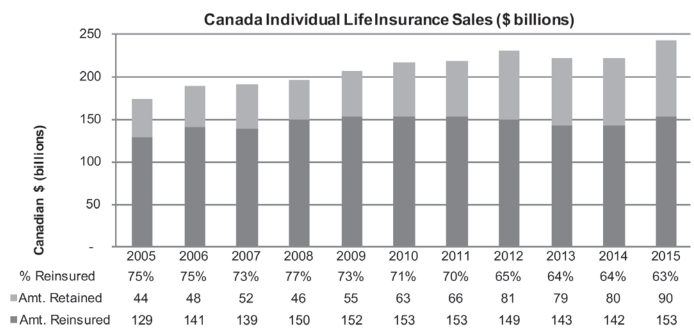


Figure 4: U.S. Inforce Group Premium Trend

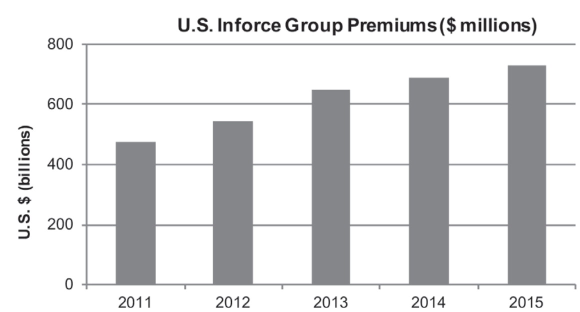


Table 4: U.S. Recurring Inforce Group Premiums ($ millions USD)

Company	2014		2015		Change from 2014 to 2015
	Assumed Business	Market Share	Assumed Business	Market Share	
Swiss Re	317	46%	328	45%	3%
Munich Re	182	26%	202	28%	11%
RGA	102	15%	110	15%	8%
Group Reinsurance Plus	34	5%	34	5%	0%
SCOR	26	4%	25	3%	-4%
General Re	22	3%	21	3%	-5%
Hannover Re	7	1%	8	1%	14%
Canada Life	1	0%	1	0%	0%
TOTALS	**691**	**100%**	**728**	**100%**	**5%**

Table 5: Canada Recurring Inforce Group Premiums ($ millions CAD)

Company	2014 Assumed Business	2014 Market Share	2015 Assumed Business	2015 Market Share	Change from 2014 to 2015
Munich Re	50	48%	47	47%	-6%
Swiss Re	27	26%	25	25%	-7%
RGA	22	21%	23	23%	5%
Optimum Re	5	5%	6	6%	20%
SCOR Global Life	2	2%	1	1%	-50%
TOTALS	**105**	**100%**	**101**	**100%**	**-4%**

As it relates to portfolio business, Canada Life and Hannover Re made up over 90 percent of the total business in 2015, writing $754 million and $539 million, respectively. Munich Re and Scottish Re also reported in-force group life portfolio business of $95 million and $17 million, respectively. In-force portfolio business decreased by 5 percent between 2014 and 2015, primarily due to a 14 percent drop in Canada Life's block.

CANADA – GROUP LIFE

In Canada, the recurring portion of in-force premiums have been fairly steady over the last few years, hovering at a little over $100 million CAD of in-force premium. As with the U.S. market, the Canadian market is dominated by three reinsurers, Munich Re, Swiss Re and RGA. Of these reinsurers, Munich Re and Swiss Re reported decreases of more than 5 percent, which contributed to the overall decrease of 4 percent.

Munich Re was the only reinsurer that reported in-force portfolio business (totaling $1.1 million in premiums) for 2015.

LOOKING FORWARD

The reinsurance business has gone through significant changes over the last few years. In looking at the survey results over the last 30 years for the U.S. recurring market, the number of reinsurers reporting new business dropped from 30 to nine, and reinsurance volume increased from $156 billion in 1986 to $844 billion in 2005 before decreasing again to the current level of $407 billion. These substantial swings in volume are predicated on multiple factors, including the introduction of preferred risk classes in the 1990s, the growth of coinsurance in the early 2000s due to Regulation XXX, and the increased prevalence of captive financial reinsurance structures to handle reserve strain.

Currently, principle-based reserving (PBR) is a major concern of many in the U.S. life insurance industry, with a focus on implementing PBR and understanding how it affects their business. Some direct writers have indicated no plans to change their reinsurance structures in the near term. In coming years, products and pricing structures may change to reflect the new reserve requirements, impacting reinsured volumes as well as reinsurer support for reserve financing structures.

Additionally, streamlined underwriting is expected to continue to impact the reinsurance market. Organizations have been working to develop new products, potentially leveraging sources of data that have not traditionally been used in our industry, and looking to reduce the time and expense it takes to issue a policy. Reinsurer involvement can span a broad range of areas, including risk sharing, rules development, product development and provision of an automated underwriting engine. ■

ENDNOTES

[1] Based on ACLI, "Life Insurers Fact Book 2015", November 2015, LIMRA, "U.S. Individual Life Insurance Sales, Fourth Quarter 2015," March 2016, and LIMRA, "U.S. Individual Life Insurance Sales Trends, 1975-2015" April 2016

[2] Based on CLHIA, "2015 Edition of Canadian Life and Health Insurance Facts", August 2015 and LIMRA, "Canadian Individual Life Insurance Sales Trends and Forecast (2016)", March 2016

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Socio-Economic Mortality Differentials and Concentration Risk

By Kai Kaufhold

Within the life insurance industry there is a strong drive to "Know Your Customer!" and as reinsurers we applaud that. While life insurers may be most interested in the lifetime value of a customer relationship from a marketing perspective, to us reinsurers it is important to be able to accurately assess the risk which an insured life represents. The variability of results within a portfolio is driven by a number of items, including the policy size distribution and the distribution by different risk classes. The more diverse the insured lives are with respect to their mortality risk (or morbidity or disability for that matter), the more widely claims will vary. Therefore, understanding the key drivers of mortality which explain the differentials in mortality rates between different groups is of great importance to reinsurers.

However, understanding cause and effect of mortality drivers is not an easy task. Take smoking as an example. While the adverse impact on an individual's health is fairly easy to detect—just listening to a smoker's cough is a dead give-away—it took us a long time to introduce smoking as a rating factor, and even longer for the legal system to acknowledge the causal relationship, but that's another matter.

As reinsurers, our motivation for understanding mortality differentials is to be able to assess the risk and adequately price for it, offering discounts for the best risks, but also being able to offer adequate prices for other groups. Society at large is interested in understanding mortality differentials more for the purpose of alleviating the disadvantage of those at greater risk and thereby improving their situation. Our interests are ultimately aligned when it comes to investigating mortality drivers.

Policy size is a risk factor that reinsurers have long known about and include in their pricing. However, policy size itself does not

explain the differences in mortality. We like to explain the observed increased mortality for lower face amount policies with lower socio-economic status, i.e., that these policyholders cannot afford larger policies. However, policy size is not a perfect predictor for socio-economic status and even socio-economic status is not an explanation; it is merely correlated with mortality differentials. The possible reasons are diverse. Thus, research into this phenomenon is warranted.

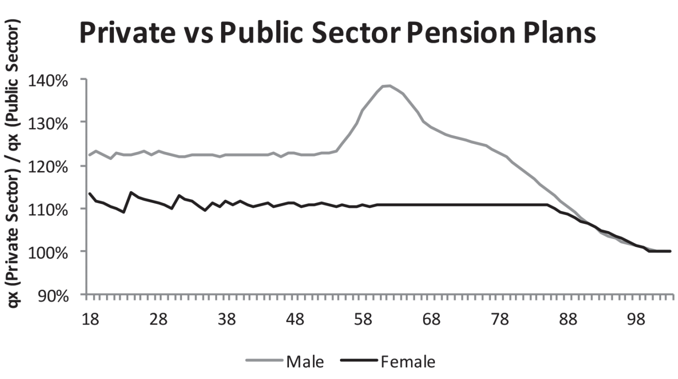
Socio-economic health inequalities have been the subject of intense study in recent years. In 2005, the World Health Organization launched the Commission on Social Determinants of Health, which produced its report "Closing the Gap in a Generation" in 2008. Since, similar initiatives have been undertaken at the national level (Strategic Review of Health Inequalities in England post 2010[1]) and Europe-wide (European Review of Social Determinants of Health and the Health Divide for WHO Euro). Premature death and higher prevalence of illness in lower socio-economic groups have been linked to a number of different drivers of mortality and morbidity, such as limited access to health care, less awareness of healthy behaviors and healthy nutrition, and the individuals' disadvantaged living and working conditions. These factors in turn are closely correlated with the level of education, the wealth of an individual and the person's social context.

