



**SOCIETY OF  
ACTUARIES**

**SMALLER  
INSURANCE  
COMPANY SECTION**

# Small Talk

ISSUE 45 • MARCH 2016

## The Promise and Risk of Industry Disruption: Generational and Technological Trends

Page 3

By Jim Koher

5 **Chairperson's Corner**  
By Ryan Stowe

6 **Letter from the Editor**  
By Mark Rowley

8 **Managing Actuarial Function in a  
Small Insurance Company in the  
United States and Canada**  
By Mark Rowley

10 **Addressing Actuarial System Risk at  
a Small Insurance Company**  
By Mark Rowley

13 **Representative Scenarios Method  
(RSM) Part 2: Field Testing the RSM**  
By Mark Birdsall and Steve Strommen

24 **Regulatory Update**  
By Karen Rudolph

27 **Benefits of Volunteering with the  
Smaller Insurance Company Section**  
By Brad Shepherd

# Small Talk

Issue Number 45 • MARCH 2016

Published by the  
Smaller Insurance Company Section  
of the Society of Actuaries.

This newsletter is free to section  
members. Current issues are available  
on the SOA website ([www.soa.org](http://www.soa.org)). To  
join the section, SOA members and  
non-members can locate a membership  
form on Smaller Insurance Company  
Section Web page at [www.soa.org/sic/](http://www.soa.org/sic/).

Facts and opinions contained herein  
are the sole responsibility of the  
persons expressing them and should  
not be attributed to the Society of  
Actuaries, its committees, the Smaller  
Insurance Company Section or the  
employers of the authors. We will  
promptly correct errors brought to  
our attention.

Copyright © 2016 Society of Actuaries.  
All rights reserved.

## 2016 SECTION LEADERSHIP

### Officers

Ryan Stowe, Chairperson  
Bryan Amburn, Vice Chairperson  
Steve Chamberlin, Secretary/Treasurer

### Council Members

Tim Cardinal  
Scott Haglund  
Stepanie Harder  
Mark Rowley  
Adam Wendling  
Mark Whitford

### Content Managers

Scott Haglund  
Federated Insurance  
Owatonna, Minn.  
507.455.5101  
[sdhaglund@fedins.com](mailto:sdhaglund@fedins.com)

Mark Rowley  
EMC National Life Company  
Des Moines, Iowa  
515.237.2147  
[mrowley@emcni.com](mailto:mrowley@emcni.com)

### SOA Staff

Julia Anderson Bauer,  
Publications Manager  
[jandersonbauer@soa.org](mailto:jandersonbauer@soa.org)

David Schraub, Staff Partner  
[dschraub@soa.org](mailto:dschraub@soa.org)

Jessica Boyke, Section Specialist  
[jboyke@soa.org](mailto:jboyke@soa.org)

Julissa Sweeney, Graphic Designer  
[jsweeney@soa.org](mailto:jsweeney@soa.org)

# The Promise and Risk of Industry Disruption: Generational and Technological Trends

By Jim Koher

If you were in attendance at the Society of Actuaries (SOA) Annual Meeting & Exhibit in Austin, Texas, this fall, you had the opportunity to hear the opening keynote address by Salim Ismail. He is a Silicon Valley entrepreneur whose current job is executive director at Singularity University, a group committed to using technology to create a massive impact for good in the world. His talk was wide-ranging, but I will focus on two topics that have relevance to us as small company actuaries. He addressed how the millennial generation is changing the workplace, and also spoke about technologies' power to disrupt existing businesses at a very rapid rate. This article is based upon his keynote address, as well as his book, *Exponential Organizations*.

Why focus on millennials? It is estimated that 10,000 baby boomers are leaving the workforce every day and Generation X is simply not big enough to fill the gap. Millennials make up 36 percent of the workforce (the most of any of the generations), and it is estimated that they will be nearly half by the end of 2020. Millennials are thought to make up 53.5 million of the working population.

Millennials, Ismail maintains, come into the workforce with a different set of values than prior generations. Although fair wages and benefits are a concern to them, their true reason for taking a job (or staying with a job) is its purpose. Both as employees and consumers they want to associate themselves with companies that are doing something important in the world, something that makes a positive difference—organizations that think BIG. They are looking for challenge, and will often freely contribute their own time and resources in order to meet a worthy challenge. For example, the purpose statement for Singularity University is “Positively impact one billion people.” A goal that lofty sounds unattainable at first, but it attracts a level of talent that is most suited to making these aspirations a reality.

Ismail posits that every organization needs a Massive Transformative Purpose (or MTP). Millennials want to make a difference in the world, and they will be able to tell very quickly if an organization is simply doing the same as last year, but a little faster or more cheaply. That kind of goal does not capture the hearts and minds of employees. Make no mistake—continuous improve-

ment and consistent quality work are crucial to an organization's long-term success. But there should also be a higher purpose toward which the organization is aimed. Millennials will get behind something big and aspirational and will leave organizations that are largely committed to maintaining the status quo.

Interestingly, some of this desire for purpose is attributed to millennials being digitally native in their upbringing. Ubiquitous Internet access and hours upon hours of computer or console gaming have instilled in them a natural bent toward technology in solving problems and a desire to make the world a better place for all (to “level up”). Ismail cites that the average young person racks up more than 10,000 hours of gaming by the age of 21. (That's almost as much time as a child spends in middle school through high school.) He encourages us to leverage that, and to try and create fun and engaging experiences in the workplace that lead to both a sense of accomplishment and further the organization's mission. This leads to more engaged and passionate employees who will show their own initiative in solving bigger and more complex challenges within the organization. Keep them challenged and fulfilled and you will have more success in retaining the employee.

Many insurance organizations (auto and health, to name two) are using “gamification” to drive consumer behavior and to create safer and healthier habits by awarding points, status and even discounts to those who “win” by scoring high on desired attributes over time. This is directly feeding the innate desire for challenge, competition and a sense of accomplishment. Rather

“Ismail posits that every organization needs a Massive Transformative Purpose (or MTP).”

than the traditional suggestion box, what if you were to challenge teams within an organization to tackle a specific business problem, with rewards and status to the winners? The key is to offer a challenge big enough and interesting enough to capture people's imaginations as to what the world would be like if this challenge were overcome.

When a group of motivated, technologically savvy, purpose-driven individuals band together, don't be too surprised if they are highly motivated to challenge and supplant the status quo. This can be somewhat intimidating since, as author John Hagel notes, “Our organizations are set up to withstand change from the outside.” This leads to Ismail's second major point about disruption from within and without. Look at the number of businesses that have been turned on their heads over the last 15

years or so, with the pace of change accelerating year after year. I'll cite two examples that you may be familiar with.

Airbnb is a company that leverages users' extra bedrooms. It offers lodging at a fraction of the cost of most hotels, usually in individuals' homes or apartments. Both lodgers and hosts are kept honest by scoring each other after each stay. If either has low scores, they will have difficulty finding hosts or lodgers willing to work with them in the future. Airbnb operates 500,000 listings in 33,000 cities and is on pace to become the largest provider of room-nights *in the world* by the end of the decade. Do the Marriotts, Hiltons and Motel 6's of the world feel disrupted? You bet.

A second example is Uber. Similar to a taxi service, Uber provides users with an app that connects riders with drivers who pick them up in their personal vehicles and take them where they want to go. Often there is a private vehicle near where you are that can arrive much faster and deliver you more inexpensively than a traditional cab service. Like Airbnb, riders give a rating to drivers so that other potential riders will have an unbiased assessment of how well a particular driver is faring (pun intended). Best of all, you leave your credit card information on file with Uber and the cost is automatically charged once you are delivered to your destination. No tipping, no worrying if you have enough cash; just a clean transaction. In many cities the taxi services have lobbied to keep Uber from being allowed to conduct business in their city, with some success. However, given its success in other markets, cities are starting to reverse their decisions and let Uber in.

Can this type of disruption happen in the insurance industry? It certainly seems likely. While many will argue that the com-

plexity of insurance regulation and other barriers to entry will keep outsiders from invading the insurance space, I'm sure the taxi drivers' unions were making an analogous argument a few years ago. So it is important for your organization to consider how scalable technology and creative thinking from outside your industry can radically change the way you do business. Let's use the life insurance business as an example. Do you allow consumers or agents to submit applications online? Do you deliver policies online? How many human touches does it take for you to issue a piece of new business? What if your MTP was "75 percent of our policies underwritten and issued the same day"? It may seem an insurmountable goal today, but it is the type of challenge that people can rally around. And if you were to achieve that goal profitably, how much disruption do you think you could create in the marketplace?

Ismail's message struck a chord with me as an executive and actuary at a smaller insurance company. I had to ask myself: "How would the world be different if our organization did not exist? What unique *purpose* do we serve?" Additionally, "How might we be disruptive to the market if we wanted to create something *transformative and massive*? How might we be disrupted if we don't decide to do the disrupting ourselves?" Asking and answering these questions today will help your organization thrive in a world of rapid technological and social change both now and into the future. ■



Jim Koher, FSA, MAAA, is executive vice president and chief actuary at Homesteaders Life Company in West Des Moines, Iowa. He can be reached at [jkoher@homesteaderslife.com](mailto:jkoher@homesteaderslife.com).



# Chairperson's Corner

By Ryan Stowe

As we get settled into 2016 at work and in our personal lives, so are the Smaller Insurance Company Section (SmallCo) Council and friends. Having the opportunity to serve as vice chair of the section last year under Pam Hutchins' leadership was invaluable. We have a few new council members, and I am happy to report that those council members rolling off have stayed active within the section as "friends" of the council.

I joined SmallCo four years ago. As a relatively new FSA, I was looking for networking opportunities within the actuarial community outside of my own company, where hopefully I could learn a thing or two along the way. What I found in SmallCo was a great community of actuaries from many different backgrounds, disciplines and practical experience. I am excited to take on the challenge of chair this year and look forward to what we have planned.

