



SOCIETY OF
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SECTION

Reinsurance News

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Call for articles for next issue of *Reinsurance News*.

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

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

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SOA Staff

Jim Miles, Staff Partner
jmiles@soa.org

Jessica Boyke, Section Specialist
jboyke@soa.org

Sam Phillips, Staff Newsletter Editor
sphillips@soa.org

Ronora Stryker, Staff Research Actuary
rstryker@soa.org

Erin Pierce, Graphic Designer
epierce@soa.org

Chairperson's Corner

By Mary Broesch

One thing I love about the actuarial profession and especially the reinsurance community is all the relationships I enjoy. The connections seem to grow and deepen with every interaction, whether it's someone you work with every day, or those folks on that project, you know, the one that seemed to take forever, but then one day is simply done. Relationships develop while sharing something in common.

Today, I'm happy to share with you the new mission statement for the Reinsurance Section:

"... to advance the reinsurance profession through the identification and communication of emerging issues and trends for the global reinsurance community through education, research, professional development and networking."

While our mission has not changed, this new statement does a better job at expressing why we exist as a Section. Our community exists so that we can share our thoughts and challenges with others, who may be experiencing the same. Networking is a great way to create new relationships. Relationships are valuable and create meaning in our lives.

So, what's emerging now? If you're a reinsurance geek like me, you will be excited to learn about the new reinsurance practice note. The American Academy of Actuaries' Credit for Reinsurance Subgroup recently released the draft practice note, *Credit for Life Reinsurance in U.S. Statutory Financial Statements*, for exposure. This is an excellent resource and reference document for practicing actuaries dealing with current and emerging credit for reinsurance issues on their statutory financial statements. The guidance is up-to-date and relevant, and includes specific questions with respect to PBR and AG48.

The original reinsurance practice note was published in 2005. Significant changes have occurred since then, including the Dodd-Frank Act, effective in 2010 that changed how credit for reinsurance is regulated in the U.S. After Dodd-Frank, the ceding company only needs to satisfy the credit for reinsurance rules in its state of domicile, rather than in all states in which it operates, essentially eliminating the extraterritorial application of credit for reinsurance laws.



Another significant change to the credit for reinsurance rules was the introduction of a new class of reinsurers, called certified reinsurers. Generally, reinsurers that meet the requirements, including being rated by at least two acceptable rating agencies, are granted certified status. The collateral requirements for a certified reinsurer are based on their financial strength ratings, with the highest rated certified reinsurers allowed to reduce their collateral requirements the most.

The updated practice note also reflects guidance on the recent Covered Agreement completed between the European Union and U.S. Treasury on Jan. 13, 2017.

It's wonderful to see all the names of those who helped to prepare and finalize the practice note. I personally thank you for this relevant and important work and look forward to spending more time delving into it.

Until our paths cross again, don't forget, reinsurance is a relationship business. Let's connect soon! ■



Mary Broesch, FSA, MAAA, is SVP–Life Solutions Group, Willis Re. She can be contacted at Mary.Broesch@WillisTowersWatson.com.

Editorial: The Diversity of Diversity

By Ronald Poon-Affat

In a company as well as an organization, a goal of managing for diversity is to ensure all employees feel valued. As The Society of Actuaries' Past President, Craig Reynolds FSA, puts it, "diversity means respect for and appreciation of differences in ethnicity, gender, age, national origin, disability, sexual orientation, education and religion. Ensuring a culture of acceptance of and respect for these differences often enables companies to achieve greater productivity, higher profits, and improved company morale by improving communication and respect and reducing harassment and conflict."

To maximize its future, the actuarial profession would do well to seek out and attract the best and brightest from all segments of the population and from a variety of educational backgrounds, cultures and experiences. The SOA's 2017–2021 Strategic Plan has within it a commitment to cultivate a more diverse membership as well as foster greater diversity and inclusion in the profession. To do so, a standing SOA Inclusion and Diversity Committee has been established, charged with determining which investments and programs might have the greatest impact on inclusion and diversity in the actuarial profession.

DIVERSITY MAY BE MORE THAN SKIN DEEP

An additional dimension of diversity within a workforce consists of human behavior.

Let's consider the following everyday situation: Four people are inside an elevator, and its doors are about to close. A fifth person is running to get on. One of the people in the elevator is in a hurry—fuming, totally impatient, and does not want to wait for anyone. A second passenger, a bubbly, energetic person, holds the door for the newcomer and chats with him when he arrives. A third passenger, happy either way, smiles while waiting patiently for the newcomer to board. The fourth passenger, meanwhile, is calculating the approximate weight of the four passengers to see if the elevator can handle a fifth one. If the weight appears to exceed the recommended limit, she plans to point it out to the newcomer and ask him or her to take the next elevator.

Seems like a completely diverse bunch of people, right? Maybe. They might all be reinsurance actuaries from the same city and

college, and might even cheer for the same football team. Still, they are reacting to a situation in four entirely different ways, and their reactions point to intrinsic personality traits that give today's workforces a fascinating amount of diversity.

LIVING COLORS

I recently took part in a course that used a system based on Carl Jung's typology as a framework to evaluate personality types. The main two divisions of human behavior, according to Jung, are: extraversion vs. introversion; and task-oriented vs. people oriented.

The course results used four primary colors to classify individual personalities. The classifications are:

- **Fiery Red:** People with Fiery Red energy are extraverted. They are high-energy, action-oriented and are always in motion. They approach others in a direct, authoritative manner, and radiate a desire for power and control.
- **Sunshine Yellow:** These individuals are also strongly extraverted. They are usually positive and friendly, and are concerned with good human relations. They approach others in a persuasive, democratic manner, and radiate a desire for sociability.
- **Cool Blue:** Introverted Cool Blue energy people wish to know and understand the world around them. They prefer written communication in order to maintain clarity and precision, and radiate a desire for analysis.
- **Earth Green:** These individuals, also introverted, focus on values and depth in relationships. They want others to feel they can be relied upon, prefer democratic relations that value the individual and are personal in style, and radiate a desire for understanding.

The use of four primary colors is extremely intuitive, memorable and far simpler than systems employed by many other typographies. (It reminded me of the colors on recycling bins, which nudge you into acquiring the habit of recycling.)

Back to the elevator example above: the impatient guy (me) was a Fiery Red; the meeter-and-greeter holding the door was a Sunshine Yellow; the patient colleague was an Earth Green; and Ms. Calculator was a Cool Blue. The system does not classify everyone with just one color: there are more and less dominant colors, which reflect a rainbow of diversity.

Actuaries, it turns out, are typically (but not always) Cool Blues—oriented toward numbers, analytics, and lots of detail.

CONCLUSION

When people think of diversity, they may think first of ethnicity and race, and then of gender and age. However, diversity can be much broader than that, especially if behavioral and personality traits are incorporated into the mix. Understanding how best to relate to and work with each personality type can substantially ease the process of gelling as a group and working together effectively.

Next time you are in the elevator, see how your colleagues respond to a just-in-time entrant. If you believe you have determined your colleagues' dominant color or colors, the following recommendations are suggested to improve your one-on-one interactions with them:

- **Fiery Reds:** Focus your attention on the task at hand. Never, ever be late for a meeting or a deadline. Their motto: "be brief, be bright, be gone."
- **Sunshine Yellows:** Smile! Ask open-ended questions. Stay open to new ideas. Their motto: "Involve me."
- **Cool Blues:** Present your ideas clearly and with structure. Their motto: "Give me details."
- **Earth Greens:** Practice active listening. Give full attention to their need and concerns. Their motto: "Show me you care."



Increased diversity in the workplace also means that we have to consider adapting our communication styles and the manner in which we engage with others. As Dr. Robert Rohm author of *Positive Personality Profiles*, says "If I understand you, and you understand me, doesn't it make sense that we can work more effectively together?" ■



Ronald Poon-Affat, FSA, FIA, MAAA, CFA, is editor of the Society of Actuaries' *Reinsurance News* newsletter and is a recipient of a 2016 SOA Presidential Award. He can be contacted at rpoonaffat@rgare.com.

2017 Life and Annuity Reinsurance Seminar

By Timothy Paris

Following the success of last year's Advanced Reinsurance Seminar, and previous Introduction to Reinsurance Boot Camps, we are planning our 2017 Life and Annuity Reinsurance Seminar for August 14–15 in New York.

Attendees can expect an in-depth view of the important topics and fundamentals of life and annuity reinsurance, from

the perspective of a U.S. insurance company. Industry experts will present on the various types of reinsurance, treaty issues, financial implications and other considerations, and we expect ample time for attendees' Q&A and discussion. This seminar will also provide a great opportunity to network with peers and experts across the industry. Attendees will leave this seminar with a stronger understanding of current topics in life and annuity reinsurance.

For now, save the date! Agenda and speakers will be finalized soon. ■



Timothy Paris, FSA, MAAA, chief executive officer, Ruark Consulting, LLC. He can be contacted at timothyparis@ruark.co.

Interview of Paolo De Martin, CEO of SCOR Global Life

By Ronald Poon-Affat

Paolo De Martin, an Italian citizen, graduated from Ca' Foscari University, Italy, with a degree in Business Economics. He subsequently spent two years in the optical business as founder and managing partner of an eyewear manufacturer. He joined General Electric Company (GE) in 1995 as a finance trainee in London. In 1997, he joined GE's internal auditing & consulting Group, charged with assignments in multiple GE businesses in the Americas, Europe and Asia/Pacific. In 2001, Paolo De Martin was promoted to Executive Manager for GE Capital Europe, before joining GE Insurance Solutions as Financial Planning and Analysis Manager for Global Property and Casualty Reinsurance. In 2003, he was appointed Chief Financial Officer of GE Frankona Group before becoming Chief Financial Officer of Converium Holding AG in July 2006. In September 2007, Paolo De Martin was appointed Group Chief Financial Officer of SCOR. In January 2014, Paolo De Martin, after a short sabbatical period, was appointed Chief Executive Officer of SCOR Global Life.

Three years ago you became CEO of SCOR Global Life. One could say that you are relatively new to Life and Health reinsurance. How do you feel about the industry?

It is true that my experience before joining SCOR in 2007 had mainly been in the P&C world. As CFO of SCOR, I had to learn more about the Life business. Between 2011 and 2013 I was significantly involved in the two acquisitions in the United States that doubled our life portfolio.

I find the Life insurance business really exciting! Our industry aims to answer critical questions: How long will we live? What happens if we get sick? How do we protect our wealth and pass it on to the next generation? And increasingly, how can I understand and prevent disease to live a longer, healthier life?

As a Life Reinsurer, we help our clients develop products and solutions that address these questions. As a consumer, buying Life and Health insurance reduces stress and anxiety about

the future, allowing people to live a life closer to their dreams. This makes working in this industry truly fulfilling.

How do you define your success?

We are driven by our client's success. As a Life and Health reinsurer, we are successful only if our clients are successful. That might seem like an obvious statement, but ultimately you thrive only if your clients grow profitably and sustainably.

Clients need a partner that starts by listening, and then creates solutions adapted to their specific needs. As an example, we helped insurers in the French market introduce the first long-term care products more than 20 years ago. Since then, we have widened this expertise and exported it to markets such as Israel, Taiwan and Korea.

One of the main burdens for insurers is the cost of acquiring new consumers. We have helped our clients finance new business generation for decades in Germany, the UK and in Southern Europe. Since then, we have brought this support to many markets in the Americas and Asia Pacific. We put all of our energy and passion into unlocking value for our clients, and more broadly, helping the industry evolve to help people live a healthier, more productive, and more accomplished life.

How do you measure your success?

We focus our efforts on providing our customers with ideas, insights, tools and solutions to grow, monitor and manage their portfolios. We share the risks with our clients and we are profitable if they are profitable.

We are curious and passionate about anticipating future trends in industry. We invest in our research and development to help our clients better assess the impacts of emerging trends and new underwriting processes on their portfolios.

We also commit significant resources to our underwriting and claims management services. Combining our global expertise and the deep knowledge of local risks from our teams in our clients' markets, we contribute to the improvement of our clients' risk management. By supporting our customers in key steps of their business processes, we ensure our common success. In the end, you know you have succeeded when your clients come back to work with you.

What is SCOR Global Life's strategy in the US?

The US is the biggest Life reinsurance market globally. With the acquisition of Transamerica Re and Generali USA reinsurance business, we have built a leadership position in the market. Today it accounts for half of our business globally.

We have established long-term relationships with our US-based clients and we remain very committed to this market. We recently moved our global mortality R&D centers to Charlotte and Chicago and hired several industry experts. Our teams work very closely with our customers to derive insights from their data and improve their pricing as well as their underwriting and risk management processes.

Your main focus in the US is the Traditional Individual business. What's your view on the health market?

The US health insurance market is quickly changing, creating new opportunities. With the rising costs of healthcare, the continued privatization of government programs and new regulations, we expect medical expenditures to increase significantly over the next few years.

There is potential for us to expand in this space. We have built a strong, deeply experienced medical reinsurance team in Minneapolis, and we are leveraging our Life platforms. SCOR is providing our clients with expert pricing, contract terms and claims management services. Offering market excess reinsurance products and developing a medical management program are our key priorities.

Are you also growing in the US capital management market?

The insurance landscape is increasingly challenging. Traditional distribution channels are competing with new business models, increasing policy acquisition costs. New regulations are adding layers of complexity. This is creating a strain on insurers' balance sheets and cash flow generation.

To help our clients tackle these challenges, we leverage our global experience in structuring complex transactions to offer a broad range of financial solutions. On top of the traditional risk transfer solutions, we help our customers manage their solvency and finance new business acquisition costs. Building on our US platform and our global expertise, we are constantly working on increasing our knowledge and capabilities to support our clients in a changing insurance landscape.

What challenges are US Life insurers facing?

In the US, like in many other markets, our clients face a range of challenges from the low yield environment to evolving demographics, from new regulations to the emergence of new technology. However we believe that challenges bring new opportunities.

The industry is currently very focused on accelerated underwriting. And for good reason – our research shows that a large share of policyholders would not need to go through



traditional underwriting to get an accurate quote. Our automated underwriting solution, Velogica, combines speed with risk assessment to underwrite life insurance applications, while streamlining the entire process. Velogica pulls from multiple databases, from medication to motor vehicle records, to provide consumers with a quote in minutes. This enables insurers to tap the large and growing underserved middle market, but also to process higher face amount business.

We are constantly refining our algorithm and adding new data sources to further enhance our solution. For example, risk scores based on credit attributes have a statistically significant impact on mortality risk. These scores can supplement or even replace traditional fluid-based underwriting inputs.

Are insurers facing the same challenges elsewhere?

With the technological disruption impacting traditional distribution models, improving consumer engagement and automating underwriting are priorities in most markets globally. However, the array of products and underwriting processes vary widely. We have developed different sets of distribution solutions to adapt to local specifics and trends. We see that some insurers lack in-house expertise, and rely on reinsurers to

support them across various needs from product development to underwriting to policy administration.

We recently launched Velogica in Asia Pacific. We partnered with Adviser Connect, a market-leading provider of web-based business processing and underwriting automation software. This new Velogica offering combines our risk and underwriting expertise with Adviser Connect's innovative technology. Insurers can expect greater in-depth analysis of their business data and processes, combined with improved customer and adviser interfaces. This will result in a convenient, responsive and intuitive journey that overcomes the clumsiness of existing market propositions to support ambitious growth of the industry in the region.

Bringing innovative distribution solutions to our customers is also a key focus in Europe. To enhance our offering in the region, we have invested in Umanlife, an innovative wellness platform which delivers custom lifestyle coaching tools for consumers. Umanlife enables consumers to interact with their insurer and receive personalized advice. For the insurer, this translates into better persistency and the ability to actively manage their risk profile.