The socio-economic differences between different parts of the general population are commonly accepted as the reason why mortality of insured lives observed within the insurance industry is lower on average than the mortality of the general population. Mortality differentials between different groups of insured lives are well known to reinsurers. These differences also exist within the pensions industry. With a growing interest in longevity reinsurance, understanding this sector should also be of interest to life reinsurers. In a recent study[2], Louis Adam of Université Laval in Canada showed the difference between general population mortality, the mortality rates in Canadian social security pensions (Canada Pension Plan and Québec Pension Plan), and defined-benefit (DB) pension plan mortality. However, the differences do not stop there: within DB pension plans there is a difference between public sector plans and pension plans sponsored by private companies, as shown in Figure 1. At retirement age, male mortality within private sector pension plans is up to 38 percent higher than mortality for male pensioners within the public sector. We can only surmise that the socio-economic cross-section of government employees must be different from the composition of the private sector workforce, leading to this significant difference in mortality experience.

Within any single DB pension plan, we also commonly observe a disparity of mortality rates that corresponds to the different socio-economic levels of the different employee groups. Figure 2 shows the ratio between the observed number of deaths and expected deaths calculated from a simple age-gender model without pension size, for a group of UK pensioners. The group comprising the 5 percent of pensioners with the largest pension amounts has mortality which is significantly lower than all other pensioners'. This is in itself already remarkable, but becomes all the more relevant when we consider that this group represents more than 40 percent of the total annual pension benefits.

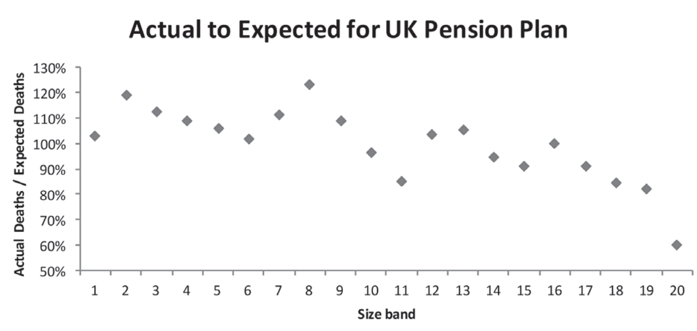
Such a concentration of benefits within a small group is another example of inequality, which is a challenge for the actuarial practitioner. The group with the largest financial impact also has the longest survivorship, which is a strain on the funding of the pension plan. This also poses a risk to any reinsurer offering longevity risk coverage to the pension plan. Therefore, understanding concentration risk is of vital importance to reinsurers.

Figure 1: Comparison of mortality for private sector and public sector pension plans in Canada.



Source: Canadian Institute of Actuaries, Canadian Pensioners' Mortality Report, February 2014, Document 214013t1e-1.

Figure 2: Mortality of a typical UK Pension Scheme



Source: Sample data from longevitas.co.uk representing a typical U.K. pension scheme, generated using a model fitted to U.K. pensioner data. Expected deaths calculated using a Makeham-Perks model included age and gender as the only risk factors. The size bands are created by sorting the pensioners by annual pension amount and subdividing them into 20 quantiles.

One would be forgiven for thinking that such inequality is specific to certain industries, such as manufacturers or mining companies, where there is a large disparity between the majority of workers and a small number of managers. However, we observe such socio-economic differences in mortality even within relatively homogenous groups. Take a German public sector pension scheme for example, which we studied in 2013[i]. The top 5 percent of pensioners by annual pension amount received around 16 percent of the total benefits, which indicates a lower degree of disparity than in the previous example from the U.K. Nevertheless, this select group displayed mortality rates more than 25 percent lower than the pensioners with the 85 percent smallest pension amounts. So, even despite being a relatively homogenous group (public sector pensioners) in Germany, a country that prides itself in being egalitarian, there were mortality differentials that had a substantial impact on the overall level of pension liabilities.

Taking this result one step further, we analyzed the mortality of a group of pensioners whom one would assume not only to be homogenous with respect to mortality, but all of whom we assume have access to excellent health care options: retired medical doctors. In Germany, there are separate mandatory pension plans for certain professions, such as doctors, architects, lawyers or chartered accountants. Since all members of such a pension plan have the same level of education and belong to the same broad socio-economic class, we would expect that their mortality rates are relatively homogenous, too. Nevertheless, we were able to observe a mortality differential of up to 20 percent between the average and those retired doctors who receive the 5 percent largest annual pensions. Such a differential can neither be explained by different levels of education nor by the "poorer" doctors not being able to afford proper health care. It only goes to show that we still do not completely understand the drivers of mortality. Might it simply be that the most successful doctors also are the longest lived, or could it be that those doctors who are most aware of their good health have the greatest incentive to make the most contributions to the pension plan? It is also possible that pension size just happens to be correlated with a different driver of mortality, such as the year-of-birth cohort. Maybe the cohorts of doctors who were able to make the most contributions to their pension plan just happen to belong to the year-of-birth cohort with the greatest mortality improvements.[ii] The investigation is still ongoing on this last project, as it is on many different projects that intend to improve our understanding of the drivers of mortality and socio-economic mortality differentials.

Many questions remain about socioeconomic mortality, drivers of mortality and modeling of future mortality. The upcoming Living to 100 Symposium to be held Jan. 4-6, 2017 in Orlando, Fla., will allow you to explore these topic areas and many more. Researchers from different countries will present their findings on trends in death by cause, the drivers of mortality, future mortality trends and socio-economic differences in mortality and leaders in the biology of aging present their perspective on the latest research on how to extend the number of healthy years of life.

Since 2002, the Living to 100 Symposium has been held every three years, giving researchers the opportunity to present current findings and discuss them with practitioners from the insurance industry and other stakeholders. Enhance your knowledge[iii] and join us in learning more about mortality and how to avoid it at the Living to 100 symposium! Coming soon are registration details at *LivingTo100.soa.org*. ■

ENDNOTES

1 The Marmot Review: Fair Society, Healthy Lives. *http://www.instituteofhealthequity.org/projects/fair-society-healthy-lives-the-marmot-review*

2 Canadian Institute of Actuaries: Final Report – Canadian Pensioners' Mortality, Pension Experience Subcommittee- Research Committee, February 2014.

i Richards, S.J., K. Kaufhold and S. Rosenbusch (2013) Creating portfolio-specific mortality tables: a case study. European Actuarial Journal, 2(3), 295-319.

ii While the cohort effect is not quite as pronounced in Germany as it is in the UK, it is nevertheless present in general population mortality experience. On the cohort effect see

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- Richards, S.J., J.G. Kirkby, and I.D. Currie (2005). The importance of year of birth in two-dimensional mortality patterns. British Actuarial Journal 12, I, 5-61

iii The monographs of past symposia with contributions from leading experts in demography, biology, medicine and actuarial science a can be found at *LivingTo100.soa.org*.

Kai Kaufhold, managing director, Ad Res, actuarial consulting firm in Cologne, Germany, is a member of the organizing committee of the Living to 100 Symposium and has studied longevity and mortality risk for more than two decades.

How Can Life Insurers Improve the Performance of Their In-Force Portfolio?

A Systematic Approach Covering All Drivers Is Essential

By Andrew Harley and Ian Farr

This article is reprinted with permission from the March 2013 Emphasis *magazine.*

In-force portfolios are a valuable but often neglected asset that life insurers should manage carefully as they meet the challenge to improve returns.

Life insurance carriers continue to build new products or enhance existing ones, hire more agents and look at new distribution methods or markets; however, over the last several years we've seen an increased number of carriers focusing on improving the performance of their in-force business. AXA, VOYA, Allianz, Genworth and John Hancock are just a few companies who have made recent announcements regarding actions taken related to certain in-force blocks and we expect this activity will continue to increase.

This article will explore how carriers are no longer taking a single thread approach when analyzing and improving in-force blocks. While they will continue to look at reducing operational costs or transfer liabilities, we see insurers following a more holistic and diagnostic path to analyzing in-force business.

