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Assistant Vice President - P&C - Corporate Reserving - Northeast/Chicago/St.Paul/Atlanta

- ◆ Highly visible corporate role supporting group-level reserve oversight, regulatory reporting, and actuarial opinion processes
- ◆ Participate in M&A integration and governance refinement
- ◆ Collaborate with senior reserving leaders and engage with global stakeholders including executive leadership, auditors, and regulators
- ◆ FCAS with 10+ years' experience, strong reserving/loss analytics background, and corporate actuarial exposure
- ◆ Well-rounded commercial/specialty and reinsurance knowledge
- ◆ Executive communication skills with deep knowledge of financial reporting, controls, and reserve oversight

112151

Senior Pricing Actuary - Casualty Reinsurance - Bermuda

- ◆ Oversee pricing across diverse US casualty treaties
- ◆ Provide portfolio insights supporting profitability and capital strategy
- ◆ Collaborate with Underwriting leadership
- ◆ Mentor and develop junior actuarial talent
- ◆ Enhance pricing tools and data capabilities
- ◆ FCAS with 10+ years' experience and expertise in US casualty treaty reinsurance pricing
- ◆ Executive communication skills

112088

Partner-Business Development Actuary-Life-Remote

- ◆ Key role in building and scaling the Life & Annuities practice, cultivating enduring, high-value client partnerships
- ◆ Partner with firm executives to shape growth strategy, enter new markets, and elevate competitive positioning
- ◆ ASA/FSA with 10+ years' experience life & annuities insurance/consulting
- ◆ Executive-level communication and presentation skills
- ◆ Base salary up to ~\$600K plus substantial bonus package

111824

Manager & Actuary - Life - Northeast

- ◆ Contribute to high-impact inforce and M&A reinsurance pricing, developing AXIS models, pricing assumptions, and supporting complex, asset-intensive transactions
- ◆ Collaborate with reinsurers and refine pricing processes and workflows to enhance deal execution and analytical efficiency
- ◆ FSA with 5+ years' (re)insurance experience and background in asset-intensive reinsurance, pricing, and product development preferred
- ◆ Great work culture and comprehensive benefits

111480 - EXCLUSIVE OPPORTUNITY

Actuarial Manager - Health - Florida

- ◆ Lead actuarial analyses supporting IBNR, revenue, and reserve modeling, identifying trends, risks, and opportunities across claims and external data
- ◆ Partner with business leaders to translate claims analytics into actionable strategy and financial insight
- ◆ ASA/FSA with 5+ years' experience and strong Medicare Advantage exposure
- ◆ Ability to lead and develop small teams
- ◆ Great analytical and communication skills

112104

MPL & Healthcare Pricing Actuary - P&C Remote or Northeast

- ◆ Support pricing and portfolio analytics, enhancing model, rate discipline, and healthcare business expansion
- ◆ Collaborate on new product development initiatives
- ◆ Assist with rate filings and reinsurance placements
- ◆ Minimum 3-5 exams in progress towards ACAS/FCAS
- ◆ 3-5 years' experience in healthcare liability, pricing preferred
- ◆ Great cross-functional communication skills essential
- ◆ Strong technical proficiency with Excel expertise
- ◆ Exceptional communication & technical proficiency

112066

Consulting Actuary - Life - Chicago

- ◆ Opportunity to work on high-impact, intellectually challenging projects and interact with senior leadership
- ◆ Conduct advanced actuarial analysis across pricing, modeling, valuation, and risk assessment
- ◆ Perform financial projections, M&A due diligence, and regulatory reporting
- ◆ Client-focused and results-driven FSA with 7+ years' actuarial experience and strong quantitative background
- ◆ MG-ALFA and SAS expertise
- ◆ Great communication & project management abilities
- ◆ Robust compensation and benefits

112157

Senior Reserving Analyst - P&C - Northeast

- ◆ Lead deep-dive analyses to provide reserving insights supporting underwriting strategy and portfolio development
- ◆ Engage with senior stakeholders and top-tier executives
- ◆ 2-6 years' actuarial experience, strong Commercial reserving background preferred (Personal Lines considered)
- ◆ Experience with quarterly/annual reserving required
- ◆ Broker or consulting background highly valued
- ◆ Strong technical proficiency (Python/SQL)