What are the growth areas outside the US?

We see two major trends driving insurance growth at the global level. First, socio-economics are quickly changing, with middle and high classes growing fast in several areas. This leads to a shift of growth towards emerging markets, particularly to Asia. To give you a sense of this evolution, about 500 million people in Asia were middle class in 2010. By 2020, it will have tripled and will represent as much as the rest of the world combined!

We've been present in Asia Pacific for more than thirty years, building strong foundations across key markets. We are further investing in resources, tools and expertise in order to expand our footprint in the region.

The second strong trend we see is the ageing population. This is driving an increasing need for new insurance and reinsurance products. In the UK, a large longevity risk transfer market has emerged in the past few years. Additionally, we recently signed a transaction in Canada. We see a huge potential for longevity in North America and Europe, even though it has not yet fully materialized.

The ageing population also generates new needs around older age. Our clients can leverage our actuarial expertise supported by our R&D centers to feed into their new product development processes.

How do you see Life reinsurance in 10 years?

Life insurance is changing fast. It has changed more in the past 5 years than in the last 50 years. We closely follow market

trends and have a strong focus on innovation, but the timing of disruptions is hard to predict.

The insurance ecosystem is getting more and more complex. We see the relationship between insurers and reinsurers moving from a risk and volatility management driven approach to a true partnership with more intricate interactions at multiple points of the business origination and capital management processes. This is why we are diving deeper and deeper into our customers' needs to deliver tailored solutions. We strive to remain humble and listen to our clients, and this will ensure that we will keep delivering valuable solutions.

What would you say to our readers who are looking to join the Life reinsurance business?

I am really passionate about Life reinsurance and about reinsurance in general.

There are very few industries where you can say you truly help people live their dreams. I am very proud that through the work of our teams there are people that wake up somewhere in the world today ready to tackle their day with less worry, because whatever happens to them, they have protected themselves and their families. Across the industry we achieve this by solving complex problems with some of the best people from a vast range of fields.

I entered the reinsurance industry 20 years ago and since then I have had the pleasure of working with climatologists, aerospace experts, virologists, medical doctors, agronomists, and I could go on with this list. I found this so precious that I have never left the industry!

What do you do at SCOR to attract and retain the best talent?

We have completed several acquisitions in the past decade or so, and building an environment where people can thrive has been critical to retaining our leaders and experts. We have set ourselves the objective to build the best possible teams in each area where we operate, because in the end we are only as good as our teams are. I consider myself lucky to be surrounded by such smart, committed professionals. We put an emphasis on attracting and retaining the best talent and creating career paths to enable our employees to grow their capabilities and succeed in their professional lives, as well as in their personal lives. ■



Ronald Poon-Affat, FSA, FIA, MAAA, CFA, is editor of the Society of Actuaries' *Reinsurance News* newsletter and is a recipient of a 2016 SOA Presidential Award. He can be contacted at rpoonaffat@rgare.com.

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Argentina: The Gradual Opening of the Reinsurance Market. New Opportunities for International Reinsurers

By Javier Campelo

In 1946, the Instituto Mixto Argentino de Reaseguros (I.M.A.R.) was created by the passing of Decree 15.345/1946, ratified by Law 12.988 and formed by supported capital of both the national government and the Argentine insurance companies. The aim was to have a national reinsurer that could carry the reinsurance cessions from national insurers of their surpluses over their technical retention (article 15). The foreign insurance companies operating in Argentina had to cede to I.M.A.R. 30 percent of all general and personal insurance risks underwritten in our country. Furthermore, I.M.A.R. had to redistribute the risks among the Argentine insurance companies, and the resulting surpluses could be placed in foreign reinsurers not constituted in Argentina, such as Lloyd's of London (article 17).

In 1952, I.M.A.R. was renamed the Instituto Nacional de Reaseguros (INDER), maintaining the fixed retention system aforementioned for both Argentine and foreign companies. INDER functioned as a nonprofit organization and had commercial links to both international reinsurers and national insurers, determining its own retention limits for every insurance category and offering priority of its surpluses to Argentine insurers through retrocessions.

The Argentine State Reform started in 1989, based on Law 23.696 (State Reform Law) and Law 23.697 (Emergency Economic Law). It allowed enormous privatizations of state-owned companies (electricity, gas, water, telecoms, railways and YPF—the national oil company), the market deregulation and the end of public subsidies. In this context, in November of the same year, Resolution 412 was passed, starting the process of ending the INDER reinsurance monopoly. This resolution authorized the Argentine insurance companies to freely reinsure with either local or foreign reinsurers 40 percent of their non-retained surpluses (article 2).

In 1992, with the passing of Decree 171, the mandatory cession regime to INDER was ended and INDER was dissolved on March 31. Three years later, in 1995, Resolution SSN 23.881 established the first general rules required for the authorization of local and foreign reinsurers, as well as for reinsurance brokers. Finally, in 1996, Resolution SSN 24.805 and its subsequent modifications established the basic regulation with which all the reinsurance placements had to comply.

Starting with Resolution SSN 35.615, in February 2011, there was a paradigm change in the Argentine reinsurance market. Since 1992, up until 2011, when the liquidation of INDER was undertaken, the market had been almost totally foreign, favoring a constant currency flow abroad, with a low-intensity control with regard to the justification of such transfers and other issues that affected the normal development of the market.

Resolution SSN 35.615 established that local insurers could be authorized to reinsure their portfolios with only reinsurers established in Argentina, either national or branches of foreign reinsurers (local reinsurers). As an exception, article 19 of this resolution established that SSN could allow insurers to place reinsurance with foreign reinsurers operating from their home office when, due to the magnitude and characteristics of the ceded risks, these reinsurance transactions could not be taken up by the national reinsurance market.

Furthermore, article 20 of this resolution defines the requirements that foreign reinsurers had to comply with in order to underwrite business from their home office abroad (admitted reinsurers). Following this, Resolution SSN 35.794 of May 19, 2011, set retention criteria, such as:

- Local reinsurers had to retain a minimum of 15 percent of their issued premiums, taking into account their entire portfolio.
- Individual risks with a face amount of more than USD 50 million could be placed with admitted reinsurers, but only the surplus over that USD 50 million (it defines criteria for the exception considered in article 19 of Resolution 35.615/2011).
- Retrocessions could be placed both with local and admitted reinsurers.
- Local reinsurers were not allowed to transfer to sister foreign companies within their groups more than 40 percent of their premiums.
- In group life and burial insurance, the reinsurance contracts had to be fully retained by local reinsurers.

CHARACTERISTICS OF THE CURRENT ARGENTINE REINSURANCE MARKET¹

Even though Argentina has started going down a different path than Brazil (our neighboring country went from an institutional monopoly in the Brazilian Institute of Reinsurance—I.R.B.—to the market opening up to foreign reinsurers in 2008), both countries are the only ones in South America to develop a local reinsurance market. In particular, Argentina broke with 20 years of an almost fully foreign reinsurance market to promote the composition of a local market as a public state policy.

There are at the moment 26 local reinsurers, with a mixed composition, including reinsurers funded by only national, only foreign and joint ventures. With regard to admitted reinsurers that operate in retrocessions, 81 companies are registered.

The annual ceded premiums were about ARS 13.7 billion in the period 2014/2015, which is the last informed by the regulator (more than USD 1 billion, based on the exchange rate at that time), with the reinsurance cession rates about 9 percent of the insurance premium market.

The reinsurance cession rates in general insurance (10.2 percent) were much higher than in personal insurance (3.7 percent), with insurance types that are very dependent on reinsurance, such as aviation (78.7 percent); fire (69 percent); and hail (54.5 percent). However, the biggest types of insurance, in terms of direct insurance production (motor vehicle and workers' compensation) have very low reinsurance cession rates (4.4 percent and 0.1 percent, respectively).

With regard to the ways of operating, about 74 percent of ceded premiums are facilitated through automatic contracts (85 percent proportional reinsurance, such as quota share, and 15 percent non-proportional reinsurance, such as excess of loss and catastrophe) and 26 percent through facultative placements.

About 75 percent of the ceded premium is placed directly with reinsurers and the remaining 25 percent through reinsurance brokers. The 10 biggest reinsurers in Argentina, in terms of ceded premium, account for 63.3 percent of the total. The top five are Allianz Argentina (10.8 percent); Punto Sur (9.6 percent); American Home (9.5 percent); Zurich Compañía de Reaseguros Argentina (8.3 percent) and Mapfre Re (6.4 percent).

THE NEW RESOLUTION (SSN 40422/2017) AND ITS EFFECT ON THE REINSURANCE MARKET

After the passing of Resolution SSN 40422/2017, the insurance regulator authorized the insurance companies to reinsure their business of all types with non-national reinsurers (admitted



reinsurers), according to a scheme of allowable maximum ceded premiums. This scheme will come into force on July 1, 2017, with a maximum of 50 percent of ceded premium allowed to be placed with admitted reinsurers. This rate grows incrementally up to 75 percent by the year 2019 (before, under Resolution SSN 35.615/2011, the insurance companies were only authorized to reinsure their business with local reinsurers, with the exception of facultative reinsurance placements with a face amount more than USD 50 million.)

Additionally, the facultative reinsurance placements with a face amount more than USD 35 million can be fully placed with admitted reinsurers and will not be taken into account when determining the aforementioned percentages (Under

Resolution SSN 35.794/2011, only the excess more than USD 50 million was authorized to be placed with admitted reinsurers.)

On the other hand, the new regulation (Resolution SSN 40163/2016) abolishes the part of the Insurance Activity General Rules that currently determines that national reinsurers (local reinsurers) have to retain a 15 percent minimum of their issued premium (Resolution SSN 35.794/2011).

In addition, the regulation has established a new structure for local reinsurers to adjust to the capital adequacy requirements as stipulated in Resolution SSN 40422/2017. This consists of proving ARS 60 million by March 31, 2017; ARS 130 million by Dec. 31, 2017; ARS 250 million by Dec. 31, 2018; and ARS 350 million by Dec. 31, 2019 (about USD 21.7 million).

This new regulation substantially modifies the Argentine reinsurance market, favoring the larger international reinsurers that in the vast majority of cases operate as admitted reinsurers. This goes against the local reinsurers, which were created under the previous reinsurance regulation framework.

The 81 admitted reinsurers in Argentina will have a distinct advantage under the new regulation because it will substantially increase the volume of premiums that the Argentine insurance and reinsurance market will cede to them, either through reinsurance or through retrocession business.

On the contrary, the 26 local reinsurers in Argentina are very likely to discontinue their operations due to the new capital adequacy requirements and the new reinsurance framework (Resolution SSN 40422/2017). Perhaps a handful of local reinsurers might merge in order to continue their operations.

It is important to state that those local reinsurers funded by national capital will not be able to start operating as admitted reinsurers, because only foreign reinsurers can operate as admitted reinsurers, according to Resolution SSN 35615/2011 and its subsequent modifications.

OUR VIEWPOINT ON RESOLUTION SSN 40422/2017

From our perspective, the Argentine reinsurance market, as it was defined by the previous regulation framework, needed to be reformed structurally, because it did not achieve its goals. The retrocessions from local reinsurers to admitted reinsurers were, in many cases, the rule and not the exception, and there were high retrocession rates to admitted reinsurers in these years.

However, we also believe the new capital adequacy requirements and the new reinsurance framework might not reach the gradualism objective planned by the regulator, and a mass exit of local reinsurers will probably occur. Although capital requirements for local reinsurers under the previous rules

were extremely low (ARS 30 million), we believe that the rise to ARS 350 million (about USD 21.7 million) is too much. If we multiply the 26 local reinsurers by ARS 350 million, we get ARS 9.1 billion (about USD 563.5 million), which is disproportionate in respect to the ceded premiums from the Argentine market. Conversely, the solvency requirements in our country continue to fall short of the best international practices that capture the risk diversity faced by insurers and reinsurers in terms of investments, policy profile and operational risks.

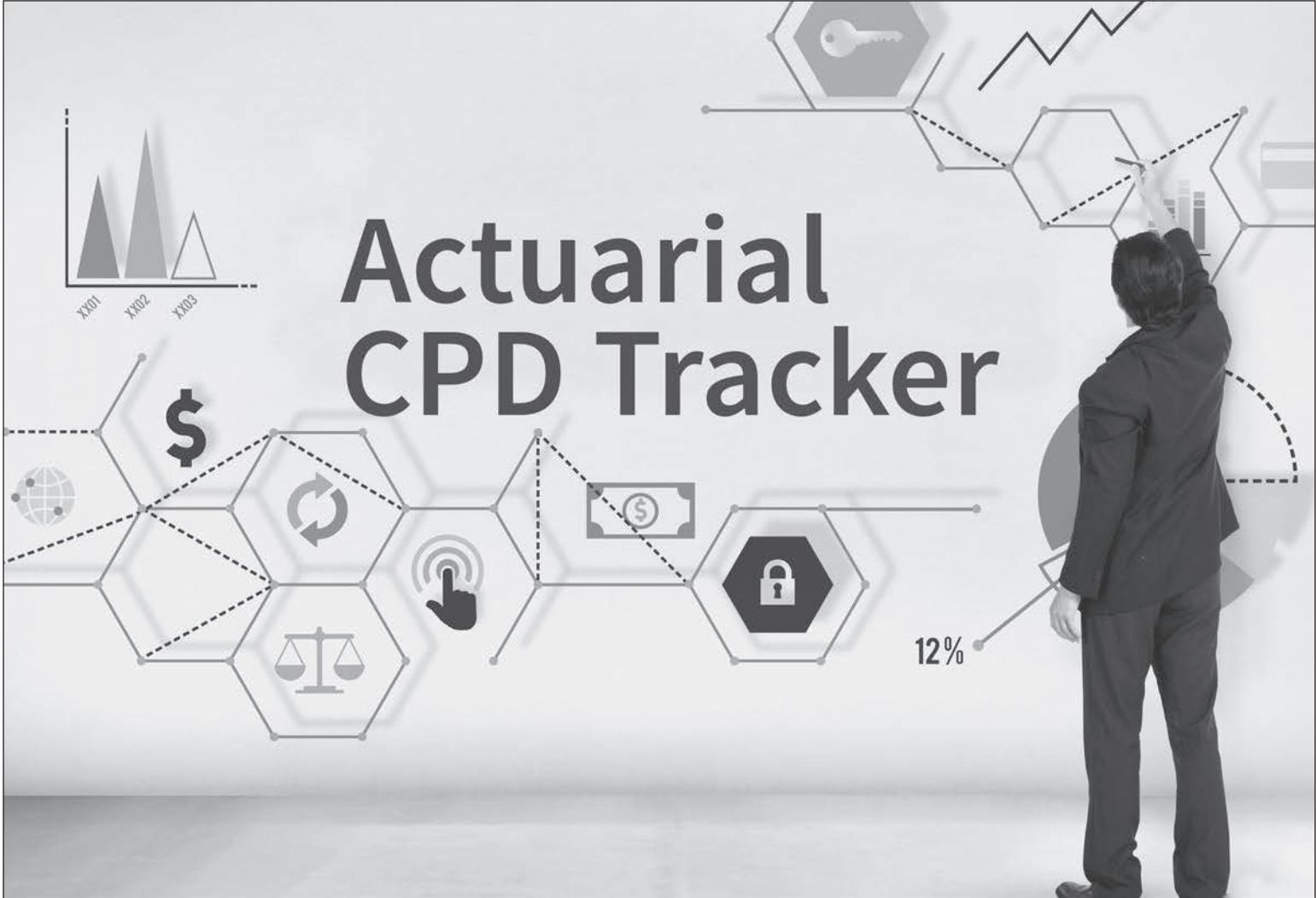
From our viewpoint, the abrupt public policy changes are counterproductive to incentivize the long-term investments, either from national or international capitals. We believe it is important that the Argentine insurance sector continue to have a medium- to long-term strategic plan, not being substantially modified by the political changes in our country. This plan must include quantitative projections of the impact of different regulatory changes on the evolution of the solvency, profitability, market production and other variables relevant to the sector. We have been working together with a highly qualified actuarial team and other experienced professionals, with the participation of all the relevant market players, from both the public and private sectors, including the insurance and reinsurance companies' authorities within Argentina with regard to the formulation of the Argentinean Strategic Plan for the Insurance Industry (PlaNeS 2012–2020).