In-force portfolios have traditionally provided life insurers with a steady and reliable stream of earnings, making a significant contribution to respectable industry margins. However, these margins are now under pressure as a result of the retention and return implications of prolonged low interest rates. Insurers need to recognize that because of the scale of their in-force portfolios, a relatively small incremental improvement in in-force performance can significantly impact bottom-line earnings and the value of the business as a whole. Willis Towers Watson's recent analysis of the embedded-value statements of major insurance groups indicates that a sustainable 10 percent reduction in management expenses or in overall lapse rates can increase the embedded value by up to 6 percent. These percentage performance gains can be significantly improved if insurers use a targeted approach to in-force portfolio management, given the wide variety of customer and policy characteristics that exist within life insurance portfolios.

There are many ways insurers can improve the performance of their in-force portfolios, and Figure 1 sets out the key drivers typically considered.

Figure 1. In-force portfolio performance drivers

Let's first look at the fundamentals—how to assess and prioritize opportunities for performance and value enhancement. Then we'll review how insurers can adopt analytical techniques to better understand retention drivers and tailor customer interactions to ultimately improve portfolio profitability. Finally, we'll address how insurers can manage the in-force liabilities to enhance their runoff value.

ASSESS AND PRIORITIZE OPPORTUNITIES

Given the range of available performance improvement opportunities, insurers will need to prioritize their actions based on considerations such as financial impact, implementation timelines and the enterprise risks involved. The financial impact analysis will typically examine a range of accounting bases that might include local regulatory, GAAP, current and anticipated IFRS, and embedded value. For some opportunities, such as retention management, different metrics can produce very different results and potentially drive different management actions. For an in-force portfolio, selection of more economic metrics, such as embedded value, as the primary drivers of decision making will typically align actions more closely with shareholder value. Often the impact of any actions on cash distributions to shareholders will also be an important decision driver.

In addition to the selection of primary decision metrics, analysis of performance improvement opportunities will generally require portfolio results to be analyzed at a more granular level than is typical within regular reporting processes. Additional investigation will likely be required to ensure the appropriate allocation of revenue items at a more detailed level, including consideration of the impact of marginal changes in the portfolio. For example, the allocation of expenses and capital at granular and realistic levels requires care, reflecting fixed/variable dynamics for expenses and allowing for diversification effects for capital.

Whichever metrics are chosen to inform the options analysis, the right decision will only be made with a thorough analysis that considers:

- Short- and long-term implications of decisions (e.g., not just the current value of customers' in-force policies but their customer lifetime value, including allowance for any market cyclicality);
- Other material business issues that affect daily operations (e.g., how the cash-flow position and the profit of the business will be affected); and
- P&L and balance sheet impacts, and overall market and business strategy.

Balanced scorecards can help ensure all factors are sufficiently and fairly prioritized. Business cases can then be developed that will require input of cross-functional working groups, subject matter expertise and high-quality analytics in each of the balanced-scorecard areas specified. With a suite of approved business cases, opportunities can be prioritized and an overall program can then be established, developed and implemented to improve in-force portfolio performance.

Retention management and liability management are two of the key areas for in-force portfolio performance improvement and often appear on the list of prioritized opportunities.

TARGETED RETENTION MANAGEMENT

Targeted retention management is the process of measuring the value of customers at a granular, segmented level, of identifying policyholder behavioral characteristics that drive lapse and surrender rates, and subsequently implementing measures aimed at retaining positive or high-value customers. Over an agreed period of time, the quality of the portfolio should improve and, along with it, the financial performance and the value of the in-force book.

Successful retention projects have a number of key stages. There first needs to be a rigorous understanding of individual customer value that reflects the value of future earnings of existing policies and the potential value of additional policy sales (a customer lifetime value assessment). This requires a good understanding of the range of variation within the portfolio (e.g., by size and cost) at a sufficiently granular level and a robust mechanism to allocate costs to products, customers and distribution channels.

Next, insurers should analyze and quantify the drivers of policyholder behavior and how they affect withdrawal rates. Technological and analytical advances have made it easier to collect and analyze data, which to date have proved difficult because of the large number of drivers involved (Figure 2), the need to allow for interactions and correlations between factors, and the sheer number of customers to analyze.

This analysis cannot be done in isolation from external market factors. Markets are dynamic, and competitive pressures or treasury/regulatory changes affect policyholder lapse behavior

Figure 2. Factors that typically influence policyholder lapse and surrender behavior

- Product class
- Distribution channel (or specific source of business)
- Socioeconomic characteristics (e.g., ZIP code, sociodemographic grouping)
- "Moneyness" of any policy options or guarantees
- Presence of product features (e.g., policy riders)
- Policy duration (current and remaining) and term
- Benefit amount
- Policyholder age and gender
- Number of other policies
- Number of recent contacts to/from the insurer
- Economic and market economic conditions
- Tax considerations

to one degree or another. These influences may be more difficult to analyze, and insurers may need to apply more qualitative judgment, at least initially, to refine retention models.

Smart insurers will also seek to aggregate external (big) data with that provided by internal sources to more precisely understand drivers of withdrawal and retention rates. Bolting on data sets generated by, for example, social media sites, credit rating agencies and Internet distribution channels can reveal important, differentiating behavioral characteristics that can make an important contribution to understanding policyholder withdrawal behavior. With so much information to analyze, firms need to use technologies and techniques that can accommodate large volumes of structured and, possibly, unstructured data. Evolving best practice uses generalized linear models (GLMs) and optimization techniques including propensity-to-lapse models—methods that have been used for many years by property and casualty insurers to identify and quantify the many factors underlying personal lines pricing and, more recently, for customer retention purposes.

The output from GLM analysis not only helps determine the factors that influence policyholder behavior, but also allows the insurer to segment customers into homogenous groups that respond similarly to changes in behavioral drivers. Insurers can then consider how to influence policyholder behavior in each segment to improve overall portfolio profitability. Additionally, the GLM can be used to estimate the degree to which each segment will react to changes in each behavioral driver.

Insurers can then establish mechanisms to focus their retention management activities on higher-value customers. These mechanisms depend on the market, the specific portfolio, regulatory restrictions and the results of retention analysis, but insurers can:

- Tailor written communication to the high-value policyholders to emphasize the merits of their policy, particularly over time;
- Script specific responses to inbound telephone surrender inquiries from high-value policyholders that provide compelling messages to persuade them to maintain their policies, yet deliver a different message to less valued customers that may direct them to an alternative product that would benefit both parties, subject to regulatory requirements; and
- Offer loyalty programs (e.g., noninsurance-related products or voucher bundles) that are proactively offered to high-value customers and timed to coincide with high-withdrawal external-factor changes (e.g., significant changes in investment market returns).

It is important that firms don't act solely on initial findings, but rather analyze a suitably representative sample of customers to understand the effect of these actions on policyholder behavior.

GLMs are an excellent starting point, but human behavior is unpredictable—so it's best to learn from an initial pilot.

GLMs are an excellent starting point, but human behavior is unpredictable—so it's best to learn from an initial pilot. These activities can then be incorporated into policyholder data sets, allowing subsequent GLMs to analyze the effect on retention rates and assess their effectiveness and/or cost efficiency.

IN-FORCE LIABILITY MANAGEMENT

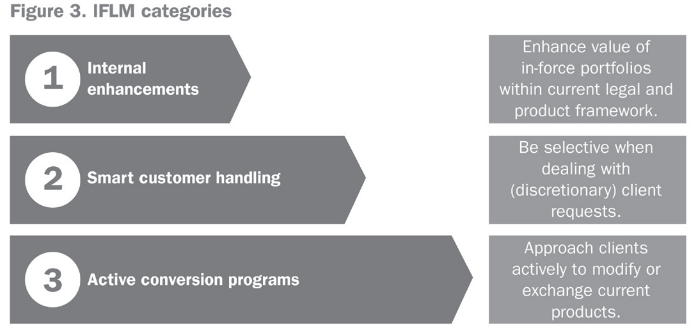
Liabilities can also be managed post-sale, and insurers have a variety of liability-driven options to influence and enhance the run-off of life insurance portfolios. We have developed three categories to analyze in-force liability management (IFLM) (Figure 3).

Internal enhancements relates to the ability of insurers to change how the liabilities are managed within the current legal and regulatory framework. This includes areas where the insurer has discretion in the setting of terms and conditions, or where the insurer is voluntarily offering better terms and conditions than are legally required.