110700

Actuarial Analyst IV - Health - Medicare D - Remote

- ◆ Assess financial risk, reserves, cash flows, and underlying assumptions
- ◆ Develop and validate advanced modeling and support product evaluations
- ◆ Collaborate closely with cross-functional teams
- ◆ ASA with 6+ years' actuarial Medicare expertise including strong Medicare Part D and leadership experience
- ◆ Strong work-life balance with competitive salary and benefits
- ◆ Remote from many flexible locations

112333

Actuarial Associate - Health - Remote

- ◆ Focus on Medicare Advantage and healthcare risk solutions
- ◆ Independently manage projects and modeling deliverables
- ◆ Exposure to advanced AI tools and best-in-class technology
- ◆ ASA with 6-10 years' experience in healthcare claims analytics
- ◆ Strong Medicare Advantage analytics and modeling skills
- ◆ High-growth environment with an exciting startup feel

IN THIS ISSUE



14 The Many Sides of Retirement Planning
An evolving Social Security, rising health care costs, and climate-driven insurance challenges are increasingly interconnected, and actuaries are uniquely positioned to analyze their impact on retirement.
By Noah Kirsch

22 What Actuaries Need to Know About Emerging Therapies
As cell and gene therapies evolve, actuaries must adapt models to account for evolving regulations, uncertain clinical outcomes, and changing financial frameworks.
By Ankit Nanda

30 Advancing With an Edge
Academy membership helps actuaries stay ahead with the tools, knowledge, and networks to grow professionally, enables employers to tap into this expertise, and strengthens the U.S. profession.
By Barbara Bryant

38 Professionalism in the Age of AI
As emerging technologies transform actuarial work, actuaries should be prepared to face challenges in transparency, control, and accountability—while continuing to uphold the principles of professionalism.
By Virginia Hulme

42 Calibrating GenAI
Generative artificial intelligence can boost efficiency in underwriting, claims, and IT, but overuse risks eroding judgment and empathy. A balanced framework ensures benefits without losing the human touch.
By Amarnath Suggu

46 Mind the GAAP
Simple concepts that can enable financial statement users to make sense of the performance of long-duration insurance contracts.
By Steve Malerich

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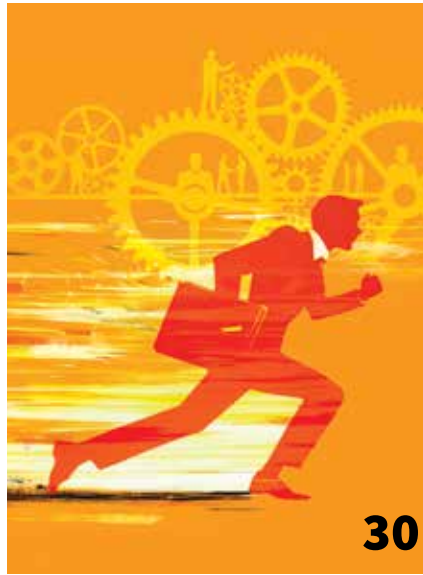
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4 EDITOR'S NOTE
George's Retirement—
and Ours
Preeti Vasishtha

6 PRESIDENT'S MESSAGE
How Academy Membership
Helped Me Grow in My
Career
Tricia Matson

7 LETTER TO THE EDITOR
Let's Not Wait for
the Tipping Point
Roy Goldman

8 CEO INSIGHTS
Bringing Member Value
to Life
William J. Michalisin

10 UP TO CODE
Are You Offside?
Eli Greenblum

50 TRADECRAFT
Balancing Protection and
Performance in Retirement
**Jeyaraj (Jay) Vadiveloo
and Karishma Gupta**

54 POLICY COMPASS
What H.R. 1 Changes Mean
for Medicaid's Future
Ted Gotsch

56 MEMBER SPOTLIGHT
Scott Merkord
Counting on Public Good

58 CROSSWORD
Nhomme de plume
Warren Manners

60 CRYPTIC PUZZLE
Honeycombs
Tom Toce

62 PUZZLES
Jigsaw-Puzzle Puzzles
Stephen Meskin

64 LAST WORD
The Long View on
an Aging World
Sam Gutterman

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George's Retirement—and Ours