PlaNeS includes the need to improve the solvency levels within the Argentine insurance and reinsurance markets and considers, with the Word Bank's assistance, that the local insurance and reinsurance market moves to a risk-based supervision scheme with risk-based capital requirements, in accordance with the best international practices. We strongly believe that PlaNeS, as stated public policy, must continue and that the implementation of the strategic policies defined in it will substantially increase the solvency and profitability of the Argentine insurance and reinsurance market. ■

Javier Campelo, ASA, is director of actuarial services at Re Consulting, SOA ambassador for Argentina and regional ambassador coordinator for Latin America and the Caribbean. He can be reached at jcampelo@re-consulting.com.ar.

ENDNOTE

- 1 Superintendencia de Seguros de la Nación (SSN). "Information About Reinsurance in the Argentinean Insurance Market." Bulletin SSN 3870.



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Results of the 2016 Life Reinsurance Survey

By David Bruggeman

ABOUT THE SURVEY

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 2016.
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 2016.
3. **Retrocession reinsurance:** Reinsurance not directly written by the ceding company. Since the business usually comes



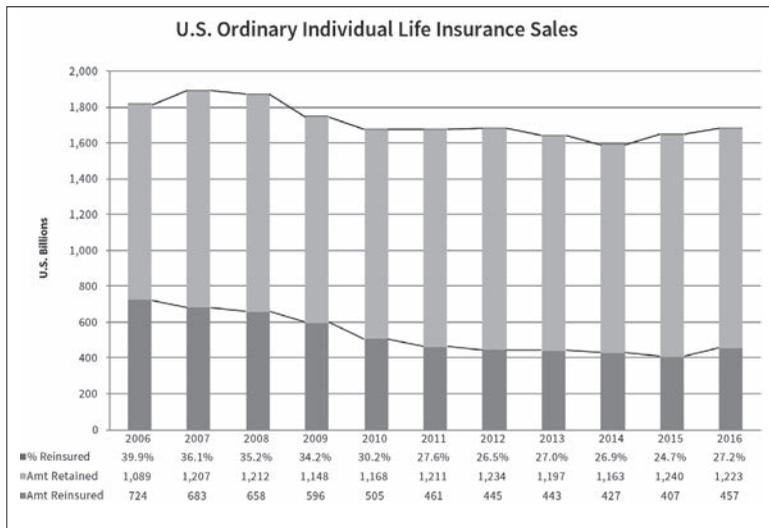
from a reinsurer, this can be thought of as “reinsurance of reinsurance.”

Individual life figures are based on net amount at risk, while the group numbers are premium-based.

Table 1.
Reinsurance Landscape

	Individual Life New Business Volumes (\$ billions)			Group In Force Premiums (\$ millions)		
	2015	2016	% Change	2015	2016	% Change
U.S.						
Recurring	407	457	12%	728	798	10%
Portfolio	130	729	459%	1,405	3,938	180%
Retrocession	5	8	61%	0	0	n/a
Total	543	1,194	120%	2,134	4,737	122%
Canada						
Recurring	153	159	4%	101	104	3%
Portfolio	3	41	1131%	1,098	786	-28%
Retrocession	2	6	240%	0	0	n/a
Total	158	206	30%	1,241	885	-26%

Figure 1.
U.S. Recurring Cession Rate



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).

Please note 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 North American life reinsurance market experienced a boost in production along most lines in 2016. Table 1 provides a summary of the most recent survey results:

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

Company	2015		2016		Change from 2015 to 2016
	Assumed Business	Market Share	Assumed Business	Market Share	
SCOR Global Life	97	24%	101	22%	4%
Swiss Re	80	20%	84	18%	5%
RGA	68	17%	84	18%	23%
Munich Re	73	18%	80	17%	9%
Hannover Life Re	41	10%	56	12%	37%
Canada Life	11	3%	17	4%	65%
Aurigen	19	5%	17	4%	-11%
General Re Life	10	2%	9	2%	-9%
Optimum Re	8	2%	9	2%	7%
Total	407	100%	457	100%	12%

Individual Life New Business

The big news from the U.S. front was recurring business finally recorded an increase in production. This is notable because this is the first increase experienced since 2002, or almost 15 years.

Canadian recurring also saw an increase in production. The 2016 increase in recurring makes this the second straight year with an increase for Canada.

Group Life Business

U.S. group business experienced a substantial increase in premiums in 2016. Recurring premiums were up 10 percent while portfolio premium jumped 180 percent.

In Canada, overall group premium exhibited a decrease in 2016 due to a reduction in portfolio premium.

UNITED STATES – INDIVIDUAL LIFE RECURRING

Ring the bell! For the first time since 2002, U.S. recurring reinsurance recorded an increase in production. Not only was it an increase, but it was a double-digit increase. Compared to 2015, U.S. recurring in 2016 rose 12 percent. The \$457 billion reported in 2016 as compared to \$407 billion reported in 2015. One contributing factor for the increase is believed to be the growth in streamlined or accelerating underwriting programs. Since these programs are relatively new to the market, direct writers have reached out to the reinsurance community for assistance in developing the programs and taking a share of the risk.

The increase in recurring production also resulted in an increase in the cession rate (See Figure 1). Per LIMRA,

individual life insurance sales increased 2 percent in 2016 thanks to strong first quarter sales. Decreases in UL and VUL sales were offset by increases in term and whole life sales. Comparing new direct life sales to recurring production shows an estimated cession rate of 27 percent for 2016.

The top five companies in the U.S. reinsurance market remained the same and continue to represent close to 90 percent of the market share (see Table 2). SCOR once again led all reinsurers in recurring new business. In 2016, SCOR reported \$101 billion of recurring which was a 4 percent increase from 2015. Swiss Re and RGA reported almost identical recurring new business production levels in 2016 at \$84 billion. For Swiss, this was a 5 percent increase from 2015 and for RGA that was a 23 percent increase. Munich Re's recurring production rose from \$73 billion in 2015 to \$80 billion in 2016 which was a 9 percent increase. Hannover's \$56 billion of recurring production in 2016 represents a 37 percent increase from their 2015 figure.

PORTFOLIO

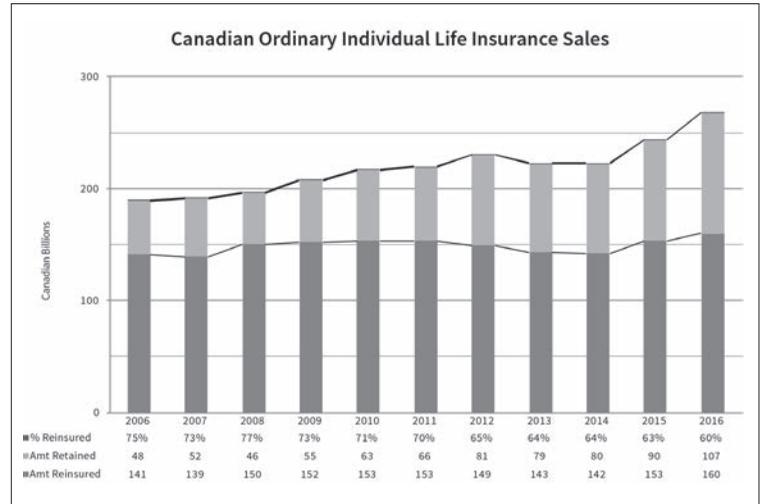
Given the definition of portfolio business (in force block or financial reinsurance), large fluctuations from year to year are often seen and 2016 was no different. While there were no major mergers/acquisitions in the life reinsurance industry in 2016, new portfolio business jumped from \$130 billion in 2015 to \$729 billion in 2016. This was primarily driven by portfolio writings reported by Hannover Life Re which totaled \$612 billion. Swiss Re's \$84 billion of portfolio new business in 2016 was the next highest amount. Other companies reporting portfolio new business include SCOR Re (\$21 billion), RGA Re (\$5 billion) and Canada Life (\$2 billion).

Figure 2 illustrates the up and down nature of portfolio new business writings since 2005. In the past, the large spikes were generated from a merger/acquisition within the life reinsurance industry. For example, the spikes in the 2011 and 2013 SCOR's acquisition of Transamerica Re and Generali

Figure 2
U.S. Portfolio Business Trend



Figure 3
Canada Recurring Cession Rate



respectively, while the 2009 spike was the Hannover Re acquisition of an ING Re block.

RETROCESSION

Over the last 10-year period, retrocession production in the U.S. had been on a downswing dropping from \$43 billion in 2005 to \$5 billion in 2015. However, similar to recurring, portfolio recorded an increase in 2016 after a lengthy period of decreases. Approximately \$8 billion of retrocession was reported in 2016 which was a 61 percent increase from the \$5 billion reported in 2015. The primary retrocessionaires in 2016 were Berkshire Hathaway Group, Pacific Life and AXA Equitable. It should be noted the 2016 increase is somewhat overstated as AXA-Equitable did not report retrocession new business in 2015. However, retrocessions increased in 2016 over 2015 even after excluding the AXA-Equitable figures.

CANADA – INDIVIDUAL LIFE RECURRING

Recurring new business in Canada rose for the second consecutive year. Around \$160 billion was reported in 2016 which is a 4 percent increase from 2015. Recurring likely benefited from the strong direct sales experienced in 2016. Direct sales rose 10 percent in 2016 thanks to UL and WL sales skyrocketing in the fourth quarter because of impending changes in the tax exempt test.

In total, an estimated \$267 billion CAD of individual life insurance new business was sold in 2016. Of this volume, it is estimated around 60 percent is reinsured (\$160 billion). As shown in Figure 3, the cession rate has been steadily dropping the last several years in Canada. In 2006, the cession rate was

Table 3.
Canada Recurring Individual Life volume (\$ millions CAD)

Company	2015		2016		Change from 2015 to 2016
	Assumed Business	Market Share	Assumed Business	Market Share	
RGA	49	32%	44	28%	-10%
Munich Re	40	26%	41	26%	1%
Swiss Re	25	16%	29	18%	16%
SCOR Global Life	18	12%	21	13%	20%
Aurigen	14	9%	15	10%	7%
Optimum Re	7	5%	9	6%	30%
Total	153	100%	160	100%	4%

75 percent compared to 60 percent in 2016. However, the Canadian cession rate is still much higher compared to the U.S., where approximately 27 percent is reinsured.

The top three life reinsurers in the Canadian market are RGA, Munich Re and Swiss Re. These three companies have long held the top three spots. In 2016, they collectively represent 72 percent of the market (see Table 3). RGA led recurring writers with \$44 billion which was a 10 percent drop from 2015. Munich Re followed with \$41 billion (1 percent increase from 2015) and Swiss Re rounded out the top three with \$29 billion reported (16 percent increase from 2015)

SCOR, Aurigen and Optimum all reported increases in 2016, but were coming from a lower starting point in 2015. This helped generate the overall increase in ceded volume of \$7 billion experienced in 2016.

PORTFOLIO

Munich Re was the lone reinsurer reporting portfolio new business in 2016 reporting more than \$40 billion in portfolio new business. This is the highest portfolio amount seen in Canada since 2011.

RETROCESSION

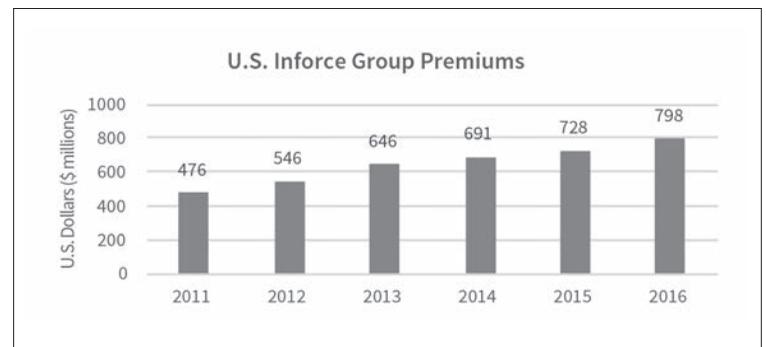
Canadian retrocessionaires included Berkshire Hathaway, Pacific Life and AXA Equitable. Berkshire led retrocessionaires with \$3.5 billion and was followed by Pacific Life (\$1.9 billion) and AXA (\$0.3 billion). Overall, the retro market in Canada increased from \$1.7 billion in 2015 to \$5.8 billion in 2016.

UNITED STATES – GROUP LIFE

U.S. group life reinsurers reported more than \$4.7 billion of in-force premium in 2016. This is a material increase from the \$2.1 billion reported in 2015. Recurring accounted for \$0.8 billion of the premium and portfolio represented \$3.9 billion.

Recurring in-force premiums in the U.S. market have risen almost 70 percent in just a six-year span. During this period, premiums have grown from \$476 million in 2011 to \$798 million in 2016 (see Figure 4).

Figure 4
U.S. In-force Group Premium Trend



As shown in Table 4, the top three reinsurers in the U.S. group life insurance market for recurring business are Swiss Re, Munich Re and RGA. Collectively, these three companies account for 89 percent of the market. Each of these companies reported increases in 2016. Swiss Re, the top reinsurer by premium, increased 5 percent while Munich Re's recurring group in-force premium rose 2 percent in 2016. RGA reported the largest increase in 2016 with a 42 percent increase.

PORTFOLIO

In-force portfolio premium totaled \$3.9 billion in 2016. This is a 180 percent increase in premium from 2015 to 2016. The increase was driven by two reinsurers. Canada Life reported \$2.4 billion in portfolio premium in 2016, up from \$753 million in 2015. Munich Re's \$1.0 billion in 2016 premium

Table 4.
U.S. Recurring In-force Group Premiums (\$ millions USD)

Company	2015		2016		Change from 2015 to 2016
	Assumed Business	Market Share	Assumed Business	Market Share	
Swiss Re	328	45%	346	43%	5%
Munich Re	202	28%	206	26%	2%
RGA	110	15%	156	20%	42%
Group Reinsurance Plus	34	5%	39	5%	13%
General Re	21	3%	25	3%	19%
SCOR	25	3%	18	2%	-28%
Hannover Re	8	1%	7	1%	-3%
Canada Life	1	0%	1	0%	0%
Optimum Re	0.2	0%	0.2	0%	0%
TOTALS	728	100%	798	100%	10%

overshadowed the \$95 million reported in 2015. Finally, Hannover Re reported \$500 million in group life portfolio premium in 2016.

CANADA – GROUP LIFE

In Canada, the recurring portion of in-force group premiums levels have remained fairly steady over the last few years, holding around \$100 million in CAD premium. Similar to the individual market in Canada, the group market is dominated by three reinsurers, Munich Re, Swiss Re and RGA. Munich Re's 7 percent increase in group in-force premium was a key contributor to the overall market increase of 3 percent (see Table 5).

Munich Re was the only reinsurer reporting in-force portfolio business in 2016. Munich reported \$786 million in portfolio premiums for 2016.