Addressing this requires a detailed comparison of contractual requirements with actual practice, invoking potentially unused insurers' rights or providing the right incentives to distribution channels to promote the desired behavior. For example, adjusting current Cost of Insurance Rates on Universal Life products falls into this category.

Smart customer handling means treating customers differently depending on the underlying financial attractiveness of their policy to the insurer. For example, for flexible premium policies, an insurer might benefit from running targeted campaigns

Figure 3. IFLM categories



to encourage additional premium payments and extending the policy term, with distribution partners and customer service staff encouraged and incentivized in this direction. However, for policies with high guarantees or any other onerous terms, the insurer might not encourage policyholders to make additional premium payments. In addressing these aspects, insurers should consider reviewing policyholder communication, and targeting surrender and retention management activities to reflect the value or capital consumption of different product portfolios.

Active conversion programs are the ultimate expression of IFLM. Typically, after a stringent legal process that often includes policyholder votes, an entire portfolio is converted to new policy types. These new policies exclude the problematic features of the old ones (e.g., onerous guarantees), with policyholders receiving compensation for the loss of these features.

Most countries like the U.S., however, allow conversion exercises only if policyholders individually agree to policy changes. Individual conversions generally lead to more diverse in-force portfolios and can be suboptimal, since only part of the in-force is converted or modified. Nevertheless, these conversions can be successful, as seen by programs in Germany and Austria, where clients have been successfully offered a way out of cash lock-ins under constant proportion portfolio insurance-based UL policies. Through the conversion program, their guarantees were reduced in exchange for higher upside potential, thus reinstating the originally planned characteristics of their policies and avoiding staying for the entire remaining policy duration in cash investments.

Our client experiences offer several IFLM lessons:

- One size doesn't fit all. IFLM approaches need to be tailored carefully to each portfolio's specifications, as well as to the values and objectives of individual companies, country-specific laws and the need to manage litigation and reputational risk.

- There is no silver bullet. Generally, IFLM is driven by many small steps, and only rarely do individual actions make a significant impact on overall performance. Often, only the combination of retention management, conversion offers and smart customer handling helps companies improve their situation in a meaningful way.

- Everyone should benefit. Conversion offers need to be financially attractive to both the policyholders and the insurer to attract sufficient participation. For instance, low-payment lifetime annuities could be converted to higher-payment annuities with a fixed term. Policyholders receive more meaningful annuity payments, and the insurer benefits from substantially reduced administrative costs, a reduced term and reduced longevity exposure.

CONCLUSION

Until recently, firms have given greater focus to new business activities, and resources and technology have been deployed to generate growth and (sometimes) return from new customers. For a period, at least, we believe this needs to change, and while sustained effort must continue to be applied to attracting profitable new business, more attention should be given to managing the in-force portfolio.

Any project to improve performance must be grounded in granular and robust analytics. High quality, informative analytics combined with deep business experience and local market knowledge tell us where to find and how to extract the value from an in-force portfolio that can give a much needed boost to sustainable earnings and shareholder value.

Some insurers have already implemented major in-force value enhancement projects using the activities outlined above, while others have taken this a step further and established a framework that assigns sustained responsibility and accountability for in-force value management. We believe more insurers will follow suit. ■

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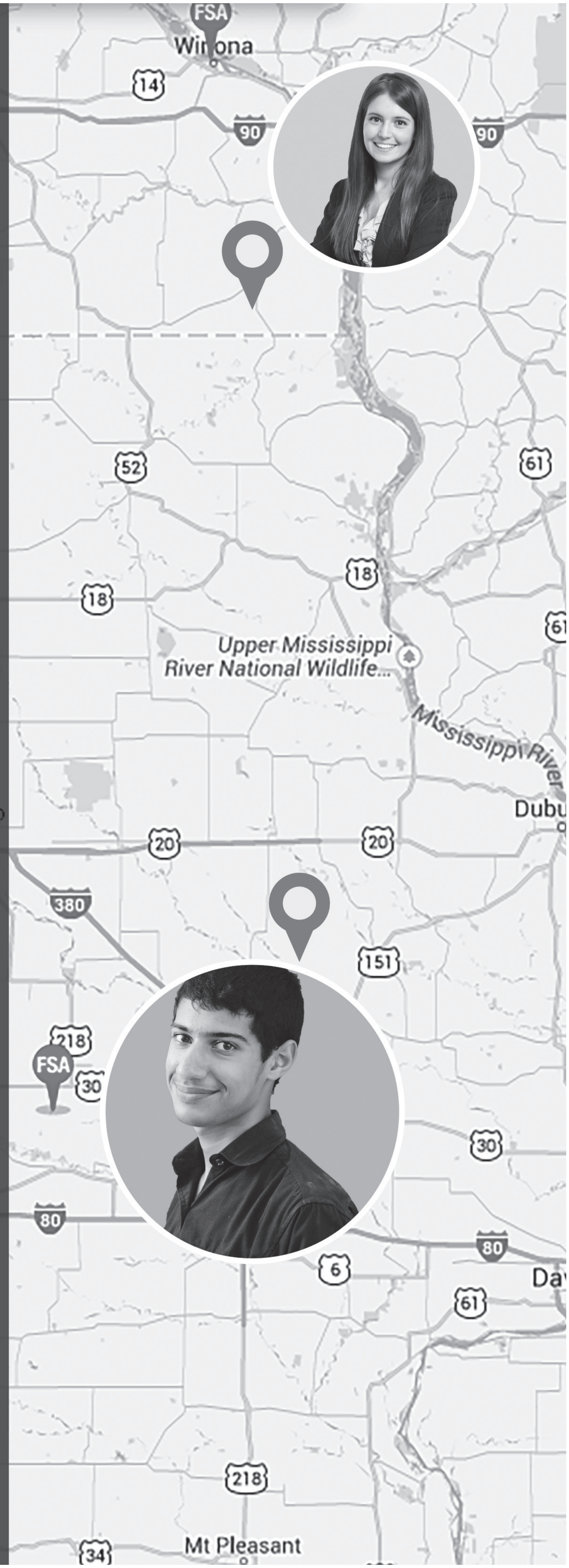


FSA
Winona
Upper Mississippi
River National Wildlife...
Mississippi River
Mt Pleasant

Tales From A Journey of Discovery

By John M. Bragg

In 1990, I started a personal journey which was unsuggested, unpaid, and unbeholden. It was to find out all I could about old age mortality, particularly at 90 and over. The project was a bit like climbing Everest: just because it was there.

Well, its 25 years later, and the results are at hand. They contain a couple of surprises:(1) at upper ages, mortality is higher for females, than for males, not lower; and (2) mortality after 97 doesn't increase; it decreases. What's going on here, anyway?

There are recent theoretical papers about longevity. But I looked in vain for any explanations of these surprises, which are the facts on the ground. So, let me explore the issue.

A. THE RESULTS

For the field of study, here are the ratios of female-to-male mortality:

Central Age	Ratio
67	.834
72	.569
77	1.073
82	1.292
87	1.030
92	1.345
97	1.159
100+	.703

The field of study is the important nonsmoker, middle- to upper-class market. (Currently, this can be thought of as policies for $100,000 or higher.)

The published SOA-Industry Life Experience, 2005–2007, has been extensively analyzed, and it confirms the main findings above: female mortality is higher than male mortality at ages 77 to 87, but lower at younger ages. (At ages 90 and up there are no SOA-Industry useable data, so the Bragg data stand alone.)

B. THE SPIKE AT 77

For the first time, the ratio spikes up dramatically at age 77. My explanation for this is "stress." The average female is still looking after the grown kids and is worried about finances, health and health insurance issues.

Also, I consulted "The New Health Contingencies." They showed that, for the 77 bracket, the prevalence of mental illness (for the first time) was higher for females than for males (14.62 percent and 13.31 percent respectively of the total population). This discovery seemed to corroborate the "stress" explanation.

The situation is not all bad, because the recovery rate is 14.63 percent for females. Also, I point out that the mental illness explanation works both ways; it also explains why male mostly is worse at the younger ages!

C. THE SPIKE AT 92

Nowadays, I am 94, and barely hanging on to my good denominator position in that 90–94 bracket. I again consulted "The New Health Contingencies" (which are very fascinating). I looked at prevalence in the sick category (other than mental illness). 63.9 percent of females were sick compared with 60.9 percent for males. Again, this seemed to corroborate the "spike" at 92.