ON A RECENT TRIP, MY RIDESHARE DRIVER, GEORGE—a man in his seventies—told me he had retired from his full-time job in upstate New York about a decade ago. He moved to the Washington, D.C., area to escape the harsh winters. Retirement, however, did not mean stopping work. He now drives several days a week, earning income that allows him to save and fund his interests in photography and travel.

George is one of the estimated 42 million people in the United States who engaged in some form of gig work in 2025. Some supplement traditional full-time jobs. Others rely on gig work entirely. For many, gig work has become a source of retirement income.

Gig income is not always steady, and how it is reported can affect Social Security benefits—the primary source of income for most retirees, from a system that is already facing long-term financing challenges. Health and long-term care costs continue to rise. Property insurance volatility, driven in part by climate risk, adds another layer of financial uncertainty. As these pressures come together, the retirement equation grows more complicated.

Our cover story, “The Many Sides of Retirement Planning” (*page 14*), explores these developments and explains how actuaries are uniquely positioned to analyze where and how these systems intersect and why actuarial insights across practice areas are essential to shaping the future of retirement.

Another field that's evolving rapidly is cell and gene therapies, which pose new challenges in modeling risk, pricing, and access. “What Actuaries Need to Know About Emerging Therapies” (*page 22*) explains the need for actuaries to adapt models to account for evolving regulations, uncertain clinical outcomes, and changing financial frameworks.

Emerging technologies, including artificial intelligence (AI) and other types of complex models, are also bringing new challenges to actuarial professionalism. From a professionalism perspective, the actuary does not always know how these models work, what data they were trained on, or what biases they may have. Professionalism requirements continue to guide actuaries as they navigate these new challenges. In “Professionalism in the Age of AI” (*page 38*), actuaries explain how they are addressing questions of transparency, control, and accountability while continuing to uphold the principles of professionalism.

As you consider these developments across your practice areas—health, life, casualty, retirement, and risk management and financial reporting—the Academy has a wealth of resources ready for you. In “Advancing with an Edge” (*page 30*), actuaries

describe how Academy membership provides the foundation they need to meet professional requirements, grow into new roles, and strengthen their credibility. Members point to Academy resources as practical tools for addressing workplace challenges. For many members, volunteering and committee involvement represents the most transformative aspect of Academy membership, providing them with unique learning experiences and career development opportunities. For employers, Academy membership is an investment in workforce development and quality, strengthening technical rigor across the organization.

President Tricia Matson captures all this and more in her own membership journey (*page 6*). Matson reflects on why she chose to join the Academy, and what she has learned about the value of membership over time.

In CEO Insights (*page 8*), Executive Director and CEO William J. Michalisin builds on this perspective, showing how the Academy empowers members to apply their expertise in service of the public and the profession—shaping policy, upholding professionalism, and reinforcing the MAAA designation—while demonstrating the real-world impact of actuarial insight through volunteer work.



George did not describe himself as part of a workforce trend or a demographic shift. He simply built something that works for him—balancing income with the freedom to pursue what he enjoys. Yet his story reflects a larger shift: Retirement today is increasingly entwined with health care, insurance, financial markets, and evolving work arrangements. Viewing these as interconnected systems—and identifying where vulnerabilities could emerge—is where actuarial insight matters most. By measuring risk, modeling long-term consequences, and designing sustainable retirement solutions, actuaries help people like George and every reader planning their own retirement to find greater financial security in their golden years. ▲

PREETI VASISHTHA is editor-in-chief, *Contingencies*, and the Academy's director of content.

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How Academy Membership Helped Me Grow in My Career

SINCE THIS ISSUE INCLUDES THE TOPIC OF ACADEMY MEMBERSHIP VALUE, I decided to share my own story about why I chose to join the Academy, and what I have learned over time about the value of my membership since joining.

