SOCIETY OF ACTUARIES

The Actuary

OCTOBER/NOVEMBER 2011 VOLUME 8 ISSUE 5

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Read questions from the new exams

FINANCIAL REPORTING CHANGES

Are you on top of the game?

WILL THERE BE ENOUGH DOCTORS?

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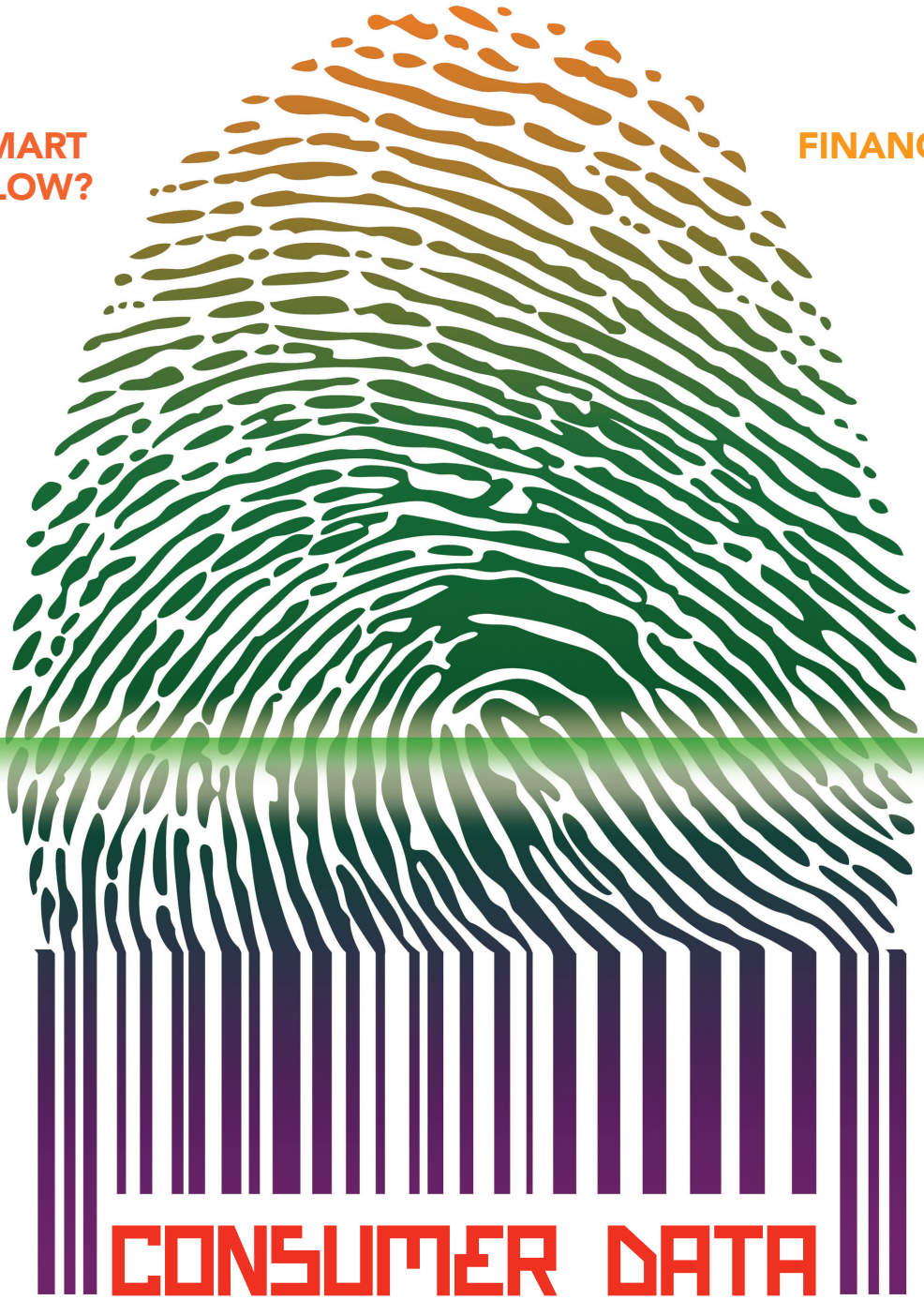

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Oct/Nov

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CONTRIBUTING EDITORS

Corin Chapman, FSA, MAAA
corin.chapman.rog2@statefarm.com

Peter Hayes, FSA, FCIA
phayes@eckler.ca

David Ingram, FSA, CERA, MAAA
dave.ingram@willis.com

Cathy Lyn, FSA, FIA
clyn@sympatico.ca

Tom A. Phillips, FSA, MAAA
phillips.tom@principal.com

James Ramenda, FSA, CERA
jramenda@sscinc.com

Sue Sames, FSA, MAAA
sue.sames@towerswatson.com

Ross Winkelman, FSA, MAAA
rossw@wakelyconsulting.com

Ruth Ann Woodley, FSA, MAAA
ruthann@ruarkonline.com

SOA PRESIDENT

Donald J. Segal, FSA, FCA, MAAA, EA
dsegal@soa.org

SOA STAFF CONTACTS

Patrick Gould
Managing Director of Marketing & Communications
pgould@soa.org

Lisamarie Lukas
Director of Communications
llukas@soa.org

Karen Perry
Publications Manager
kperry@soa.org

Jacque Kirkwood
Senior Communications Associate
jkirkwood@soa.org

Sam Phillips
Magazine Staff Editor
sphillips@soa.org

Erin Pierce
Graphic Designer
epierce@soa.org

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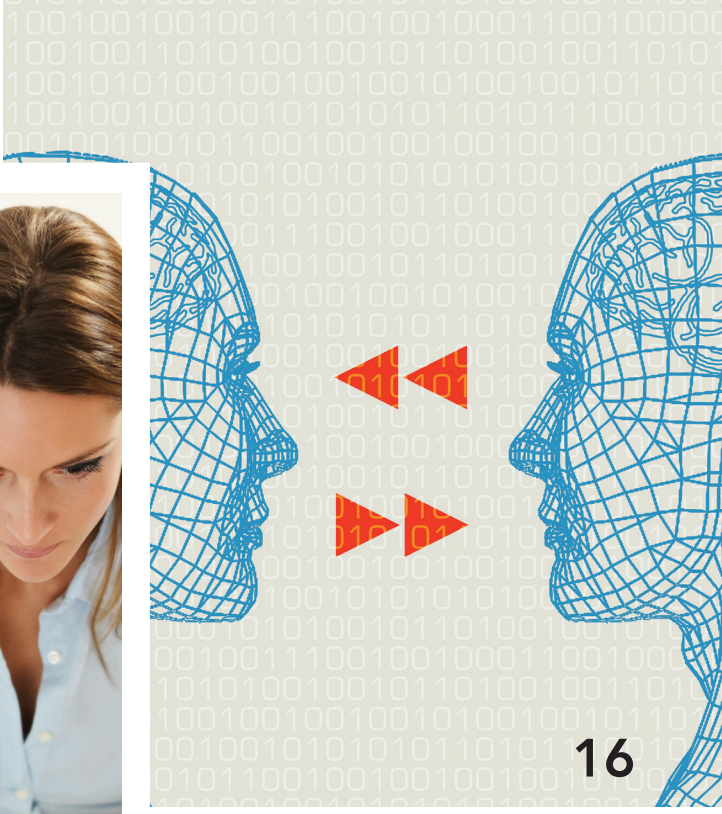

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Editorial

WHAT'S YOUR WHY?

BY PETER HAYES

"IT DOESN'T MATTER WHAT YOU DO, IT MATTERS WHY YOU DO IT."

I had the pleasure of seeing Simon Sinek speak at a luncheon last year. He's the author of *Start with Why*, and his main theme is captured in the quote above: those that are most successful in inspiring others—in showing leadership that others will follow—understand the why. According to Sinek, most of us understand how we do things and what those things accomplish, but we never get to the question of why we do them.

I've thought about that message a lot since I heard it, particularly as it pertains to the work I do for clients. I have become amazed at how often management communicates change to staff by simply announcing "this is what we need to do," without ever articulating why they need to do it. Sometimes it's outright survival, but the reality is that changing something is the how to survival's why. How often have we all experienced difficulty in our business lives implementing change and striving to overcome frustrating resistance—all because those on the other end never understood why?

We can look at other examples from, say, government, when they (unintentionally) communicate paternalism as a primary motivation for doing something: "we're doing this because (somehow) it's good for you." Think of how the U.S. health care debate might have evolved if the advocates for reform had started with an unassailable why, to which creating a healthier America was the how and health care reform the what. Here's a challenge for you: try to articulate that question of why and see how truly difficult it is to do.

I'll give you an example from Sinek: America is the richest country in the world, but its infant mortality rate remains embarrassingly high. So here's a why: let's work to let our kids live so that they can have the chance to embrace all that America, as a country, has to offer. Let's keep kids alive! How? By devoting (fill in the blank) resources to improving infant mortality. Enabled with what? Health care reform. All of a sudden the debate changes: you're not debating health care reform, you're debating whether to keep children alive long enough to survive on their own two feet and erasing a national embarrassment. There's no debate—who argues with striving for excellence when it comes to the health of infant children?

I've also considered the why question in the context of the SOA, I think at two levels: one, as a detached observer watching change take place, and thinking about how that change is communicated to the membership; and two, at a very personal level, wondering why so many of us have such an affinity to the SOA and the work that it does.

As an example of the former, think about how many changes have taken place in the administration of the exam system over the years. I started in the (now ancient) 10-exam system, that got blown up into several pieces in the late '80s, only to be reassembled, only to be disassembled—well, you get the idea. The path may not always have been smooth, but it is these series of changes that have allowed us to evolve to the excellent education and

examination system we, as a profession, have today.

What I find interesting is the level of resistance that these changes were often met with, and I wonder if it's because we sometimes don't do a terrific job of communicating why. The end result of improvements to education is that we produce better actuaries, but is this why we make changes to our system from time to time—to produce better actuaries? I'm not so sure.

Consider for a moment the race to occupy the intellectual and business opportunity space created by the heightened awareness around managing risk. It has, I believe, opened our eyes as a profession: we hold ourselves out as being uniquely trained in aspects of risk management, yet we observe others marching into what we consider our territory. Could it be that enhancing our relevance as a profession is the compelling reason to want to build a better actuary, and the means for doing so is better delivery of an actuarial education?

Think of e-learning and Fundamentals of Actuarial Practice (FAP): some still consider this a watering down of the educational opportunity, yet the evidence shows improved learning outcomes as they relate to the material covered. We're advancing the relevance of the actuarial profession (the why) by building better actuaries (the how) through the introduction of e-learning and FAP (the what), yet the criticism from some within the profession is so focused on the what that the why gets completely lost—and the long-term damage we inflict upon ourselves could very well be our ultimate demise. That's not to say that there doesn't need to be a circling back—a validation, if you will—to ensure that change, in fact, accomplishes what it is intended to do. On that note, the evidence thus far is that FAP is helping build better actuaries.

Professions are also embracing life-long learning through continuous skill improvement, and continuing professional development (CPD) initiatives by the SOA and by the CIA in Canada are examples specific to the actuarial profession. Relative to the pre-qualification education system, CPD is in its infancy, but the SOA has taken a quantum leap in developing the Competency Framework as a tool to analyze gaps and help actuaries set a personal path to ongoing education. It is very innovative.

Building better actuaries in order to continually enhance the pre-eminence of our profession represents leadership. This is much different than building better actuaries simply to try, as a profession, to survive and maintain our relevance. We will broaden our horizons as a profession—and be recognized as we do so—through continuous innovation. The means by which an actuarial education is delivered is but one small example of how this innovation can occur.

Maintaining and enhancing our education system, and developing and implementing a new CPD framework, is a ton of work, much of it done through the use of volunteers. Do you ever wonder why we do it? I have long maintained that the 20-odd years I spent as a volunteer in the exam system was, itself, the most fulfilling CPD you could ever want to get, and I suspect that many section volunteers could make a similar claim. Does that mean we volunteer because "there's something in it for me"? Or by becoming actuaries, do we develop a sense of belonging, an affinity or a tie that draws us together and makes us want to work for what we have in common—the SOA being the catalyst?

Peter Hayes

If I'm selling people on volunteering, I'm selling the "what's in it for you" as the why—"*Here are the benefits you get … how? By volunteering. At what? For Education and Exams or a section or whatever.*" It's not "you should join a section," it's "you should derive such-and-such a benefit for yourself." The how and the what are automatic followers.

Many of us, however, give back as a means of nurturing a profession that has provided us with our livelihood. I have a hard time pegging the why, despite having thought about it. Perhaps a sense of belonging to the greatest profession in the world, and sharing that sense of belonging with some very incredible people, provides an insight into why. Perhaps, deep down, it's wanting to play some small role in advancing the greatest profession, and to make it even greater. A

Peter Hayes, FSA, FCIA, is principal for Eckler Ltd. He can be contacted at *phayes@eckler.ca.*

Letter From The President

IT'S NOT JUST ABOUT THE NUMBERS

BY DONALD J. SEGAL

THE 12 MONTHS from October 2010 until now have been some of the most memorable in my life and in my career as an actuary.

I'm writing this column, not to recap what has been achieved in the past year, but to talk about what I've learned about the SOA and our profession. Serving as president provides a unique vantage point, one that I am privileged to share. Here are three things I've learned this year.

First, I've spoken to quite a few employers, who have told me that they are not looking for actuaries who know something about business, but rather they are looking for businesspeople who are actuaries. Take advantage of every opportunity to develop professionally both inside and outside your area of expertise.

As you enter or progress in your career, do you want to be a manager or a leader? Another observation I picked up is: "Hard skills are associated with authority. Soft skills are associated with leadership." Do people follow you because they have to or because they want to?

Second, employers want actuaries to take responsibility for their own careers. Think about your career path—for many of you, it probably went something like this: You go to college. In college you get a summer job. You start taking exams. You get hired by a company with an actuarial training program. You get your ASA. You get your FSA.

This is a great path toward a rewarding career, but don't rely solely on your employer to determine your next steps. Take a hard look at where you want to go, then seek out and take advantage of opportunities. Identify new areas where your skills can be put to use. Is there an opportunity to use your skills in the clean energy field? Would your skills in ALM be beneficial in China? If you see an opportunity, go for it. This advice applies to everyone—not just the young.