## CONTINUING EDUCATION

SmallCo sponsors many sessions throughout the year at various Society of Actuaries (SOA) meetings. If you plan to attend any of the following events in 2016, please check out the SmallCo sessions. You will not be disappointed.

Life & Annuity Symposium  
May 16–17 in Nashville, Tennessee

Valuation Actuary Symposium  
Aug. 29–30 in Hollywood, Florida

SOA Annual Meeting & Exhibit  
Oct. 23–26 in Las Vegas, Nevada

As an alternative to in-person meetings, SmallCo is also planning to sponsor four webinars in 2016. The topics covered will include:

- Professionalism
- Two-part series on principle-based reserving (PBR) practical considerations
- Year-end financial reporting issues (annual event co-sponsored with the Financial Reporting Section)

SmallCo has built a strong reputation for providing relevant continuing education meeting sessions and webinar presentations. I encourage you to check us out if you haven't already.

## KEEPING AN EAR TO INDUSTRY DEVELOPMENTS

In addition to all of the continuing education efforts, SmallCo has established teams to keep apprised of important topics in 2016 through active industry involvement and/or sponsoring research projects. Teams include:

- Research team
- PBR team
- Product team
- Non-PBR regulatory team
- Interest rate team

Broader industry topics like PBR, the Department of Labor (DOL) fiduciary rule and the (continued) low interest rate environment will likely be addressed by more than one team, as there are many perspectives to evaluate as our industry and regulatory oversight continue to evolve. SmallCo has also identified the Affordable Care Act as an important industry topic for health actuaries, and the section is looking for volunteers to help monitor activity on this and other health-related topics. You do not have to be an elected member of the council to participate in any of these teams. Many hands make light work, so if you are interested in getting involved, please reach out to me or to any one of the council members for more information.

## LOOKING AHEAD TO 2016

Change is coming, whether we like it or not. SmallCo plans to be at the forefront of industry change to keep our membership informed and educated regarding what is happening and the impact to the smaller insurance company. I look forward to 2016 and invite you to be a part of it. For those on our council and who are already friends, thank you for your support. Let's have a great year. ■



Ryan Stowe, FSA, MAAA, is the director of Pricing and Product Management for Wealth Management at CUNA Mutual Group in Madison, Wis. He can be reached at [ryan.stowe@cunamutual.com](mailto:ryan.stowe@cunamutual.com).

# Letter from the Editor

By Mark Rowley

Welcome to the March 2016 edition of the Smaller Insurance Company Section (SmallCo) newsletter, *Small Talk*. Including this article, there are eight articles.

Our cover article examines critical topics for the industry, including small companies. It is a reaction to Salim Ismail's keynote at the 2015 SOA Annual Meeting & Exhibit. It is titled: "The Promise and Risk of Industry Disruption: Generational and Technological Trends." You may have to read this one a couple of times, and also spend some time thinking about the future.

On a lighter note, the section chairperson has some interesting notes on where the section is today, and where it is headed.

I was able to convert some meeting and webinar presentations into articles:

- "Managing Actuarial Function in a Small Insurance Company in the United States and Canada"
- "Addressing Actuarial System Risk at a Small Insurance Company"

I hope you find these articles useful.

Mark Birdsall and Steve Strommen contribute the follow-up article they promised six months ago on the representative scenarios method—very interesting!

Karen Rudolph, starting with this edition of *Small Talk*, is going to share her considerable knowledge by giving us a regulatory update twice a year. Thanks, Karen!

We end with a great article from Brad Shepherd in which he recounts how he has benefited by volunteering with the section. He also points out that anyone can benefit as he has. There are good things happening with SmallCo!

I think you will enjoy this issue. Don't hesitate to contact me or co-editor Scott Haglund if you have comments or questions! ■



Mark Rowley, FSA, MAAA, is vice president, managing actuary with EMC National Life in Des Moines, Iowa. He can be reached at [mrowley@emcnl.com](mailto:mrowley@emcnl.com).



# 2016 SOA Health Meeting

June 15–17, 2016

Philadelphia, PA

Be a part of the leading  
event focused on relevant  
topics for health actuaries.

Register by May 13  
and save \$200.

[SOA.org/HealthMeeting](http://SOA.org/HealthMeeting)



# Managing Actuarial Function in a Small Insurance Company in the United States and Canada

By Mark Rowley

**T**he Smaller Insurance Company Section put on a webinar with this title in August 2015. In this article I will summarize the key takeaways.

## STRATEGIES FOR MANAGING SCARCE RESOURCES

When the actuarial team at a company is small, it is critical to cross-train. This is challenging to accomplish due to time constraints, especially when there is staff turnover, but it is great to have the flexibility to assign tasks to more than one person on the team. This helps the team be more productive. Another key is documentation, which is invaluable all the time, but especially when there is staff turnover. Using the documentation as a training manual when there is new staff works very well.

It is also critical to constantly refine and automate processes. There needs to be a constant focus on looking for efficiencies. At the beginning of each new task:

- Step back and consider how to automate.
- Brainstorm as to how the new task could fit into an existing process.

Along a similar vein, it is important to constantly re-engineer processes. This is automation but also adding controls and instilling the culture where two sets of eyes need to review every task.

Sometimes it is appropriate to make a case for additional staff. Often you can make a more persuasive case if the actuarial team makes a good impression on management, and the lead actuary is a team player who has good relationships with other company leadership.

If a full-time person can't be justified, consider hiring an intern or sharing a team member with another department.

The interns I have hired recently have had excellent computer skills, and have been tremendously helpful in re-engineering projects.



## RETAINING STAFF

Another key strategy for managing scarce resources is retaining staff. While cross-training and documentation make it easier during staff turnover, what is even easier is not having staff turnover!

To retain staff, I suggest:

- Give them challenging work that is important to the company's success.
- Tell them often they are making a difference.
- Keep them in the loop on everything possible.
- Take a huge interest in developing them, having frequent conversations where you talk and brainstorm about their future.
- Bottom line: Create a culture where they love their job!

To do this, there needs to be a constant emphasis on long-term productivity. Every interaction with your team is a coaching opportunity.

If team members love the small company culture and see the advantages of a small company, where it is easier to see the difference they are making, they may even come back after moving to a large company that they thought provided greener pastures.

### WORKING THROUGH STAFFING CHANGES/ SUCCESSION PLANNING

When there is a change, the first thing to do is to step back and re-evaluate everything. A knee-jerk reaction where a new person is hired with the same responsibilities that the person leaving had is very rarely the right answer. Step back and list all the tasks that the team does. Start with a blank sheet of paper, and divide up the tasks in the way that makes the most sense. It is often an opportunity to provide greater challenges to the team members who remain. It is usually best to split up the responsibilities of the person leaving.

When there is a sudden change in staff, it is often best practice to use consultants. There are times also when another department can help. It may also be inevitable that projects get pushed back. Depending on the position, it may make sense to have a consultant provide support to a new person until the new person has been in place for some period of time, such as a year.

When team members leave, in my experience the best thing they can do is stop working on everything and document, document, document! In the long run this will pay off, although there will definitely be some short-term pain with this.

### BEST PRACTICES IN USING CONSULTANTS

Have a philosophy in place for using consultants. Are they used due to knowledge gaps or resource gaps? I often use consultants to set certain pricing assumptions (e.g., mortality and lapse), but I do the rest of the pricing myself.

It is practical to work with a consultant that uses the same software that you do. Often, it is helpful in the long run for the consultant to teach your team. One way to transfer knowledge from consultant to team is to give responsibility for documentation to your team.

If you find consultants that fit well with your company, they may get to know you well enough that they provide “extra value”

“Take a huge interest in developing them, having frequent conversations where you talk and brainstorm about their future.”

when you use them. Developing a relationship with the consultant is key. If a staff member had an emergency, this consultant could swoop in and get up to speed quickly.

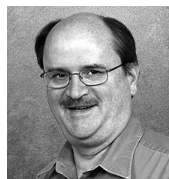
### CLOSING COMMENTS

There is never a dull moment in a small company actuary’s life. The job entails a large number of varied tasks:

- People manager
- Member of management team
- High-level work
- Nitty-gritty work
- Non-actuarial responsibilities

Unexpected events occur frequently. There is a real opportunity to influence decision-making and make a huge difference in a company’s success.

There were Canadian and U.S. small company actuaries involved in the webinar. It was remarkable how similar the philosophies were! ■



Mark Rowley, FSA, MAAA, is vice president, managing actuary with EMC National Life in Des Moines, Iowa. He can be reached at [mrowley@emcnl.com](mailto:mrowley@emcnl.com).



# Addressing Actuarial System Risk at a Small Insurance Company

By Mark Rowley

We all have system risk. As an actuary I define this simply: It is the risk that I messed up and made an error that led to bad pricing, bad financial reporting, or some other error that led to a flawed decision.

There are more and more meetings and articles these days about controls, model governance, and other similar topics. This is good and helpful, but oftentimes the ideas work best for a large company.

In this article I share what a small actuarial team has been able to do to improve controls over the last several years. I am the only credentialed actuary at my company, and I have two full-time team members plus an intern from nearby Drake University. This means I am a generalist and know enough about many things to be dangerous!

With my small team the thought often goes through my mind that we do not have the resources to add controls to our processes. However, I think more often that we can't afford to not add controls. Reducing errors is critical if the actuarial team is going to make a difference in the success of the company.

We have improved the frequency over the years of having two sets of eyes look at a work product before it goes out. This simply means we have one person do the work and a second person check it. This is challenging with a small team, but it is important.

When we document and automate, inevitably we end up with better controls and productivity.

## WHAT WE ACCOMPLISHED WITH EXCEL SPREADSHEETS

A few years ago we had a quarterly valuation process that needed help. We decided to create an Excel spreadsheet named "Step-by-Step." It organizes our financial reporting by:

- Providing excruciatingly detailed instructions for each financial reporting task
- Assigning target dates
- Ensuring there are two sets of eyes (a "doer" and a "validator")

Our first attempts to create such a spreadsheet were lacking. We focused on improving the spreadsheet each quarter for years. Finally, in 2015, we have a stable spreadsheet. The result is a quarterly financial reporting process that takes a lot less time, is much less error-prone, and provides a lot more time for analysis.