Table 5.
Canada Recurring In-force Group Premiums (\$ millions CAD)

Company	2015		2016		Change from 2015 to 2016
	Assumed Business	Market Share	Assumed Business	Market Share	
Munich Re	47	46%	50	48%	7%
Swiss Re	25	24%	25	24%	1%
RGA	23	22%	22	21%	-3%
Optimum Re	6	6%	6	5%	0%
SCOR Global Life	1	1%	1	2%	26%
TOTALS	101	100%	104	100%	3%

LOOKING AHEAD

The increase in recurring new business in 2016 was a welcome sight for the life reinsurance industry that has weathered decreasing production levels and seen the number of reinsurers reduce considerably since the “glory days” of the late 1990s and early 2000s. Will this year's increase spark a trend? Below are just a few factors that could impact life reinsurance levels in the near future:

- **Principle-Based Reserves (PBR):** The new reserve regulation, PBR, became effective in 2017 and allows for a three-year phase-in period. Indications are many direct writers are moving to the new 2017 CSO reserve basis in 2017 for their term products, but are delaying implementation of PBR. The three-year phase-in period allows insurers to obtain a good understanding how PBR may affect their business



before actually implementing. As more direct companies actually begin adopting PBR over the next couple of years, there could be a change in the pricing structures, however it is still unknown how this reserve regulation will impact life reinsurance.

- **Streamlined Underwriting:** Streamlined/accelerated underwriting programs are expected to be more commonplace in 2017 as direct writers look to issue business quickly at mortality levels as close to fluid tested business as possible without actually obtaining fluids. Along with MVR, MIB and prescription database checks, vendors are also touting the benefits of credit scoring. Reinsurers with expertise with these programs will be best positioned to benefit from new life sales generated by these programs. Reinsurers are providing underwriting rules development, product development and even automated underwriting engines to assist direct writers with these programs.
- **Direct Sales Distribution Shifts:** Per LIMRA, almost one quarter of life insurance purchases were direct to consumer in 2015, up from 11 percent in 2000. The percentage of direct to consumer sales is expected to continue to rise as insurers focus on ways to reach out to potential insureds.

- **Portfolio Reinsurance:** Because of the low interest rate environment, direct writer's appetite for financial reinsurance and reinsurance of in force blocks is not expected to wane in 2017. Reinsurance will remain a viable option for efficient capital management.

Finally, I would like to thank all of the companies who participated in the survey this year. Complete results are available at www.munichre.com/us/life/publications. ■



David Bruggeman, FSA, MAAA, is an assistant vice president and actuary for Munich Re Life (US). He can be contacted at dbruggeman@munichre.com.

ENDNOTES

- 1 Based on LIMRA, "U.S. Individual Life Insurance Sales (Fourth Quarter 2016), March 2017
- 2 Based on LIMRA, "Canadian Individual Life Insurance Sales (Fourth Quarter 2016)", March 2017
- 3 Based on LIMRA, U.S. Individual Life Insurance Yearbook (2015)

Disruptive Innovation— Coming to Insurance Near You

By Louis Rossouw

The *New York Times* was struggling online. While the quality of its journalism was not in doubt, the company’s digital business was shrinking, as measured by subscription numbers and advertising revenues. A “new ideas task force” was formed to address the challenges the news organization faced; fortunately, for us at least, their conclusions were leaked online in 2014.¹

The initial focus of the task force had been to develop a new product to resolve the issue of their flagging digital business, but on digging into the detail the ambit changed to something much broader: “... helping *The Times* adjust to this moment of promise and peril, we concluded, would have greater journalistic and financial impact than virtually any product idea we might have suggested.”

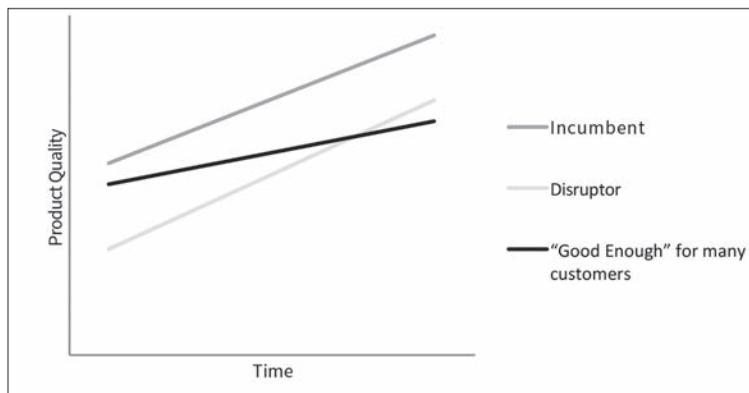
Much has been written about the report and the glimpse it offers into a large organization seeking to respond to new competitors that threaten it because of their better use of new technologies.^{2,3,4} The conclusions it draws make interesting reading even to such news industry outsiders as life and health insurers.

THE INNOVATOR’S DILEMMA

The authors of *The New York Times* report reference *The Innovator’s Dilemma*, written by Clayton Christensen, which develops a concept called “disruptive innovation.”⁵ More recently, Christensen summarized disruption as a process whereby a smaller company with fewer resources is able to successfully challenge established incumbent businesses.⁶ The company entering the market can be successful because the incumbent is busy improving its products and services only for its existing customer base.

Typically, an incumbent business works to service only those customers that provide its main source of revenue and profit. This leaves unserved segments of the market—gaps that a new and more nimble entrant can focus on servicing, usually with an offer of a cheaper, if inferior, product or service, yet targeted to this segment.

Figure 1.
Disruptive Innovation Graphically



As time goes by, the new entrant may improve its quality while keeping costs low. It begins to threaten the incumbent’s business by luring away customers with a “good enough” offering that is cheaper or more convenient. This is when “disruption” occurs.

Represented graphically, it might look like Figure 1. The disruptor starts with an inferior product appealing to segments of the market overlooked by the incumbent. As the inferior product becomes “good enough” for many customers to use it, the incumbent provider faces losing significant market share to the disruptor.

An example of disruption is what happened with film cameras, which for many years were the top product for taking quality photographs. As the first digital cameras became available, they only produced inferior pictures to photo film ones. As technology improved, digital cameras could eventually produce images that were “good enough.” While not of the outright quality of top-end film cameras, for most consumers the convenience of the digital format far outweighed the benefits of using film.

The story does not end there, of course; digital cameras are now built into most smartphones. While consumers may have doubted the necessity, the image quality soon became “good enough” for many to abandon even their digital cameras; the disruptor became the disrupted. Although customers remain for digital and film cameras, they exist in smaller numbers and in niche use cases. This mass of disruption was not without corporate victims; Kodak filed for Chapter 11 bankruptcy protection in 2012 after failing to respond adequately to competitors.

In its report, *The New York Times* task force cited the example of BuzzFeed using social media distribution as a potential disruptor to its own news business. BuzzFeed is a global network for news and entertainment made up of articles and

videos available on mobile devices. While the BuzzFeed offering—its news content—may lack the journalistic quality of *The New York Times*, it provides content to a market segment underserved by the newspaper online. BuzzFeed has continued to improve its offering to the point that it has proved “good enough” to attract 6 billion monthly views; in the process certainly luring *The New York Times*’ customers.

We can also differentiate between “low-end” and “new market” disruptors. Low-end disruptors, like BuzzFeed, enter the low-quality, low-price end of a market and grow from there. In contrast, new market disruptors grow by attracting customers who have not previously used a particular product or service. An example of new market disruptor might be a budget airline that gets people flying who would not have considered it before, perhaps due to cost. This type of disruptor starts out by expanding the market rather than by luring customers from incumbents.

An important determinant of whether new entrants will be disruptive is the pace of their technological development. They are more likely to prove disruptive if they are able to improve their product rapidly without incurring the same cost base as the incumbents.

BATTLE FOR THE CUSTOMER INTERFACE

Tom Goodwin of TechCrunch, a news group that follows start-up companies, describes a new breed of company that is emerging:

“Uber, the world’s largest taxi company, owns no vehicles. Facebook, the world’s most popular media owner, creates no content. Alibaba, the most valuable retailer, has no inventory. And Airbnb, the world’s largest accommodation provider, owns no real estate. Something interesting is happening.”⁷

Goodwin says that while much of the world’s economy was built on large organizations with extensive supply chains and complex distribution channels to the customer, the fastest-growing companies in recent times are instead “interface owners.” New breed companies like this operate through a thin layer (the interface) that sits in front of the supply chain. They extract value from relationships with customers, not by altering the product or service so much, but by changing the interface.

Where new interface owners emerge, a commodity market for suppliers of the actual products develops in parallel. The vehicle owners and drivers of Uber, the apartment owners on AirBnb, and all the content that gets produced by people and organizations (including traditional media like *The New York Times*) that gets shared via such social media as Facebook, are all part of this market.

Take the example of Uber. It supplies a taxi service essentially like any other (you pay to be driven from A to B), but the ease of interaction and its interface is where the value lies. To assess the interface worth, consider that after seven years of operation Uber is already valued higher than General Motors, Ford or Honda.⁸

Christensen’s comments on Uber are that he found that it is not disrupting taxi business. They are providing a higher quality service than most established taxi business and targeted existing users of taxis. This is not the traditional disruption as he defines it.

However, when we consider Uber as being a disruptor of car ownership, the model seems to fit a lot better. This may also explain why Uber’s valuation is being compared to that of the likes of General Motors and Ford.

Either way, while it’s a company that may not strictly fit Christensen’s definition of disruptive innovation, its success is hard to ignore.

Life and health insurers are yet to feel much pressure from disruptors because many are still developing models and approaches. ...

DISRUPTING INSURANCE?

The New York Times faced a similar battle over the interface. Its problem was, to an extent, one of distribution. It needed to pump out its news in a way that customers would place value on it. The high quality of the product itself was no longer enough to achieve this. It is easy to see similarities with traditional insurance companies: large organizations (typically) using well-established models and processes of business face challenges adapting to new and rapid changes to the consumer, technology and business environments.

Life and health insurers are yet to feel much pressure from disruptors because many are still developing models and approaches or are catering to the low-end and to the never-insured parts of the market. But these companies have started, and solutions are being developed. They have the advantage of being without legacy processes, and are thus likely to improve much faster than insurers, albeit from a lower base.

Many disruptors focus on distribution—particularly the interface, or interaction, with the customer and trying to make it



easier for people to buy insurance. Developments in the U.K. market highlight this. Much of the business of life insurance is now conducted through online aggregators and broker portals providing quick and easy price comparisons and these, to an extent, have replaced insurance brands and commoditized insurance companies' products.

TECHNOLOGIES

Technology is integral to disruption—driving it, as Christensen sees it—and is central to the development of customer interfaces (for smarter distribution). There are large trends here that are likely to create disruption in insurance for years to come.

Probably the first technology trend in insurance to consider is the use of **data analytics** to better understand customers.^{9,10} It is credible that analyzing data effectively is the key to delivering consumers a better experience, especially in sales and in the underwriting process. To some extent all the technologies

and behaviors described below take data analytics as their base line.

Mobile technology is an important shift in both behavior and technology, with smartphones and tablets now used more than ever. Devices generate and store invaluable and unique information about customers, and integrating insurance products with them will be increasingly important. In some markets this is the only way to reach people cheaply and effectively, which means there is huge potential in Mobile First platforms targeted at the developing world.

Wearables, an extension of mobile technology, are a potential driver of disruption in life insurance. Wearable technology will allow life insurers access to better information, particularly about the health and lifestyle habits of applicants and policyholders.

Wearables and mobile technology lend themselves to the fast-developing concept of **wellness management**. Discovery's Vitality insurance program, which promotes the concept backed by data from wearables, is the vanguard of a trend other providers are starting to follow. Wellness management extends from general fitness into disease or "condition-specific" observation; for example, a person with diabetes using an application on a device to monitor blood sugar.

Behavioral science is another "technology" that is being used to improve the user interface to make sure consumer and insurers get what they want using influence and incentive techniques.¹³

The **Internet of Things (IoT)** allows devices to connect, send and receive data. As a parallel to health monitoring using wristbands, telematics boxes are already prevalent to monitor driver behavior in motor insurance, while the IoT-connected home also presents opportunities for insurers.¹⁴

The potential of **mobile money** is already opening financial services to those with no access to formal banking; in some African countries, for example, the M-Pesa service has a stronghold. New forms of money transfer, payment and financial technology present opportunity; Vodafone, for example, has 25 million mobile money platform users.¹⁵ This flexible development represents an opportunity for insurers, especially in developing markets. Other Fintech developments extend to payments, remittances, peer-to-peer lending, financial advice, budgeting apps, Bitcoin and blockchain technology, which holds the promise of distributed ledger technology in financial services.¹⁶

Peer-to-peer approach, being explored in lending, is also garnering interest in insurance. There are some start-ups focussing on peer-to-peer insurance where smaller groups share some risk, which is also how insurance started.^{17,18} There is also distribution of insurance in a peer-to-peer manner.¹⁹

Chat (and message bots) is also starting to emerge as a new way to think about distributing insurance. Consider the prevalence of services such as WhatsApp and Facebook Messenger; why can't we just chat to our insurer and get financial advice? It is often difficult to convince people to install an app and go through some effort to get it set up. Chat is a much more immediate and natural way to interact with customers.

The above, combined with a renewed focus on **artificial intelligence**, is leading to the focus on robo-advisors. This could be delivered by an app, on the internet or as mentioned, via chat interfaces. This shows promise in the lower income markets where paid advice models are too expensive to be successful.

WHERE TO NEXT?

The New York Times responded to being faced with large numbers of competitors taking on new technology and distribution approaches. How did they fare? Firstly, contrary to some beliefs, they seem to have implemented the points of the report, and online traffic is up.²¹ This is a hopeful development in the face of disruption and indicates that incumbents are able to respond.

Christensen says that “universally effective responses to disruptive threats remain elusive.” He goes on to say that their current thinking is that incumbents may need to establish separate division to tackle or exploit a new disruptive business model.

Much of *The New York Times'* problems stemmed from having a culture supporting print and having to protect the existing revenue sources. This occurred to such an extent that the digital-only subscription was more expensive than a print and digital subscription. This problem seems to have been addressed from within.

As insurers, we also have cultures based on existing channels and distribution that produce much of our revenue, resulting in our missing opportunities elsewhere. That is probably why some insurers are establishing separate units and new brands for new business models.

It's not certain what the right approach is. What is certain is that insurers will be facing significant disruptive business models in the near future. There will be existing insurance companies that do not respond quickly enough, but there will also be those that end up paving the way for a new, better way for doing insurance business.

One positive outcome of all this jostling is that the customer is bound to get an ever-improving experience of insurance and, in the end, is that not the best outcome? ■



Louis Rossouw, fellow of Actuarial Society of South Africa, is head of Research and Analytics for Gen Re Africa. He can be contacted at LRossouw@genre.com.

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Return on Capital Enhancement Opportunities for the Life Insurance Industry

By Rebecca Wilczak

Unlike products sold in most industries, life insurance is the sale of a promise to pay in the future, when vulnerable parties are in their greatest times of need. These vulnerable parties count on life insurance benefits to pay bills, send their children to college, and return to some semblance of normalcy after a tragic event. The importance of these benefits and the uncertainty in their timing makes regulation of life insurance companies a matter of public policy. Regulations exist to make sure that life insurers have the funds necessary to pay the benefits they promised at the time of sale.