A noted contemporary American philosopher once said that you need to find your calling, take responsibility for your life, and use your life to serve the world. Great words of wisdom, right? Oprah Winfrey said this on her final show.

Let me illustrate this example with an actuary who fulfilled his life's calling. Last year the SOA created the Hickman Scholars program to honor Jim Hickman, former dean of the University of Wisconsin–Madison School of Business. Over his 40-year career, he made numerous contributions to our profession through teaching, research, scholarship, and serving as a member of the SOA Board of Governors and trustee of the Actuarial Foundation.

Of his life, his wife, Margaret Hickman, says:

He did not neglect involvement in community, national politics or our Presbyterian church. (He served on the national pension committee for them for many years.) He was adamant about what privileged citizens owed to those who came before him or were in need around him. He felt all of us needed to return the help we had received from our parents, our teachers, mentors and all others who had helped us along the way to achieve success. … Actuaries are very intelligent and able people. The road to that end is a hard one, but when it is achieved, it is necessary to give back.

Finally, what I've learned, and what Mrs. Hickman's story illustrates, is that our

profession is not just about the numbers. There are many professions that can claim expertise with numbers. It's about the context that actuaries provide—we give the story behind the numbers. Actuaries forecast and understand future risks, and provide valuable industry context for general business strategies. No other profession can lay claim to our expertise and insight in risk management.

Those are the three things I've learned this year. Serving as president has also confirmed something I have already known—that our credentials are world-class, and that our members are truly the best of the best.

I have traveled throughout the United States and Canada and across the world, met with actuarial clubs, universities and employers, and the best part of being president has been meeting our members and candidates! There are few things as rewarding as presenting new fellows with their hard-earned certificates at the Fellowship Admissions Course. The enthusiasm of our new FSAs is energizing, and I hope that spirit carries through for years to come.

Thanks to each and every one of you for your commitment to our profession.

I would also like to thank the SOA staff for everything you do to support our members and candidates.

It has been an honor to serve you as president of the Society of Actuaries. A

Donald J. Segal, FSA, FCA, MAAA, EA, is president of the Society of Actuaries. He can be contacted at *dsegal@soa.org*.

If you read my inaugural column or were at last year's Annual Meeting, you know that I've approached my year as president of the SOA in terms of my "five C's":

Commitment to our Profession,
Communication,
Collaboration,
Customer Focus, and
Continuing Professional Development.

This year we have seen each of these "C's" in action.

- On a daily basis, our members demonstrate their **commitment to the profession**, whether it's through the hours dedicated to volunteerism, acting as champions for the profession, or seeking out new opportunities for actuaries.
- The SOA continues to **communicate** openly and frequently with members and candidates, adding new vehicles that encourage a dialogue. Last year we started the blog, and now the SOA is on Twitter (***@SOActuaries***) and this month we are launching an SOA Facebook page geared toward candidates.
- A great example of **collaboration** this year has been the effort among the U.S. actuarial organizations to strengthen and simplify our Joint Disciplinary Process. It's our duty to uphold our profession's strong reputation by having the best process in place, and this amendment will improve our current system. I'm pleased to announce that the bylaws amendment has passed, which is an important step forward for our profession. Thank you to all of you who voted in favor of this change.
- The SOA is continually strengthening its **customer focus**. One particular group of customers is the growing number of SOA members who are outside of the United States and Canada. We are working to develop more professional development opportunities for our members in Asia, and we recently hired an SOA programs manager in the Hong Kong Joint Actuaries office to identify relevant continuing education content for actuaries in the region.
- The final "C" is **continuing professional development.** Like I said at the 2010 Annual Meeting, the key word here is "development." Our continued development ensures that we are the best of the best in risk management, and I encourage you to learn both inside and outside of your specialty area to become a leader in your field. A

THE FIVE C'S

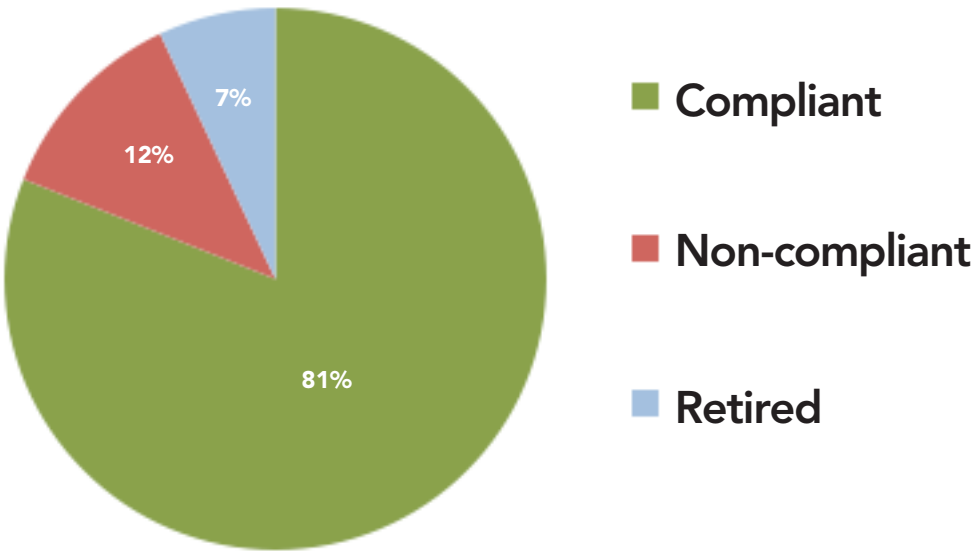
Donald J. Segal

CPD ATTESTATION THE NUMBERS ARE IN

THE FACTS, STATS AND EVERYTHING YOU WANTED TO KNOW ABOUT HOW PEOPLE MET THE REQUIREMENT, AND SOME TIPS FOR YOU FOR NEXT TIME. BY EMILY KESSLER

THE SOA CPD REQUIREMENT closed its first cycle on Dec. 31, 2010. As of that date, all members were required to attest compliance with the requirement. The SOA also completed its first audit of compliance with the requirement this spring (the requirement contains a provision that we will audit members each spring to ensure compliance with the requirement). We've had some time to review the facts and figures and wanted to share with you what we learned about how members are meeting the SOA CPD Requirement.

SOA CPD Requirement Compliance Statistics



HOW MANY MEMBERS ARE COMPLIANT?

Of our 22,346 members (as of June 2011), 17,956 have "Compliant" status (81 percent), 1,642 have "Retired" status (7 percent), and 2,748 (12 percent) have "Non-compliant" status. If we exclude members with "Retired" status, 87 percent of members have "Compliant" status and 13 percent have "Non-compliant" status. Breaking down those numbers:

- Ninety percent of the non-retired FSAs and 81 percent of non-retired ASAs/CERAs have "Compliant" status.
- Rates of attestation of compliance are highest in the countries where the SOA has the most members: more than 87 percent of our non-retired members in the United States, Canada and China have "Compliant" status. In the rest of the world, 78 percent of the non-retired members have "Compliant" status.
- Rates of attestation of compliance rates are higher for members who earned their last credential in 2000 or later than for members who earned their last

credential prior to 2000. This finding excludes members who earned their first (and only) credential in 2009 or 2010 (they were deemed compliant with the CPD Requirement for 2009–2010). Seventy-eight percent of members who earned their last credential before 2000 have "Compliant" status, versus 92 percent of those members who earned their last credential in 2000 or later.

HOW DID MEMBERS ATTEST COMPLIANCE?

We looked at how our members attested compliance as well. How many people used one of the alternative compliance standards? How many members had to use multiple methods?

There were two surprises. First, a large number of members in the United States and Canada used the provisions of Section B to meet the standard. The second, and larger, surprise was the number of people who attested to using more than one CPD compliance method in the United States. Table I shows the results.

When we looked into the results they showed that 15 percent of Canadian members and 29 percent of U.S. members who attested, complied solely through the Basic Requirement provisions. We thought maybe that new ASAs (who hadn't yet earned their FSA or FCIA) might be more likely to use the Basic Requirement provisions of Section B, particularly since those provisions provide credit for activity taken to earn the credential. This turns out to be the case in Canada, but not in the United States.

- In Canada, 90 percent of members who earned their last credential prior to 2005 complied using the CIA Qualification Standard and only 6 percent used the Basic Requirement provisions (4 percent did something else, including using multiple methods). In contrast, only 63 percent of Canadian members who earned their last credential after 2004 used the CIA Qualification Standard as their method of compliance, versus 31 percent of Canadian members who used the Basic Requirement provisions (6 percent did something else).

- In the United States, the percent complying using the Basic Requirement provision or the continuing education provisions of the U.S. Qualification Standard was essentially the same for members earning their last credential prior to 2005 and after 2004. This also holds true for those members in the United States who attested to meeting both the Basic Requirement provisions of Section B and the U.S. Qualification Standard (there is no difference by year of last credential earned).

Why do we see different behavior in the United States? We believe it's due to several factors (and this hypothesis was supported by what we saw when we audited members' compliance):

- The continuing education requirements of the U.S. Qualification Standard and the SOA CPD Requirement were enacted around the same time. U.S. members have had to learn both requirements simultaneously over the past few years. However, the CIA Qualification Requirement has been in place for a few more years, and Canadians have had to attest to meeting that requirement for several years; thus, Canadian members have had more time to understand how the separate requirements work.

- There is no requirement for members in the United States to attest that they've met the continuing education provisions of the U.S. Qualification Standard. We hypothesize that U.S. members believe they are attesting to meeting both the SOA CPD Requirement and the U.S. Qualification Standard when they attest for the SOA CPD Requirement. Hence, they check both boxes. However, they

Table I – Method of CPD Compliance, 2009-2010 Cycle

Method of Compliance	Canada	China	United States	Rest of the World
CIA Qualification only	80%	4%	<1%	6%
U.S. Qualification only	<1	1	56	3
UKAP or Australia only	<1	1	<1	21
Section B (Basic Requirement) only	15	89	29	65
Section B & U.S. Qualification	<1	3	14	3
All other multiple methods	3	2	<1	2

Excludes members who were automatically compliant because they earned their first SOA credential in 2009 or 2010 and any retired member.

What Is Professionalism Credit?

We saw a lot of different things classified as professionalism credit on audit that we weren't expecting. Here's a handy guide to some of what we saw and how it fits under the rubric of professionalism credit. Remember—depending on what compliance path you're using, you might need structured credits, and some of these examples are self-study credits. While most of these aren't professionalism credit, some of them would count as CPD credit as relevant or job-relevant credit.

EXAMPLE	IS IT PROFESSIONALISM CREDIT?
Reading publications of the actuarial organizations, e.g., *The Actuary*, *Contingencies*, CIA (e)bulletin	**NO** unless the specific article is on a professionalism topic (e.g., *Contingencies*' "Up to Code")
Reading publications/attending events covering activities of the actuarial professional organizations (e.g., Academy, CIA, SOA)	**NO** unless the speaker is specifically talking about code of conduct, standards of practice, discipline, etc. (e.g., proposal in the United States for joint discipline)
Proctoring actuarial exams	**NO**
Reading regulation topics: accounting, taxation, solvency, etc.	**NO** unless it specifically governs the practice (conduct) or licensure of an actuary (e.g., rules issued by the Joint Board covering enrolled actuaries).
Studying for an exam (in general)	**NO** unless your syllabus reading is on a specific professionalism topic, e.g., code of conduct, standards of practice; the Fellowship Admissions Course also provides some professionalism credit.
Situations where you've had to resolve internal disputes or handle matters which required an exercise of professionalism	**NO** because while these may be great examples of professionalism in practice, CPD credit is earned by learning something new; for professionalism, that learning may mean reviewing something you ought to know to be sure you understand the rules. Reviewing the professional code is a vital part of professionalism education; you want to know the rules so you can apply them without having to study them.

are misunderstanding the purpose of the SOA CPD Requirement attestation. For the SOA attestation, members are only attesting to the method of compliance; they are NOT in any circumstances attesting to being qualified to practice. It's clearer for Canadian members, because they attest twice: once with the CIA (for qualification standards) and once for the SOA (for the SOA CPD Requirement). For U.S. members, it can be easy to confuse the two.

- The SOA CPD Requirement permits methods of alternative compliance. However, the continuing education requirements of the U.S. Qualification Standard do not contain any alternative requirement provisions. You cannot use the Basic Requirement of Section B to meet the continuing education requirement of the U.S. Qualification Standard. Alternative compliance only works in ONE direction. While the provisions are very similar, there are important differences. Members practicing in the United States who issue, or who might be issuing, Statements of Actuarial Opinion should be following the continuing education provisions of the U.S. Qualification Standard.

WHAT HAPPENED WITH THE AUDIT?

In March, we randomly selected 221 names for audit. Once we eliminated members who were non-compliant, retired or were compliant because they were new ASAs, we had 153 members left to audit. Every member who sent us their records for audit was found to have complied with the requirement. For the most part, members submitted detailed records that showed they had earned CPD credits well in excess of the provisions of the requirement

Tips For Attesting

THREE TIPS FOR SOA MEMBERS LIVING IN CANADA

1. **When in doubt, focus on the CIA Qualification Standard.** The best way for most actuaries working in Canada to meet the SOA CPD Requirement will be to follow the provisions of the CIA's CPD requirements. You can use the CIA's tracking tool to keep track of your hours and provide a copy of that record to the SOA should you be selected for audit.

2. **CIA exemption does NOT apply.** If you are exempt from the continuing professional development requirements of the CIA Qualification Standard (per Section 3) you are NOT exempt from the SOA CPD Requirement. You must elect to either a) meet the Basic Requirement provisions of Section B of the SOA CPD Requirement; b) voluntarily elect to meet the CPD requirements of the CIA Qualification Standard; c) meet the provisions of an alternative compliance standard for which you might be eligible (U.S., U.K. or Australian); or d) be non-compliant with the SOA CPD Requirement. You cannot be compliant with the SOA CPD Requirement by earning zero CPD credits.

3. **Rolling two-year cycle—we're attesting again at the end of 2011.** And, don't forget we have a rolling two-year cycle. The next CPD cycle is 2010–2011, which ends as of Dec. 31, 2011. Attestation will open around Nov. 1, 2011 and go through Feb. 28, 2012.

FOUR TIPS FOR SOA MEMBERS LIVING IN THE UNITED STATES

1. **When in doubt, focus on the U.S. Qualification Standard.** The best way for most actuaries working in the United States to meet the SOA CPD Requirement will be to follow the continuing education provisions of the U.S. Qualification Standard. You can use the TRACE tool, available on the American Academy of Actuaries website, to keep track of your CPD hours, or build your own spreadsheet.