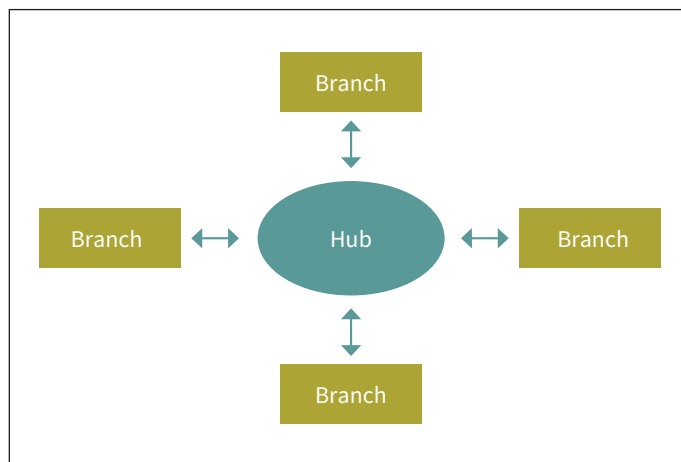
Part of this process was to re-engineer our many spreadsheets, which was time-consuming. These were the things we focused on related to spreadsheets:

- Limit access to actuarial files.
- Back up files every night.
- Use version controls.
- Keep track of changes.
- Identify source of data input.
- Identify when data changes.
- Color code—formulas vs. inputs.
- Put totals at top.
- Don't use Excel functions that are not "controlled," such as "Indirect," "Lookup" or "Offset."

## WHAT WE ACCOMPLISHED WITH ACCESS DATABASES

Another part of the process was to re-engineer our databases. We currently use Microsoft Access, but are in the middle of migrating to SQL. We re-engineered our Microsoft Access databases into a hub-to-branch structure (Figure 1).

Figure 1



The hub is the central database that stores time-sensitive data. In it we closely monitor whether data gets updated, since we have had problems inadvertently using data from the wrong

quarter. The branch databases are linked to the hub, and each database is dedicated to a single task.

We use macros to automate tasks. We are migrating to SQL since it has better capacity to handle the large amount of data we use. Getting to SQL will be another great improvement.

### WHAT WE HAVE DONE WITH FINANCIAL MODELS

We use GGY AXIS as our software for financial models. We employ our financial model for all financial projections, internal and external, including asset adequacy analysis.

In 2015 we initiated a model governance procedure. A key tenet in model governance is to have two sets of eyes review changes. It is interesting to me that when I attend a Society of Actuaries (SOA) session on model governance, the presentation is about all the different actuarial departments involved. They describe a great way for all the different people to play a particular role. Since we have two AXIS users, all of these roles get mapped to either me or one member of my team.

We are in the midst of a huge effort to add controls to our model. We are:

- Doing an inventory of all inputs into our model
- Auditing the tables in the model vs. our administrative system
- Documenting in 2016 why we chose each assumption.

Through this process we inevitably find errors, and we use our model governance procedure to fix the errors, to make sure the impact of fixing the error is as expected.

### TEAM MEMBERS

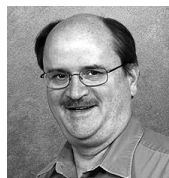
When I hire team members I look for strong computer skills. My team members have done the great bulk of the work and deserve the credit for the progress that has been made. Interns are, of course, inexpensive, and I have had no trouble finding interns with strong computer skills. Since the goal is to improve controls, the makeup of my team works very well.

### PROGRESS

Quarterly financial reporting is much more of a smooth, routine task at this point. Productivity has increased. However, what I like the best is that our error rate is down. We are not messing up as much!

Our most stable step-by-step spreadsheet is, as I said, for quarterly valuation. We have made great strides this year with our spreadsheet for financial projections, but it needs to be tested quarter by quarter and improved. In 2016 we are planning to add step-by-step spreadsheets for other processes such as pricing.

When I make a list of additional controls that could be added, it is endless! We need to keep moving forward or we will fall back. Doing this is critical to having an actuarial team that is making a difference in the company's success. ■



Mark Rowley, FSA, MAAA, is vice president, managing actuary with EMC National Life in Des Moines, Iowa. He can be reached at [mrowley@emcnl.com](mailto:mrowley@emcnl.com).

# 2016 SOA Life & Annuity Symposium

May 16-17, 2016  
Nashville, TN



The world's most comprehensive event for actuaries in the life industry. Sign up by April 15 and save \$200 off the registration price!

Visit [SOA.org/LAS](http://SOA.org/LAS) to register.



# Representative Scenarios Method (RSM) Part 2: Field Testing the RSM

By Mark Birdsall and Steve Strommen

This article is the second of two articles to address the RSM. Part 1 was published in the September 2015 issue of *Small Talk*. That article focused on the motivation and goals for this new reserve methodology, together with a description of how the methodology works and what key information can be derived from the analysis. The ultimate goal would be to develop and validate a consistent analytical framework that could be used for all long-tailed liabilities.

This article will focus on the field tests that have been undertaken to validate the accuracy and practicality of this methodology, describing refinements to the methodology together with next steps. Four product types have been tested: non-variable indexed annuities with guaranteed lifetime income benefits (FIAs with GLIBs), level premium term life insurance (term), universal life with secondary guarantees (ULSG), and variable annuities with guaranteed lifetime withdrawal benefits (VAs with GLWBs). Note that in the course of this testing, refinements have been made to the RSM methodology.

If the testing shows that a refined RSM analytical framework can be used for all long-tailed liabilities, then RSM could be used as an asset adequacy analysis methodology and also as an approximation method for principle-based reserves (PBRs) for all long-tailed product types. For example, Section 2G of VM-20 states:

A company may use simplifications, approximations and modeling efficiency techniques to calculate the net premium reserve, the deterministic reserve and/or the stochastic reserve required by this section if the company can demonstrate that the use of such techniques does not understate the reserve by a material amount and the expected value of the reserve calculated using simplifications, approximations and modeling efficiency techniques is not less than the expected value of the reserve calculated that does not use them.

## APPROXIMATING THE TARGET RESERVE

In reviewing the field tests, it is important to recall the target reserve that is being approximated by RSM. While there are several possible candidates, the Part 1 article states, “RSM approximates the results that would be derived from full stochastic

modeling of all key risks associated with a block of business.” In the development of RSM, this is our working definition of the “right-size reserve” that was the original goal of the principle-based approach (PBA).

If you had the computer power and the luxury of adequate time to run a very large number of fully stochastic scenarios, meaning that all the key risk drivers (KRDs) would be stochastically modeled at the same time, there would still be the question of the proper size of the statutory margin to be included in the reserve. As noted in the Part 1 article, there are two main methodologies for determining such an aggregate margin: the cost of capital (COC) method and the percentile method. The COC margin is similar to the concept of transfer value, wherein the margin represents the compensation that an arm’s-length investor would require to accept the risks associated with a block of business. The percentile approach is more like the CTE 70 methodology of VM-20, approximating a percentile level in the distribution of the present value of future cash flows across all scenarios. One of the features of RSM is that it can provide an estimate of the aggregate margin on either basis; therefore, we will be presenting results using both aggregate margin methodologies.

## FIXED INDEXED ANNUITIES WITH GLIBS

The Annuity Reserve Work Group (ARWG) of the American Academy of Actuaries (AAA) responded to the Life Actuarial Task Force’s charge to develop Section 22 of the PBR Valuation Manual (VM-22) by setting the statutory reserve equal to the greater of a formulaic reserve (floored by the cash surrender value) and a modeled reserve. To support the development and testing of both the formulaic and the modeled reserves, the Kansas Insurance Department (KID) led by Commissioner Sandy

RSM could be used as an asset adequacy analysis methodology and also as an approximation method for principle-based reserves (PBRs) for all long-tailed product types.

Praeger sponsored a field test of these methodologies for the purpose of advancing PBR. A field test team of programmers and actuaries was assembled (Steve Strommen, James Kavanagh, Phil Colbert and Mark Birdsall), and two companies recruited to provide funding and actual product and policy information for the testing.

One of the challenges for both ARWG and the field test team was the lack of industry experience on GLIB utilization for FIAs.

As the result of extensive discussions, consideration of a Society of Actuaries (SOA) survey of pricing assumptions for FIAs with GLIBs, plus a review of information aggregated by KID from actuarial memoranda in support of asset adequacy analysis, ARWG developed a set of principles and a sample GLIB utilization function that was the initial basis of the field test. This sample function was applied for both the formulaic reserve and the modeled reserve calculations using RSM. The principles used in developing the GLIB utilization function included the following:

1. GLIB utilization begins at attained age 60.
2. Utilization peaks at key retirement ages, with modest rates in between. Utilization rates around key retirement ages are smoothed around those ages, reflecting changes to the normal retirement age.
3. Contract status (qualified versus non-qualified) impacts the pattern of GLIB utilization.
4. GLIB utilization rates must follow contract provisions, such as waiting periods.
5. GLIB utilization is influenced by the degree to which the benefit is “in-the-money” (ITM)—see the following detailed description of the ITM calculation. The GLIB utilization rate for a contract is zero when the GLIB benefit is not ITM.
6. GLIB utilization can be deferred, anticipating near-term increases in GLIB benefits, and then added back when the higher benefits are available.
7. GLIB utilization is influenced by the relative richness of joint- and single-life benefits, which may not be actuarially equivalent. For some FIA with GLIB products, the joint-life benefits are richer than the corresponding single-life benefits.
8. GLIB utilization is 100 percent after critical terminal ages (85 for non-qualified; 71 for qualified). If contracts are issued at these terminal ages or later, then all such contracts are assumed to utilize the GLIB at the end of the first contract year.