At the same time, life insurance companies, like most other industries, only sell products to the extent they can earn a profit, that is, earnings which exceed the cost of capital. Life insurers do not benefit from knowing the actual cost of goods sold at the time of the initial sale of a life insurance policy. Thus, it is necessary to make assumptions about future mortality rates, interest rates, lapse rates, expenses, and other items in order to determine the premiums charged to a policyholder and the level of revenue to hold back as reserves and capital. Using more aggressive assumptions allows the company to realize a higher profit sooner, but perhaps not have enough funds to pay benefits in the future. Using more conservative assumptions increases the likelihood that the company will have funds to pay benefits, but also delays and lowers current profits. For a company to be able to ensure that all benefits can be paid in the worst possible case where all insureds die immediately, the company would need to hold the entire face amount of all policies in reserves and capital. Doing so would require that premiums be set equal to the face amount of the policy and effectively eliminate the benefit that life insurance now provides.

The question, then, is not whether life insurance companies, regulators, and policyholders should accept a non-zero probability of failure, but what probability of failure is acceptable. There must be a balance between the competing objectives

of having strong life insurance companies that are able to pay claims even through extremely-adverse mortality scenarios, with making life insurance affordable and accessible to the largest number of people.

An important measure to use when finding this balance is the return on capital that the insurance company can achieve. A company with extremely conservative levels of capital that could withstand even the worst scenarios will generally have a lower return on capital than a company that is able to offer cheap insurance but may not be able to pay future claims. A tool that allows life insurers to earn a higher return on capital without eroding the ability to pay claims would obviously be useful.

At the most basic level, there are three ways for a life insurance company to generate a higher return on capital. The first is to make the business more profitable by increasing the profit margin and maintaining the same level of capital, the second is to produce more volume with the same capital base, and the third is to lower the amount of capital that is held. By examining the ways that life insurers have used these methods in the past, we can see how the life insurance market has swung between the two objectives mentioned above.

Before Regulation XXX, many insurers accomplished this boost to their return on capital by structuring term and universal life insurance products to take advantage of the existing statutory reserve calculations. As an example, term life insurance policies included substantial unilateral rate increases in their later years, and, because statutory reserve calculations assumed that no policyholders lapsed, these high premiums were assumed to be paid and could be set at a level that reduced the minimum statutory reserve required to be held. Term insurance products were made available at low prices and with long guarantees, but the minimum reserves could be set lower than many felt was prudent.

Regulators reacted to this practice by adopting Regulation XXX, which, in most cases, substantially increased the statutory reserve requirements for term life insurance products. The assumptions and methods used in the calculation were viewed as overly conservative and the resulting level of reserves onerous and redundant. To compensate, some insurers raised prices and shortened guarantees, making it difficult for consumers to obtain life insurance that matched their needs.

Other life insurers were successful at ceding blocks of term policies to offshore reinsurers with less conservative reserve requirements. In order to take reserve credit on their statutory statement, the insurer only needed for the offshore reinsurer to hold, for example, a letter of credit. The simplicity of this approach led to an explosion in the use of offshore third-party reinsurers and a peak in the cession rate to more than



60 percent in 2002¹ versus less than 25 percent in 2015². Life insurers taking this approach were able to offer products at lower rates and with better guarantees, but they took on significant counterparty credit exposure to entities which were in turn using significant amounts of financial leverage to support these reserves. This method created systemic risk to both the U.S. life insurance and global insurance market.

Not long after this, the market for financing these “redundant” reserves expanded to include investment banks, which used existing securitization and credit technology to develop solutions. To facilitate these solutions, certain states allowed life insurers to set up limited purpose insurance company subsidiaries, known as captives, which were subject to more advantageous accounting. Captives allowed life insurers to segregate blocks of policies from the rest of the operating company and attract more cost effective third-party financing. These capital market approaches allowed life insurance companies to back redundant reserves with less expensive sources of capital and reduced counterparty credit exposure, but replaced that counterparty credit risk with a combination of financial and operating leverage.

This pattern continued until credit markets tightened during the financial crisis, when even the most transparent credit

facility became difficult to complete at a reasonable price, let alone esoteric structured insurance transactions. The lack of financing solutions came at the same time that insurers experienced the impact of the crisis on their fixed income portfolios. Fortunately, the life insurance industry faced mostly optical challenges and, inconsistently, certain states granted their domestic life insurers exceptions to some standing regulations. These exceptions let healthy life insurance companies withstand the external circumstances and continue offering products at reasonable rates.

Given that statutory reserves were viewed by most regulators as having a material amount of excess conservatism and that the challenges of the financial crisis led to a requirement to replace many existing credit facilities, one of these exceptions was to allow additional flexibility in the requirements for assets which could be used to finance reserves, including letters of credit and structured notes. The use of these non-traditional assets let life insurance companies hold the entire statutory reserve while transferring risk to a highly-rated counterparty. Each state made the decision individually on whether to allow this or not. At the same time, captive transactions usually involve limited disclosures making it difficult for one state to examine the condition of a company located somewhere else. Changes to regulations, including Dodd-Frank, also limited the ability

of states outside the state of domicile to make requirements for what types of captives should be allowed. These structures allowed life insurers in some states to consistently offer insurance products at reasonable prices, but concerns grew in other states that a potential race to the bottom, as states competed amongst themselves to be the most reasonable, could worsen the financial condition of the industry. These fears led to three years of data gathering and analysis by regulators which culminated in a 2014 report by Rector and Associates.³ This report did not confirm many of the concerns with a so-called shadow insurance market, but it did make several recommendations on how to make redundant reserve financing transactions more robust, more consistent, and more transparent.

The release of Actuarial Guideline 48 in December 2014, which built upon the Rector report, codified the use of captive reinsurers and sought to bring uniformity and transparency to captive structures. The new regulation allowed captives to hold a level of traditional securities equal to a so-called modified VM-20 reserve instead of the substantially more conservative XXX reserve. The captive could then hold non-traditional assets, for example, a structured note, to back the portion of reserves in excess of the modified VM-20 reserve up to the required XXX reserve. The new requirement, which acts as a bridge to principle-based reserves, allowed life insurers to continue offering term products at reasonable rates in the face of increased scrutiny of their financing structures. Had regulators completely disallowed such structures or required insurers to hold the entire XXX reserve in traditional securities, insurers would have needed to substantially increase rates in order to accommodate the increased cost of supporting the product.

A 2013 paper by Kojien and Yogo⁴ and a 2014 paper by Harrington⁵ take contrasting views on the use of captives, and a detailed review is beyond the scope of this article, but a point of agreement is that captive reinsurance makes term life insurance more affordable and available. Kojien and Yogo estimates that without the use of captives, term premiums would increase by more than 10 percent for companies that currently utilize captives and the industry as a whole would shrink by \$6.8 billion or 7 percent. With an estimated gap in existing life insurance coverage of more than \$16 trillion, making life insurance less affordable and less available is certainly not a favorable outcome.

Some regulators have taken the view that financing transactions and captives would be temporary solutions as principle-based reserves would obviate the need to finance redundant reserves. Principle-based reserves, while generally less conservative than current XXX reserves, still do include material conservatism which is very significant for some policies and can still result in statutory reserves that are much higher than a company's best estimate. In fact, many are finding that principle-based reserves

for certain products are materially higher than existing statutory reserves. For this reason, among others, we will again see a transition to new forms of financing arrangements in the coming years as life insurers implement principle-based reserves.

A potential way forward is that these new era financings may look like the XXX securitizations of the early 2000s, as described above, which require traditional securities backing their reserves and do not allow for the structured notes and letters of credit of the post-crisis, pre-AG 48 era. Funded securitizations allow a life insurer to isolate risks in a captive and repackage it to better suit investor's individual preferences—a fixed income asset manager may be interested in senior insurance risk with a small risk premium while an insurance-linked securities investor may look for mortality risk as a diversifying tool. Securitizations remove many of the intermediary steps between investors and the risks they want to assume, improving the efficiency of the market. To the extent that the reserve is fully funded with traditional securities, securitizations can represent a less expensive source of capital for life insurers while reducing the risk that a company defaults on its promise to pay.

Regardless of the future of captives, the life insurance industry and its regulators must continue to work to strike a balance between affordable insurance and strong, well-capitalized companies. Requiring insurers to hold an excessively conservative statutory reserve is unlikely the best option, but neither are opaque captive structures which create the perception of a shadow insurance industry. Alternatively, transparent financing transactions that bring more affordable capital into the U.S. life insurance industry with such capital available to widows, widowers, and orphans can make insurance more affordable while reducing the risk of default. ■



Rebecca Wilczak, FSA, CERA, MAAA, is actuary, Financial Solutions at Hannover Re. She can be reached at rebecca.wilczak@hlramerica.com.

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A Rendezvous at ReFocus 2017

By Ronnie Klein

The 11th annual global meeting for senior-level life insurance and reinsurance executives, jointly sponsored by the American Council of Life Insurers and the Society of Actuaries was the best ReFocus yet! OK, I am biased as I am a co-chairperson of ReFocus.

This year we had a record turnout of 658 attendees, slightly eclipsing last year's total of 650. ReFocus is slowly becoming what Les Rendezvous, held each fall in Monte Carlo, is to the non-life industry. It is the networking meeting of the year with increasing attendance each of the 11 years since it was conceptualized by Mel Young and myself in 2007.

The initial idea was to have a meeting for U.S. reinsurance executives, but it has evolved into a global meeting of both reinsurance and insurance executives. Mel Young had the foresight to steer this conference toward direct insurance, correctly stating that "...wherever life insurance executives go, the reinsurers will follow." During the past few years we have added some international topics thereby attracting attendees from 12 different countries. Our professional moderator and CNN analyst Bill Press quipped in his opening remarks that we would have had representation from additional countries if these people were not worried about the travel ban.

While the entire conference was exceptional, there were two sessions that were clearly highlights. First, Craig Venter was a keynote speaker on the topic of genetics. He is featured on the cover of the Feb. 28, 2017 edition of Forbes magazine as the man who first mapped the human genome. Dr. Venter took us on a scientific journey through the benefits of genetic testing. It is truly amazing to see the advancements that have been made and what is expected in the near future. This session was nothing short of jaw-dropping.

The second session that I would like to highlight was about activist investors. Bill Anderson, one of the panelists, is a lawyer at Evercore Partners specializing in defending companies against activist investors. Joining him on stage was David Herzog, former CFO for AIG and currently on the board of directors for MetLife and AMBAC. David gave the perspective

from inside the boardroom as he sat on AIG's board during the activism of Carl Icahn and John Paulson onto AIG's board. The stories were intriguing, including a story about an activist investor following the family of a company CEO with a drone to gather personal information. This session was expertly moderated by Bill Press and led to so many audience questions that the hour and 15-minute session went over time.

While the sessions, with the theme of "Evolving Business Models," were great, many attendees came for the networking opportunities. The ReFocus programming committee, made up of JoAnne Martin and me as co-chairpersons, Pete Schaefer, Kent Sluyter and John Laughlin, worked hard to make sure there was sufficient time to meet and greet. Sessions began at 9:00 a.m. to allow breakfast meetings (or recovery from late dinner events the prior evening), each break was 30 minutes and lunches were two hours. Except for one timeslot, all of the sessions were General sessions which made it easier to find people as we all emerged from the same room.

In short, the programming committee does everything possible to have high-level presenters speaking about very current issues as well as time to network. It is a difficult balance and one that we strive to master. Brenda Buckingham, a managing director at Berkshire Hathaway, told me that she is always conflicted at ReFocus because the sessions are so good, but attending them takes time away from her client meetings.

Next year ReFocus will be held from March 4-7 at the Aria Hotel in Las Vegas. The programming committee hopes to see you there. In the meantime, if you attended ReFocus 2017, please complete and return the survey or contact someone on the programming committee with your thoughts. Also, if you have a suggested topic or theme for the 2018 meeting, please contact one of us. We strive to make the conference better each year.

As a final note, I would like to personally thank Mel Young for all of his hard work in conceiving and advancing the ReFocus Conference during his 10 years of volunteerism. Mel retired from RGA last year and transitioned off of the ReFocus programming committee turning it over to JoAnne Martin and myself. I still look to Mel for advice with difficult situations regarding the conference and he is always happy to take my calls.

See you next year in Las Vegas! ■



Ronnie Klein, FSA, MAAA, is director, Global Ageing, with The Geneva Association. He can be contacted at ronniefsa@aol.com.

Ten Years of the Brazilian Reinsurance Market—Lessons and Perspectives

By João Marcelo dos Santos

Ten years ago Supplementary Law no. 126/2007, the landmark of the Brazilian insurance market opening, was published. And despite all the problems that obviously result from such a major change to a paradigm, this is a fact that should be celebrated by all those that need a developed insurance and reinsurance market or that operate in it.

Personally, I had the honor of leading, within the ambit of the Private Insurance Superintendence—SUSEP, the discussions held with the Brazilian Congress about the law. The interesting aspects of such a process and everything that went into creating it deserve to be remembered.

Before the publication of the law, we were indeed concerned to prepare the insurers, as much as possible, for the insurance market opening.

In the first place¹, SUSEP is to be congratulated on the quality of the regulation that was initially prepared in view of all the limitations of the lack of experience in reinsurance, the shortage of human resources and the urgent need to make the determinations of the law effective.

Before the publication of the law, we were indeed concerned to prepare the insurers, as much as possible, for the insurance

market opening. One example is the rules on risk-based supervision risks (internal controls, accounting and actuarial audit, underwriting risk-based capital and others). However, in practice it was impossible to progress a lot more in the preparation before the market's opening.

In this context, also considering that the closed market was for a long time one of the bases for the development and good functioning of the Brazilian insurance market, to promote an ordered opening was a major challenge. And the result reveals the ability of those involved in the bill both to propose a model and to discuss and improve that model jointly with the private sector.

An example of a good measure was the establishment of relatively few rules (considering the Brazilian excessive interventionist standard practice) and an important barrier for the entry of foreign reinsurers by requiring a high rating and five years of experience. We know that there is no good market with bad companies and the opposite is true almost always.

And the adopted strategy, outlined by the law and detailed by SUSEP, was extremely successful to ensure a less troubled transition.

We also took advantage of the size of our economy and our potential insurance market to set up the foundation for the existence of an actual local reinsurance market.

The permanent concern, at this point, should always be keeping in mind that the protection of the local reinsurance market makes sense only to the extent that such protection will not result in difficulties for the development and good functioning of the insurance market. And the insurance market serves the society when it offers adequate protection safely and at the lowest possible cost.

Concerning the debate on market reserve x preferential offer, it is worth remembering a bit of our history.

It was not the legislator's intent to give the insurance regulator the choice between the market reserve and the preferential offer. We even included in the Law detailed rules on preferential offer, which were approved by the Brazilian Congress and sent to the president for sanction.

But it was the discussion held with the Brazilian Congress, combined with our need to progress with the bill, which forced us to detail more and more the rules that were initially proposed. We even inserted in article 11 of the Law six paragraphs, some with several items, explaining how the preferential offer should be made. For such reason, after the approval of the Bill by the Congress, upon recommendation made by SUSEP itself to the president, such rules were vetoed. The task of detailing them fell on the regulatory agency.



The veto message is clear: “As this is a new market, it is not proper nor convenient to have in a supplementary law a level of excessive detailing, as it may be an obstacle to accomplish the expected purposes of this Bill. Ideally all such rules should be detailed at the discretion of the regulatory agency for the adaptation of the regulatory framework to follow the dynamics and the development of the market itself. It should be emphasized that the spirit of the article, which establishes the preferential offer and defines its magnitude and effectiveness, will remain unchanged, and it will be incumbent upon the regulatory agency, according to the authority defined in the head provision, to define the rules on this preferential offer.” (emphasis added) http://www.planalto.gov.br/ccivil_03/Atos2007-2010/2007/Msg/VEP-16-07.htm)

The text of art. 11, according to which “Subject to the rules of the insurance regulatory agency, the cedent will engage or offer preferably to local reinsurers ...” was not intended to mean that the regulatory agency may choose between the preferential offer and the market reserve.