D. THE DECREASE AFTER AGE 97

From age 97 to age 102, mortality decreased: (17 percent for males, and an astonishing 50 percent for females.) Thereafter, mortality seemed to "plateau." Females regained the role of being far better than males!

I consider this decrease after 97 to be the results of survivorship of the very fittest of the very fittest.

E. STATE OF OUR JOURNEY

Captain Cook went to the South Seas just to observe the transit of Venus. But serendipity set in and he ended up making three major discoveries (New Zealand, Australia, and Hawaii). He knew he couldn't have done any of this without a brand new tool: Celestial Navigation using the new chronometer. Finally he made a major proposal (colonization).

Our modest journey is parallel. We do have a brand new tool ("The New Health Contingencies"). Serendipity did set in and we made three new discoveries: (1) the mortality differences based on age and gender; (2) the mental illness explanation for those differences; (3) the discovery of recovery rates. Finally, we do make a major proposal (see Section G below).

We need to discuss mental illness much more thoroughly, and do so in Section F. That section also deals with recoveries.

F. MENTAL ILLNESS RESEARCH

Mental illness is suggested as a reason for the mortality differences observed. So this section deals with the present state of actuarial research in this most important topic.

Mental illness is a major scourge. A recent story estimated 43 million adult sufferers in the U.S. Its effects include suicide and even jail overcrowding. A front page headline in the April 22, 2016 edition of *The New York Times* reads, "Sweeping Pain As Suicides Hit A 30-Year High."

Mental illness permeates Federal disability programs and has led to coverage requirements for insurance programs, including the Affordable Care Act, and long-term disability coverage.

There are numerous types of mental illness, ranging through severe depression, post-traumatic stress disorder, concussion disorder, dementia, bi-polar, cognitive disorder, Alzheimer's disease, and many others. Classification is very difficult. To date, actuarial classification is by age, gender, smoking status, mortality ratio, and activities of daily living. In descending order, these activities are (1) needs skilled care, (2) needs assisted living, (3) needs home care, and (4) needs walk-in care. Cases are fitted into these classifications, regardless of the "clinical description." This system is fairly parallel to classical underwriting "table" systems.

Some general comments: (1) mortality ratios for mental illness are not particularly high, but it is still very important, because of its high prevalence; (2) gathering all of the conditions under a single label, mental illness seems gratifying for purposes of analysis; and (3) we hope that our use of the term mental illness does not conger up thoughts of extreme sickness. By far, the majority of cases are quite mild, requiring only home care or walk-in care.

> Aprevailing "myth" about mental illness is that it only gets worse. However, this myth is wrong.

A prevailing "myth" about mental illness is that it only gets worse. However, this myth is wrong. Current actuarial research shows that recovery rates are quite good. This news could work wonders if properly pursued. It is also of interest that mental illness is not a major problem at very high ages (90 and over) because the prevalence of mental illness has declined.

Actuarial study of mental illness has made major use of "The New Health Contingencies," which are very fascinating and require extensive separate description. They are based on Quantum Mechanics and produce detailed results for incidence, prevalence, and especially recovery. They apply to all forms of disability, not just mental illness. A well-known application of "The New Health Contingencies" is health expectancy, which provides a break-down of life expectancy into the periods: Healthy, Needs Assisted Living, and Needs Skilled Care. Results were published in 2008 for the two candidates; they showed that both McCain and Obama would remain healthy for at least 8 years. It's nice to have predictions that come true.

The following brief table gives some information as examples for mental illness.

Age	Prevalence		Recovery Rate	
	M	F	M	F
67	7.74	4.35	19.79	17.93
72	10.15	8.36	18.45	15.88
77	13.31	14.62	14.65	14.63
82	17.85	18.47	9.72	11.01

Notes: (1) All numbers are percentages; (2) recovery rates are annual and consist of (a) movement to a more favorable activity level, and (b) total recovery; (3) "The New Health Contingencies" are capable of splitting (a) and (b).

Male mortality is higher through age 72; but female mortality is higher above that age. The prevalence pattern is exactly that way also. In fact, it was the prevalence pattern that caused us to come up with the mental illness explanation, which applies in both cases!

We can report two famous recoverees from mental illness:

(1) Winston Churchill—Throughout his life, Churchill suffered from severe depression which he called "the black dog." However, he always managed to recover (through his own efforts).

(2) John Forbes Nash, Jr.—of "Beautiful Mind" Oscar winning fame. In his 30s, Nash was institutionalized for severe mental illness. Over a 10-year period, he managed to recover. Tragically, Nash was killed in a taxi accident in May 2015.

G. A PROPOSAL

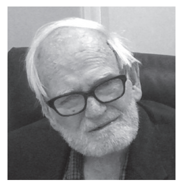
Finally, I should say that the discovery of recovery rates (for all illnesses) has caused me to advocate the use of recovery rates as a second decrement (after mortality) for health insurance reserving and pricing; The financial benefits would be very welcome. Untold benefits could also arise in the treatment field, especially if the reasons for recovery are further researched and put to use.

H. NOTE TO REINSURANCE SECTION

I have been honored in the past by meeting with and providing data to the Reinsurance Section on many occasions. The above is a continuation along those lines. As usual, I would appreciate comments. A more widespread exposure could ensue. I can be reached at nbk@mindspring.com.

On a slightly different topic: the subject of Longevity Risk is quite hot right now. I believe that it is eminently insurable, as long as we know what is actually going on in the mortality world.

Longevity risk insurance is a needed and very good service for the public. ■



John M. Bragg, FSA, ACAS, MAAA, is chairman for John M. Bragg & Assoc. Inc. He can be contacted at *nbk@mindspring.com*.

Trees That Feed

By S Michael McLaughlin

After retirement from a long and rewarding actuarial career, there could be many years before your q_x=1.00. Many highly motivated workers, especially men, are so focused on work, career, and profession, that they have little room for other interests. When they retire, on the first Monday morning in retirement, these folks have nothing to do. Maybe they start the day with a cup of coffee and the morning news … which takes them to 8:00 am … and, "OK, so now what do I do for the rest of the day!?"

There are several years of this, potentially. e_{65} could be 20 years or more! That's a long time. Your grandchildren will grow up and soon enough you won't have to pick them up from day care anymore. What are you going to do then!? This is a real challenge for the unprepared.

THE IDEA

In my case, my lovely bride of 40-plus years had the answer. A few years ago, around the middle of 2007, she woke up one morning and said, "you know we've been fortunate … the actuarial profession has treated us well … we should be giving something back to others. Not necessarily just to actuaries, though." Mary had always been a bit of an environmentalist, so we decided to plant trees. Not just any trees, but fruit trees. If planting a tree is good for the environment, then a fruit tree is even better, because now you can feed people as well. On a larger scale, ultimately, you'll be creating jobs. So instead of complaining about what's wrong with the world, we realized that each of us can make a difference.

That was the genesis of the Trees That Feed Foundation. Despite the occasional discouraging word, we formed a corporation. After a few letters exchanged with the nice people at the Internal Revenue Service, we gained our tax exempt status as a 501(c)(3) organization. TTFF, as we affectionately call it, became a legal public charity, which means that donations to TTFF are tax deductible for U.S. taxpayers. We planted some seed money (get it?) and embarked on our mission.

> Our mission is planting fruit trees to feed people, create jobs and benefit the environment.

THE FACTS

Our mission is planting fruit trees to feed people, create jobs and benefit the environment. We donate fruit trees, we also give or subsidize the equipment necessary for processing into post-harvest products, and we educate. We get requests for trees from farmers and various other organizations in Haiti, Jamaica, other Caribbean countries and other mostly tropical countries. Requests vary. Individuals or small groups such as those led by Peace Corps volunteers may request eight or 10 trees. Other large groups including certain religious or governmental groups may request 4,000 trees. We've built a network of suppliers in the U.S. and in each local country, and TTFF pays for the trees when they are delivered.

As the operation has grown and as we've gotten smarter, we're focusing more on local suppliers. In 2010 we contacted a small nursery in Jamaica and asked if he could supply us with fruit trees. He was willing, and he estimated that he could propagate about 300 breadfruit trees per year. "OK," I said, "we'll buy them all." That was 2010. We are now buying more than 15,000 trees per year from this same nurseryman. He has expanded operations, leased land and hired a number of employees, really quite a success story for a small business in Jamaica.