ITM-ness was calculated as a ratio of the present value of both GLIB income payments and death benefits, discounted at the current valuation calendar year Plan Type C interest rate, divided by the contract account value at the valuation date. The present value of the GLIB benefits was adjusted based on the relative

Figure 1  
Comparative Reserve Levels (\$millions)

Item	Company A		Company B	
	Reserve	% of Account Value	Reserve	% of Account Value
Account Value	5,139	100.0%	2,635	100.0%
Cash Surrender Value	4,608	89.7%	2,292	87.0%
CARVM (AG 33 & AG 35)	4,753	92.5%	2,542	96.5%
<b>Modeled Reserves</b>				
RSM (COC margin)	4,081	79.4%	2,911	110.5%
Fully Stochastic (COC margin)	4,018	78.2%	2,979	113.1%
RSM (percentile margin)	3,965	77.2%	2,681	101.7%
Fully Stochastic (CTE 70)	3,941	76.7%	2,741	104.0%
<b>Aggregate Margins</b>				
RSM (COC margin)	137	2.7%	418	15.9%
Fully Stochastic (COC margin)	107	2.1%	358	13.6%
RSM (percentile margin)	21	0.4%	189	7.2%
Fully Stochastic (CTE 70)	30	0.6%	120	4.6%



richness of the joint- and single-life GLIB benefits. More details regarding the GLIB utilization function and other modeling information can be found in “Phase 1—RSM Field Test Report to ARWG for VM-22,” available by request to Nicole Boyd of KID at [NBoyd@ksinsurance.org](mailto:NBoyd@ksinsurance.org).

Referring to the two participating companies as Company A and Company B, it is worth noting that the FIAs with GLIBs that were included in the field test were of different benefit richness, with Company B’s GLIB product generally richer. In addition, the policies valued were almost all in the first contract year, which will impact the COC calculation significantly due to the long length of the remaining liabilities.

The KRDs for this analysis were determined to be mortality, lapse, GLIB utilization, interest and expense. Following the RSM process outlined in the Part 1 article, the table in Figure 1 summarizes the results of the modeled reserve calculations using both the RSM scenarios and 500 fully stochastic scenarios, for which all the KRDs varied stochastically in each scenario.

The sizes of the modeled reserves relative to the account values reflect the relatively richer benefit for Company B’s product. Note that the modeled reserves for Company A are within a narrow range and slightly higher than the respective fully stochastic reserves. For Company B, the results are lower than the respective fully stochastic reserves and further away as a percentage. While the current CARVM reserve also reflects the difference in the benefits, it does not fully reflect the difference in the relative riskiness of the product designs.

The higher margins shown for Company B reflect the greater risk due to the richer guaranteed benefits. For these blocks of business, the COC margin is higher than the percentile or CTE margin. This is typical for new business on long-term contracts with many years before expiry. The COC margin tends to reduce much more rapidly over time, and becomes less than a percentile or CTE margin in later years as the contract ages. The comparative behavior of these two margins over time was not calculated for this, the first product that was tested, but was calculated for the other three products that were tested later.

Other conclusions from testing FIAs with GLIBs include:

1. While RSM did not provide exactly the same numerical results as full stochastic testing, it did provide essentially the same comparative information for potential use by regulators. That information includes:
  - a. Before adding a margin, the central estimate for both companies is less than the current account value. That means that if expectations are realized, both companies will realize a profit on this business.

While RSM did not provide exactly the same numerical results as full stochastic testing, it did provide essentially the same comparative information for potential use by regulators.

- b. Aggregate margins for Company B need to be much larger than for Company A due to the risk associated with the richer guaranteed benefits.
  - c. When the aggregate margin is included, modeled reserves for Company A are still much less than the account value, while those for Company B are greater than the account value.
2. The KRD of investment returns should be split into two separate risk drivers: interest rates and equity returns. These separate risks are not fully correlated, but in the RSM scenarios generated for testing FIAs they were treated as fully correlated, thereby overestimating the risk. (This refinement has been implemented in the testing for VAs, which was done later.)
3. The yearly projections of capital for the COC method should be in proportion to some base, such as the present value (PV) of the remaining benefit-only cash flows, some measure of the remaining in-force block, or some other projected base, depending on product type and the likelihood of future premiums. If the same base is to be used for all product types, a generic measure that would apply to all product types—such as projected policy count or benefit count—would need to be used. For purposes of this testing, the base used to project future capital requirements was the PV of remaining benefit-only cash flows.
4. While not shown in this summary, the various scenario amounts produced using the RSM provide substantial information about the size of various risks, and could feed readily into a company’s risk management program. The interest KRD reflects the impact of both dynamic lapse and dynamic GLIB utilization in response to interest rates and tends to have the largest impact for the products studied, while expenses tend to have the smallest impact and may in fact not be considered a KRD. To increase understanding of the components of risk, it may be desirable to separate out the impact of dynamic lapse and dynamic GLIB utilization from the interest KRD. This would not change the result of the reserve or margin calculation because all the separated components would be perfectly correlated with changes in interest rates.

But it might be useful for risk managers to understand how much of the interest rate risk is due to policyowner behavior changes in response to interest rate changes.

### LEVEL PREMIUM TERM LIFE INSURANCE

KID made four changes in preparing for the testing of the next product types:

1. A case study approach employing prototype products was used to help make the testing more efficient.
2. A peer reviewer knowledgeable in each respective product type was recruited to help establish the appropriate product designs, modeling assumptions and product pricing, and provide other review.
3. The COC margin for FIAs with GLIBs was based on a 6 percent after-tax COC factor. Due to the high level of COC aggregate margin produced by that factor relative to the percentile margin, it was determined to use a 4 percent after-tax COC factor for the remaining products.
4. KID funded the testing rather than the participating companies. We thank Kansas Insurance Commissioner Sandy Praeger for her support!

One key fundamental of RSM is using current (best) estimate assumptions. The RSM aggregate margin, whether calculated by COC or percentile method, is explicit and varies with risk, as shown in the work for FIAs with GLIBs. One complication in evaluating RSM for life insurance products (such as term and ULSG) is that mortality improvement is currently not recognized in calculating statutory reserves, though such improvement is allowed and prudent in the calculation of reserves for other types of long-tailed insurance products. In the analyses of term and ULSG, we assumed that this regulatory constraint would be

lifted and some recognition of the trend of mortality improvement would be allowed, subject to the inclusion of reserving margins that reflect the possibility that it may not happen.

For the field test, five variations of level premium term were priced for purposes of the case study:

1. 10-year term, issue age 35
2. 10-year term, issue age 55
3. 20-year term, issue age 35
4. 20-year term, issue age 55
5. 30-year term, issue age 35

All contracts are issued to males, and the amount of insurance is \$500,000 per contract. Full details of assumed experience and other pricing assumptions are in the Phase 2 report on term life insurance at [www.blufftop.com/RSM/Kansas.html](http://www.blufftop.com/RSM/Kansas.html). The KRDs were determined to be mortality, mortality improvement, lapse, interest, default costs and expenses.

From the testing, the reserves under RSM and the fully stochastic reserves were very similar, as shown in Figure 2 (note the reserves are projected in this work).

Figure 3 compares the aggregate margins under the two methods over time. A log scale is used for the vertical axis so that proportional differences remain visible even as both margins get much smaller in dollars as the business runs off the books.

The main difference between these two margin methodologies is apparent from this graph. The COC margin tends to be larger when the business still has a long period to run. However, the COC margin is released faster, crosses over and becomes lower than the percentile margin.

Figure 2  
RSM vs. Stochastic Reserves Over Time

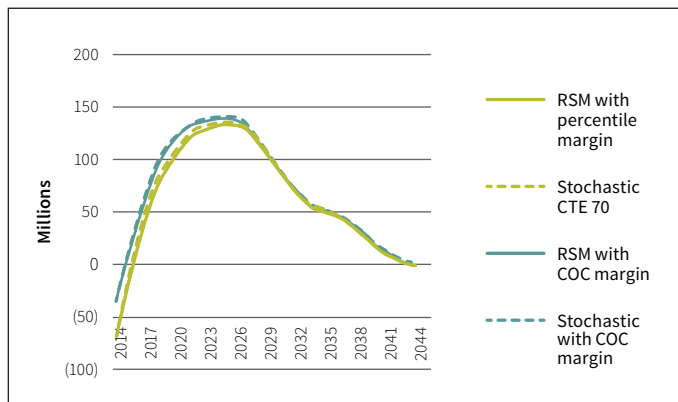
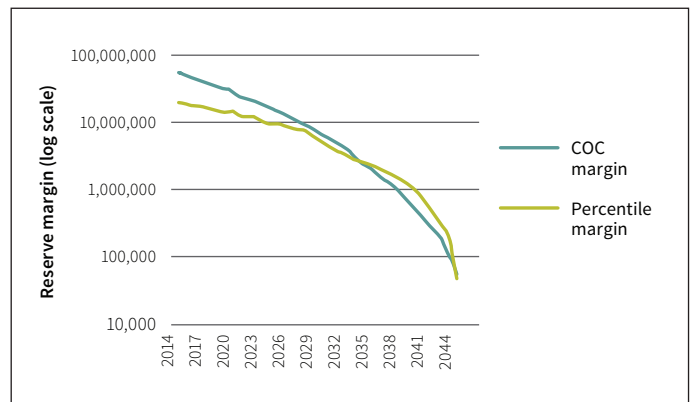


Figure 3  
Margins Over Time



In reviewing the breakdown of risks over time, we reached the following conclusions:

- The largest risk is the mortality trend, at over \$70 million initially. As time passes this risk declines rapidly. As noted earlier, we assumed that some recognition of the future mortality trend would be allowed in RSM. The effect of this single assumption explains most of the difference between reserves under RSM and VM-20.
- The second largest risk is mortality fluctuation. Since claims are heaviest in later years, this risk remains significant as long as business remains on the books.
- The lapse risk for this block of business is surprisingly small in 2014–2015. This is because the direction of this risk changes over time. Before 2015, high lapse rates are adverse due to the loss of renewal premiums and the expense recovery that they provide.<sup>1</sup> After 2015, high lapse rates are favorable due to the elimination of future claims liabilities. In 2014–2015 these risks largely offset so the total risk due to lapse rates is minimal at that time.
- Default cost risk is comparable in size to interest rate risk. This is dependent, of course, on the assumed quality of the investment portfolio, which in this example is on the low end of investment grade.