2. **Just check one box.** If you meet the continuing education provisions of the U.S. Qualification Standard you only need to check ONE box when you attest compliance with the SOA CPD Requirement. There is no need to show that you meet both Section B and the U.S. Qualification Standard. You are only attesting to your method of compliance with the SOA CPD Requirement.

3. **Section B is not a substitute for the U.S. Qualification Standard.** You can satisfy the SOA CPD Requirement by meeting the continuing education requirements of the U.S. Qualification Standard. However, the opposite is NOT true; you CANNOT meet the continuing education requirements of the U.S. Qualification Standard by following the provisions of Section B of the SOA CPD Requirement. If in doubt, follow the continuing education provisions of the U.S. Qualification Standard.

4. **Rolling two-year cycle—we're attesting again at the end of 2011.** And, don't forget we have a rolling two-year cycle. The next CPD cycle is 2010–2011, which ends as of Dec. 31, 2011. Attestation will open around Nov. 1, 2011 and go through Feb. 28, 2012.

THREE TIPS FOR SOA MEMBERS LIVING OUTSIDE THE UNITED STATES & CANADA

1. **Section B requires three hours of structured professionalism credit.** A reminder that Section B of the SOA CPD Requirement requires three hours of structured professionalism credit. Structured means it has to be a formal learning event, such as a meeting, webcast or e-course or it has to be an audio or video recording (or transcript) from a live event (generally a meeting session or a webcast). See the call-out box on page 13 for more of what counts as professionalism education.

2. **Consider your alternative compliance paths.** Just a reminder that, in addition to the CIA Qualification and U.S. Qualification Standards, eligible members can also use the continuing education requirements of the UKAP and the Institute of Actuaries of Australia to meet their compliance. While we expect most members outside the United States and Canada to use the provisions of Section B of the SOA CPD Requirement to meet the SOA CPD Requirement, you should always consider all your options.

3. **Rolling two-year cycle—we're attesting again at the end of 2011.** And, don't forget we have a rolling two-year cycle. The next CPD cycle is 2010–2011, which ends as of Dec. 31, 2011. Attestation will open around Nov. 1, 2011 and go through Feb. 28, 2012. A

they were following. We thank all those members who were audited who responded quickly with their documentation and gave us such complete records. However, we did find a few discrepancies:

- The most misunderstood provision of Section B of the SOA CPD Requirement was the professionalism credit. Members are required to earn three units of STRUCTURED professionalism credit. Structured credit means that it's a formal live learning situation (webcast, event, e-course) or an audio or video recording of a formal, live learning situation. Second, professionalism credits are broadly defined, but they don't include everything (see call-out box on page 13 for what counts as professionalism credit). Members outside the United States and Canada seemed to have more questions about what counted as professionalism credit.

- There were a few Canadian members who thought they were compliant because they were exempt from the CIA requirement, who, once we began audit procedures, understood what had happened and changed their status to non-compliant. Canadian members who are exempt from the CIA Qualification Standard are not exempt from the SOA CPD Requirement and must do some form of continuing education to be compliant with the SOA CPD Requirement (either by fulfilling the provisions of Section B or by voluntarily complying with the CPD provisions of the CIA Qualification Standard).

- As noted earlier, we had many U.S. members in the audit who had attested to meeting both the U.S. Qualification Standard and the Basic Requirement provisions of Section B. We discovered on audit that their records supported the continuing education provisions of the U.S. Qualification Standard. They were informed that next year, they only needed to check one box—for the U.S. Qualification Standard.

THE PURPOSE OF THE AUDIT IS TO ASSURE THE PUBLIC THAT MEMBERS WHO ATTEST COMPLIANCE ARE, ACTUALLY, COMPLIANT ...

There were a few people who did not submit their records for audit. They were given several opportunities to submit their CPD records or have their status changed to "Non-compliant." The purpose of the audit is to assure the public that members who attest compliance are, actually, compliant with the SOA CPD Requirement. Members who cannot support their attestation on audit will be assumed to have not met the SOA CPD Requirement and have their CPD compliance status changed to "Non-compliant."

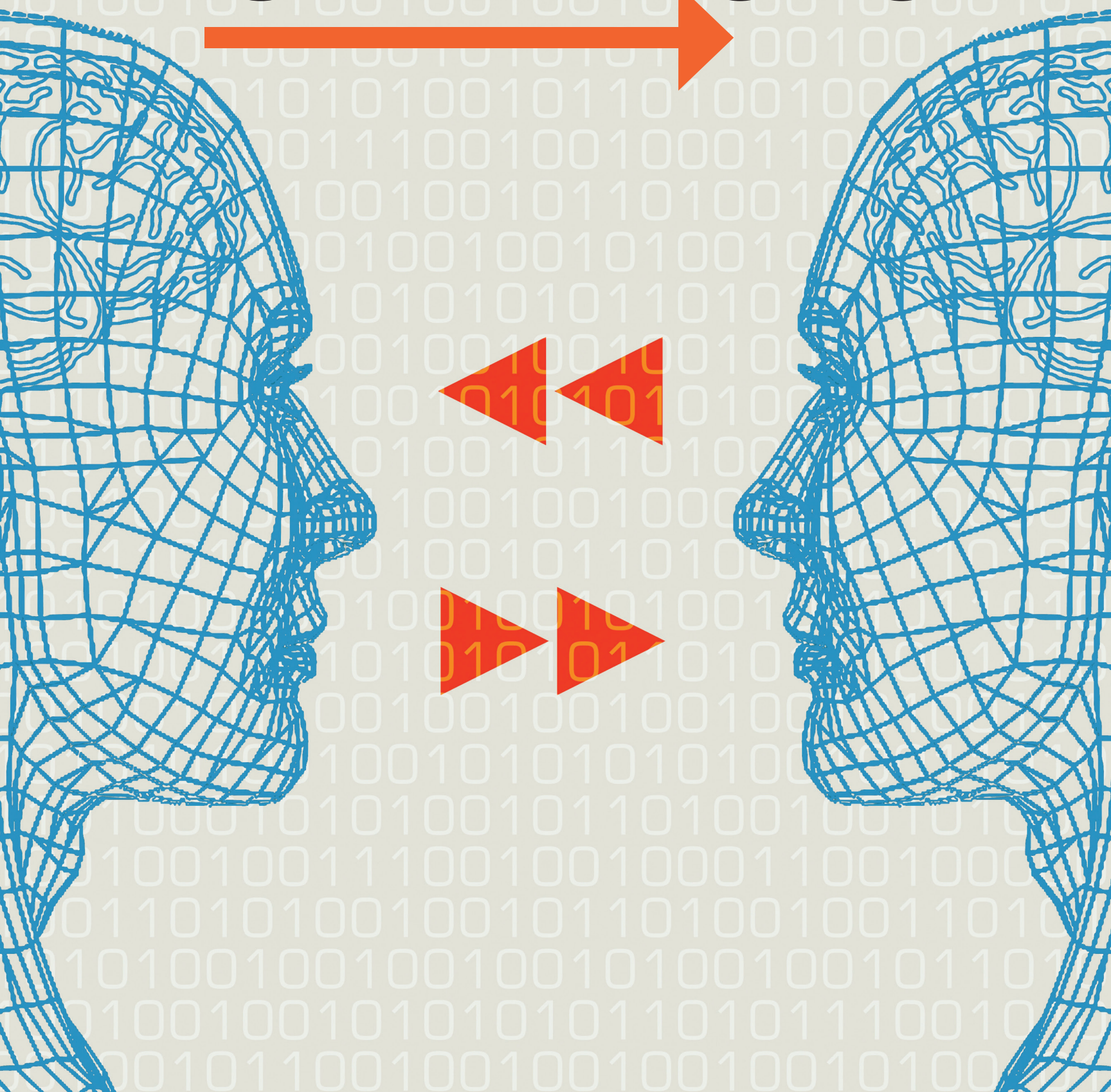
NOW WHAT HAPPENS?

The first thing to remember is the requirement is still in effect, and with a rolling two-year cycle that means that we have another CPD attestation just around the corner! So continue to track and earn, and we'll repeat attestation for the 2010–2011 cycle beginning on Nov. 1, 2011. Second, make sure you're using the right attestation method, based on what you learned from this article. In particular, if you're in Canada, remember that you must earn CPD credit to be compliant with the SOA CPD Requirement; you're not "exempt" from the SOA CPD Requirement if you're exempt from the CIA Qualification Standard. If you're in the United States, remember that you're attesting to HOW you've met the SOA CPD Requirement, not that you HAVE met the U.S. Qualification Standard. You don't need to attest to more than one method (unless you are using more than one method to comply).

Any questions about the SOA CPD Requirement can be sent to ***cpdcomments@soa.org.*** We're happy to answer all questions about the requirement, and how you can best comply. A

Emily Kessler, FSA, EA, FCA, MAAA, is senior fellow–Intellectual Capital, at the Society of Actuaries. She can be contacted at *ekessler@soa.org.*

ACTUARIES AS CATALYSTS



INSURANCE ACCOUNTING is in the midst of significant changes, many of which were proposed during a time of severe economic uncertainty. Given the concern about these regulations by many insurance finance executives, it is time for a re-examination of the capabilities of the financial reporting function. BY NOEL HAREWOOD

THE RECENT FINANCIAL CRISIS led to significant questions about insurers' financials, including capital adequacy, dividend-paying ability and return on capital. Future and expected regulatory changes will pose challenges as insurers move toward fair-value-type accounting, new principle-based regulations for reserves and capital, and Solvency II for European insurers and their subsidiaries. Implementation of these proposed changes will prove difficult for some, especially insurers whose actuarial projection systems and models are not well established or not as robust as they need to be.

Companies need to rethink how they assess and communicate the performance of their insurance businesses, and develop systems and processes that can generate timely, secure and auditable information. In addition, the actuarial processes necessary to measure liabilities are likely to differ significantly from those now in place. Finally, companies will need the right assumption-setting processes and robust experience investigations. Implementing these processes is not a simple matter and will require strong actuarial competencies and models, as well as ample time for testing and interpreting the results.

But before companies can tackle these upcoming challenges in financial and regulatory reporting, they need to have a clear understanding of the capabilities of their financial and regulatory reporting (FRR) function. They must assess the current state of the organization in terms of the following:

- **Technical:** Can the organization prepare and produce financial results correctly?
- **Controls/governance:** Can the organization be confident of the accuracy of its results?
- **Analysis:** Can the organization explain the causes of performance in the period in question?
- **Forecasting/budgeting:** Can the organization reasonably and accurately forecast its financial position?
- **Driving decisions:** Finally, can the organization use the financial information to drive strategic decisions?

This assessment can be made on multiple levels, and most companies will find themselves in different stages for various reporting metrics and processes (Figure 1). Any time a new regulation or reporting standard is established, companies will find themselves in the technical stage by necessity. But the assess-

Figure 1: Five Stages of Financial and Regulatory Reporting Evolution

	Stage 1: Technical	Stage 2: Controls/ Governance	Stage 3: Analysis	Stage 4: Forecasting/ Budgeting	Stage 5: Driving Decisions
Clear line of sight from financials to company actions?					●
Able to produce realistic forecasts under multiple scenarios?				●	●
Able to explain results and why they differ from expectations?			●	●	●
Is the process controlled and auditable?		●	●	●	●
Able to produce results correctly?	●	●	●	●	●

ment can also be viewed as an overall read on the FRR function. Organizations that rate strongly overall are likely to "evolve" faster for new requirements as well, giving them a strategic advantage.

For insurers, actuarial components are a critical part of the financial reports, and so actuaries can be expected to play a critical role in moving the overall FRR function forward. In fact, the FRR function in an insurance company cannot advance significantly without actuarial expertise. Actuaries are therefore in the position of being able to help drive the evolution of a company's finance function.

FINANCIAL AND REGULATORY REPORTING: FIVE STAGES OF EVOLUTION

Stage 1: Technical

The initial stage of financial reporting evolution is the technical stage. At this stage, the organization is focused on *doing*—producing the required information and financial statements correctly, according to the standards specified in the regulations. Analysis of the results may not be as robust as management might like, and may focus more on establishing reasonableness and compliance than on understanding how to use the information to make decisions.

The technical stage requires:

- Knowledge of the required information (e.g., reserves, deferred acquisition cost (DAC) balances)
- Knowledge of the appropriate guidance/standards
- Ability to calculate the required amounts.

The familiarity with the standards is critical to this stage. Specifically, the organization must be able to appropriately apply the specific methodologies and bases to the affected business. As an example, consider what was then called SFAS 157 (pre-codification). Implementation of this regulation required an initial understanding of both what was affected (fair values) and what was required in the calculation (e.g., risk margins).

In addition to knowing what to do, which depends heavily on the expertise of key personnel, the organization must be able to do it. This requires processes, systems and models to perform the calculations. In early-stage financial reporting organizations, these processes are often implemented manually, as topside adjustments.

The organization in this stage is able to produce the required reporting, albeit usually with some difficulty. Further, these organizations typically use undeveloped or partially developed systems and processes (workarounds) to produce the required financials.

This is the first area where actuaries can make substantial contributions to advancing the organization. Actuaries are often knee-deep in the production process over the fourth and first quarters, and for many involved in financial reporting, these are the "grind" months. However, what happens in the other months (the off-season)? This is where actuaries can work to refine and enhance both their own knowledge and the actuarial and data processes in place.

Stage 2: Controls/Governance

Gaining confidence in the organization's reporting results is the next step in the evolution of the financial reporting process. Strong audit controls and good governance practices are essential to this step.

Both shareholder and regulatory reporting are now expected to have material controls processes, as a result of Sarbanes-Oxley and the Model Audit Rule (MAR). While many actuaries may have been isolated from Sarbanes-Oxley, the MAR incorporates many of the same concepts, and will have a much broader applicability. Even without the regulatory drive to improve, many organizations are now beginning to demand more reliability in their financials.

Organizations in the governance stage will implement robust controls for the process of developing the reported results. This often includes moving many of the elements of the calculation to a production environment, minimizing manual intervention. In addition, companies at this stage will typically streamline the process for more efficient reporting.

Actuarial controls, particularly around models, are an area that needs specific focus. One option is to work to enhance controls via software, but even without this, process controls around the modeling can be effective in improving the control environment.