Differently, the preferential offer was intended to be satisfied (i) by the offer of risk to all local reinsurers or (ii) by the local contracting of 40 percent of the risks.

However, the “personal” intent or the legislator’s intent objectively explained is not even the most important element for the law interpretation. And, according to the words used to write the rule above, it was later interpreted that the regulatory agency had the option to choose the preferential offer or the reserve regime.

Thus, given the failures in satisfying the preferential offer system, and this could have been corrected by localized inspection actions designed to inhibit practices in contravention of the spirit of the law and the legislation, in 2010, after almost three years of experience with the open reinsurance market, the National Council of Private Insurance (CNSP) published resolution no. 225/2010, which imposed the market reserve in replacement for the preferential offer. This market reserve, combined with the prohibition of intra-group transactions (provided for in CNSP resolution no. 224/2010, which was later amended by CNSP resolution no. 232/2011 to become

more flexible) represented a structural reduction in the opening level of the Brazilian reinsurance market.

More than their contents, the way said rules were prepared and published, without an open and transparent discussion, was extremely harmful to the trust that was being established, including abroad, in the Brazilian regulatory environment.

On the other side, it should be noted that, due to a political issue of the Workers' Party,² the reinsurance market was opened without the privatization of IRB (state-owned company that monopolized the Brazilian reinsurance market) differently from what occurred in almost all privatization/market opening processes previously promoted by the Administration Fernando Henrique Cardoso in the '90s.

Perhaps, even the maintenance of IRB as a state-owned company was an important element for the smooth transition to an open reinsurance market.

Anyway, the "open by privatizing" strategy made the successful privatization of several monopolist companies viable to the extent that the company that controlled the market on the day before the market opening was being sold. At the same time, the monopolist company was prevented from suffering, in the condition of a state-owned company, the inevitable losses arising from the competition to which it had never been exposed. In other words, the market opening associated with the privatization of the monopolist company prevented the inevitable losses of the ex-monopolist company from being a problem for the government, the ex-shareholder, which became a regulatory state. But

that was not the case of the Brazilian reinsurance market and the IRB.

For this reason, it was not possible to prevent the fact that the negative impacts of the market opening on IRB's transactions would lead the Government to change the regulation imposed on the insurance and reinsurance market to protect IRB. And, among such impacts is the replacement of the preferential offer for the combination of market reserve and restriction on intra-group transactions.

More recently, upon the publication of CNSP Resolution no. 325/2015, there was an attempt to correct in part that move by the increase along the next years of the authorized portion of intra-group transactions and the reduction in the market reserve percentage, all associated with the preferential offer. However, the result was not good.

The evident difficulties arising from the coexistence of the reserve and the preference, as well as the maintenance of the reduction in the intra-group restrictions signal the need for

new future adjustments to make the legislation comprehensive and enforceable, without excessive operating costs and without many controversial points. All this in spite of the attempt to clarify the meaning of the rule via the legislation.

Anyway, irrespective of the identification of the mistakes and successes and the comings and goings, it is undeniable that today we actually have a functional reinsurance market.

Moreover, the Brazilian reinsurance market became the driving force for the development not only of the insurance market but also of the Brazilian supervision and regulation practices.

In the past 10 years, the new business environment challenged SUSEP to develop its practices and did it wonderfully. And everything signals that this process, subject to the economic and political turbulences in Brazil, is only beginning.

Today, we entertain the possibility of Brazil being consolidated as a hub for Latin America for insurance and reinsurance transactions of global and local groups.

We are also discussing with the government, on the initiative of the National Federation of Reinsurance Companies—Fenaber—the enactment of new rules to reinforce our capacity to establish in Brazil a regional insurance pole to accept reinsurance risks from abroad.

In brief, we advanced a lot and will advance further with the reinsurance market opening introduced by Supplementary Law no. 126/2007. The perspectives are the best possible. But we must be permanently alert to proactively construct a regulatory and business environment that continually grows.

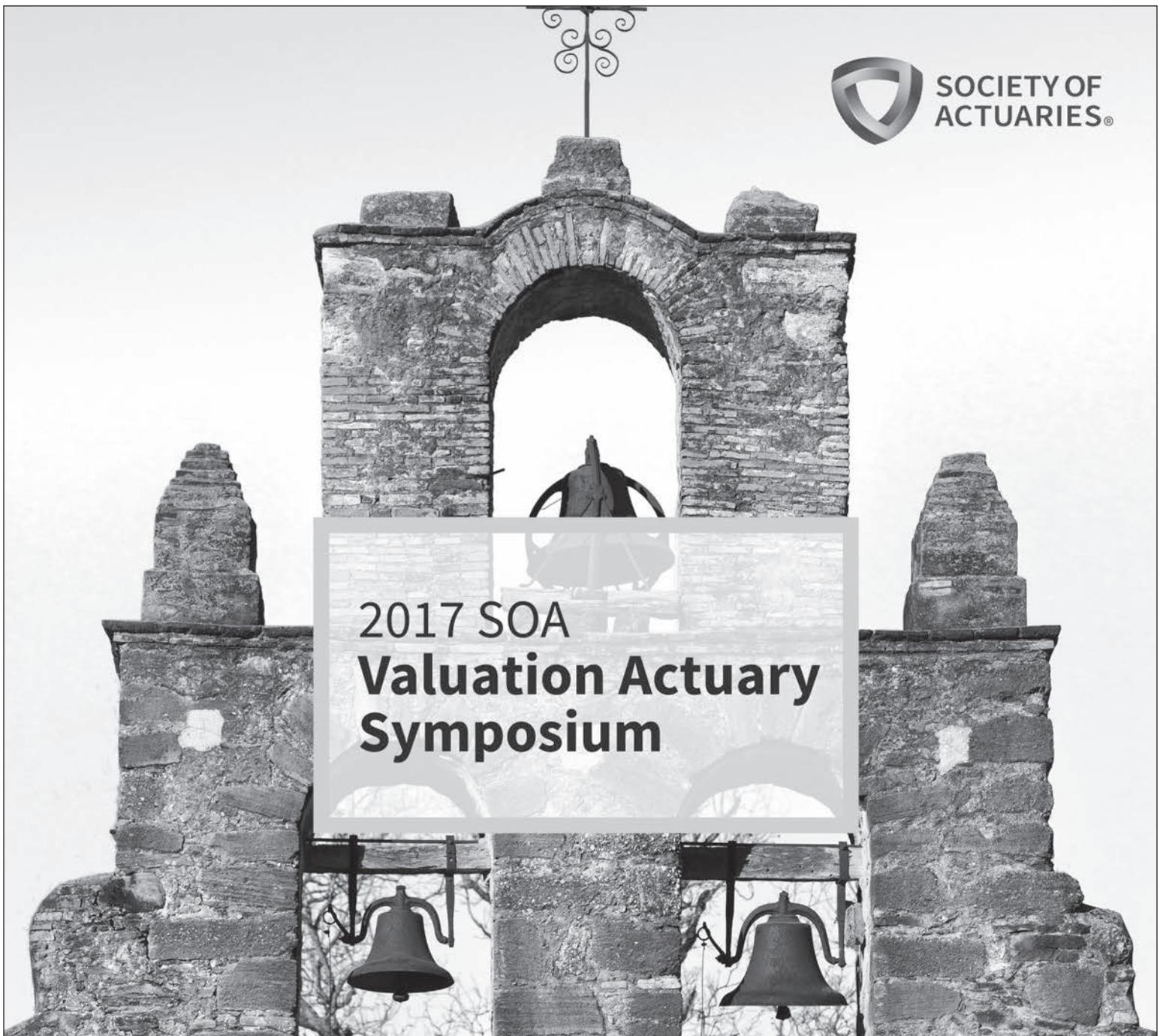
The private sector, in turn, must prevent demands for SUSEP to intervene and, in addition, must discuss with the agency, whenever necessary, the best alternatives for specific or structural changes to the legislation and the supervision practices. ■



João Marcelo dos Santos is a former director and deputy superintendent of SUSEP, chair of the Council of Members of the National Academy of Insurance and Pension and founding partner of Santos Bevilaqua Advogados. He can be contacted at jmsantos@santosbevilaqua.com.br.

ENDNOTES

- 1 I worked at SUSEP until soon after the publication of the law, and the regulation was prepared under the coordination of Director Murilo Chaim, during the management of Superintendent Armando Vergilio.
- 2 That was the political party of President Lula, and it was during his first term that the law was discussed with the Brazilian Congress.



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Living to 100, So What?

By Kai Kaufhold

A friend of mine always interrupts me with “Kai, what’s the ‘So, what?’” every time I launch into an excited report on the latest great paper that I have read or an inspiring presentation that I recently heard. I secretly believe he’s just trying to avoid listening to me geekily ramble on about some technical issue that he isn’t that interested in, but it usually does make me get to the point. So, what was the “So, what?” of the sixth Living to 100 Symposium, which the SOA hosted in Orlando in January 2017?

As someone who has worked for 20 years in life reinsurance and on reinsurance related topics, I have been able to take away a handful of ideas and methods which extend the tools and methods [I use]. ...

Living to 100 is made for giving actuaries a wider view. Topics relevant to aging and the aging society which are presented and discussed at Living to 100 include genetics, bio-gerontology and medicine in general, but also questions relating to how the aging population is already affecting today’s society and what will actually become of us in our own old age. Hearing about research developments in fields outside the actuarial realm is incredibly important if you take our responsibility for both our industry and society at large seriously. Understanding why efforts to refine our understanding of metabolic processes at the cell level are important and what impact they may have on the health and vitality of the individual gives us a better sense for the context within which we actuaries analyze mortality and morbidity experience data and project future trends in mortality. We are part of a greater picture and getting the chance to connect with others working in various fields related to longevity and aging is inspiring. However, for me the real widening of the view is much more up close and personal. As someone who has worked for 20 years in life reinsurance and

on reinsurance related topics, I have been able to take away a handful of ideas and methods which extend the tools and methods I apply in analyzing life insurance risks, every time I have attended Living to 100. This year was no different, so here are my top three relevant take-aways which will find their way into my everyday work in reinsurance:

IT’S OKAY TO BORROW THE TABLE SHAPE FROM YOUR NEIGHBOR

In reinsurance, we are often faced with the challenge that we have to come up with mortality assumptions for a product or a specific market, for which only a limited amount of experience data exists. We then normally rummage around in the toolbox until we find a mortality table or a set of data which we think might be “close enough” to the problem at hand. Then, as reinsurers, we convince ourselves that we can take the leap of faith and apply the existing table—with some adjustments—to the problem we are working on. This has always left me with a nagging feeling of doubt. In a paper presented at Living to 100¹, Jack Yue and Hsin Chung Wang from Taiwan showed in a more rigorous way, how to “[Use] Life Table Techniques to Model Mortality Rates for Small Populations.” These techniques include the so-called standard mortality ratio (SMR) which is nothing other than our well-known and often used actual-over-expected (A/E) ratio. The added benefit here was that the authors showed how to construct useful weightings for individual age groups to optimize the applicability of one (larger) population’s mortality table to the experience of a small (neighboring) population. Furthermore, Yue and Wang show how they tested the applicability of the results. Who knows, this test may one day soon find its way into a pricing memo helping to justify why I have borrowed Austrian tables to model Slovenian mortality instead of using Italian tables—or the other way around. Or are you trying to develop a product for a particular market within a region of the U.S., for which you don’t trust the standard industry tables, but you don’t have enough local experience data to build your own regional table? Weighted SMR’s might just do the trick.

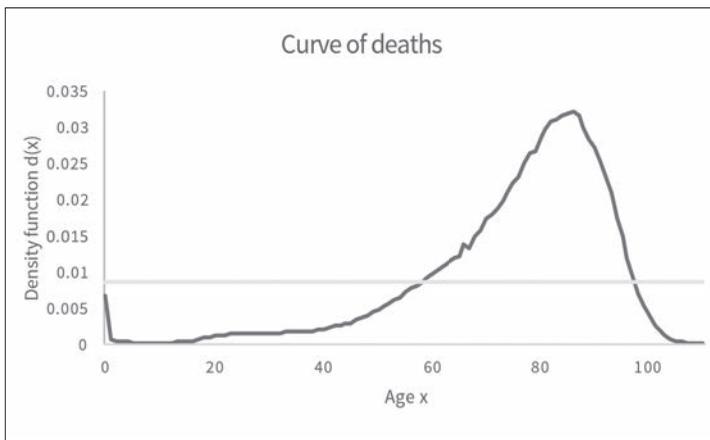
THERE ARE FOUR THINGS TO LOOK AT WHEN COMPARING MORTALITY TRENDS ACROSS DIFFERENT COUNTRIES

Dealing with insufficient data and “borrowing” from related data sources is a running theme in a reinsurance actuary’s daily work, and becomes especially important when dealing with mortality trends and the evolution of mortality over time. When a given population, target market or group of insured lives does not have sufficient data to measure time trends, the natural reaction is to use data from a larger source. In many instances, this will be the general population mortality data for the country for which the reinsurance is being priced. For smaller countries, the data source will usually be a large



neighbor, where the choice is usually made based on proximity and perceived similarity in culture and qualitative aspects of historical mortality. Martin Genz presented a paper that

Figure 1.
Illustration of Curve of Deaths for US Males in 2013



Source: General population mortality experience for males in the U.S.A. in 2013, extracted from Human Mortality Database at mortality.org. Average death rate 8.6 per 1,000, modal age at death $M = 86$, $UB = 110$ years, $Dol = 4.34$ and $d(M) = 0.032$

carried out a comprehensive international comparison of mortality trends based on the evolution of the curve of deaths.² He applied a framework that uses four quantitative measures to describe the position and the shape of the curve of deaths and its evolution over time. These four measures are the modal age at death, the upper bound, the degree of inequality and the number of deaths at the modal age at death.

For a given population, each of these statistics is determined for each year in the study period, giving four specific time series. By comparing the changes in these statistics for different populations over time, you can make a much more informed decision about whose mortality trends have been similar and whose different. Very useful information for a reinsurer to have.

THE MORTALITY PLATEAU VARIES FROM COUNTRY TO COUNTRY. WHAT DOES IT SIGNIFY?

One of the recurring themes of *Living to 100* is the question of what actually happens to mortality rates at the very advanced ages. Does mortality continue to increase with age at a constant rate, or does the rate of mortality increase slow down or even level off?

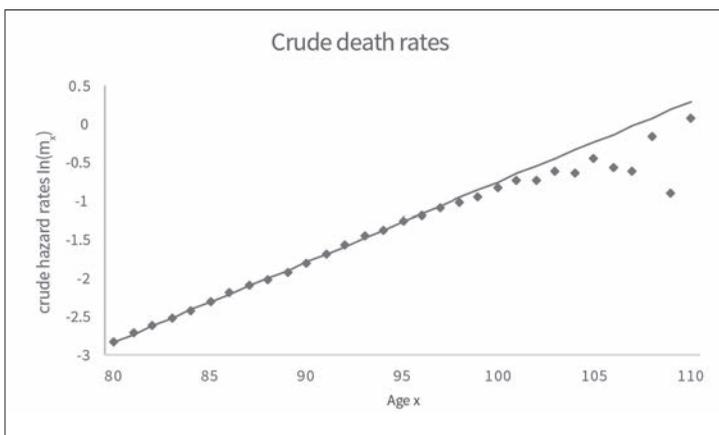
This is where my friend would normally interrupt and hit me with his “So, what?” The reason why this question is important

The chart in Figure 2 shows the crude death rates on a logarithmic scale. Between ages 80 and 95, these very closely follow a linear pattern.

to actuaries and society at large is that the shape of the mortality curve at those ages has a material impact on the cost of providing retirement benefits to pensioners. Consider the curve of deaths in Figure 1 (Pg. 33). Half of all deaths occurred between the ages 69 and 89. Any changes to the mortality rates at these ages will have a huge impact on the number of survivors to advanced ages beyond 90 or even 100. However, given the historically low population at those ages, we have only very little data out there, on which to form an opinion. Therefore, improving the general understanding of oldest age mortality behavior is especially important.