- Expense risk is not material. Therefore, as with FIAs with GLIBs, it would not need to be included as a KRD.

### UNIVERSAL LIFE WITH SECONDARY GUARANTEES

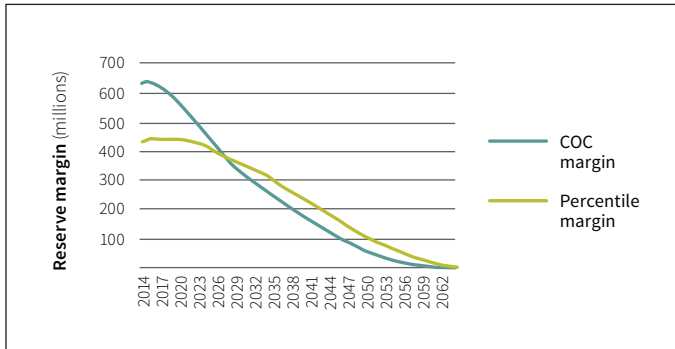
ULSG provides a fixed benefit amount upon death at very low cost. The basic contract takes the form of universal life insurance with flexible premiums. A secondary guarantee ensures that coverage will remain in effect even if the contract's account value declines to zero, as long as a shadow fund remains positive. The premium level needed to keep the shadow fund positive is much lower than that needed to keep the account value positive. This leads to the two main characteristics of a ULSG contract: a low premium for lifetime coverage and a small or zero surrender value.

The ULSG contract used for this testing was meant to represent the competitive low-premium end of the estate protection market. When the minimum premium is paid, the account value never accumulates to a large amount and goes to zero fairly quickly. For purposes of this testing, all policy owners were expected to pay the minimum level premium. Two different ULSG contracts were priced for this study: male issue age 50 and male issue age 70. Full details of assumed experience and other pricing assumptions are in the Phase 2 report on ULSG at [www.blufftop.com/RSM/Kansas.html](http://www.blufftop.com/RSM/Kansas.html). The KRDs were determined to be mortality, mortality improvement, lapse, interest, default costs and expenses.

Figure 4  
Comparative Reserve Levels (\$millions)

	RSM with Percentile Margin	Stochastic CTE 70	% RSM-CTE 70	RSM COC margin	Stochastic margin	% RSM-CoC	VM-20 Deterministic	VM-20 Stochastic
2014	204	189	8%	403	429	-6%	942	981
2019	2,112	2,061	3%	2,252	2,231	1%	2,732	2,766
2024	3,864	3,782	2%	3,913	3,808	3%	4,344	4,367
2029	4,964	4,883	2%	4,943	4,857	2%	5,313	5,334
2034	4,921	4,845	2%	4,867	4,800	1%	5,143	5,170
2039	4,089	4,028	2%	4,031	4,001	1%	4,227	4,254
2044	3,487	3,436	1%	3,430	3,402	1%	3,562	3,587
2049	3,074	3,046	1%	3,023	3,009	0%	3,108	3,123
2054	2,430	2,414	1%	2,392	2,383	0%	2,434	2,442
2059	1,360	1,352	1%	1,340	1,336	0%	1,353	1,356
2064	497	496	0%	491	491	0%	494	494

Figure 5  
Margins Over Time



From the testing, the reserves under RSM and the fully stochastic reserves were not as similar as for level term insurance, as shown in Figure 4. The reserves under RSM were slightly higher than the fully stochastic reserves, with the percentage difference generally declining with duration.

Note in this case we also estimated two VM-20 reserves, shown in the last two columns of Figure 4. A comparison of the VM-20 reserves with the RSM and stochastic reserves makes it clear that the VM-20 reserves are materially higher in the early durations. The difference between RSM and stochastic reserves is tiny compared to the difference between RSM and VM-20 reserves. Most of that difference between RSM and VM-20 is attributable to the treatment of mortality improvement. The VM-20 reserves cannot reflect mortality improvement beyond the valuation date, but for RSM and stochastic reserves we allowed reflection of mortality improvement.

While the RSM estimates become better over time, the early durations are not as close as a percentage of the fully stochastic reserves. Note that the crossover point for the RSM with the two different aggregate margins is just beyond the 10th duration in this projection.

Figure 5 compares the aggregate margins under the two methods over time. Unlike the graph for level term, a log scale is not used, resulting in a somewhat different shape as compared with term.

The main difference between these two margin methodologies is again apparent from this graph. The COC margin tends to be larger when the business still has a long period to run. However, the COC margin is released faster, and crosses over and becomes lower than the percentile margin. The crossover point for the two different aggregate margins is just beyond the 10th duration in this projection.

The results in Figure 6 show that in the case study of ULSG the margins estimated using RSM are a bit more conservative than

Figure 6  
RSM vs. Stochastic Margins

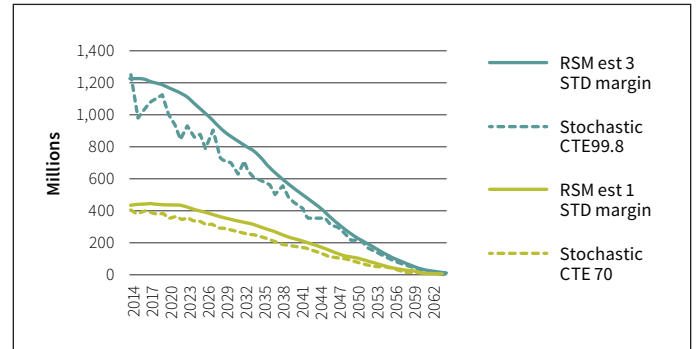
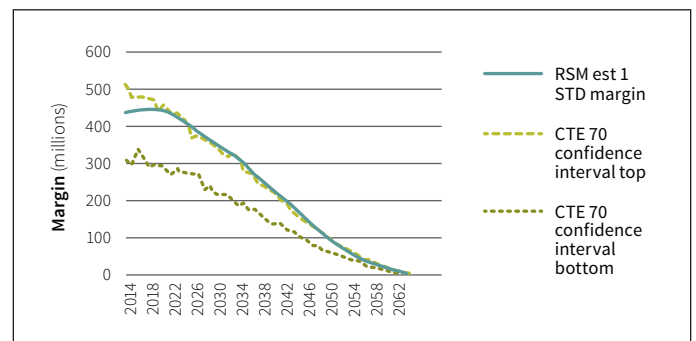


Figure 7  
RSM Percentile Margin vs. CTE 70 Confidence Interval (100 Scenarios)



those estimated using full stochastic analysis. This contrasts with the results previously obtained for level premium term, where the margins estimated using RSM were closer to those from full stochastic analysis.

While the RSM estimate of the percentiles is higher than estimated using full stochastic modeling in this study, it is worth bearing in mind that the stochastic results are subject to estimation error. Figure 7 illustrates the 95 percent confidence interval for the CTE 70 based on a sample of just the first 100 scenarios out of the 1,000 scenarios that were used. One hundred scenarios is a much larger number of scenarios than were used to obtain the RSM figure. Nevertheless, the RSM estimate appears to be on the edge of the confidence interval for the stochastic CTE 70 estimate using 100 scenarios.

In reviewing the breakdown of risks over time, we reached the following conclusions:

- The largest risk is the interest (i.e., reinvestment) risk. Since most of the premium will be received many years in the fu-

ture, uncertainty about interest rates available in the future is a major contributor to total risk.

- Mortality improvement and lapse rates compete to be the second-largest risk. Lapse risk is surprisingly large given the low level of anticipated lapse rates on ULSG. It is the extreme case where lapses decline to effectively zero that creates this risk.
- Default cost risk is substantially smaller than interest rate risk.
- Expense risk is not material. Therefore, it would not need to be included as a KRDR.

### VARIABLE ANNUITIES WITH GLWBs

For testing this product type, we focused on a single-premium deferred VA with the following design characteristics:

- Death benefit = account value
- Blended fixed/equity fund only. Investment purely in equities is often disallowed with GLWBs.
- Free withdrawals equal to 10 percent of account value
- Surrender charges applied in first 10 years
- GLWB rider
  - Guaranteed minimum withdrawal payments equal to percentage of GLWB shadow fund when withdrawals start. Shadow fund is original single premium projected at 5 percent per annum for 20 years, 0 percent thereafter.
- Rider charges
  - Rider charges are percentage of account value and continue after start of withdrawals.

Due to the underlying variable nature of the account value mechanics, certain adjustments were made to the utilization function for GLWBs, but the function was similar to that used in the testing of FIAs with GLIBs discussed earlier.

VAs with GLWBs pose significant market-related risk to the insurer. Therefore, it is common practice to use a hedging program to reduce these risks. Through hedging, the capital requirements can be significantly decreased. However, hedging can be expensive, and the cost of hedging must be balanced against the savings from reduced capital requirements.

In practice, very refined hedging programs are often used. For purposes of this testing, a simple strategy has been used in order to illustrate how hedging can reduce reserve and capital requirements, with the understanding that more refined hedging might increase that effect.

The hedging program used in this case study involves the purchase of a specified package of options at the beginning of each year, with settlement of those options (and purchase of new ones) at the end of the year. The package of options represents a simple delta hedge on stock market movements that protects against severe downside risk. The cost of downside protection is reduced by giving away some upside. More specifically, the package includes:

- For downside risk: a put option that covers losses from a stock market return that is more than 12 percent below the risk-free rate
- For upside: a pair of call options (long and short) that give away 25 percent of stock market returns in excess of 5 percent over the risk-free rate, but not past 15 percent over the risk-free rate

The notional amount of the hedges at time of purchase is 60 percent of the account value on the VAs at that time. That represents the portion of account value of the blended investment fund that is invested in the stock market.