Stage 3: Analysis

Once companies are able to quickly and efficiently produce the required financials, analysis becomes a central issue. Analyzing and assessing performance is a key stage in the reporting process because it allows management to move beyond developing the numbers to understanding the profitability of the insurance product or line of business.

The ratios and projections are crucial to assessing past performance, creating comparables, presenting projections and setting performance benchmarks. Why are the results emerging as they are? What happened over the last reporting period? This level of analysis is the next stage in adding value as a reporting function.

Certain elements of reporting often generate questions (e.g., DAC amortization and fair-value reserves). Anticipating these questions and enhancing the process to include appropriate analytics means that these questions can be answered more quickly and thoroughly and as part of the routine process rather than ad hoc. These analytics are central to building a more savvy reporting function, and should be a central role for financial reporting actuaries. Actuaries need to provide the support for allowing management to understand the changes in actuarial items (e.g., reserves, DAC) and also for allowing management to understand the emergence of the risk-capital-value tradeoffs in the business.

Stage 4: Forecasting/Budgeting

Budgeting and forecasting are crucial to planning and to the overall success of any organization. However, budgeting for insurers is more complicated than for other companies, given the complex nature of some of the critical components of an insurer's balance sheet. When a company can project these elements effectively, it significantly improves the quality of its financial planning and budgeting functions.

This is an area where many companies struggle or rely on approximations. This may be due, in part, to competing priorities for computing power and staff resources. There are hardware and software solutions available to accommodate the technological demands, but a strong partnership between the actuarial and technology aspects of the financial reporting process is essential in order to optimize performance.

Companies operating at this level are able to use actuarial systems to produce multiple forecasts for value-based activities such as scenario planning. The ability to produce realistic projections also allows for more extensive use of the actuarial control cycle. This is a significant step in developing financial information of strategic value.

NEW FINANCIAL AND REGULATORY REPORTING REQUIREMENTS HAVE PLACED GREAT STRAINS ON THE RESOURCES OF FINANCE ORGANIZATIONS AT INSURERS ...

Stage 5: Driving Decisions

The ultimate goal of the finance function at all companies is to provide timely information to reach the final stage in the FRR process driving business decisions. Highly evolved financial reporting functions are better able to work at the strategic level working both to improve broader financial information in other areas of the organization (e.g., pricing) and to determine improved metrics for management purposes. Actuarial expertise has a critical role to play as part of this function.

SUMMARY

New financial and regulatory reporting requirements have placed great strains on the resources of finance organizations at insurers; in some cases, the requirements have revealed shortcomings and weaknesses in accounting, governance and controls, analysis, and budgeting and forecasting.

Greater regulatory changes lie ahead as insurers move toward fair-value accounting, new principle-based regulations for reserves, and capital and Solvency II for European insurers and their subsidiaries. The challenge is ensuring that the finance function can deliver under the new requirements.

Actuaries wishing to contribute to the new finance function need to be able to effectively answer the following:

- Is the actuarial team up to speed on current regulatory requirements?
- Are appropriate controls in place for actuarial components of financial reports?
- Are actuarial models under appropriate controls?
- Are changes in reserves and DAC clearly explainable?
- Are the risk, capital and value positions of the company reasonably estimated under multiple scenarios?
- Is the actuarial function seen as an effective partner?

Answering these questions can help actuaries identify how far the function has evolved in its financial and regulatory reporting. Insurance financial reporting cannot advance far without the appropriate actuarial support. A

A version of the article "Actuaries as Catalysts for Advancing Financial Reporting" was previously published by Towers Watson. *Copyright Towers Watson.*

Noel Harewood, FSA, MAAA, leads the Financial and Regulatory Reporting initiative for Towers Watson in the United States. He can be contacted at *noel.harewood@towerswatson.com.*

DOCTORS, NURSES AN

WILL THERE BE ENOUGH FOR OUR AGING

D HOSPITALS

POPULATIONS? LIVING TO 100

THE THIRD IN THE SERIES FROM THE 2011 LIVING TO 100 SYMPOSIUM, THIS ARTICLE EXAMINES THE GROWING CONCERN ABOUT DOCTOR TO PATIENT RATIO.

BY RONORA STRYKER WITH CONTRIBUTIONS FROM WILLIAM PECK, DOUG ANDREWS AND NOREEN SIBA

OVER THE PAST YEAR, I have been an active participant in the U.S. health care system having experienced a long hospital stay and numerous follow-up physician visits. I am fortunate to live in an urban area where I have access to many providers. When there were times I could not get in to see a doctor when I wanted, I was usually referred to other physicians for treatment.

When I share my health care experience with my family members, often I discover that they do not share my views. Many of my family members live in less populated areas where they talk about traveling long distances to see a specialist or complain about the wait times needed to see their physician or have a medical test done at the local hospital.

Given my family's mixed health care experiences, one of the highlights for me at the 2011 Living to 100 Symposium was a session on the demand for and supply of health care providers in developed countries given the increasing aging population. Among the questions addressed by the presenters include:

- Is there currently a shortage of providers?
- What factors influence supply?
- What might the delivery of health care look like in the future and will there be a provider shortage in the future?
- What changes to provider supply are countries considering to meet expected demands?

This article summarizes the three country viewpoints that were provided by the distinguished panel of:

Canada: Doug Andrews, FSA, FCIA, FIA, senior lecturer at the University of Southampton, who is a member of the Canadian Institute of Actuaries' Health Committee;

United Kingdom: Noreen Siba, managing director, International Longevity Centre-UK; and

United States: William Peck, M.D., Alan A. and Edith L. Wolff Distinguished Professor of Medicine and director for the Center for Health Policy at Washington University.

CANADA VIEWPOINT

Canada is in the midst of a dramatic demographic shift. Currently only 13 percent of the total population is over age 65. However, within 20 years, this figure is expected to climb to 20 percent. Given the demographic change and increasing life expectancy, the demand for health care services is increasing. Yet, Andrews did not offer a definitive answer to whether there would be enough medical providers to meet the health care needs of the aged as there are many factors influencing supply. He identified the following factors which may cause demand to exceed supply.

Currently in Canada there are 1.95 physicians and 10 nurses per 1,000 patients. While the number of nurses is probably adequate, there might already be a physician shortage as two physicians per 1,000 patients is considered to be a sufficient level.

Surveys have shown that Canadians want shorter waiting times for health care services and are even willing to pay in order to not have to wait as long. So continued pressure on governments or the provincial health plans to decrease wait times could impact the demand for and supply of services. In fact, governments are currently examining what are considered appropriate wait times.

Canada has a very large geographic mass, which increases the difficulty in delivering health care on a uniform basis to all the populations. While access to care is good in the four large urban centers, it varies considerably in other parts of the country. How medical services get distributed across the country is a consideration for determining whether supply is sufficient, but it is likely that certain rural parts of the country will be underserved.

However, Andrews went on to identify a number of ways in which demand and supply imbalances may be addressed.

The increase in the number of physicians and nurses is impacted by government support. An increase in governmental spending on medical schools could increase the supply but it is difficult to measure the magnitude. Even though the Canadian government reduced funding levels in the early 1990s, Canada has not experienced a large reduction in the number of physicians. There is some evidence, however, that government might be increasing spending as some medical schools have reported an increase in the number of graduates and some universities

are requesting the right to establish medical school programs. In addition some medical schools are considering modifying their curriculum so that individuals can graduate in three years instead of four.

Another factor influencing the number of physicians in Canada is emigration. Doctors that are trained in Canada often migrate to the United States. There have been articles recently indicating that the trend might be changing. The articles have reported that there are not as many physicians as in the past going to practice in the United States and that physicians are actually starting to return to Canada to practice.

Moreover, the immigration of physicians could also impact the supply. Canada has experienced high immigration in recent years. A number of immigrants are qualified health professionals in their home countries but are not eligible to practice in Canada. The licensing of qualified immigrants to perform some medical services on a quicker basis would increase the number of physicians. Currently the licensing process for immigrant physicians is rigorous and involves working with a licensed Canadian provider and writing a series of exams.

Besides increasing the number of physicians to meet the increasing health care demands, there are other actions that may increase services provided. Health care delivery is likely to change in the future. More and more nurses may be trained to provide services that have been traditionally performed by physicians. Recently, Canada had the first graduation of specialty nurses that can fulfill some of the services that a general practitioner physician does. Even though they did not have trouble being placed within the health care system, it is yet to be seen if physicians are willing to release some of their responsibility to them.

Another change being considered is having private alternatives to the medically necessary services covered by the provincial health plans. While this may not increase supply, it may help address some of the urgency issues.

Another idea to make the system more efficient is to reduce dependence on fee-for-service medicine. As the structure changes away from fee-for-service, there may be more emphasis on delivering preventative care.

Lastly, having more 24-hour services available through group practices or other providers might make the system more efficient. Currently Canadians typically have to go to the emergency room, which is often an expensive way to use valuable resources and creates the appearance of shortages.

UNITED STATES VIEWPOINT

(As provided in Dr. Peck's own words)

Many factors contribute to the overall demand for health services, including among others population growth, advances in diagnostic and therapeutic technology, the predominant approaches to insuring for and providing health care services, and the burden of illness in society, particularly chronic disease. It is the older population that is particularly prone to chronic illness.[1] A significant percentage of elderly patients have multiple chronic illnesses—20 percent have as many as five.[2] Chronic illnesses are responsible for as much as 80 percent of health care expenditures. The first baby boomers become 65 years old in 2011; baby boomers will significantly expand the elderly population and demands for clinical services.

By increasing the insured population, health care reform (the Patient Protection and Affordable Care Act (PPACA)) will stimulate demand as well. It mandates health insurance for all Americans (unless the courts find this law unconstitutional). An estimated 32 million previously uninsured individuals will

receive subsidies for private insurance or become Medicaid-eligible.

The availability of America's medical work force, physicians and other health professionals, must satisfy the high and rising demand for services. However, there is strong evidence for a current numerical shortage of physicians that is predicted to worsen over the next 10 to 15 years.[3,4,5] Whereas shortages have emerged in many medical specialties and subspecialties, the shortage of primary care physicians (PCPs) who care for adults has received the most attention—family practitioners, general internists, geriatricians. Other specialists provide less frequent primary care services. PCPs offer first contact and ongoing care for patients with a wide variety of conditions, orchestrate and coordinate their subsequent management long term, and care for the majority of patients with chronic illness. The bulk of evidence indicates that patients fare better when they have a PCP.[6,7,8,9]

Some regions appear to have a sufficiency of PCPs and even an excess, at least as judged by documented overuse of health care facilities.[10] However, there are severe regional shortages now, for example in rural America, and it is most likely that a nationwide shortage will emerge in the future, absent corrective action.

The current and expanded future shortage of PCPs has multiple causes. There is a substantial, progressive decline in the number of medical school graduates pursuing PCP careers since the late 1990s,[5,11,12] et al., although a small increase has appeared in the past several years. The average PCP retirement age and the hours spent in actual practice may be declining as well.[13,14]

Among the major contributors to this decline are money, an unsatisfying practice environment, an educational process that favors other specialties and other factors.[15,16,17,18,19,20,21,22]

The majority of American medical graduates carry significant debt—approximately 20 percent owe $200,000 or more.[23,24,25] Annual and lifetime earnings of PCPs are well below most other practitioners. Dealing with multiple insurance companies, each with its own time-consuming authorization, billing, collecting and appeals process contributes significantly to practice inefficiencies and dissatisfaction. Since the majority of PCPs do not have access to electronic records, they rely on time-consuming paper records to keep abreast of their patients.[26] PCPs are generally reimbursed on fee-for-service, which places the physician in the position of seeing more patients in shorter visits. Given these constraints, devoting sufficient time to the preponderance of patients with chronic illness requires more time and represents a very real challenge.

Lack of interest in the field, followed by financial challenges and the desire for a more controllable lifestyle are the main reasons for declining pursuit of PCP careers.[20]

Residency training, funded in large part by the federal government, is required for new graduates to practice medicine in America—and the number of residency positions has been capped for more than 10 years. America will not be able to mitigate the physician shortage until the number of positions is increased.[4,27]

Recognizing the emerging PCP crisis, medical schools have increased their class sizes, and new medical schools and Colleges of Osteopathy have opened.[28] Learning environments are being modified to enhance student interest in PCP careers. We continue to depend on international medical graduates to round out our medical work force. But the fixed number of residency positions virtually prevents overall workforce expansion.

PPACA addresses the shortage in multiple ways.[29] These include streamlining practices by supporting uniform and more rapid billing and collecting, pilot programs to test improved methods of reimbursement, continuing promotion of health care information technology, grants to enhance primary care education, federal loans for practices in underserved areas, increased Medicare payments of those pursuing primary care, support for the formation of improved PCP practice models such as medical (health) homes and accountable care organizations that will also improve patient care. Increasingly, hospitals and health systems are employing PCPs (and other specialists). These organizations can provide more effective and efficient practice environments—including access to electronic health records, availability of time-sparing physician assistants and advanced practice nurses, ready access to specialty and subspecialty care and other efficiency-promoting approaches.

It is impossible to predict how medicine will be practiced in 10 to 15 years. Advances in fundamental and applied medical science, new health care organizational entities, increased use of non-physician health professionals, expanded availability of sophisticated information technology and possible improvements in personal responsibility for health may limit the need for substantial workforce expansion.

UNITED KINGDOM VIEWPOINT

Unlike Canada and the United States, in the United Kingdom there is not as much uncertainty about a current or future physician shortage. Siba noted the U.K.'s National Health Service (NHS) is widely believed to be understaffed in comparison to other international health systems. While the number of doctors per thousand population has been rising steadily, the number remains below the Organisation for Economic Co-operation and Development (OECD) average. In addition, temporary or "locum" doctors are appointed to cope with the shortfall in the United Kingdom and the cost of hiring the doctors has increased substantially in the past few years.

Certainly the graying population is influencing the demand for services. By 2033, 23 percent of the population will be over age 65 and only 18 percent will be 16 and younger. The number of individuals over 80 will increase by about 75 percent than current levels. Given the increasing aging population, the current physician shortage, people's expectations for care, and increasing costs to the NHS system, there will not be enough doctors and nurses to cope with the shifting demographics. Without new funding sources NHS rationing of services and waiting lists will continue.