FINANCE

A key part of the job is fundraising. Mary and I are leading contributors although by no means the main support. We have been lucky enough to attract a number of corporate sponsors and charitable foundation grants. We also appeal to individual donors through personal meetings, garden clubs, Rotary clubs and social media. We've received contributions from hundreds of individual donors, in amounts ranging from small to large.

One of my favorite stories goes back a few years. We were given a booth at the Chicago Flower & Garden Show at Navy Pier. We arrived the day before to set up our exhibits, including business cards, posters, potted plants and of course a donation box. As we set up our display a gentleman came up and asked what we were selling. We weren't selling anything, but we told the story of planting trees and the benefits to be gained. He was silent for a moment, then he pulled out his wallet and put a $20 bill in our donation box, our first donation in the show. So who was this gentleman? He was the janitor.

The first few months after planting a small fruit tree are critical. The plants need to be carefully tended until they reach a robust, drought and animal-resistant size. That concern led to an actuarial project.

A TYPICAL DAY

A typical day starts with a short commute to a small local office near home. The landlord knew what we were planning and gave us a good deal on the rent. We have our own website, *www.treesthatfeed.org*, attorneys, an accounting firm, a small army of volunteers and now a bit of money in the bank. Mary and I work closely together, spending about 50 percent of our working time on TTFF. Right now we're an all-volunteer organization, except for one part-time person.

We get perhaps 50 emails a day dealing with the myriad of details involved even in a modest-sized charitable organization such as we have. When a request comes in for fruit trees to be donated, we ask for enough information to vet the request. We look for ways to say "yes," but we want to be sure the recipient will take care of the trees so that they reach fruiting maturity. We don't want to merely deliver trees. If the person requesting is inexperienced, we start them off with a modest number of trees initially. We issue them a coupon which they sign, to authorize collection from the nursery. We ask for photos to show survival before donating more. We track all coupons and deliveries, and we periodically monitor survival counts.

Many emails are calling for help and advice in other areas, such as which fruit trees grow in certain areas, or how to obtain equipment, or how to create a complete program to help a local community help itself. We can answer most of the questions now, but if not, we refer the inquiry to one of our local experts.

HANDS-ON

In a small organization you need to be versatile. You can't stick to a narrow job description. As we advised folks to process fruit into flour, a very high-value post-harvest product, we learned ourselves about the many types of equipment that might be needed, including peelers, processors, dryers, grinders and packaging equipment. We call the set of equipment needed for processing our "factory in a box."

As we learned more about the process we discovered that drying fruit isn't as simple as laying it out in the sun. Although the tropical areas we work in (Haiti, Jamaica, other Caribbean countries) are all relatively warm climates, issues such as food quality and production metrics come into play. Here's where non-actuarial skills once again were called on.

I built a hybrid solar dryer of a cabinet style design, using plywood, sheet metal and acrylic plastic sheets. This took a few weekends and a quick refresher on safe use of power tools! The dryer collects solar heat and funnels it up through a cabinet. Fruit is shredded or sliced and placed on mesh racks. The warm air flows through and around the fruit and dries it. The dried fruit has a much longer shelf life than fresh fruit. Excess fruit when preserved this way is a significant increase in available food.

The design for the dryer is being improved based on testing the prototype, and a new dryer is now being built in Jamaica and soon in Haiti.

Using a hammer and saw isn't quite the same as applying stochastic actuarial models … but it's also a lot of fun!

ACTUARIAL MATTERS

The first few months after planting a small fruit tree are critical. The plants need to be carefully tended until they reach a robust, drought and animal-resistant size. That concern led to an actuarial project.

We were offered volunteer effort from University of Minnesota, one of our partnering organizations. Their Master's degree students obtained funding for a summer project in Jamaica. Two students traveled to more than 45 locations where we had provided trees, and conducted a study … yes, a mortality study … on fruit trees. Overall we found over 75 percent survival over those first few critical years. As with humans, infant mortality can be high, but then $\mathbf{p_x}$ improves and stays low for many years. Finally, after a century or so, the trees reach the end of the actuarial table.

THE ROLE OF ACTUARIES

Trees That Feed Foundation would not be successful if not for the assistance of actuaries. When we initially applied to the IRS for tax exempt status, my wife and I and her brother named ourselves board members. The IRS found fault with that. A public charity cannot be controlled by family members. With just a few days left to the filing deadline, we suddenly needed four non-family directors. Cathy Lyn, in Jamaica, and Lee Smith, my former partner, both actuaries, agreed on short notice to serve, for which we continue to feel grateful. Cathy in particular is on location in Jamaica and can execute locally on our initiatives.

TTFF wanted to expand operations in Haiti. Caribbean Actuary #2 (there's a back story there) Franz Alcindor, after a brief bout of skepticism, enthusiastically supported our efforts. He introduced us to senior government leaders in Haiti, arranged meetings and served as interpreter. After hearing our spiel at a couple of meetings, Franz led us into the next meeting and he said, "Leave this one to me." And he conducted a flawless meeting.

My role in the profession internationally has allowed me to make contacts in many countries relevant to our work. We're now looking to expand into Surinam, and we're relying in part on our Dutch actuary friends to make introductions. And last, but not least, many of my fellow actuaries have contributed financially.

CONTINUING EDUCATION

We've learned a lot about agriculture, botany, farming, food testing, and more. It's been extremely interesting, and actually we've learned enough to teach. For our work to sustain itself, it has to be taken over by others, especially local people in each country. We conduct seminars in each country, passing along knowledge of tree propagation, orchard planting, tree care including pruning, reaping, post-harvest production, and marketing and sales. Of course we continue to rely on the real experts, so we bring them in for teaching sessions, both theory and practice.

One of our most successful training ventures involved taking seven Haitian farmers and agronomists to Jamaica for advanced training in tree propagation and care. After various skirmishes with visa authorities, airlines, currency exchanges and bus rental organizations, everything came together nicely. The group learned about root culture, air layering, orchard layout, food processing and much more. We worked in cooperation with Hope Botanic Garden and the College of Agriculture in Jamaica. And our seven participants are passing along their acquired knowledge to their colleagues back in Haiti.

IN OTHER NEWS

Personally, TTFF isn't quite a full-time job. I have many other interests where I make a difference, at least in a modest way. I still am an active volunteer for the Society of Actuaries, the IAA and The Actuarial Foundation, and I sit on a major company board of directors. It's busy. I'm not quite ready for the rocking chair. Like so many others in semi-retirement, I joke that retirement is so busy, I wonder how I found the time for work!

CONCLUSION

Trees That Feed Foundation has now delivered more than 85,000 fruit trees to farmers and other groups in Haiti, Jamaica, and eight other countries in the Caribbean area and sub-Saharan Africa.

We've donated many pieces of equipment such as shredders and grinders, to allow the fruit to be processed and preserved. One of our favorite trees is the breadfruit, a nutritious carbohydrate fruit, which can be converted into a delicious, gluten-free flour. We're building both the supply and demand sides of the local markets in Jamaica and Haiti, and eventually points beyond.

Trees That Feed Foundation wants to pass along the knowledge needed to continue the process, so that eventually our beneficiaries will be independent and able to sustain themselves profitably. We think that's the best type of charity … giving such that no dependency is created. We are growing and will need more help soon, but there is no plan to build an empire. But it's tremendously gratifying.

POSTSCRIPT

I wrote this article from my current perspective as a retired professional. Let me hasten to add that actuaries, during their working careers, can also make a difference. I only wanted to emphasize that roles unrelated to actuarial work also can be highly rewarding. In fact my best advice to working actuaries who wish to be successful is that you should be involved in at least one other unrelated activity, for example volunteer charitable activity. You will gain as much benefit as you give, if not more.

For more information visit *www.treesthatfeed.org*. ■

S Michael McLaughlin, FSA, CERA, FIA, MAAA, is principal for McLaughlin Actuarial Consulting. He can be contacted at *mike2567@aol.com*.

"RAPA" Origins: Reinsurance Administration Professionals Association

By Greg LaRochelle

Reinsurance is complicated. Throw in a group of actuaries with moustaches and/or teased hair from the 1980s along with some grain, hops, yeast, and water; allow adequate time for fermentation and reinsurance goes from complicated to incoherent.