This simple hedging program could be refined in many ways in practice, but such refinement was not modeled for this study. Potential refinements include:

- Add some sort of hedging on interest rate movements.
- Change the delta hedge over time based upon stock market returns in previous periods. For example, if the stock market rises, the downside risk gets more remote and the strike price of the put option could be reduced.
- Make the hedge program dynamic. This would allow inclusion of options for terms longer than one year, with dynamic management of the option portfolio (settlement of some options and purchase of others) as conditions change.

Such refinements could reduce overall risk further, thereby reducing required reserve margins and capital requirements below those illustrated here. Nevertheless all hedging has a cost that must be balanced against such potential benefits.

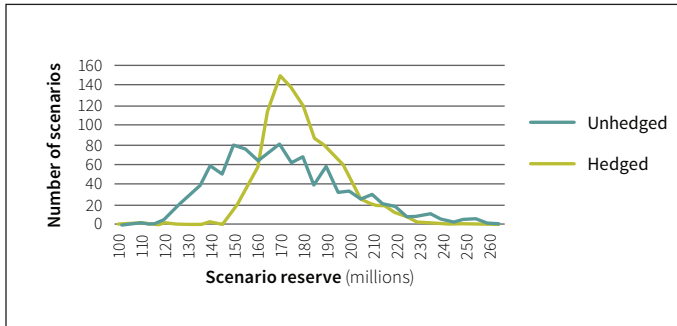
Figure 8 illustrates the cost/benefit trade-off of the simple hedging program used in this study. The distribution of 1,000 stochastic scenario reserves was determined both with hedging and without hedging.

Figure 8 shows clearly that the hedged distribution is different from the unhedged distribution in two significant ways:

1. The hedged distribution is narrower, with more scenarios in the center and fewer in the tails. Also, the extreme tails are not as far from the center.



Figure 8  
Distribution of Scenario Reserves



2. The hedged distribution is shifted to the right, indicating a higher average or central value. This increase in the average reserve represents the expected cost of the hedging.

Numerically, these effects are illustrated by the mean and the CTE 70 of the two distributions:

	Unhedged	Hedged
<b>Mean</b>	\$168.8 million	\$177.2 million
<b>CTE 70</b>	\$202.8 million	\$197.2 million

Hedging increases the mean due to the added cost of hedging. But hedging reduces the CTE 70 because of the protection against downside risk.

More details regarding the modeling assumptions and other information related to the testing can be found in “Phase II—RSM Field Test Report for VM-21,” available by request to Nicole Boyd of KID at [NBoyd@ksinsurance.org](mailto:NBoyd@ksinsurance.org). For this product design, the KRDs were determined to be mortality, lapse, GLWB utilization, expenses, equity returns and interest.

Figure 9 summarizes the results of the modeled reserve calculations using both the RSM scenarios and 5,000 fully stochastic scenarios, for which all the KRDs varied stochastically in each scenario.

Note that all the modeled reserves calculated more fully reflect the risks associated with this product design than does the Standard Scenario reserve, which in this case is less than the cash surrender value.

In this case, the RSM reserve with the percentile margin is not a good estimate of the fully stochastic CTE 70 reserve. The reason is that hedging changes the mapping between experience levels and investment returns so that investment returns in the

Hedging increases the mean due to the added cost of hedging. But hedging reduces the CTE 70 because of the protection against downside risk.

tail produce about the same scenario reserve as investment returns at, say, the one standard deviation level. Such a scenario reserve is at a very high percentile level in the full stochastic distribution.

Basically, RSM assumes lower investment returns lead to higher scenario reserves. But when hedging is in place that may not be the case, so the small number of RSM scenarios do not provide a good indicator of the full distribution. However, the RSM scenarios do still provide a good indication of where the tails are.

In looking at the aggregate margins calculated using the COC and percentile methods, the comparison we observed for this VA product was different from that observed for the life insurance

Figure 9  
Comparative Reserve Levels (\$millions)

Item	Reserve	% of Account Value
Account Value	206.4	100.0%
Cash Surrender Value	186.3	90.3%
Standard Scenario Reserve	178.2	86.3%
<b>Modeled Reserves</b>		
RSM (COC margin)	204.5	99.1%
Fully Stochastic (COC margin)	203.7	98.7%
RSM (percentile margin)	212.1	102.8%
Fully Stochastic (CTE 70)	197.2	95.5%
<b>Aggregate Margins</b>		
RSM (COC margin)	20.6	10.0%
Fully Stochastic (COC margin)	26.3	12.7%
RSM (percentile margin)	28.2	13.7%
Fully Stochastic (CTE 70)	21.7	10.5%

# SOA Explorer Tool

Find Fellow Actuaries  
Around the Block or  
Around the Globe

The SOA Explorer Tool is a global map showing locations of fellow SOA members and their employers, as well as actuarial universities and clubs.

[Explorer.SOA.org](http://Explorer.SOA.org)



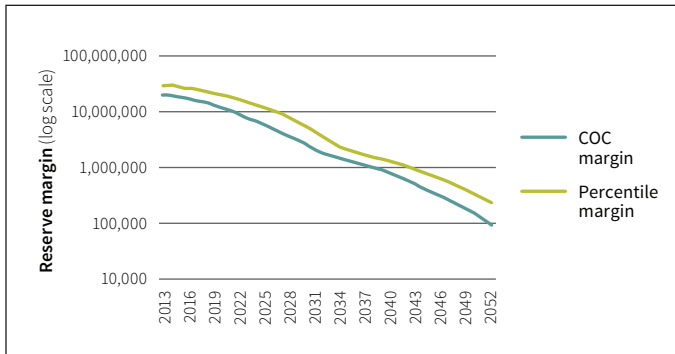
**SOCIETY OF  
ACTUARIES**



products. For VAs, the COC margin was consistently lower than the percentile margin as shown in Figure 10.

Two observations can be made regarding this comparison of margins over time for VAs with GLWBs:

Figure 10  
Margins Over Time



1. The COC rate used to calculate the COC margin has not yet been set. For the VA case study we used 4 percent, but this could easily be calibrated to a higher value if the desire was to bring the margin under the two approaches closer together for this product.
2. For life insurance products, we observed a crossover by duration in the margin under the two methods. We stated that for products with a long remaining lifetime, the COC margin tended to be higher than the percentile margin, but it was released faster. For products with a short remaining lifetime, the COC margin would be lower. Actually, that remains true if one understands the measure of “remaining lifetime” in use. The “remaining lifetime” for this purpose is the ratio of the PV of the COC in all future years to the COC in the first projected year. When that ratio is high, the COC margin is

It is hard to see how the regulator frustration with life insurance reserve work-arounds such as lines of credit and captive reinsurers will be resolved without some recognition of the trend of mortality improvement.

greater than the percentile margin, and vice versa. In the case of the VAs with GLWBs we simulated, the relatively high assumed lapse rates and contract withdrawal rates made the capital requirement reduce more quickly over time and made that ratio much lower than for the life insurance products. In short, the “remaining lifetime” was shorter for VAs, and the relationship between the COC margin and the percentile margin reflects that.

In reviewing the breakdown of risks over time for VAs with GLWBs, we reached the following conclusions:

1. In the early contract years, equity return risk is the most significant risk by far followed by interest, increased by the impact of dynamic surrenders and GLWB utilization related to ITM-ness.
2. Over time, mortality becomes the dominant risk.
3. As with the other product types, expenses could be left out as a KRD.

#### MAJOR CONCLUSIONS AND NEXT STEPS

1. Based on the results of these tests, two refinements to RSM have been made. The first is to separate the investment risk drivers for interest and equity risk. The second is to change the COC rate used in calculation of the COC aggregate margin from 6 percent to 4 percent.
2. Initial RSM results can lead to paring down the number of KRDs. In these tests, the small impact of expense variations suggested removing expense as a KRD.
3. Mortality improvement is a significant issue in the analysis of the two life insurance products tested. We believe that realistic central estimates would reflect some degree of future mortality improvement, but that reserve margins and minimum capital requirements for life insurance must be adequate in the case of no improvement. It is hard to see how the regulator frustration with life insurance reserve work-arounds such as lines of credit and captive reinsurers will be resolved without some recognition of the trend of mortality improvement. Note that when mortality improvement is a KRD, the variation around the current (best) estimate assumption for mortality improvement is included in the calculation of the aggregate margin using either the COC or percentile method. If regulators required, these variations could include a scenario where there is no mortality improvement, building that requirement into the aggregate margin.
4. The accuracy of the RSM approximation of the percentile margin is impacted by factors significantly affecting the shape of the distribution of the fully stochastic scenario amounts, such as hedging and possibly reinsurance and other



factors. Hedging had a significant impact on the shape of the stochastic distribution of scenario amounts for the VAs with GLWBs that were tested, so for this product type RSM did not provide a good estimate of the percentile margin (see point 7). The accuracy of the RSM approximation to the extreme tails of the distribution seems less affected by this issue. RSM with a COC margin (where capital is based on the tails of the distribution) seems to be a good approximation to fully stochastic reserving if the COC approach to the margin is accepted.

5. If the percentile approach to the aggregate margin is strongly preferred over the COC approach, a fully stochastic reserve employing scenario reduction methods may be a better approach than RSM in some situations, such as VAs with GLWBs. In this case, the number of stochastic scenarios used can be reduced significantly if the resulting CTE measure is increased by a measure of its potential statistical error. The variance or standard error of the CTE can be calculated, and the CTE plus two standard deviations could be used (in place of the CTE itself) as the reserve level. In this way each company can choose a “sweet spot” that balances the number of scenarios with the level of the approximation of the fully stochastic reserve. The use of a larger number of scenarios would reduce the add-on to the CTE and, with a high degree of probability, reduce the reserve. Additional research of an approach that combines RSM and full stochastic scenarios may be undertaken for potential use if a percentile margin is preferred.
6. For all four product types tested, the modeled reserves (both RSM and fully stochastic with either the COC or percentile aggregate margins) better reflect the risks associated with the assets and liabilities than the statutory requirements currently defined in CARVM, VM-20 and the Actuarial Guideline (AG 43) Standard Scenario.