CERTAINLY THE GRAYING POPULATION IS INFLUENCING THE DEMAND FOR SERVICES.

In the United Kingdom older people's care is seen not just as a health issue but also as a social issue. While diseases like cancer are covered under NHS, a problem like dementia is seen also as a social ill so the care could be self-funded. To help address the needs of the population, NHS reform is being studied. A new Commission on the Funding of Care and Support has been established to define the care (health and/or social) to be provided in the future and suggest who will pay.

In addressing the supply and demand for health care providers, other questions need to be researched besides how to increase the number of providers. As populations age, do their increasing health needs have to be met just by increasing the number of health care providers, or alternatively looking at the role of formal and informal careers?

Studies in the United Kingdom have shown that medical practices employing the most registered nurses per number of patients often provide the best quality of care. Investigating the role and effectiveness of nurses in delivering more health care services is important and might lead to quicker service for individuals and cheaper health care costs overall.

Researchers recently investigated deaths of patients older than 80 that took place in U.K. hospitals. Among the findings included that in the majority of cases, patients were treated by very junior doctors without review by geriatric physicians; many patients were malnourished before they arrived in the hospital and while in the hospital received poor nutrition and had serious associated illnesses; and clinically significant delays occurred in one-in-five patients between admission and operation. This study might suggest that better training and organization might be an answer in meeting older people's health care needs. Certainly more research into the relevancy of changes into provider quality and quantity in obtaining sustainable improvements in the health and well-being of older individuals is needed.

Finally, the current U.K. health care structure focuses on acute health and social services with much less focus on prevention. Yet prevention medicine might be part of the solution to provider supply and demand. More research needs to be conducted on how

preventative care might impact health care need, cost effectiveness of delivering these medical services especially to the elderly, and how might it contribute to employment and overall well-being of individuals.

CONCLUSIONS

Meeting the increasing health care needs of aging populations does not have a simple solution. While increasing the supply of medical providers may provide better access to medical treatment, it does not guarantee the improvement in the overall health and well-being of individuals. Much remains to be done in addressing the increasing demand for health care. Certainly this is a great opportunity for actuaries to assist in finding solutions such as modeling future provider workforce populations and quantifying and measuring the financial impact of preventative care and changes to traditional health care delivery and financing. To gain a better understanding of the issues and challenges in addressing societal health care needs, I encourage you to read the transcript of this panel session published in the 2011 Living to 100 monograph available at *http://www.soa.org/2011-livingto100-mono*. A

Ronora Stryker, ASA, MAAA, is a research actuary with the Society of Actuaries. She can be contacted at *rstryker@soa.org*.

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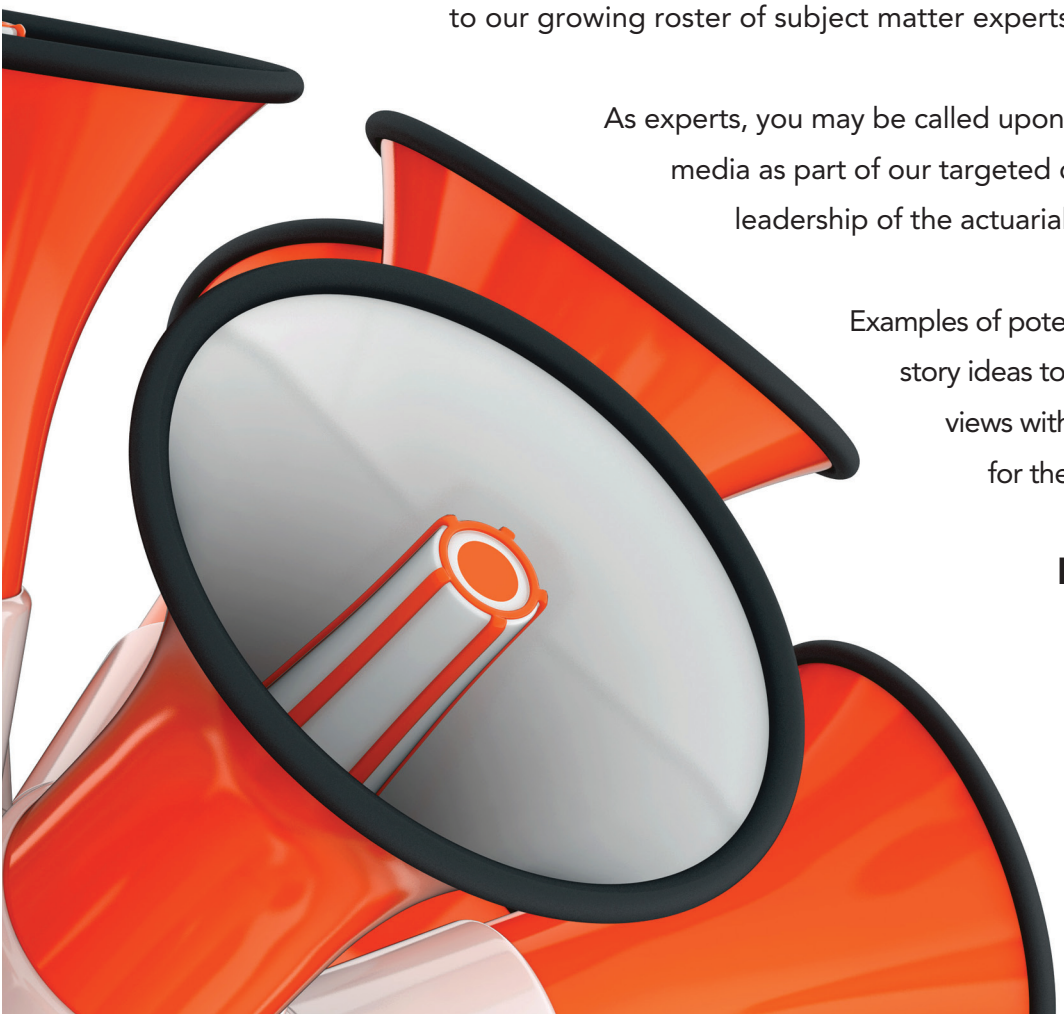

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PREDICTIVE MODELING WITH CONSUMER

RUNNING/JOGGING

Prevalence of cardiovascular disease by interest

0.60%

HEALTH CARE REFORM will require health insurers to change the way they make decisions on what to sell while remaining financially sound. The new regulatory reality of expanded access to coverage leaves insurers with fewer options for managing costs and business risk. With the introduction of risk adjustment mechanisms in the exchanges, the most profitable members will not necessarily be the lowest cost ones, but rather, the members which the health plan is relatively more effective at servicing. While Patient Protection and Affordable Care Act (PPACA) prohibits underwriting and using any health status information for denying coverage or varying the premium rates, using predictive modeling and consumer data to help identify and market to these members will allow carriers to remain competitive in the post-reform world.

What does this all mean for a consumer?

DATA

BY KSENIA DRAAGHTEL

HERE'S HOW USING CONSUMER DATA WILL AFFECT THE WAY HEALTH INSURERS MAKE DECISIONS ON WHAT PRODUCTS TO SELL.

The greater awareness of the publicly available consumer data and its uses in the industry may make some consumers nervous. Consumer data is self-reported and inferred information about individuals and households that is primarily used for marketing purposes. It is collected and aggregated by a number of commercial data vendors. However, having information and knowledge is power for a consumer as well. "How accurate are these data? What is the source of this information? How is it used in the health insurance industry?" All are valid questions and deserve consideration.

THE BUSINESS NEEDS

EFFICIENCY THROUGH SEGMENTATION

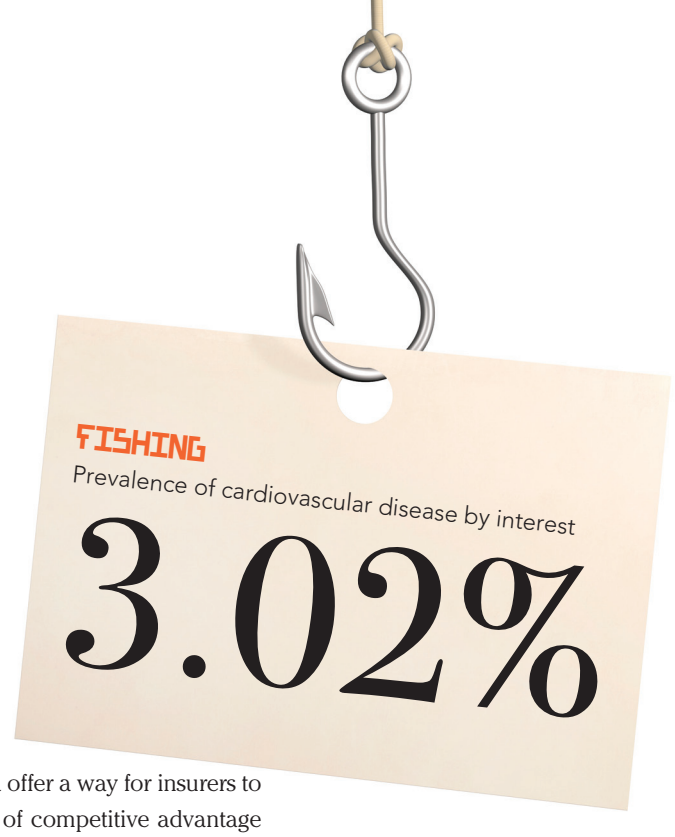
Facing myriad regulatory restrictions, many carriers are starting to explore their unique competitive advantages in their markets and the ways they can "play" the efficiency game in order to remain competitive. PPACA explicitly prohibits marketing practices that can be used to identify individuals who are less likely to become claimants and discourage enrollment of those with significant health care needs.[1] With restricted ability to accurately price individual risks, what if areas of greatest comparative advantage are identified and offered to the subpopulations that would benefit from these particular services? With the introduction of risk adjustment mechanisms in the exchanges, the prior goal of attracting healthier segments of the population is no longer necessarily the optimal strategy.

We expect that some health plans are more effective at managing certain conditions and providing certain services more cost-effectively than others. They have dedicated resources to improving their outcomes in certain areas, gained the expertise, acquired appropriate staff and technology, and hence are better positioned to serve these populations. Predictive modeling

BICYCLING

Prevalence of cardiovascular disease by interest

1.33%



CAMPING/HIKING

Prevalence of cardiovascular disease by interest

3.39%

and consumer data offer a way for insurers to identify their areas of competitive advantage by segmenting the population and identifying subpopulations that are most likely to benefit from their products and services. It's a win-win proposition: insurers can become more competitive by spending their resources in places they can manage care more efficiently than their competitors, and consumers benefit by finding plans that fit their needs. The similar approach is used now in the Medicare Special Needs Plans that are designed to insure members with specific conditions.

In economics, the concept of comparative advantage states that two parties (companies, countries or individuals) can benefit from a trade of goods or services if without the trade they have different relative costs of producing the goods or services. The concept was first introduced back in 1817 by David Ricardo in his book titled "On the Principles of Political Economy and Taxation."[2] As a simple illustration, assume that if all resources were dedicated solely to producing one of these two goods, China and Brazil would be able to produce the quantity of tea and coffee noted in the graph below.

While China can produce both tea and coffee, it is more advantageous (cheaper) for China to produce excess tea and trade with Brazil for coffee for the price closer to the price of producing tea. Brazil benefits from this trade because its cost of producing coffee has not changed, but the price of tea has been reduced by half. Therefore, both parties benefit from the trade by specializing and focusing their efforts on the product with the most comparative advantage and trading with other parties for the remaining products.

Similarly, it is more economically advantageous for a plan with a $400 per member per month (PMPM) incurred claim cost to provide care for patients with heart disease and $600 PMPM to provide care for chronic obstructive pulmonary disease (COPD) patients to attract a greater number of heart patients, than it is for a plan where it costs $500 PMPM to cover either COPD or heart disease members. We are assuming that each plan has the same quality of care for each condition.

	TEA (UNITS)	COFFEE (UNITS)	TEA, COST/UNIT	COFFEE, COST/UNIT
China	560	80	$10	$70
Brazil	200	400	$20	$10

One potential approach for identifying the areas of competitive advantage is by using a carrier's past experience to calculate the insurer's financial gain/loss for each member. Given each member's condition profile, the difference (gain or loss) between the carrier's actual total incurred claim costs for each member and the expected average market cost can be calculated. A reasonable proxy for the expected average market cost across competitors for health care services utilized by a member is a risk adjuster predicted cost using an out-of-the-box risk adjuster model. The risk adjuster predictions can be obtained from a commercial risk adjuster model that is calibrated on a general population basis as opposed to the carrier's specific population. Comparing the member's expected market cost to the carrier's actual claim cost can provide valuable insight to the areas in which the carrier provides and delivers care most and least efficiently. Examples of potential areas of advantage (or disadvantage) may include:

GOLFING

Prevalence of cardiovascular disease by interest

2.36%

- Which conditions' presence contributes to the gain and loss? For example, a large portion of members with a financial gain may have had claims associated with asthma, recognizing that the carrier may manage these patients better than the average insurer in the market.
- Which commonly available member characteristics (e.g., age, gender, product type, region of residence) contribute to the gain and loss? For example, a large portion of members with financial gain may be females between the ages of 25 and 30 in a certain geographical region.
- Are there particular service types (e.g., inpatient/outpatient/pharmaceutical, inpatient surgery, maternity, mental health) which contribute to the gain and loss? For example, a large portion of members with financial gain may have had maternity services.
- What lifestyle and socioeconomic characteristics contribute to the gain and loss? For example, a large portion of members with a financial gain might have an estimated household income of $60,000 to $124,999, own two or more vehicles, and have demonstrated frugal spending behavior.

This information is also valuable in identifying areas for further improvement. For example, if the incurred costs are significantly higher for patients with mental health disorders, this may indicate that this is one clinical area where better integration of care is needed. Once the areas of relative advantage have been identified, consumer data and predictive modeling can further assist in identifying the consumer and demographic characteristics of the population segments (such as those listed in the examples above) associated with the area of competitive advantage. A predictive model

AVID BOOK READING

Prevalence of cardiovascular disease by interest

3.91%

can synthesize all of this information to create a scoring methodology which can then be applied prospectively. This analysis and the resulting model have multiple business applications, including:

- Product design and pricing: Identifying gaps in coverage and designing products that serve specific markets.
- Patient-centered care delivery: Designing care delivery programs that serve patient needs more effectively.
- Provider network customization and negotiation: Choosing providers who are best able to serve the needs of a given population most cost-effectively.
- Sales and marketing: Finding new markets for given products based on demographic and lifestyle characteristics.
- Cost reduction: Finding consumers who can be served most effectively by an insurer.