And here begins the origins of the reinsurance administration professionals …

RAPA is the Reinsurance Administration Professionals Association, an organization whose members are life and health insurance professionals around the globe responsible for the administration of reinsurance between direct writers, reinsurers, and retrocessionaires.

Originating as the Reinsurance Administration Roundtable this group of senior administrative professionals began its journey by meeting informally at a roundtable prior to the annual Canadian Reinsurance Conference to discuss common administration practices, concerns, and solutions. Tasked with putting reinsurance terms into action for the next 80 years or so (depending on your view of mortality improvements), the goal was to enhance their respective companies' administrative operations through information sharing and creative problem solving.

The Admin Roundtable discussions quickly evolved from their roots in the 1980s, to a mature association by partnering with LOMA to create RAPC—The Reinsurance Administration Professional's Committee. Through its partnership with LOMA, RAPC would help create professional education programs that could be easily accessible to the reinsurance industry. *The Introduction to Reinsurance* text was initially created and ultimately became the *Associate*, *Reinsurance Administration*[1] (ARA) course book and professional designation during the late 1990s and is still a key resource today. It is a remarkable tool for those looking to grasp reinsurance principles, the financial importance of reinsurance, and the development, administration and auditing of reinsurance products. Essential learnings include:

- Key players and the reasons for using reinsurance;
- Laws and regulations affecting reinsurance transactions;
- Provisions of a reinsurance contract and how they affect the administration of reinsurance transactions; and
- Processes involved in the administration of new business, inforce business, and terminations.

As the organization grew in size and importance it moved swiftly into the new millennium and the name was formally changed to RAPA, the Reinsurance Administration Professionals Association, becoming its own not-for-profit association. The ultimate purpose of the association had now crystalized …

> "to improve the effectiveness and efficiency of its members' reinsurance administration processes, which include treaty management, reinsurance processing, claims processing, premium accounting, and reporting. RAPA's objectives are accomplished through issue-oriented initiatives that research, define, and recommend best practices. These best practices are in the areas of business processes, procedures, technologies and management of data. As an association we focus on providing educational materials on topics such as audit best practices, data management, and reinsurance treaty fundamentals."

In 2008, the RAPA Audit Committee published a reinsurance *Operational Risk Management* book[2] to capture audit best practices including preparation and execution, all the way through to the final audit report. A very comprehensive read that will benefit those in an analytical role and/or audit function.

Education continues to be at the forefront of the association and to supplement the ARA designation; new learning tools were developed by RAPA to help those new to reinsurance to quickly learn the concepts and terminology. The Supplement to Reinsurance Basics Program consists of four short courses:

i. Reinsurance Overview,

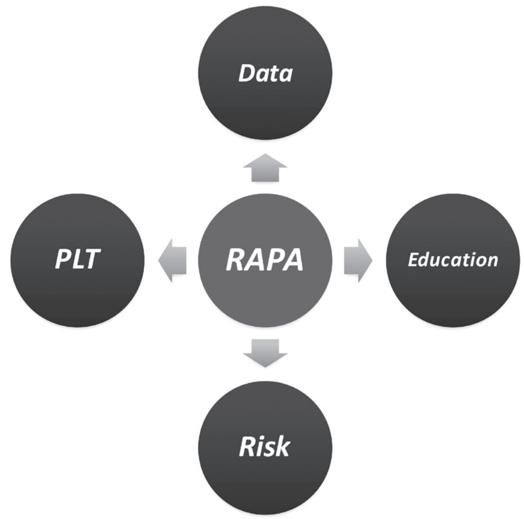
ii. Reinsurance Operations Overview,

iii. Reinsurance Basics, and

iv. Supplement to the Reinsurance Basics.

The per course cost is only $42 for members or you can choose the entire collection for $100. See the endnotes for to links to RAPA material.[3]

Over the past couple of year's RAPA's primary focus has been on four key initiatives. These initiatives aim to help improve the effectiveness and efficiency of RAPA member's reinsurance administrative operations through understanding processes and information sharing. The initiatives' work provides the opportunity for members to work together on education and training, and to benefit from a robust collaboration with industry experts within the working groups. The initiatives and purpose are as follows:



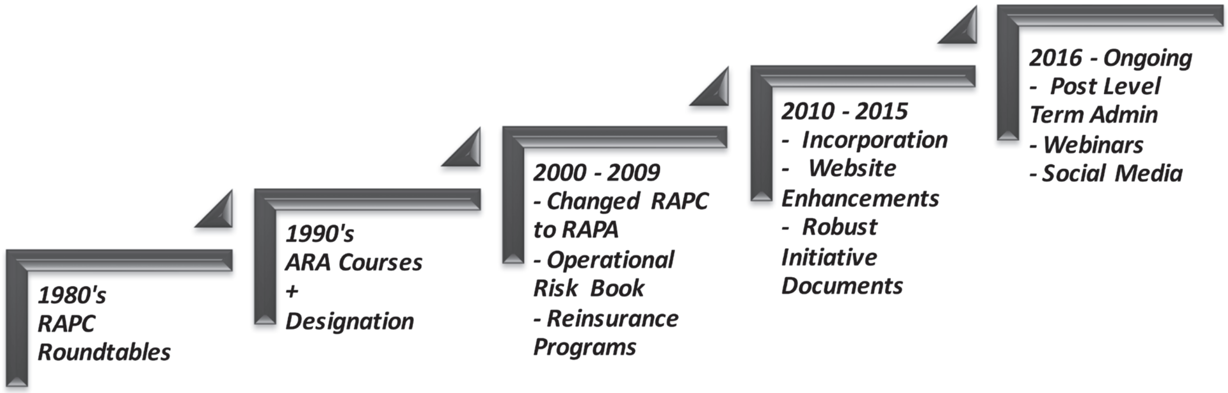
- **Data:** To create a "Guideline for Reinsurance Reporting" document for best practices in specific areas of reinsurance administration and data quality. Topics include conversions, communication/notification reporting, taking a treaty from paper to system implementation, samples of typical reporting (exhibits, transaction/in-force files, etc.). There are four versions available on the RAPA website.[4]

- **Education:** To develop training material presented as a workflow chart for different functions (direct writer, reinsurer, retrocessionnaire) along with a case study to illustrate the impact of processing by using the workflow charts.

  The workflow charts for new business and new treaty set up as well as changes, maintenance, and terminations have been completed and are available on the RAPA website. [4]

- **Risk Management:** This is a relatively new initiative with a focus on the development of tools and techniques to provide guidelines on reinsurance risk management methodology and approach. Particularly relating to risk assessment and auditing and compliance reviews of the reinsurance administration function of the direct writers, reinsurers and retrocessionaires. The initiative is divided into two sub-teams, i) Reinsurance Administration Risk Assessment, and ii) Reinsurance Administration Audit and Compliance Reviews.

- **Post Level Term (PLT):** Given the industry focus and administration complexities surrounding PLT, this new initiative has just kicked off. The intent is to gain insight on administration issues and capture best practices with the goal of deliv-



ering a white paper document. Subsequently, RAPA will look for opportunities to present its findings at industry meetings.

RAPA meetings are held on two occasions every year and include breakout sessions with the initiative leads and members. The first, Spring Meeting, which takes us back to the origins of the association, is a half-day session held in Toronto the day prior to the Canadian Reinsurance Conference.

The second occurs in the fall and is a much more robust conference, which was first held back in October 1997. 2016 will be the 19th annual RAPA conference[5] which will be held in San Antonio, Texas from Oct.16–18.

Topics for this year's conference range from workplace efficiencies, corporate culture, reinsurance perspectives on operations & IT, and defining gender. Also, a new innovative approach to our annual meeting will be on the RAPA Chats which will be brief reinsurance specific presentations from experts on retention management, risk-based audit, MIB trends, PLT, and E&O.

RAPA is a non-profit association which continues to deliver crucial reinsurance learning tools and techniques available at a very low cost. Membership to join the association is only $75 and individuals are welcome to participate in the initiatives. The annual conference is also very cost efficient as members only pay $375, which covers food and beverage. We strongly encourage companies to invest in their company and employees by ensuring representation on the association.

While RAPA continues to stand the test of time, the relationship between actuaries and administration has never been more important. Big data has been an emerging theme in our industry and relying on sound/quality data with timely analytics/reporting is critical to our business. Experience studies, new product development, post level-term risk mitigation/opportunities, and simplified underwriting are a few examples of how we have been relying on our data to springboard our organizations into the future.