7. As of this writing we are working on a case study applying RSM to long-term care insurance, using all the lessons learned so far and building on the previous work of the AAA's Long Term Care Work Group (LTCWG). An additional refinement to RSM, increasing the number of RSM scenarios somewhat for the KRDs contributing to the largest variations from the result of the anticipated experience scenario, will be tested as to whether this refinement improves the approximation of the fully stochastic CTE 70 reserve.
8. Develop sample demonstrations that would allow RSM to qualify as an approximation method for PBR reserves per VM-20, AG 43, VM-21 and other relevant VM sections, including VM-22, currently under development. ■



Mark Birdsall, FSA, MAAA, MBA, is a consulting actuary with Lewis & Ellis in Overland Park, Kan. He has been working on a number of initiatives to improve actuarial modeling to properly reflect multiple material risks and establish meaningful margins. He can be reached at [mbirdsall@lewisellis.com](mailto:mbirdsall@lewisellis.com).



Steve Strommen, FSA, CERA, MAAA, is an independent consultant and owner of Blufftop LLC. He has more than 35 years of life insurance industry experience and specializes in financial modeling, risk management and principle-based reporting. He can be reached at [stevestrommen@blufftop.com](mailto:stevestrommen@blufftop.com).

#### ENDNOTE

- <sup>1</sup> The measurement we used for whether a change in lapse rates was favorable or unfavorable was the effect on the present value of future cash flows. This is different from measuring whether the change in lapse rates creates a statutory gain or loss. The statutory gain or loss is often dominated by the release of statutory reserves, which is not a cash flow but does increase the statutory gain associated with an increase in lapse rates. If measured by whether there is a statutory gain or loss, high lapse rates on term are almost always favorable to the company.

# Regulatory Update

By Karen Rudolph

This material was prepared Dec. 12, 2015. At time of publication, actions noted in this article may have changed due to later regulatory meetings and decisions. Readers are encouraged to periodically check the [NAIC.org](http://NAIC.org) website or refer to the Smaller Insurance Company Section website ([soa.org/sic](http://soa.org/sic)) to find the most recent news. Opinions expressed in this article are solely those of the author, and not the Smaller Insurance Company Section or the Society of Actuaries.

## ITEMS OF IMPORTANCE FOR THE SMALLER COMPANY ACTUARY

This article includes items of importance in the regulation of individual life and annuity policies. Every company situation is different, making it difficult to pinpoint which of the regulatory developments is critical to the Small Talk audience. Readers will want to be at least peripherally aware of all developments; however, common areas of importance for smaller companies may include:

- Progress of state adoption of the principle-based reserving (PBR) legislation
- Planning for the 2017 Commissioners Standard Ordinary (CSO) valuation mortality table
- Proposed definition of a secondary guarantee and whether this impacts the company's plans for PBR implementation and/or product development
- Proposed clarification of the Net Premium Reserve (NPR) method for purposes of calculating the deterministic exclusion test
- Following the progress of the simplified issue, guaranteed issue and preneed valuation mortality tables

## PBR STATE ADOPTION STATUS

Currently 39 states representing 71.78 percent of premium, measured as stipulated by Section 11 of the Standard Valuation Law (SVL), have adopted the SVL and Valuation Manual providing for PBR methodologies. These states are: Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida,

Georgia, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Rhode Island, South Dakota, Tennessee, Texas, Vermont, Virginia, Wisconsin and West Virginia. The version adopted by each state will be reviewed to establish whether the language provides for "substantially similar" provisions when compared to the model law of the National Association of Insurance Commissioners (NAIC). Only those states in which the adopted law is deemed substantially similar will be counted toward the 42-state and 75 percent of premium totals.

## FALL 2015 NAIC MEETING

The focus of the following paragraphs is the Life Actuarial Task Force (LATF) of the NAIC and activity taken at its meeting held in November 2015. Please refer to [www.naic.org/committees\\_a\\_latf.htm](http://www.naic.org/committees_a_latf.htm) for more detail.

### Valuation Manual Version

In recent months, updated versions of the Valuation Manual have been more frequently posted to the NAIC website. The version currently available includes language consistent with the adoptions of LATF and (A) Committee as a result of the November 2015 meeting. This language is found as tracked changes in the document and denotes provisions adopted by LATF and (A) Committee, but not yet adopted by NAIC Executive and Plenary. Many of these newly adopted provisions are noted in the following paragraphs.

### 2017 Commissioners Standard Ordinary Mortality Table

Language implementing the 2017 CSO mortality table for nonforfeiture was adopted into the Valuation Manual. For nonforfeiture, the 2017 CSO is required for policies issued on or after Jan. 1, 2020. For policies issued on or after Jan. 1, 2017, and prior to Jan. 1, 2020, the 2017 CSO is available for use at the company's option. Similar to current rules, the preferred version of the 2017 CSO is not available for use in calculating nonforfeiture values. These provisions can be found in VM-02 Section 5.A.

For statutory valuation, the 2017 CSO will become the minimum standard for policies issued on or after Jan. 1, 2020, and may be used for policies issued on or after Jan. 1, 2017, and prior to Jan. 1, 2020. These provisions can be found in VM-20 Section 3 and VM-M. Conditions for the use of the 2017 CSO Preferred Structure tables are similar to conditions for the use of the 2001 CSO Preferred Structure tables (Model 815). For companies electing to establish minimum reserves under VM-A and VM-C for business otherwise subject to VM-20 and issued during the first three years following the operative date of the Valuation Manual, Section II of the Valuation Manual under Life Insurance Products now provides for the 2017 CSO at the option of the company.



## VM-20 Mortality Credibility and Margin Provisions

Mortality credibility measurement follows a prescribed methodology. For valuations in which the industry table is the 2015 Valuation Basic Table (VBT), the company has the option of using one of two methods:

- The Limited Fluctuation method by amount, with the relative error in the estimate being 5 percent, with a 95 percent probability
- The Bühlmann Empirical Bayesian method by amount

Each credibility method has a table of prescribed mortality margin percentages. The percentages vary by attained age and credibility level within the given table. For example, for attained ages less than 47, the Limited Fluctuation method margin is 10.0 percent for credibility of 43 to 47 percent. The Bühlmann method margin is 10.3 percent for credibility of 78 to 82 percent. Companies may want to evaluate credibility under each method. The prescribed grading of company rates with margins to industry rates with margins does not vary by credibility method.

## VM-20 Default Cost Tables

An update to the VM-20 asset default cost tables was adopted. These tables are developed using Moody's data through December 2014. With the inclusion of more recent data, many of these prescribed cost factors have increased when compared to the earlier table.

## Valuation Manual Amendment Proposals Exposed for Comment

Many amendment proposals have been submitted and exposed for comment. These proposals are important clarifications and refinements to the requirements of the Valuation Manual. To be clear, these are proposals, not adopted changes.

- The definition of the term “secondary guarantee” as a guarantee that a policy will remain in force for more than five years (the secondary guarantee period) even if its fund value is exhausted, subject to one or more conditions. This definition, together with the footnoted condition regarding secondary guarantee periods of five years or less, is consistent with the definition of secondary guarantee found in Model 380, Section 3.
- A proposal clarifying assumption modifications made to the NPR calculation when performing that calculation for purposes of the Deterministic Exclusion Test for term insurance policies—specifically, that annual lapse rates are 0 percent and the shock lapse rate at the end of the level premium period is 100 percent. For annually renewable term policies, the test should consider premiums for the duration of the policy. Lastly, if using the mortality that the company expects to emerge produces a net premium greater than the net premium that would be produced when using the

Many amendment proposals have been submitted and exposed for comment.

valuation mortality, the company shall use the mortality it expects to emerge in determining the net premium for the exclusion test.

- A proposal specifying the determination of the PBR Credit Rating for commercial and agricultural mortgage loans. For these mortgages, the company uses the numeric rating corresponding to the NAIC CM or commercial mortgage category that is assigned by the company consistent with the NAIC RBC instructions. This numeric rating would be used to point to the appropriate PBR Credit Rating in VM-20's Table K. The link between the CM designations and PBR Credit Rating already exists in Table K. For example, an NAIC CM designation of “1” equates to a PBR Credit Rating of “7.”
- Because all the tables found in VM-31 are also part of the annual statement blank, a proposal has been submitted for changes to the requirements of VM-31 whereby the tables are removed. Without this proposal, the tables from the annual statement would be duplicated in the PBR Actuarial Report.
- The scope of the PBR Actuarial Report required by the Valuation Manual and specified in VM-31 is proposed as being required only for those companies that compute a deterministic reserve or stochastic reserve for any in-force policies. For companies that do not compute any deterministic or stochastic reserves as a result of passing exclusion tests, these companies must also develop the PBR Actuarial Report, but only the sections pertaining to the exclusion tests.
- VM-20 includes many references to the phrase “minimum reserve” in places where, under the current requirements, “modeled reserve” is intended. There is also a proposed change to the language specifying the starting asset requirement. In the current version, the requirement states: “If for all model segments combined, the aggregate annual statement value of starting assets is less than 98% or greater than the larger of NPR or 102% of the final aggregate modeled (whether stochastic or deterministic) reserve. ...” The proposal removes the NPR reference and the parenthetical.
- A proposal to remove any reference to “seriatim reserve” and instead use “modeled reserve.” The reference to seriatim reserve is left over from a much earlier time in the history of VM-20.