SEGMENTATION WITH CONSUMER DATA

"It is estimated that lifestyle-related chronic diseases account for 70 percent of the nation's medical care costs, which translates to more than 11 percent of the entire U.S. gross domestic product."[3]

Consumer data and predictive modeling—correlating commercially available lifestyle and demographic data with disease incidence—has been around for years and provides a way to use nontraditional publicly available lifestyle information to stratify individuals by risk. Suppose that a health plan has determined that it is comparatively more effective at providing coverage for members with heart disease and therefore would like to attract prospective members with this condition. If this is the case, having the ability to determine and consequently use the information contained in Table 1 is key to implementing the engagement and enrollment strategy. One dimension in a population segmentation aimed at finding members with higher likelihood of having heart disease would be to identify individuals with interest in flower gardening and walking for health.

Models can be built which rely purely on consumer data as predictor elements to predict a likelihood of certain medical conditions. The advantage of such a model is that it can be applied to a large population base after purchasing their consumer data. This approach exploits correlations between lifestyle characteristics

TABLE 1: PREVALENCE OF CARDIOVASCULAR DISEASE BY SELF-REPORTED FAVORITE INTEREST

REPORTED FAVORITE INTEREST	PREVALENCE
Running/Jogging	0.60%
Bicycling	1.33%
Golfing	2.36%
Fishing	3.02%
Camping/Hiking	3.39%
Home Workshop/Do-It-Yourself	3.42%
Avid Book Reading	3.91%
Walking for Health	4.03%
Flower Gardening	4.55%

Source: Based on data used in Milliman's past analysis.

HOME WORKSHOP/DO-IT-YOURSELF

Prevalence of cardiovascular disease by interest

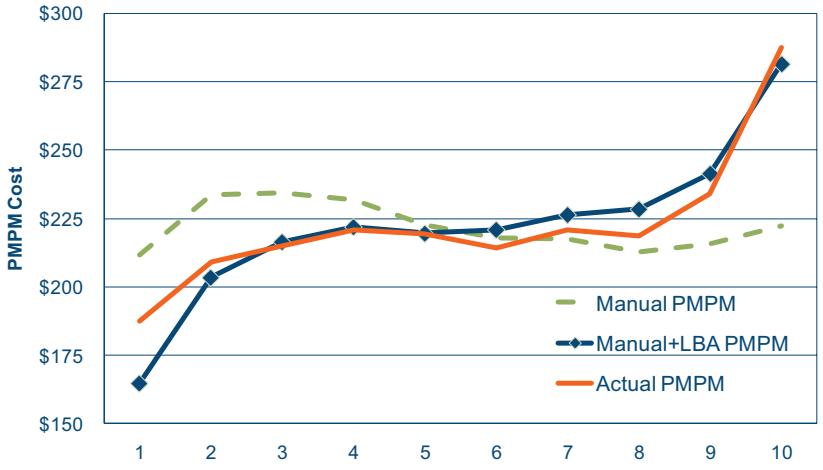
3.42%

and medical conditions and in combination with statistics and modeling techniques determines correlations between the lifestyle information and prevalence of various diseases.

It is important to be realistic about the predictive power of the lifestyle information. It will not replace past actual claim experience or information gathered through health risk assessment surveys (that is, if it can still be gathered). However, in the absence of any other source of information, consumer data can be an extremely useful resource for health actuaries.

I have been heavily involved in using consumer data over the last five years in my consulting practice. We have completed a number of projects in which we have built and helped clients to implement such models for underwriting purposes. After completing these projects, we determined that the power of this approach is in its ability to stratify members more effectively than age and gender and enhance manual ratings. Chart 1 (at right) illustrates both the stratification power obtained with the use of a consumer data predictive model, as well as the improvement in accuracy of manual rating if a lifestyle factor is included. The horizontal axis represents the deciles of the population ordered by the predicted lifestyle factor alone. The three lines on the chart represent three sets of average values by each decile—the average manual rate PMPM (the green line), the average manual rate including the lifestyle score PMPM (the blue line), and the average actual PMPM claim cost (the orange line). The inclusion of the lifestyle factor increases the accuracy of the predictions versus a standard manual rating approach (which typically consists of age, gender, area and maybe industry factors), especially for the bottom and top deciles of the population.

Chart 1: Predictive Power of Lifestyle Score by Lifestyle Factor Decile



THE CONSUMER PERSPECTIVE

It is no surprise that this vast body of information—namely, consumer data—is gaining momentum in several industries and has extended its reach well beyond the marketing industry. An article by Joel Stein this past March brought the topic to the cover of *TIME* magazine and provided a well-balanced perspective on these types of data, its usage, and even attempted to debunk the ever-present privacy concerns. One line was especially on point, "Oddly, the more I learned about data mining, the less concerned I was."[4] In my

FLOWER GARDENING

Prevalence of cardiovascular disease by interest

4.55%

own experience, the more informed consumers are about what type of information about them is truly out there, the less concerned they become. There are many misconceptions about the level of information that is gathered and that someone will know everything about you. However, the information available is typically at a much lower level of detail than most people might assume. Moreover, the chances of any human actually reading that information specifically about you are rather slim.

So let's review the sources of consumer data, what they do and do not include, and the data's advantages and limitations. The consumer data that we keep referring to comes from commercial data aggregators. These databases have their origins in the field of marketing and are typically used to target advertising campaigns, particularly direct mail. This type of data is available in some form for approximately 95 percent of consumer households in the United States, although the number of variables included on a particular household varies considerably. It does not contain information protected by the Fair Credit Reporting Act such as credit scores or bank account information, nor does it contain specific purchase data such as the frequency of your stops at Wendy's fast food restaurants or the purchase of tobacco products. The specific data elements commonly contained in consumer data include lifestyle interests (fine dining, traveling, golf, etc.), demographic information (such as age, gender, family composition and ethnicity), an approximate home value, and possibly the type and number of owned vehicles.

Consumer data can be roughly divided into four general types:

- Self-reported: Typically gathered directly from consumer surveys and registration cards.
- Inferred: Data assumed to be true about an individual or a household because of the presence of other related information. For example, one of your favorite interests can be inferred to be golfing if a certain number of occurrences of shopping in a golf specialty store are present.
- Modeled: Variables arrived at through the use of mathematical models whose inputs are known variables about the household or characteristics of its neighborhood. Household income is a good example of such an element, which is frequently modeled using other available information.
- Aggregated: Data compiled at the level of block, neighborhood, ZIP code, metropolitan statistical area (MSA), city, state or other geographical region. These variables are usually available for 100 percent of households and are often based on publicly available sources such as U.S. Census data.

The price tag for this information is surprisingly low, and varies anywhere from three to 10 cents per household for the standard set of in-

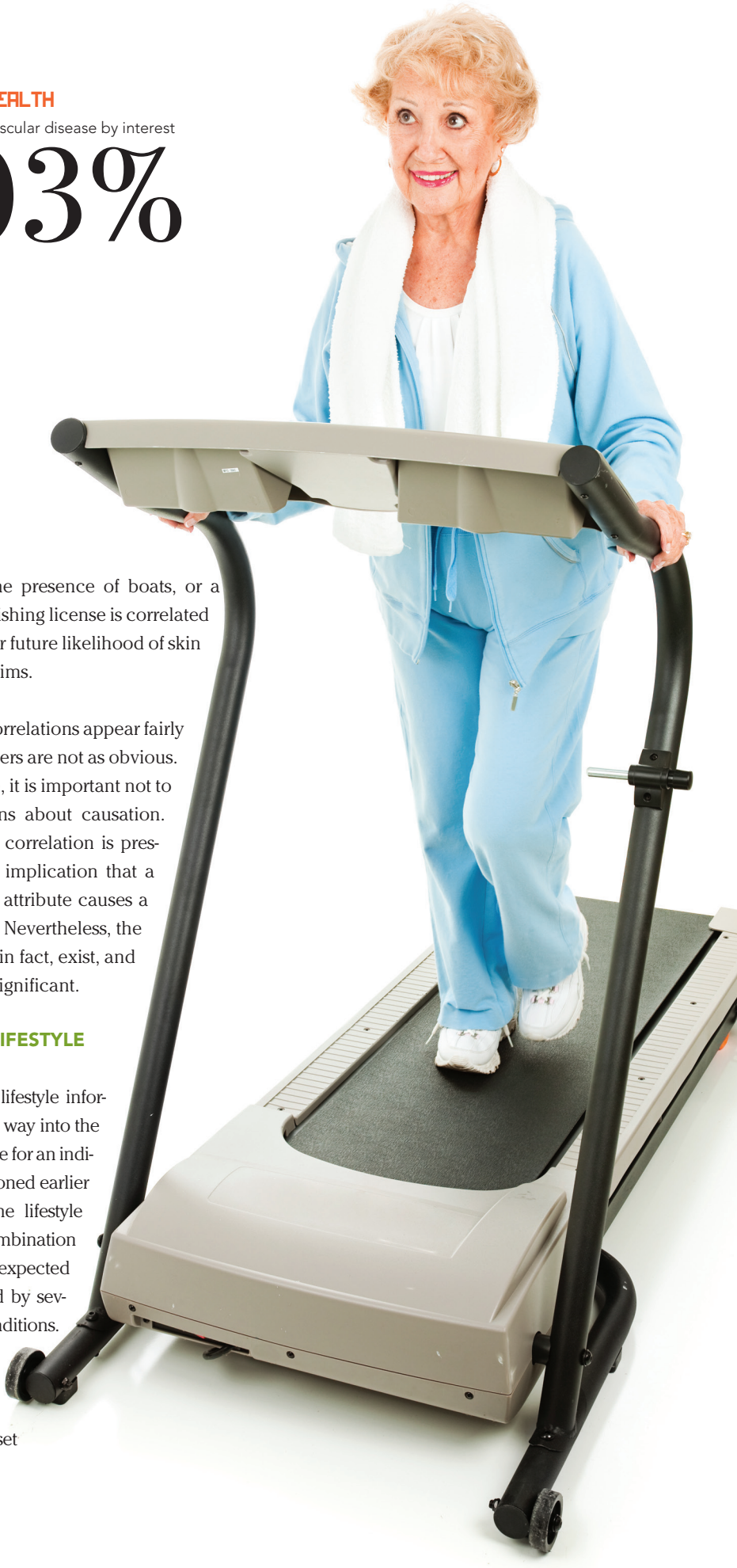
Learn about

Predictive modeling techniques—read the collection of papers, "Predictive Modeling for Life Insurers," at *www.soa.org/predictive-modeling.*

WALKING FOR HEALTH

Prevalence of cardiovascular disease by interest

4.03%



formation, usually subject to minimum orders. Certain proprietary or modeled variables may increase the per-record cost. The usual method of obtaining the consumer data is by matching the name and address to the data and specifying which variables are to be purchased.

WHAT ELEMENTS ARE PREDICTIVE?

Different consumer data elements are correlated with different medical conditions, and not always in intuitive ways. We have found that building condition-specific sub-models and aggregating the results produces a much more accurate prediction than modeling the overall claim cost. Examples of correlations found in past models include:

- Gambling is correlated with higher future likelihood of diabetes claims.
- Purchasing men's "big and tall" apparel and women's plus size clothing is correlated with higher future likelihood of cardiovascular-disease-related claims.
- Presence of pets in a household is correlated with lower future likelihood of pregnancy claims.
- An interest in dieting and weight control is correlated with higher future likelihood of depression claims, while watching sports on TV is correlated with the lower future likelihood.
- Golfing, the presence of boats, or a saltwater fishing license is correlated with higher future likelihood of skin cancer claims.

Some of these correlations appear fairly intuitive, but others are not as obvious. And, in any case, it is important not to draw conclusions about causation. Even if a strong correlation is present, there is no implication that a specific lifestyle attribute causes a specific disease. Nevertheless, the correlations do, in fact, exist, and are statistically significant.

WHAT IS MY LIFESTYLE SCORE?

So what type of lifestyle information makes its way into the final lifestyle score for an individual? As mentioned earlier in the article, the lifestyle score is a combination of predicted expected costs contributed by several medical conditions. Hence, for each prediction, the information contained in a subset

REACTION OF AN ACTUARY AND CONSUMER

By Ruth Ann Woodley

As the subject guinea pig for this article, I have found myself having some mixed reactions. Going into the project, I had no direct experience with how health insurers are using consumer data, but as I learned the basics, the idea sounded promising. As an actuary, I like the idea of using any data that gives more accurate predictions of risk and cost, as long as it is legal. Having seen how my data was used, I am still a novice on the topic, but here are my reactions—decidedly not those of a professional with respect to the topic, but colored by my actuarial background.

I had a chance to review the specific data available for purchase on my name and my husband's, and I found it was mostly correct, but not entirely. Some of the inaccuracies were trivial and don't seem to have been important in the modeling process. A couple of items were quite different between my data set and my husband's—one set listed our household as having only one resident, and the home values given were quite different. These might have been more important in the rating process, and since both data used the same address, flagging and addressing these kinds of discrepancies seems to be a desirable improvement to the process.

The majority of the data elements based on me personally (as opposed to aggregate information for my area of residence) were actually blank. That may be true for many or most people, since there turned out to be a lot of individual items for things like hobbies and interests. This suggests that these data profiles may be less comprehensive than many people fear, or at least that the modeling is not trying to reach a conclusion about where everyone falls on every possible item.

My first reaction to our assigned niches was that they must be completely wrong, since I am the opposite of chic. But after reviewing the descriptions, they are reasonably accurate. Not every detail fits my household, but many more are correct than not and we look more like these descriptions than we do the population as a whole. The two niches assigned do contradict each other on a couple of points, which may be a result of the contradictory details mentioned in our data.

By far the most difficult aspect of this process—and maybe the most important—was to decide how I feel about the lifestyle score of 1.05 assigned. In fact, for the past few years, my household's medical costs have been much lower than a typical manual rate for our demographic, probably by 50 percent or more, and there has been no change to our health status that should vary that in the near future. As an actuary, I find the evidence presented in this article for the model's predictive power to be compelling, and realize I cannot judge it on the results for just two individuals. But as an individual consumer, I can't help but react to the fact that this does overestimate my risk quite a bit. The lifestyle grouping I am assigned to may be correct, but there are apparently other qualities that differentiate me from that group and cause me to have lower claim costs. Finding ways to identify those and better predict low-cost customers—always a difficult aspect of medical risk predictions—could be a valuable enhancement to the model.