“And what is all the fuss about, then?” my friend is likely to ask now, getting a little worried that I will begin to torture him with esoteric models and stuff. This is where a picture comes in handy.

Figure 2
Death Rates for U.S. Males in 2013 on a Logarithmic Scale.



Source: General population mortality experience for males in the U.S.A. in 2013, extracted from Human Mortality Database at mortality.org. The death rates m_x are calculated as the number of deaths between ages x and $x+1$ divided by the average population exposed to risk for that age group. A straight line was fitted to the death rates for ages 80 to 95, in order to illustrate the deceleration at ages above 95 years.

The chart in Figure 2 shows the crude death rates on a logarithmic scale. Between ages 80 and 95, these very closely follow a linear pattern. For older ages, this constant rate of increase appears to become gradually slower. A number of possible explanations have been put forward for this phenomenon of mortality deceleration. One possible cause could be overstated ages at death and under-reported deaths for high ages. In other words, flawed data. An alternative explanation might be that for an individual, the rate of mortality increase does actually slow down at the extreme ages. This would have far-reaching consequences for pension liabilities and social security systems the world over, once a larger number of people make it to age 100. Finally, another alternative explanation has been put forward by Prof. James Vaupel and others. This explanation is the starting point of the paper which Prof. Roland Rau of Rostock University in Germany presented.³ According to Vaupel, Rau and other demographers, the apparent deceleration in mortality rates can also be explained by the fact that the population for which the mortality experience is gathered is heterogeneous with respect to mortality. In other words, the total population is made up of a number of different groups with different levels of mortality (or frailty, as engineers would put it). For example, we know that the U.S. general population mortality for males which is shown in Figure 1 and Figure 2 is made up of different socio-economic groups with different levels of mortality. Furthermore, the mortality data shown in these charts also relates to many different birth cohorts. People born in 1910, for example, will have been 103 in 2013 when the data was collected, and will have had somewhat different experiences in life from those born in 1933, say, who were 80 at the time of observation. Such generational differences may be another contributing factor for heterogeneous mortality rates, which in turn can be mathematically shown to cause the deceleration pattern, even though each individual would continue to see a constant rate of increase in their mortality rates.

The facts that Roland Rau presented at the 2017 Living to 100 Symposium are another indicator that the third, more technical explanation may be true. His research team managed to fit models to the mortality experience data of males and females in seven industrial countries, which displayed statistically significant results for a mortality plateau in each country. However, the mortality plateau in different countries had a fairly wide range. This tells us that (1) the level of the mortality plateau is not likely a universal constant built into the human biology, and (2) that it depends on the different circumstances in the different countries. It could possibly be interpreted as an indicator for the disparity of mortality rates within each country.

In my own work on Longevity Reinsurance transactions, I have made a similar observation, which also points towards the plateau being a function of how heterogeneous a group of individuals is with respect to mortality. When analyzing the historic mortality experience of a pension plan, I am often able



to fit the same model type, which Roland Rau used to quantify the mortality plateau, i.e., the frailty model according to R.E. Beard⁴ (1959):

$$\mu_x = \frac{e^{\alpha+\beta x}}{1 + e^{\alpha+\beta x+\varrho}} \rightarrow e^{-\varrho}$$

According to this mortality law, the force of mortality μ_x will tend towards a constant $e^{-\varrho}$ at very large ages x . When fitting the Beard model to mortality data without differentiating between different risk factors that might influence mortality, such as socio-economic status and health status, it is often possible to estimate a parameter for the plateau $e^{-\varrho}$. As soon as one includes explanatory variables that distinguish between mortality for different pension size bands, ill-health retirement vs. normal retirement or different life-style groups, for example, the statistical significance of $e^{-\varrho}$ tends to disappear, which means that the parameter ϱ is likely zero and $\mu_x \rightarrow 1$.

“So, what?” my friend cries, frustrated by the fact that I did manage to get a formula in. The “So, what?” is that this is emerging research into the behavior of oldest age mortality which will likely have an important impact on pension liabilities and social security systems across the globe. And it

was presented at the SOA’s 2017 Living to 100 Symposium. If you didn’t manage to attend the symposium, never fear! A monograph containing all the papers and transcripts of the presentations will be coming out shortly, so you can brush up on mortality plateau, mortality trends and even good old A/E ratios without having to travel to Orlando in January and meet hundreds of interesting people. ■



Kai Kaufhold, Aktuar DAV, is managing director of Ad Res, an actuarial consulting firm in Cologne, Germany. He can be contacted at kai.kaufhold@adreservices.com.

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Cancer Diagnostics 2.0 – What Does It Mean for Insurers?

By Karin Neelsen

The general media has drawn a lot of attention to promising medical research in the field of cancer diagnostics. Headlines proclaiming the availability of new “simple blood tests” to diagnose tumors have appeared on a regular basis.¹ Gen Re has conducted its own research within the medical community to investigate the—at times—rather simplified information played out in the media. The ultimate goal has been to gauge what these emerging techniques imply for insurance, especially Critical Illness (CI) products where protection against the risk of cancer plays an important part.

A rush of companies are offering new blood-based cancer tests—unsurprising as the global market for CTC testing alone is estimated to be worth \$2.28 billion by 2020.

The most prominent emerging techniques are based on blood samples—often combined with DNA sequencing methods—referred to as “liquid biopsies.” These are targeted at finding circulating tumor cells (CTCs), circulating tumor DNA (ctDNA) or microRNA/exosomes in the blood. Another method that has received attention is refined imaging technologies, such as MRI scans, allowing differentiation of normal and cancerous cells.

This article will not only describe the medical background and implications of new technologies—focusing on solid cancer detection—but also take a look at the broader picture of what CI insurance is all about, and what needs to be taken into account for continuously offering a successful protection for major diseases.

CURRENT CANCER DETECTION

Currently, cancer is diagnosed or confirmed by histopathological evidence from a tissue sample extracted in a biopsy and examined under a microscope. This methodology is essential for diagnosis of almost all cancers, unless the tumor site means taking a tissue sample is too risky (for example, in the brain).

Results of the histopathology, together with physical examination and imaging tests, form the basis of cancer staging. Staging is the method of describing the extent to which a cancer has grown and spread, either locally or to distant sites in the body.

Staging systems, as described by the American Joint Committee on Cancer (AJCC) or almost identically by the Union for International Cancer Control (UICC), in the majority rely on tumor size, lymph node involvement and existence of metastasis. Could this be overhauled with the advent of biomarkers offering a different type of information on cancerous cells?

In any cancer diagnostic tool, it is essential that the assays identify all existing cancers (sensitivity) and do not show positive results in healthy cancer-free patients (specificity). Poor sensitivity makes any assay inapplicable for diagnosis, whereas poor specificity may lead to overdiagnosis and potentially overtreatment in otherwise healthy patients.

NEW CANCER DIAGNOSTICS

It is important to be clear that none of the new tests have been tailored to cancer diagnosis. The vast majority are being applied to patients whose cancer diagnosis has already been made with conventional methods. The goal in using the new technology is therefore to improve outcomes in cancer patients and this will remain the focus for the near future.

Despite this clear focus, media attention has been on the tests’ potential as diagnostic tools. Clearly, the idea of a simple blood test to find cancer is appealing, in contrast to the often burdensome requirement for a tissue biopsy. A rush of companies are offering new blood-based cancer tests—unsurprising as the global market for CTC testing alone is estimated to be worth \$2.28 billion by 2020.² An inevitable degree of hype surrounds manufacturers’ claims, and while press releases fuel consumer enthusiasm, they also help generate investment for the companies involved.

With the tests being predominantly applied to patients with established cancer, research is just starting on patients who have early-stage cancer, but it is not clear if the currently available tests will prove to have any value. A liquid biopsy is not useful for screening at this time, because the test accuracy is unknown, with experts arguing that this remains a long way off. The other detection techniques are even less advanced.



In sum, the majority of current research and biomarkers up for testing are highly tailored to the cancer site; no promising “catch-all” technique is in the pipeline. While some correlation between positive results of blood tests and tumor size appears to exist, the influential factors for the outcome of any such test are not yet fully understood.

CIRCULATING TUMOR CELLS

Circulating tumor cells (CTCs) in the peripheral blood were first described in the 19th century.³ More recently, methods have been developed for detection, isolation and characterizing CTCs in multiple different cancers arising in solid organs. The stage at which a tumor may shed tumor cells in the bloodstream is not fully understood by medical scientists and is assumed to vary by tumor type, size and/or aggressiveness.

With “CELLSEARCH,” so far one technology has been approved by the U.S. Food and Drug Administration (FDA) for evaluating CTCs in order to assess patient prognosis or predict progression-free and overall survival.

For advanced cancers, CTCs are present only in very low concentrations, e.g. 10-100 cells per millilitre of blood compared to more than 1 million white blood cells per millilitre of blood. Looking at sensitivity and specificity, CTCs are rarely found in healthy people or in people with non-malignant tumors.⁴

A significant part of samples from patients with metastatic carcinomas in various cancer sites showed no detectable CTCs, without clear evidence as to which factors—such as vascularization of the tumor, sites of metastasis or aggressiveness of the tumor—had contributed to the wide range of results in number of detected CTCs.

The vast majority of publications discuss the application of CTC testing in patients with advanced cancers for improvement of treatment and prognosis, and one of only two available studies applying CTC testing as a diagnostic tool touched upon screening a high-risk group of 168 patients with chronic obstructive pulmonary disease (COPD) for lung cancer. CTCs proved to be useful sentinels for early detection of lung cancer in 3 percent of these COPD patients.⁵

CIRCULATING TUMOR DNA

Circulating tumor (or cell-free) DNA (ctDNA) originates from tumor cells and can be found in the blood of a cancer patient. Testing for ctDNA provides opportunities for minimally invasive cancer diagnosis, prognosis and tumor monitoring. In the context of cancer, testing for ctDNA involves finding known mutations identical to those in common tumors. Cancer has heterogeneous genetic mutations that may alter at different stages.

While some common mutations can be searched for, ctDNA testing may miss the cancer DNA if the test is not specifically aimed at the mutation that exists at that time. The need to test for separate cancers means ctDNA is unlikely to be useful for screening all cancers. Abnormal cells commonly develop but can be killed by host immune cells. ctDNA may simply be part of this process rather than from any tumor that could ever be identified.

Testing for ctDNA is thought simpler than testing for CTCs because fewer technological adaptations are needed and sampling windows are longer.⁶ It is also a more sensitive marker since it is present in over 80 percent of advanced cancers, including in many patients in whom CTCs are not detectable. Another aspect is that there is more ctDNA than CTCs detectable in the blood of cancer patients. Most studies include numbers based on detectable ctDNA in people with advanced malignancies or tumors that are already large enough to be diagnosed easily using current techniques, again aiming at improved outcomes in these patients.

Revisiting sensitivity and specificity, a study of patients with various cancer types found ctDNA in more than 75 percent of those with advanced pancreatic, ovarian, colorectal, bladder, gastroesophageal, breast, melanoma, hepatocellular, and head and neck cancers, but the study found ctDNA in less than 50 percent of primary brain, renal, prostate or thyroid cancers.⁷

Trials of ctDNA are underway to predict hepatocellular cancer in hepatitis B virus carriers and to detect nasopharyngeal cancer in Epstein-Barr virus carriers.⁸ Here, however, the test only identifies the persistent virus associated with the cancer and not the cancer itself; histology is still required to confirm cancer diagnosis. Furthermore, for 20 out of 1,318 patients identified with persistent raised levels of ctDNA, only three were diagnosed with nasopharyngeal cancer, the other 17 being false positive samples identified at the same time.

MICRORNA AND EXOSOMES

In the recent past, both microRNA and exosomes have emerged as a promising field of research in cancer diagnosis, prognosis and therapeutics. Exosomes, which are small vesicles involved in the process of breaking down metabolic waste, act as shuttles for bioactive molecules, such as microRNA, between cells. Research suggests that tumor cells release excessive amounts of exosomes, potentially influencing tumor growth or building of metastases. There is evidence that exosomes play critical roles in almost all aspects of cancer, such as transformation of normal cells into cancer cells, tumor growth or tumor metastasis, thus having some potential as diagnostic biomarker.⁹ The majority of circulating microRNA is concentrated in the exosomes. Also, the circulating microRNA itself could be a promising non-invasive biomarker. Studies in both areas, however, suggest that the exact mechanisms and complex

roles of exosomes and microRNA in cancer development need to be explored further “for the proper use of ... biomarkers in evidence-based medicine.”¹⁰ Given the early stage of research in the context of exosomes and microRNA, there is as of yet no information on their accuracy.

REFINED IMAGING TECHNOLOGY

Imaging technology can detect tumors, but for distinction between benign growth and cancerous tissue, a biopsy is typically required. A recent study suggests that fine-tuned MRI scanning could one day make at least some biopsies unnecessary.

Researchers show that imaging can detect sugars attached to a particular protein, allowing for normal and cancerous cells to be differentiated. The technology is at a very early stage and has so far only been tested with lab-grown cancer cells and mice.

To show if the technique has any value in human cancer diagnosis requires “much more testing.”^{11,12}

CHALLENGES AND OPPORTUNITIES FOR THE INSURANCE INDUSTRY

Current terms and conditions of CI policies covering cancer typically require the finding of malignant cells characterized by uncontrolled growth and spread, confirmed through histopathological evidence. The medical experts are in agreement that histopathology is most unlikely to be replaced as the gold standard in cancer diagnosis in the near future. This is expected to change only if and to the extent that new diagnostic means provide added value, i.e., more detailed information on staging and/or adequate treatment.

While these new technologies develop, it makes good sense to revisit the language in CI benefit triggers and consider a future where new tests may lead to vastly different evidence for cancer claims than what is common today. In the case of a cancer claim, how would a claims manager make a decision based on just a positive result of a liquid biopsy with confirmation by the attending physician that cancer is present?

Certainly, cancer definitions in the insurance context require uncontrolled growth, invasion of tissue and histopathological evidence, so the requirements of the definition would not be fulfilled in the circumstances described above. However, should liquid biopsies become the gold standard for cancer diagnosis and have proven excellent accuracy, this requirement may no longer be possible to uphold.

On the other hand, further developments may come along with measurable thresholds, which could actually help the insurance industry in phrasing severity levels, according to the intent of

most of today's policies—to cover cancer of specified severity or critical cancer only. Scenarios are also imaginable where the majority of neoplasms are detected in very early—i.e., pre-malignant—stages and can be successfully treated so that eventually the burden of invasive cancers is reduced.

Even if the technology is available, its wide application is not necessarily a certainty. To be used in population screening in the context of national health systems, any of these tests will have to take high hurdles in terms of evidence-based accuracy, cost-effectiveness and treatability of additionally detected cancers, which experts expect to take quite some time based on the need for large scale population studies.

The rapidly falling cost of DNA sequencing, combined with the amount of venture capital flowing into private biotech companies, will lead to tests being offered in the private sector and could thus be of interest to high net-worth individuals who are effectively managing both their health and their insurance portfolios. These people might be more inclined to undergo such tests in exchange for a potential payout of the sum insured under their Critical Illness policy.