The great work that RAPA does wouldn't be possible without the support from the industry as well as our sponsors (Protective Life, Canada Life, Munich Re, Swiss Re, RGA Re, Optimum Re, LOGiQ3, Scor Re, Hannover Re, and Aurigen Re).

Take your organization to the next level and *Join today!*[6] ■

Greg LaRochelle is the Chair of RAPA and the Head of Risk Reporting & Reinsurance at RBC Insurance. He can be contacted at *greg.larochelle@rbc.com*.

ENDNOTES

1. *http://www.loma.org/ProfDev/Designations/ARA.aspx*
2. *http://www.lulu.com/shop/rapa/operational-risk-management-2nd-edition/hardcover/product-5456056.html.*
3. *http://learning.loma.org/public/SearchResults.aspx?CTGYLCL_CATEGORY_ID=-DA28E2A4D4C947DBA225A9752C9C8954&CNTLCL_LOCALE_ID=en-us*
4. *http://reinsadmin.org/initiatives/*
5. *http://reinsadmin.org/wp-content/uploads/2015/06/2016-RAPA-2016-04-15.pdf*
6. *http://reinsadmin.org/membership-information/*

SOCIETY OF ACTUARIES

LIVING *to* 100

SOCIETY OF ACTUARIES
INTERNATIONAL SYMPOSIUM

Jan. 4–6, 2017
Orlando, Florida

Save the Date

Registration for the 2017 Living to 100 Symposium will open soon. This prestigious event on longevity brings together a diverse range of professionals, scientists and academics to discuss:

- How and why we age;
- Methodologies for estimating future rates of survival;
- Implications for society, institutions and individuals;
- Changes needed to support an aging population increasing in size;
- Applications of existing longevity theories and methods for actuarial practice.

Moonwalking with Einstein—The Art and Science of Remembering Everything, by Joshua Foer

Review by Dave Snell

This article first appeared in the November 2015 issue of The Actuary of the Future. *It is reprinted here with permission.*

In this age of smartphones, password vaults, cloud drive backups, and various other electronic assistants, why should an actuary care about a book on memory? That's a valid question. I hope to provide an answer in this review.

Many years ago, I knew the telephone numbers of all my friends, the text of various famous speeches, and the values of pi and e to 20 decimal places. I still know pi and e, and a girlfriend's past telephone number from 50 years ago. However, when my own family members get new cellular phone numbers, I feel helpless if I have not entered the number yet into my smartphone. When did my phone seem to become so much smarter than I am at retaining telephone numbers, shopping lists and password hints? And why do some of the old memories seem stronger than new ones?

Actuaries are known for their facility with numbers and equations and obscure regulations that make them the centerpiece attraction at any party, right? OK, perhaps not the party headliner, but we can regale (or bore) our friends with present value and reserve calculations. We can even do some (ever decreasing) mathematical problems in our heads. These feats can impress others—especially the mathematically challenged.

Yet, when I go to a Society of Actuaries (SOA) meeting or most any type of event attended by several people, I often have a terrible time remembering the name of the person introduced to me mere minutes before. Those folks who can walk into a room, meet dozens of people, and remember all their names and companies and various important facts about them, seem like rock stars of memory. We naturally assume they are very highly intelligent people.

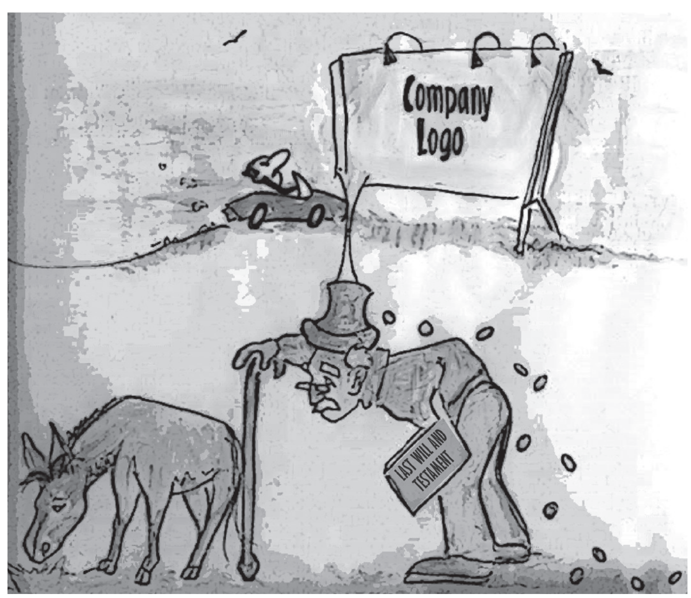
Joshua Foer, a journalist, used to think the same thing. He covered a contest of "mental athletes"—where contestants had to compete in such qualifying events as:

1. Names and Faces—15 minutes to memorize 117 color photos of different people (head and shoulder shots) with a first and second name written below each picture.
2. Speed Numbers—five minutes to memorize a list of computer-generated numbers that are presented in rows of 20 digits with 25 rows per page.
3. Speed Cards—five minutes to memorize a freshly shuffled pack of 52 playing cards.
4. Poetry—15 minutes to memorize a previously unpublished poem.

They performed these and other feats of memorization seemingly way beyond the abilities of mere mortals. Yet, when he interviewed these giants of memory magic, he was surprised to hear a consistent message. They claimed no innate gift for memory! They just learned some techniques that most other people could learn if they put in the time and effort.

Intrigued, Foer set out to learn how to memorize—under the guidance of some of these memory mentors—and a year later, he won the 2006 USA Memory Championship!

This book is a chronicle of his journey from being a forgetful person like I am, to becoming a memory wizard. Along the way, he interviews people with profound memory loss, such as a man who can't retain new information for more than a few minutes. He also interviews medical researchers to learn how the human brain remembers things, and how long-term memory and short-term memory differ.



Surplus Risk Types: Asset, Mortality, Interest, Business (original sketch by *http://www.nikkeycreative.com/*)

Additionally, Foer gives the reader a history of memorization, which used to be of far greater importance and stature than now. Some of the most common and effective memory techniques used today are actually a few thousand years old! One of the best is the Memory Palace, where you visualize rooms familiar to you, and place objects into them at very specific locations. You can see them in your mind in the room, and recall them as desired. Another is the idea of absurd imagery—hence the title of the book—that was part of a nonsensical, and partly obscene, image to help the author remember a deck of cards in order.

Here is an actuarial example I created using this technique: Picture a donkey, or ass. Walking behind the ass is an old man carrying his last will and testament. He is wearing a very interesting hat with lots of coins falling from it. On top of that hat is a big sign with the logo of your company on it. A car is heading toward the sign and may crash into it. I am showing a visual to trigger ideas for you; but the best way to use this technique is to visualize your own images. That way, they become more personal for you, and also more memorable.

How can this image possibly be useful? What if you were trying to remember the four types of coverage risks that the SOA has defined to be covered by the assigned (or allocated) surplus?

These are:

1. C1—**Ass**et Risk: The risk that the assets supporting the product line lose some or all of their value.
2. C2—Insurance, or **Mortality**, Risk: The risk that the price for the insurance product provided is inadequate.
3. C3—**Interest** Rate Risk: The risk that assets must be sold at a loss in order to meet the cash needs of a policyholder.
4. C4—**Business** Risk: A "catch-all" category of risk management to cover anything not specifically included in the C1, C2 or C3 category.

As a reinsurance actuary, you do need to embrace the wonderful technological advances such as smartphones, clouds and other electronic aids. Ultimately, though, advancement beyond technical positions requires an ability to communicate. You should remember facts as needed to support your arguments, and learn to paint a mental picture to convey your ideas. The techniques used for millennia to remember people, stories, lists and related items without having to refer to a written or electronic aid still work. A good memory is still viewed as a sign of high intelligence, and it conveys a sense of confidence in the expertise of the speaker.

Moonwalking with Einstein offers several insights into human memory storage and time-proven techniques for remembering. …

Moonwalking with Einstein offers several insights into human memory storage and time-proven techniques for remembering what you wish to remember. It is not an immediate solution to every problem, and some of the techniques are difficult and require much practice. It wasn't a perfect book. There were some slow spots, and some unnecessary tangents. Yet, in harmony with the topic, I found it unforgettable. ■

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