Finally, there is the question of whether my privacy felt violated when I saw the wealth of personal information that can be purchased about me for just pennies. To be honest—not really. I've never been particularly concerned about this kind of privacy and experiencing this firsthand did not change that as I thought it might. I would probably feel better about the data being out there if I thought it could lead insurance companies to charge me much lower rates, but even with these specific results I don't seem too much worse off than I would have been under the old individual insurance application process.

Despite the somewhat controversial nature of this topic, I have learned how consumer data can be used in a positive way by insurers. Regardless of how relevant regulations develop in the next few years, we as actuaries have a responsibility to harness the data in a positive way such as that described in this article. We should also be careful to educate the public on how we are—and are not—using the data, to protect the reputation of our industry and our profession. A

Ruth Ann Woodley, FSA, MAAA, is vice president with Ruark Consulting LLC. She can be contacted at *ruthann@ruarkonline.com.*

of lifestyle data elements would contribute to either an increase or a decrease of the condition's expected cost. The predictor elements include all types of information available in the consumer data—from self-reported indicators to area- and state-level information.

To see an example of how this works in practice, we acquired data for Ruth Ann Woodley and her husband. Using a model developed for a previous assignment, we were able to calculate a lifestyle score for both of them, which was 1.05 for both individuals. In other words, based on the data we received, we would expect that Ruth Ann and her husband are 5 percent more expensive than the average commercially insured population of the same age and gender. To illustrate what makes up this score, we dug into its components. In doing so, we determined that for most of the medical conditions, the resulting predictions did not significantly deviate from the age- and gender-based expectation, which contributed to the score close to an average score of 1.00. There were two other conditions which contributed to an increase in the lifestyle score and two others that contributed to a small decrease in the score. The claim cost predictions specific to tobacco neoplasm and COPD were lower than expected, while the predictions for cardiovascular diseases and other neoplasm were slightly above the age- and gender-based expectation.

Further investigation of the individual predictors of each condition suggested that the vast majority of data elements were at the area and state level, rather than directly attributable to Ruth Ann's and her husband's lifestyle habits. This was likely due to the absence of self-reported information in the data on the Woodleys, which we noticed when Ruth Ann was reviewing the accuracy of the information. For instance, Ruth Ann's area of residence is located in an area with a lower reported interest in running/jogging as well as camping and hiking, but a higher level of interest in Bible or devotional reading. Additionally, the state of residence as a whole experienced a lower prevalence of COPD. These are a few of the data elements which contributed to the lower predicted costs for COPD and tobacco-related neoplasm. Similarly, the average expected prevalence in the state of residence of cardiovascular disease and other neoplasm, as well as higher reported interest in automotive work contributed to the largest portion of the predicted cost for these two conditions. In this particular case, the more interesting drivers of the score were segmentation elements called niches, where each individual is assigned into one of more than 50 consumer segments based on their overall data profile. Niches assigned were Chic society and Loose change,[5] both of which contributed to the higher expected prevalence of cardiovascular conditions in both scores. A

Ksenia Draaghtel, ASA, MAAA, is an associate actuary with Milliman, Inc. She can be contacted at *ksenia.draaghtel@milliman.com*.

ENDNOTES

1 [To be certified], a plan shall, at a minimum meet marketing requirements, and not employ marketing practices or benefit designs that have the effect of discouraging the enrollment in such plan by individuals with significant health needs" (Sec. 1311(c)1(A)).

2 Fully searchable text is available at the Library of Economics and Liberty via link: *http://www.econlib.org/library/Ricardo/ricP.html*.

3 Fries JF, Koop CE, Soklov J, Beadle CE, and Wright D. Beyond Health Promotion: Reducing Need and Demand for Medical Care. Health Affairs 1998;17(2):70-84.

4 Stein, Joel. "Your Data, Yourself." *TIME*, March 21, 2011.

5 **Loose change**—This niche is dominated by households containing two adults and no children. These households tend to be homeowners and typically have longer length of residence—between two and 13 years. Their homes are valued at about $120,000. These professional households are more likely to contain a postgraduate degree than the households in the general population.

These households are not big credit card owners and users, and fall below the general population use of credit cards. They are also less mail-responsive, but do shop retail and on the Internet, and occasionally from catalogs. They purchase electronics, home improvement and workshop items, and wines. These households travel abroad, often on business, and are members of frequent flyer clubs. They also contribute to wildlife and environmental charities.

This niche is marked by its interest in the rugged outdoors. They are fond of camping, hiking, bicycling, horseback riding, power boating, hunting and shooting, snow skiing, and motorcycling. As compared to the general population, this niche is much more likely to own household pets. They are interested in a healthy lifestyle and try to watch their diets. Additional interests include golf, watching sports on TV, surfing the Internet, science fiction, working on cars, cultural events, and stock/bond investing.

Chic society—The households in this niche are very business- and culturally-oriented. These 49-year-old-headed households typically have no children. There is extensive domestic business and foreign travel in this niche. It is no wonder they are frequent flier members. These homeowners have residences that have an average value of about $265,000 and they have lived there for about six years, many of them as long as 20 years or more. They are also more likely than the general population to own a vacation property.

These households own many credit cards and have a known history of being mail-responsive and to purchase items through the mail. They purchase many items through the mail, including books and music, general merchandise, magazines and women's apparel. The households in this niche are also more likely to donate to charitable causes, like wildlife and environmental issues. They have a great interest in monetary investing, specifically mutual funds, stock/bond investments and real estate investments.

These households tend to lead very cultural, high society lives. Their activities and interests include fine arts and antiques, cultural events, fashion, wine, gourmet food and book reading. Other interests include photography, home furnishings and decorating, golf and bicycling. They are very health conscious with regular physical fitness, exercise, dieting, and self improvement.

Education

ARE YOU AS SMART AS A NEW FELLOW?

BY STUART KLUGMAN

IF YOU ARE AN ACTUARY of a certain age you are likely to proclaim that you don't understand the current pathway to fellowship as it has changed dramatically since your day. In the June/July 2011 issue of *The Actuary*, Dan Cassidy described the current system and outlined many of the features of how we now deliver education and assess learning. But that is only part of the story. Regardless of the system employed, the critical question must always be, "What does a new fellow know and what can a new fellow do?"

There are (at least) three ways this question might be answered. We could round up a random set of new fellows and present them each with a relatively easy actuarial assignment. Those who complete it successfully get a more challenging assignment and so on, until we have a good feeling for what they can accomplish. This could all be filmed and sold to a cable network. That approach is unlikely to generate enough income to offset the cost and the small sample size may not yield a significant result.

A second approach is much cheaper, but significantly less entertaining. I could walk you through the syllabus for each exam, seminar and module and offer commentary on how each item contributes to the education of a high-quality actuary. But at the end there is no assurance that new fellows have actually learned that stuff.

So I've adopted a third option, one that is relatively short, inexpensive and I hope you find enjoyable (and, if not, revealing). For your entertainment, I present questions from throughout the fellowship exam pathway. All of them have appeared on previous exams and where possible I have selected questions that turned out to be of average difficulty for that examination (using the delta measure, a standard in educational measurement).

To keep you honest, the solutions are not here, but are available on the SOA website at *http://www.soa.org/multiple-choice*. Also recall from Dan's article that there has been a concerted attempt to raise the cognitive level of our questions. A look at the sidebar by Brian Louth expands on this concept by showing how various verbs relate to cognitive levels. You will see those high-level verbs in many of the questions.

Note that for U.S. candidates on the retirement benefits track the fellowship requirements include the enrolled actuary exams. As a result, the SOA's exams cover topics not tested in those exams.

In order to highlight the difference in questions we now ask, I begin with two questions from 1978, which by no coincidence is the year I last had to take an exam.

1978 EXAMS—FROM PART 6

Discuss provisions included in a group life insurance contract in order to minimize anti-selection.

Describe the approaches used by Blue Shield Plans in the U.S. for physician reimbursement.

Discuss the considerations in underwriting group dental insurance.

Define peripheral vascular disease, describe its various forms, and briefly discuss the significance of each form for life insurance underwriting.

Stuart Klugman

1978 EXAMS—FROM PART 8

Describe the assumptions that are generally used in pricing group survivor income benefits. As part of your answer, indicate which of these assumptions could appropriately be used for pricing group term life insurance.

In the 1975 and 1976 Reports of the Society of Actuaries Committee on Group Life and Health, data relating to experience by sex are presented for group life, group weekly indemnity, and group long-term disability coverages. For each of these coverages described in the reports:

(a) Identify the types of statistics relation to experience by sex.

(b) Describe the difference in experience by year.

And now on to some recent questions. The following five questions appeared on fellowship exams in either fall 2010 or spring 2011. In order to highlight the cognitive level implied, the key verbs have been set in bold type.

INDIVIDUAL LIFE AND ANNUITIES CSP, U.S.—SPRING 2011—QUESTION 15

(6 points, 18 minutes) CBA Life, a U.S. insurance company, is acquiring a block of nonparticipating, two-year term life policies from ZYX Life.

(a) You are given the following information about a sample policy from this block:

Face amount: 100,000

Gross annual premium: 500

Best Estimate Assumptions	Year 1	Year 2
Mortality Rates	0.45%	0.59%
Lapse Rates	10%	n/a
Interest Rates	5%	5%

Assumptions that Include Provision for Adverse Deviation	Year 1	Year 2
Mortality Rates	0.46%	0.60%
Lapse Rates	5%	n/a
Interest Rates	5%	5%

Assume:

- The Best Estimate lapse assumption is based on ZYX's company experience studies which are fully credible.
- The Best Estimate mortality assumption is based on industry experience.
- Lapses and deaths are assumed to occur at the end of the year.
- There are no expenses on this product.

(i) **Calculate** the GAAP Net Level Premium for the policy using the Best Estimate Assumptions. Show all work.

(ii) **Evaluate** the appropriateness of the provisions for adverse deviation, taking into consideration guidance outlined in ASOP 10 (Financial Statements under GAAP). **Justify** your answer.

RETIREMENT BENEFITS CSP, U.S.—SPRING 2011—QUESTION 15

(10 points, 30 minutes) The CFO of ABC Company wishes to adopt an asset allocation policy, including an asset allocation policy for its defined benefit pension plan, which maximizes shareholders' value. Shareholders who have a combined $20 billion invested in their individual portfolios own the company. Pension investments are transparent to shareholders and they rebalance their portfolios to maintain a 50% Equity / 50% Fixed Income mix. The shareholders have determined that their current total after-tax income, using the Augmented Balance Sheet approach, is $910 million.

ABC is considering a new investment policy for the defined benefit pension plan which it sponsors.

New Policy: 80% of the plan assets in equity investments, 20% of the plan assets in fixed income investments.

You are given the following data and assumptions:

- Pension plan assets: $3.0 billion
- Gross investment return assumptions:
  ⟹ Equity investments: 7% per annum
  ⟹ Fixed income investments: 4% per annum
- Corporate income tax rate: 30%
- Individual tax rates on investment income:
  ⟹ Equity investments: 10% per annum
  ⟹ Fixed income investments: 30% per annum

Changes in shareholders' equity, including returns on plan assets, flow through to investors and are taxed at 10%.

Using the Augmented Balance Sheet approach, **calculate** the total after-tax income for the new policy and make a **recommendation** whether the proposed policy supports the CFO's goal. Show all work.

Exam Creation

BY BRIAN LOUTH

IN MY ROLE as Examination chair, I have overall responsibility for the creation and grading of SOA exams. One aspect of that is ensuring that all the examination committees follow the policies and procedures that we have established for exam creation. One of them is to ensure that a significant number of the points on each exam are at the three highest cognitive levels and about half are at the two highest levels. The following list is the definitions we use along with a sampling of the verbs that often accompany such questions.

Retrieval—This usually requires a list derived from a single source and mostly relies on memorization (define, list).

Comprehension—This requires distilling or summarizing knowledge from a source (synthesis) or re-presenting information in a different form or in your own words (apply, calculate, derive, describe, explain).

Analysis—This requires an evaluation of information and a subsequent explanation based on that evaluation. For example, comparison of whether items are alike or different, identifying strengths and weaknesses, generalization of the previous two levels to a new situation or an error analysis (assess, compare/contrast, evaluate, interpret).

Knowledge utilization—This requires an analysis and comparison of information, drawing a conclusion, and the subsequent explanation/justification of one or more facets of that evaluation/comparison/conclusion. It often expects a solution, decision or recommendation, with justification (construct, develop, justify, recommend).

Individual questions may cover more than one level. For example, a question may begin by asking for a list (retrieval) but then ask you to indicate how each item in the last relates to a specific situation (analysis). Finally, the question may ask for a recommendation with respect to a specific issue (knowledge utilization).

As you look at the questions, the verbs used in each question provide a guide (though may not completely determine) the cognitive level. More about verb lists and other elements of exam construction are available in our recently published guide for exam candidates (*http://www.soa.org/written-exams-guide*). A

Brain Louth, FSA, FCIA, is senior vice president for RGA Life Reinsurance Co. of Canada. He can be contacted at *blouth@rgare.ca.*

GROUP AND HEALTH CSP—SPRING 2011—QUESTION 17

(7 points, 21 minutes) You are the consulting actuary for the pension plan of Motor Engines (ME), a large US based automobile manufacturing company subject to Financial Accounting Standard Number 106 (FAS 106). Due to financial problems resulting directly from the credit crisis, you have been asked by the senior management of ME to peer review the work of the internal actuary pertaining to a large settlement affecting employee benefits.

You have been given the following about the settlement:

- The plan has an unrecognized loss of $60,000,000 prior to the settlement.
- The plan does not have any unrecognized transition obligation.
- The unrecognized loss is amortized over a 20 year period.
- As a result of the purchase of individual annuities:
  - ◊ Half of the plan's Defined Benefit Obligation is settled.
  - ◊ The plan incurs an additional $15,000,000 loss due to the annuity purchase.

(a) **Differentiate** settlements from curtailments.

(b) **Calculate** the settlement loss recognized immediately into earnings along with the remaining unrecognized loss. Show your work.

(c) (i) **List** the actuarial assumptions for Life and Health post-retirement plans.