The AJCC staging of cancer has taken “circulating cells” into account for breast cancer staging. An additional category has been created, supplementing the current distinction between metastases present (M1) or not present (M0) by “M0(i),” which is defined by the presence of circulating tumor cells. While there has been no change to the overall group staging applied, it is not certain this will remain unaltered in the future. Application of higher group stages, based on additional information gained through the blood tests, could thus have an immediate impact on tiered products where the benefit amount is directly linked to the stage at diagnosis.

CONCLUSION

Cancer is the leading cause of claim under Critical Illness (CI) insurance, which means its diagnosis has the strongest impact on the insurers' experience. The new tests described here are still in their infancy but have the potential to overhaul the diagnostic process—with yet unknown consequences for the frequency of cancer detection.

Much depends not only on the continued technical progress of the new technology, but also on national health systems using it in combination with existing screening. Even if the diagnostic approach does not undergo dramatic change immediately it is possible that a very different level of cancer incidence rates than that we currently observe will emerge in the future.

In CI it is important to review disease definitions regularly, adjusting them to the highest standard in terms of being future-proof and following objective, measurable severity

criteria. The latter in particular prevents the cover shifting from substantial support after survival of a life-threatening disease to a payout for incidental findings of an asymptomatic one. A shift like this could render CI products unaffordable as common minor diseases are being covered where no substantial insurance need meets significant benefit pay-outs.

Pricing should allow for the level of uncertainty being outlined here, be it by offering cover on a reviewable basis only or by including additional margins commensurate with the associated risk. Applying expertise to assess the progress in cancer diagnostics will allow insurers to continue to offer the fullest range of living benefits to those most in need of financial support following a serious illness. ■



Karin Neelsen is actuarial manager, Life/Health Research & Development with Gen Re. She can be contacted at karin.neelsen@genre.com.

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InsurTech and the Innovation Agenda

By Jamie Yoder and Javier Baixas with contributions from Eric Trowbridge

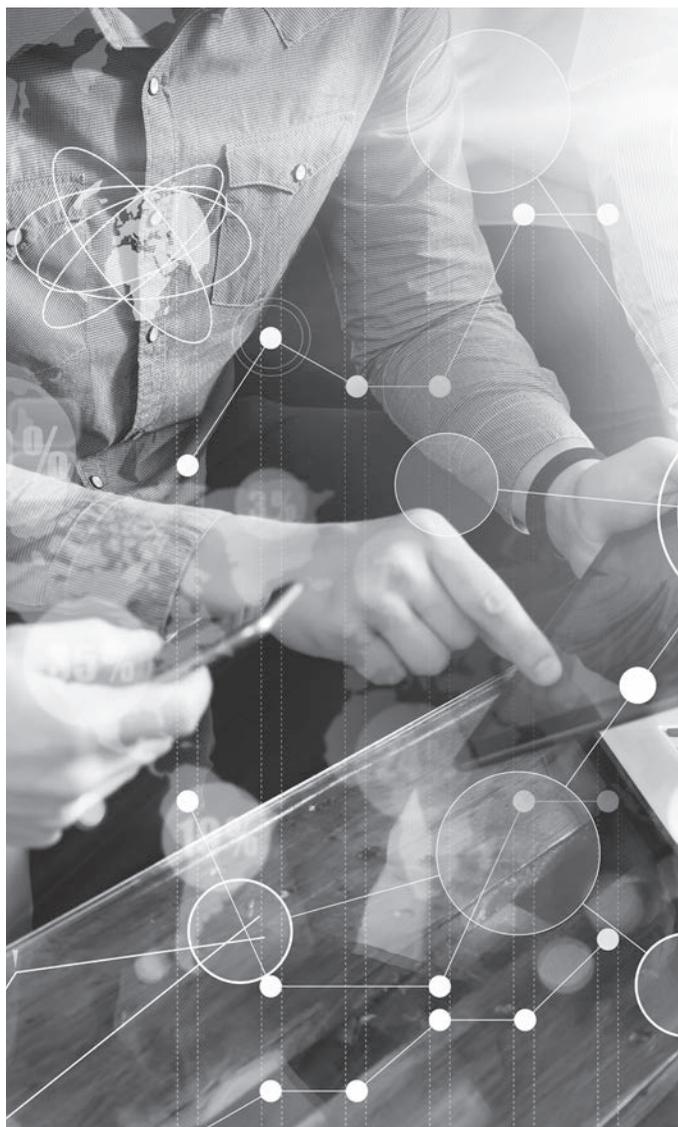
Insurance companies are very much aware of the FinTech revolution: 74 percent of respondents to a recent PwC survey¹ see FinTech innovations—in the case of insurance, InsurTech—as a challenge for their industry. There is good reason to believe that insurance is indeed heading down the path of disruptive innovation, whether it is the effect of external factors, such as the rise of the sharing economy, or the ability to improve operations using artificial intelligence (AI).

Innovative solutions are more than a “nice to have.” They are increasingly table stakes for insurers to:

- **Meet customer needs** – Social and technological trends, which have led customers to expect transparent, personalized, real-time service, are a source of external opportunity for tech-savvy insurers. The incorporation of FinTech solutions will result in a better client experience and also provide them the opportunity to have more and better touch-points in a business where interactions mainly happen in sales, billing and claims.

Market players who have been taking action and adapting their offerings to changing client demands—recognizing that one size does not fit all—will at least maintain their market position. However, this does not guarantee them a truly competitive advantage, since fast-followers can quickly replicate their innovative value propositions. Notwithstanding, by adapting FinTech solutions, incumbents have the opportunity to position themselves as leaders in more than just incremental innovation.

- **Better collect and process data** – In parallel, and from an internal perspective, InsurTech is enabling traditional insurers to leverage existing data to generate deeper risk insights. Embracing InsurTech is helping incumbent insurers gather more insightful and higher quality data—a game changer because insurance is a business that, by its very nature, relies on risk insights. This has the promise to increase the speed of servicing, lower costs, and promote greater product precision and customization. In particular, the Internet of Things



(IoT) (e.g., sensors and drones) in particular promises efficient generation of insights from external data sources.

- **Improve risk assessment and underwriting** – Related, InsurTech solutions are valuable when developing new approaches to underwriting risk and predicting losses. Protection-based models are shifting to more sophisticated preventive models that facilitate loss mitigation in all insurance segments. The ability to capture and analyze data from different sensors and other sources in near real time is opening the door to more proactive prevention models.

NEW VALUE PROPOSITIONS

New market entrants are capitalizing on changing customer expectations, and the need to build trusted relationships is forcing incumbents to seek value propositions where user

experience, transaction efficiency, and transparency are key elements. Some of the ways forward thinking companies are achieving this include:

- **Self-directed services** – As is the case in other industries, insurers are investing in the design and implementation of more self-directed services for both customer acquisition and customer servicing. This is allowing them to improve their operational efficiency while enabling the online/mobile channels that emerging segments (i.e., millennials) want. In some cases, customer-centric designs create compelling user experiences (e.g. obtaining quotes by sending a picture of a driver's license and vehicle identification number). New solutions also offer the opportunity to mobilize core processes in a matter of hours (e.g., accessing services by using “robots” to create a mobile layer on top of legacy systems), and can augment key processes (e.g., first notice of loss (FNOL)), which includes differentiated mobile experiences.
- **Usage-based insurance (UBI)** – UBI models are emerging in response to customer demands for personalized insurance solutions. Initially, incumbents viewed UBI as an opportunity to underwrite risk in a more granular way by using new driving/behavioral variables, but new players see UBI as an opportunity to meet new customer needs (e.g., low mileage or sporadic drivers). In particular, there is increasing interest in finding new underwriting approaches based on deep risk insights, and usage-based models are becoming more relevant as initial challenges, such as data privacy, are being overcome.

Leveraging new data sources to obtain a more granular view of the risk offers a key competitive advantage in a market where risk selection and pricing strategies could be augmented, and can allow incumbents to explore unpenetrated segments. New players that have generated deep risk insights also are likely to enter these unpenetrated segments of the market (e.g., life insurance for individuals with specific diseases).

- **Remote access and data capture** – New data sources that can be accessed remotely and in real-time can generate deep risk and loss insights. These sources include the IoT; for example, (1) drones, which can access remote areas and assess loss by running advanced image analytics, and (2) integrated IoT platforms, which include various types of sensors, such as telematics, wearables and those found in industrial sites, connected homes, or any other facilities/equipment. However, capturing huge amounts of data must be coupled with effective analysis in order to generate meaningful insights.

The ability to collect and analyze huge amounts of data will allow insurers to shift from reactive protection models to

New approaches are emerging in the life market, such as using wearables to monitor lifestyle healthiness and offering rewards and/or premium discounts ...

more sophisticated, proactive and personalized prevention models thanks to a more granular view of risk. A current example of this is telematics-based pay-as-you-go coverage. New approaches are emerging in the life market, such as using wearables to monitor lifestyle healthiness and offering rewards and/or premium discounts to people who make prudent health choices.

RELENTLESS INNOVATION

The speed of social and technology change and non-insurance specific trends such as shared economies, self-driving cars, robotics and medical advances, are likely to continue disrupting the insurance market and at a rapid pace. In fact, while we predicted long ago that disruptive change would affect the industry no later than the middle of this decade, the pace in which it has occurred has surprised even us. In particular²:

1. **Insurers need to become more comfortable with the implications of innovations in shared economies and smart cars.** For example, even though many insurers anticipate that smart cars are likely to become more prevalent in the near future, relatively few of them appear to be planning a response. In our earlier work on the future of auto insurance, we outlined four possible risk scenarios that insurers need to consider: 1) risk shifting, 2) risk sharing, 3) risk slicing, and 4) risk reduction.³
2. **Robotics will lead to changes in core insurance operations beyond just advice.** Robo-advice based on AI leverages different approaches to support existing advisors and/or provide direct-to-consumer solutions. Early robo-advisors have typically offered a portfolio selection and execution engine for self-directed customers. The next stage in robo-advisor evolution is offering better intelligence on customer needs and goal-based planning for both protection and financial products. Advanced analytics to simulate future scenarios will help customers and advisors to align financial goals and portfolios. In general, AI's initial impact primarily relates to improving efficiencies and automating existing



customer-facing, underwriting and claims processes. Over time, its impact will be more profound; it will identify, assess and underwrite emerging risks and identify new revenue sources.⁴

- 3. Connected health, combined with other InsurTech trends, will help revitalize life insurance.** We anticipated in one of our first Future of Insurance reports that sensors will change insurers' ability to predict, prevent and mitigate risk.⁵ In fact, connected health and P4 Medicine (predictive, preventive, personalized and participatory) is now a reality. For life and health insurers, sensor technology is helping to monitor policyholders' health. Devices can alert them to early signs of illness and help them receive timely treatment.
- 4. Insurers haven't explored blockchain technology deeply enough, but existing proofs of concept (POCs) and emerging start-ups are already producing relevant use cases.** In our experience, insurers have less understanding of blockchain than other financial services companies, and many have practically no understanding of the technology at all. However, blockchain already offers considerable

opportunity across the insurance value chain. For example, reinsurers⁶ are now concentrating on improving operational efficiency and security with blockchain solutions, including smart contracts and related innovations that have the promise to significantly change how companies maintain the privacy and security of non-public information.

DEVELOPING AN INSURTECH MINDSET

Although many insurers claim that FinTech lies at the heart of their corporate strategies, this has not necessarily translated into action. Relatively few have explored partnerships with FinTech companies and even fewer have a more active participation in ventures and/or incubator programs. Surprisingly, many insurers have not made FinTech a key element of their strategy at all. This inaction is putting their business at risk of falling behind their competitors and significantly reduces opportunities to innovate.

Insurers must start by addressing their innovation needs and assessing how prepared the organization is to cultivate innovation. Once there is a clear idea of the organization's strategic goals and a suitable appetite for change, insurers can start

planning how to maintain awareness of promising new trends and potential future scenarios. Lastly, insurers must decide how they plan on interacting with technology start-ups and their plan for linking to the InsurTech industry.

BRIDGING THE CULTURAL GAP

The difference in management and culture is one of the major impediments when insurers and technology companies work together. Insurance is an inherently risk averse industry while technology startups inherently take risks many other companies would not. Despite these differences, most insurers understand that an innovative mindset—typically the possession of external talent—is the key to driving breakthrough innovation. Moreover, InsurTechs are learning to leverage incumbents' expertise in risk and regulation to solve complex problems and scale new solutions.

Interestingly, while incumbents are much more concerned about cyber risk than new entrants, emerging InsurTechs often struggle to address regulatory challenges that frequently are part of incumbents' business as usual. And, differing perception of cyber and regulatory challenges is one of the main areas of potential discord between established insurers and new players. Accordingly, both cyber risk and regulation are an essential part of the innovation agenda. This requires including appropriate cyber-risk and regulatory specialists in the development of the enterprise innovation model.

FINAL THOUGHTS

Even though InsurTech is currently in its infancy, innovative new business models are emerging. The unique value proposition of InsurTech is in the shift from complexity and long tails to real-time, easy-to-use, configurable, customized and cost-friendly products and services, all available via mobile and real-time technology.

In a fast paced digital age, insurers are balancing InsurTech opportunities with the challenge of altering long-standing business processes. While most insurers have embraced change to support incremental innovation, bigger breakthroughs are necessary in order to compete with the new technologies and business models that are disrupting the industry.

In order to remain in the race, insurance leaders' innovation agenda should include the following:

- Scenario planning—what are the potential future scenarios and their implications?
- Real-time monitoring and analysis of the InsurTech landscape.

- Determining how to promote enterprise innovation, including combining different approaches of accelerating and enabling execution.
- Augmenting the organization with new and different types of talent.
- Cyber security and regulation.

Taking effective action in these areas will inform how the company approaches innovation, any talent gaps that may exist, and the most promising opportunities. Most importantly, the resulting insights can help insurers translate knowledge of disruptive forces into strategic, actionable plans for competitive innovation.

PwC senior manager Eric Trowbridge also contributed to this article. ■



Jamie Yoder is a PwC US Insurance advisory leader. He can be contacted at jamie.yoder@pwc.com.



Javier Baixas is a director with PwCStrategy&. He can be contacted at javier.baixas@strategyand.es.pwc.com.

ENDNOTES

- 1 Available at <https://www.pwc.com/gx/en/industries/financial-services/fintech-survey/blurred-lines.html>. Our findings in this article are based on the survey and a recent follow-up report, which is available at <https://www.pwc.com/gx/en/industries/financial-services/fintech-survey/report.html>.
- 2 For more on InsurTech and the innovation agenda, please see our Innovating to Grow report at <http://www.pwc.com/us/en/insurance/publications/insurance-innovation.html>.
- 3 Please see the Top Insurance Industry Issues in 2015 section on the potential impacts of autonomous vehicles on the insurance industry at <http://www.pwc.com/us/en/insurance/publications/top-insurance-industry-issues-2015.html>.
- 4 For more on AI in insurance, please see the eponymous section in Top Insurance Industry Issues in 2016 at <http://www.pwc.com/us/en/insurance/publications/top-insurance-industry-issues-2016.html>.
- 5 For more on reinventing life insurance, please see the eponymous section in Top Insurance Industry Issues in 2014 at <http://www.pwc.com/us/en/insurance/publications/assets/pwc-top-insurance-issues-reinventing-life-insurance-2014.pdf>.
- 6 For more on blockchain and reinsurance, please see our recent report on the subject at <http://www.pwc.com/gx/en/industries/financial-services/publications/blockchain-the-5-billion-opportunity-for-reinsurers.html>.



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475 N. Martingale Road, Suite 600
Schaumburg, Illinois 60173
p: 847.706.3500 f: 847.706.3599
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