**VM-22**

The VM-22 subgroup working on developing PBR for non-variable annuities is leaning toward a minimum reserve definition as the greater of a formulaic reserve and modeled reserve. They also intend to have an exclusion test defined specifically for non-variable annuities. Whereas at one time this group was pursuing a method termed “Representative Scenario Method” for the modeled reserve component, this method has been dropped for the time being.

**Joint Project Oversight Group—Guaranteed Issue, Simplified Issue and Preneed Mortality Tables**

LATF heard an update on the development of these tables and the loading of each. There remains work to be done on these tables before they are ready for use in the industry.

For guaranteed issue (GI) business, an experience table and a draft of the valuation table have been constructed. Work continues on finding the appropriate loading levels.

For simplified issue (SI), the group is considering data collected from 30 companies. Even with this number of companies, there is a shortage of applicable data at longer durations and younger ages. The group expects to develop a full 25-year select and ultimate table. They are looking for industry feedback on appropriate loading structures and valuation standards for business issued with this underwriting type. The SI underwriting framework and tools have changed rapidly in recent years, making the data used to support these tables somewhat out of step with current SI procedures such as prescription drug scoring and other scoring algorithms.

Preneed insurance data submitted by the industry represent a high percentage share of the industry, despite the fact that only 11 companies contributed such data. The data is primarily unisex, so the team expects to first develop unisex preneed tables, then develop gender-specific tables after establishing the loading structure. As with SI, the team is looking to industry and LATF on appropriate levels of loading should the table be used for valuation.

**PBR Pilot Project**

The PBR Pilot Project is under the authority of the PBR Review Procedures Subgroup. The project will enlist many participating companies as well as regulators, and will be a pilot focused more on the process than on the reserve outcomes. The companies will be producing the PBR Actuarial Report as outlined in VM-31 as part of the pilot, the PBR supplement for the annual statement, as well as computing reserves and exclusion tests according to VM-20. Companies will be asked to apply VM-20 to various product types over several years of assumed new business. The goal of the PBR Review Procedures Subgroup is to have the companies on board in time to perform this work with

a completion date of year-end 2016. Through this process, the American Academy of Actuaries and SOA working groups familiar with the PBR process and requirements may be called on to assist with clarification questions.

**NAIC to License Modeling Software**

The NAIC is currently evaluating actuarial modeling software for its use in moving to a PBR valuation environment. Having such software available is expected to address concerns that a principle-based environment with modeled reserves will complicate the audit process. The software will support the exam process, helping the NAIC to better evaluate and calibrate company models. The NAIC is staffing up to address PBR needs. Actuarial staff hired specifically to address PBR needs going forward will work with the Valuation Analysis Working Group (VAWG) to encourage states to apply uniform interpretations and consistent application of PBR requirements.

**Actuarial Guideline XXXIII**

The actuarial guideline “Determining CARVM Reserves for Annuity Contracts with Elective Benefits” (AG 33) had previously been amended by LATF, and these amendments were adopted in September 2015. NAIC Executive/Plenary adopted these changes at the 2015 Fall National Meeting. These edits specify that actuarial judgment should be used in determining the appropriateness of applying any non-elective incidence rates other than mortality. These changes impact valuations for 2015 year-end. The amended guideline can be found on the [NAIC.org](http://NAIC.org) website and also in the *Accounting Practices and Procedures Manual*.

**NAIC Streamlining Project**

The NAIC is working with Actuarial Resources Corporation to develop a template to improve the structure and flow of statutory actuarial reporting. At present, a company reporting on a statutory basis may have up to 19 separate actuarial reports or submissions for the ordinary life and annuity lines of business. This makes for cumbersome review from the regulatory side, and for an overabundance of reports from the company side, with much duplication. The streamlining project seeks to develop a template a company can use to organize and submit its actuarial reports efficiently in a logical package, easing the submission to states. Several companies are on board with respect to beta testing the proposed template. ■



Karen Rudolph is principal and consulting Actuary at Milliman Inc. in Omaha, Neb. She can be reached at [karen.rudolph@milliman.com](mailto:karen.rudolph@milliman.com).

# Benefits of Volunteering with the Smaller Insurance Company Section

By Brad Shepherd

**H**ave you recently considered volunteering within the actuarial profession? If so, becoming a “friend” of the Smaller Insurance Company Section (SmallCo) is a great way to start. Most people who volunteer do so because someone asked them. If no one has asked you recently, feel free to consider this article your personal invitation!

If you haven’t volunteered before, you can probably think of many reasons not to. Maybe you’re too busy and stretched thin. Maybe you think you don’t have anything of significance to contribute. Maybe you think you won’t get anything out of it. There are many reasons we can think of to not get involved, but by not doing so you may be missing out on many valuable career benefits.

Overall section membership has been declining the past few years—not just for SmallCo, but most sections—and that’s unfortunate considering all the good work that sections do. One of the consequences of smaller section membership is that the pool of potential volunteers shrinks too. SmallCo has been very fortunate to have a core group of volunteers for a long time—we like the saying that “many hands make light work”—but in order to accomplish all that we need to do and keep the work light, we have to consistently work to recruit new volunteers.

With that in mind I’d like to share a little bit about how I got involved with the section and some of the benefits of volunteering—either with SmallCo, or with another section.

I was a new ASA when I first became involved. I was working at a very small life insurance company—we had two actuaries including me—and I’d been fortunate enough to attend a few Society of Actuaries (SOA) meetings, but never really knew about sections or the roles they serve. It never occurred to me how meetings were planned, and I certainly didn’t realize that almost all of the program is put together by volunteers.

A little over three years ago I was asked to run for section council, and I ended up winning a seat. My three-year term recently expired, but I look back and it’s been a very good experience for me professionally. I look forward to staying involved as a friend of the section. Friends of the section can be involved in every

way that an elected council member can be, except that they can’t vote (and the council doesn’t have a lot of votes).

Starting out, I was doubtful that I’d be able to contribute anything much of value. I soon learned that the beauty of the SmallCo dynamic is that you can contribute as much or as little as you want. Even though we don’t all have the same talents—and some of us have more experience than others—everybody has at least something to contribute.

If you do decide to volunteer, then what can you expect? Personally, learning something new is a major reason I volunteer. In an ideal world, we would learn something new in our jobs every day, but sometimes our normal duties don’t provide all that we need in order to develop professionally in the way that we’d like. Volunteering with a section is an excellent way to fill in those gaps—especially as it relates to what we tend to call “soft skills.”

For example, if you have a desire to be a leader in your organization, you can certainly hone those skills by volunteering in areas that require you to help make decisions or help set plans in motion in some way. Also, when you work with other people,

Personally, learning something new is a major reason I volunteer. In an ideal world, we would learn something new in our jobs every day, but sometimes our normal duties don’t provide all that we need in order to develop professionally.

you aren’t always going to agree on priorities or the best way to accomplish something. When you volunteer with a section, you will be working with people who, although you may share the same “big picture” goals, may disagree on how to prioritize those goals or how to best accomplish them.

Most likely, if you are to meet your full potential as an actuary (especially if you work in a small company and/or have aspirations for a management role), you must be able to clearly communicate your work to other people. That doesn’t come naturally to a lot of people in our profession—myself included. Volunteering with a section gives you plenty of opportunity to hone those skills—whether you’re participating in a conference call about actuarial issues, writing a newsletter article, or presenting a topic within a webinar or a meeting, those are all great ways to practice conveying important information.

One of the most beneficial ways I became involved with the section was to volunteer to present a webinar. It's really one of the easier ways to get involved in public speaking. A webinar requires the same amount of planning as a live presentation, but you don't have to dress up or stand in front of a large group of people. If that sort of thing gives you anxiety, then presenting a webinar can be a good way to get your feet wet.

Maybe the most important benefit to volunteering is simply having another avenue to stay updated on current issues within our profession. It's hard to keep up with it all: new guidelines, accounting practices, reserving standards. ... The actuarial profession is in a constant state of change, and if you have limited resources or budget then only the squeaky wheel will get the oil. The problem is that there are sometimes too many squeaky wheels. It's very easy to enter into a potentially dangerous cycle where you are always behaving reactively as opposed to proactively.

Fortunately, part of the mission of SmallCo is to help filter this information and pass along the items that are important to our members. In this way SmallCo prides itself on practicality, getting relevant information to its members. Taking part in SmallCo-sponsored meeting sessions is one way to get that information, but even then you're just still just getting a high-level overview of things. When you're actually responsible for researching an issue and making sure you understand it well enough to teach other people, you end up with deeper understanding than you would by just listening to someone else's presentation.

Another great reason to get involved with a section is the networking aspect. If you work in a small insurance company or small consulting firm, you may not have the network of contacts that you would gain by working at a larger company. Smaller company actuaries are always challenged with doing more with less, and not everyone understands that situation unless they've been in those shoes before. Sometimes it's good just to have a few trusted people that you can bounce ideas off of. You meet new people when you volunteer, so there's a lot of opportunity to build that network of actuaries who you trust to talk to about certain issues.

Finally, volunteering allows you to contribute something to the profession. No matter your level of expertise or experience, we all have something to contribute. We're a relatively small profession, and one of the good things about that is a relatively small group of people can make a significant impact.

If you've got a good idea about something SmallCo should be doing, and—even better—if you'd be willing to help us out by volunteering, feel free to contact me personally, or contact any section council member and we'll be glad to let you know how to get involved. ■



Brad Shepherd, FSA, MAAA, is a client support specialist with GGY AXIS in Lexington, Ky. He can be reached at [brad.shepherd@ggyaxis.com](mailto:brad.shepherd@ggyaxis.com).





# LIVING to 100

SOCIETY OF ACTUARIES  
INTERNATIONAL SYMPOSIUM

Jan. 4–6, 2017  
Orlando, Florida

## Save the Date

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

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





# SOCIETY OF ACTUARIES

475 N. Martingale Road, Suite 600  
Schaumburg, Illinois 60173  
p: 847.706.3500 f: 847.706.3599  
w: [www.soa.org](http://www.soa.org)