(ii) **Describe** the considerations in selecting the assumptions in part (i) above.

(d) **Identify** the problems associated with using the premium rates or claim costs for valuations.

FINANCIAL ECONOMIC THEORY AND ENGINEERING—FALL 2010—QUESTION 14

(7 points, 21 minutes) Petit Verdot Inc., an all-equity financed viticulture company, expects to earn $10 million before interest and tax (EBIT) per year in perpetuity. You are given the following:

Petit Verdot's current systematic risk	2
Risk free rate, annual	4%
Market risk premium	3%
Corporate income tax rate	35%

The Chief Financial Officer wants to explore the effects on the capital structure under various levels of debt financing, with business disruption costs and lost interest tax shields taken into account. The following

financial information for the various debt financing scenarios is provided:

Value of debt	Cost of debt	Present value of $1 contingent on future business disruption	Business disruption cost
$6,500,000	6.00%	0.20	$275,000
$8,500,000	6.25%	0.25	$300,000
$10,500,000	6.50%	0.30	$325,000
$12,500,000	6.75%	0.35	$400,000

(a) **Determine** the value of Petit Verdot Inc.
(b) **Calculate** under the four different debt scenarios:
  (i) Expected value of the tax benefit from the deductibility of interest payments
  (ii) Expected present value of the business disruption costs
  (iii) Petit Verdot's weighted average cost of capital.
(c) **Evaluate** the benefits of the four debt scenarios in terms of optimal capital structure and recommend the best alternative for Petit Verdot.

ADVANCED FINANCE/ERM—FALL 2010—QUESTION 12

(10 points, 30 minutes) Wier Green (WG) is a widely held, well capitalized, debt-free publicly traded paper producer. Recently, WG has experienced large income volatility attributed to the following two factors:

- Significant fluctuations in the price of pulpwood, a main input to the paper production process;
- An inability to pass along cost increases to its customers.

(a) **Describe** five considerations companies should take into account when deciding whether to hedge risk or manage risk.
(b) **Explain** the advantages and disadvantages of managing versus hedging WG's exposure to pulpwood price volatility.
(c) The CFO of WG has proposed acquiring TreeToppler, a primary producer/wholesaler of pulpwood, to hedge their exposure to pulpwood price volatility. The proposed acquisition price is $55/share. TreeToppler is currently trading at $50. **Evaluate** the CFO's rationale for the acquisition from the perspective of WG's shareholders.
(d) WG is considering modernizing its production process by investing heavily in a new and costlier technology. The new technology is much more environmentally friendly than the prevailing technology because it uses less pulpwood.
e. (i) **Describe** the five steps of the process through which this disruptive technology can displace currently prevalent technology.
f. (ii) **Explain** the strategic implications for WG of investing in the new technology.

SUMMARY

Over the years, much of the exam-related discussion has centered on structure, such as the number of tracks, many small exams versus a small number of large exams, ways to incorporate professionalism and nontechnical skills. Lost in those discussions is the process of continually improving the exams (and other assessments) themselves. This article has shown how the written-answer fellowship exams have changed to expect candidates to demonstrate higher-level skills than in the past.

You probably are as smart as a new fellow, but may also be relieved to not have had to demonstrate it with questions such as those above. A

Stuart Klugman, FSA, CERA, is staff fellow, Education, for the SOA. He can be contacted at *sklugman@soa.org.*

FALL CHANGES

HAVE YOU REGISTERED for this year's SOA Annual Meeting in Chicago? With all it has to offer, you don't want to miss it. The General Session keynote speaker is Nick Bontis, director of the Institute of Intellectual Capital Research, Inc. Bontis will talk about ways to overcome information bombardment—what he believes to be a major cause of decreased productivity.

Four-star Gen. Stanley McChrystal is the Presidential Luncheon keynote speaker. McChrystal will offer leadership lessons learned on the battlefield, including how to build teams able to actively pursue results.

There are some new features to this year's Annual Meeting. We are excited to offer a meeting application to be used on your mobile device. With this app you will be able to access session, speaker and presentation information and much more. Other new features are based on attendee feedback from previous Annual Meetings—the length of the sessions has been increased to 75 minutes and the number of concurrent time slots has been increased to 10. All of this combines to offer you more continuing professional development credit than ever before.

As you know, October is the month for new leadership for the SOA. The SOA would like to thank outgoing President Donald J. Segal for all his dedication and hard work and welcome incoming President Brad Smith. We look forward to a productive year under Smith's leadership.

The SOA would also like to thank all of the volunteers who have given their time and effort to make the SOA what it is today. For that reason, we have named 2011 the year of the volunteer and will be honoring the SOA's volunteers at the Annual Meeting.

We look forward to serving you this year!

— SOA Executive Director Greg Heidrich

E-COURSES

Corporate Finance: Introduction to Corporate Finance
This e-course covers the corporate finance branch of financial economics; that is, how institutions make decisions about raising and deploying capital. You will learn about the roles of the corporation, debt holders, shareholders and managers and the relationships between each. You will consider what things would be like in an ideal world and examine what factors contribute to corporate financial structures seen today. This e-course consists of readings, exercises, review quizzes and scenario-based case studies. If you would like to learn more on the subject of corporate finance, consult the reading list at the end of this e-course.

Decision Making and Communication
Today's actuaries must apply their advanced technical skills within the context of increasingly multifaceted business and management demands. Nontechnical skills are also central to the actuary's success as a well-rounded business professional and advisor.

Decision Making and Communication (DMAC) provides a foundation for making decisions related to complex business problems that require the involvement of many stakeholders and decision makers. Although the literature includes many suggestions and opinions regarding decision-making definitions and processes, there are no standardized definitions of decision making and there are no best practices regarding decision-making processes.

For more information, visit *www.soa.org*, Professional Development, e-Learning.

THE ACTUARIAL PROFESSION IN THE NEWS

The SOA is focused on raising awareness of actuaries in the media. Recent efforts have been successful. Here are just a few examples:

2011 100 Most Influential People in Finance
Richard Lauria is one of the top most influential people in risk management. For more information, visit *www.treasuryandrisk.com*, search term 100 Most Influential or use the QR code.

Milliman Recognized as 2011 Microsoft Technical and High-Performance Computing Partner of the Year
Milliman's completed actuarial model wins Microsoft Innovation award. For more information, visit *www.milliman.com*, search term 2011 Microsoft or use the QR code.

Seven Steps to a Sound Retirement
Noel Abkemeier talks about seven steps to a sound retirement. For more information, visit *www.kenndungu.wordpress.com*, search term Noel Abkemeier or use the QR code.

Six Surefire Ways to Live a Long Life
Member Tim Harris discusses ways to live longer. For more Information, visit *www.insure.com*, search term 6 Surefire Ways or use the QR code.

How Can We Make 401(k) Plans More Like Pensions?
Actuary Emily Kessler is quoted about Retirement 20/20 and its key principles. For more information, visit *www.secondact.com*, search term How Can We Make or use the QR code.

View all of these articles by going to *www.soa.org/newsroom* and clicking on the Profession In The News link. A

ATTENTION READERS!

If you have an idea for an article you think should appear in *The Actuary*, or a response to something you have read in these pages, tell us about it by sending an email to *theactuary@soa.org*.

PROFESSIONAL DEVELOPMENT OPPORTUNITIES

ANNUAL MEETING & EXHIBIT
Oct. 16–19
Chicago, Ill.

ACTUARIES & TRADERS: BRIDGING THE GAP SEMINAR
Oct. 20–21
Chicago, Ill.

HEALTH PRICING BOOT CAMP
Nov. 7–8
Nashville, Tenn.

MEDICAL SCHOOL FOR ACTUARIES
Nov. 8–9
Nashville, Tenn.

ETHICS AND PROFESSIONALISM FOR ACTUARIES
Nov. 9
Nashville, Tenn.

HEALTH VALUATION BOOT CAMP
Nov. 10–11
Nashville, Tenn.

BRIDGING THE GAP: FILLING THE BLACK HOLES IN VA RISK MANAGEMENT
Nov. 13
Chicago, Ill.

EQUITY-BASED INSURANCE GUARANTEES CONFERENCE
Nov. 14–15
Chicago, Ill.

View all Professional Development opportunities by visiting *www.soa.org* and clicking on Event Calendar.

Recommended Readings

The following is a list of recommended readings from the contributing editors that they feel will pique your interest and help keep you informed.

From Ruth Ann Woodley

This editorial in *The New York Times* discusses the recent coverage of studies suggesting that antidepressants aren't effective after all. This is of interest to health actuaries since this class is a big chunk of drug spending. And it raises fascinating broader issues about the difficulties of designing sound research on medical efficacy. For more information, visit *http://nyti.ms/pVwwkq* or use the QR code.

Data Mining: How Companies Now Know Everything About You. To read the article, visit *http://ti.me/o2v3Aw* or use the QR code.

QR Reader download

To use the QR codes provided here, you must download a QR reader app to your smartphone. This can be easily done by visiting *get.neoreader.com* on your smartphone.

FOUR COURSES FOR
HEALTH ACTUARIES

Health Pricing Boot Camp
Nov. 7-8

Medical School for Actuaries
Nov. 8-9

Ethics and Professionalism for Actuaries
Nov. 9

Health Valuation Boot Camp
Nov. 10–11

Visit **SOA.org** to learn more!

What do you do
when you're out of the office?

- **Collect** rare artifacts?
- Win ballroom dancing **competitions**?
- **Play** an instrument, or **Create** artwork?
- **Organize** Special Olympics activities?

The Actuary will soon be introducing a new column called, **"Out of the Office."** It will be a place where you can showcase your talents, your community involvement, or extracurricular activities you participate in just for the sheer fun of it.

So, what are you waiting for? Send us a short paragraph providing some basic details about your out of the office experiences, along with your contact information, and we'll be in touch. Visit ***http://www.soa.org/pub-out-of-office.***

We look forward to hearing from you!

Out of the Office

Section Highlights

THE HEALTH SECTION is 30 years old this year! As the oldest section, it is the first to reach this milestone. We celebrated our anniversary at the recent SOA Health Meeting, which this year broke all records for attendance. The Health Section continued its history of breaking new ground at this meeting where a way cool new SOA meeting app and a Twitter feed about the meeting both had their debut.

In the past year, the council has been busy with many projects, some examples of which include:

- Working with the SOA staff to present the Health '11 meeting;
- Sponsoring a textbook on Complexity Science for Actuaries;
- Coordinating 14 sessions at the SOA Annual meeting last fall;
- Planning a Boot Camp for Health Actuaries that included sessions on health care trend, pricing, professionalism and valuation in addition to a MedSchool for Actuaries;
- Sponsoring or co-sponsoring webcasts on topics related to health reform, rating and nontraditional actuarial opportunities;
- Working with the Untapped Opportunities Task force to enhance the health actuary brand and the opportunities available for health actuaries; and
- Working with the SOA board to identify projects for the Health Actuarial Research Initiative. This initiative is designed to increase the quantity and quality of, and the speed at which the profession is able to complete research on health topics. The first project under this initiative is on risk adjustment.

The Health Section Council reviewed and revised the section's Mission and Vision statements, which will be posted on the section website. We identified metrics to track to be sure the council activities address our strategic goals. Members should expect to see a new member survey later this summer seeking feedback.

Over the next year, the section council will be planning the Health '12 meeting, annual meeting sessions, more webcasts on health reform and other topics and another boot camp. We will also be focusing on identifying strategic opportunities to enhance the health actuary brand, and on joint projects with the Academy of Actuaries' Health Practice Council. A

Judy Strachan, FSA, FCA, MAAA, is chairperson for the Health Section. She can be contacted at *judy.l.strachan@gmail.com.*

IF YOU ARE AN ACTUARY IN A SMALL COMPANY, you know that work is different in a small company. Almost everything you read and hear must be translated into a small company environment in order to be implemented. The Smaller Insurance Company Section connects actuaries who speak "Small Company." Sessions at meetings, webcasts, the Smaller Insurance Company Chief Actuaries Forum, buzz groups, section breakfasts, the *Small Talk* newsletter, the section web page—everything the section does—helps us translate current practice into a small company environment. And, perhaps most importantly, the section provides venues for us to get acquainted with other small company actuaries, so we can discuss issues with others as they arise, long after the meetings are over. Those connections help us for years.

The section is always trying new ways to serve our members. The newsletter is electronic, so it gets to people faster; blast emails get out news that affect smaller companies and can't wait for the next newsletter, such as PBA developments; the website contains current news and is becoming a repository of reference material; and the section is sponsoring four economical webcasts this year (after having sponsored only two webcasts in its entire history). Webcasts about ASOP 41 (Actuarial Communication), data management, and managing actuarial functions at smaller insurance companies have already been presented. A year-end financial reporting update will be presented Dec. 8, 2011 in conjunction with the Financial Reporting Section.

If you work for a small company, joining the Smaller Insurance Company Section can help you do your job better and enjoy it more. The section council is always looking for new ideas and people who want to link with us. Want to talk? Call 334.612.5013. A

Jerry Enoch, FSA, MAAA, is vice chair of the Smaller Insurance Company Section. He can be contacted at *jenoch@alfains.com.*

SOCIETY OF ACTUARIES

Annual Meeting
& Exhibit

Oct. 16-19
Sheraton Chicago
Hotel & Towers
Chicago, IL

SOA 2011

Get ready to get it done in the city that works.

Join us at the SOA 2011 Annual Meeting & Exhibit in Chicago—the SOA's largest networking opportunity. Roll up your sleeves. This is the event where you dig in and get tons of takeaway. More than 100 hearty sessions, full of just what you need for professional growth—and offering loads of CPD credit. Speakers who'll move you to take action. And networking opportunities where you'll find other doers like yourself.

Past attendees said:

"The breakout sessions were terrific—right on target."

"Best retirement plans content ever, especially the DC plan content."

"Lots of good speakers. The complexity science session was impressive and useful."

Ready to get it done? Head to **SOAAnnualMeeting.org**.

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Equity-Based Insurance Guarantees Conference

Nov. 13, 2011
Bridging the Gap: Filling the Black Holes in VA Risk Management

Nov. 14-15, 2011
Equity-Based Insurance Guarantees Conference—Chicago, Ill.

This seminar is designed to give professionals with limited-to-moderate experience an understanding of how to better quantify, monitor and manage the risks underlying the VA and EIA products.

Learn more at **www.soa.org**.