I received my associateship from the Society of Actuaries in 1996. I was working in consulting at the time and was very excited about the prospect of being able to sign actuarial opinions! I was lucky to be working at an employer (Arthur Andersen) that strongly encouraged Academy membership. So I joined right away, and added those very desirable letters after my name—Patricia Matson, MAAA, FSA. It was not long after that I signed my first actuarial report.

Volunteering Accelerated My Learning

What I did not appreciate at the time was how significant my Academy membership would be to my overall career growth. Five years after becoming a member, I started my volunteer journey, becoming a member of the Life Practice Council's Life Financial Reporting Committee (LFRC). I quickly learned that I knew very little about life financial reporting—at least compared to the amazing volunteers on the committee. Regardless, I was welcomed into that role with open arms, and I did my best to be useful. I didn't have deep technical expertise but was able to do research, read and critique documents, and volunteer for any tasks I felt capable of taking on.

At the same time, I was starting to do more and more life financial reporting work. I changed roles (this was not my choice; it was the Enron era!), moving to Deloitte Consulting. We had a lot of work involving technical GAAP (Generally Accepted Accounting Principles) issues, and my time on the LFRC gave me great information to leverage. I also found the reverse—my consulting work helped me gain expertise so I could play a more technical and significant role on the committee. Having the combination of my day-job knowledge and LFRC knowledge made me better at both roles. The education I received by working side by side with industry experts was really second to none—I could not have learned as much, or as fast, if I had tried to do it with my day job alone. This continued to be true for the next 25 years—working side-by-side with industry experts on topics such as fair value, economic capital, IFRS (International Financial Reporting Standards), principle-based reserving, risk-based capital, asset modeling, and so on, has been *critical* to my career-learning journey, and I am very grateful to the Academy for providing this to me.

Leadership, Networking, and Giving Back

But wait, there's more! Another huge benefit has been the people I have worked with through my 25-year volunteer journey. I have served on about 20 different Academy and Actuarial Standards Board (ASB) committees, and I would guess that this has resulted in adding more than 100 actuaries to my network. Having a strong professional network is critical for all of us. These are people whom I have hired and who have hired me. They have given me career advice, technical advice, and personal advice. They have been my clients and my consultants. We have given each other recommendations and helped each other find jobs. And there is something special about Academy volunteers. Because we all have a passion about serving the public and the profession, we are naturally helpful and professional. These are some of my best "actuarial" friends.

Now, about leadership. Obviously, I have a very significant leadership role now. I've not been in it very long, and it is already giving more to me than I am giving to it. To be a part of such a meaningful mission—serving the public and the profession through objective, independent, and balanced advice on actuarial issues—is incredibly rewarding. But this is only one of many incredible leadership opportunities the Academy has given me. Getting back to that first committee, the LFRC, I watched the chairpersons in action and thought that I could do that one day. I asked my committee peers for advice, and eventually I was asked to lead the committee. It was hard—the other members had more experience and more knowledge—but it was a great experience and everyone was wonderful to me. I proceeded to chair a wide range of Academy and ASB committees. I learned a lot about how to lead and reach consensus despite disagreement, how to manage a group with varied levels of commitment, how to ensure all voices are heard, how to produce work products aligned with strategy and mission, and how to turn complicated actuarial discussions into something enjoyable for volunteers.

In my current day job, I lead a team of actuaries across all disciplines. All of our actuaries are Academy members. Many are active volunteers. I want my team to grow and develop—for the sake of our firm, our clients, and for their own career



goals. One of the best ways to do this is through Academy membership. Even those who aren't active on Academy committees can leverage the vast array of learning opportunities on Academy Learning and access the Academy's many free or low-cost practice-area and professionalism webinars. Some find ways to micro-volunteer, which is a great way to learn and grow without a significant time commitment. I would encourage every employer to look into the value of the membership for their actuarial team, whether they are already members or considering becoming members.

If you want to learn more about these amazing career development opportunities for you or your team, visit the Membership Benefits and Volunteer Center drop-down links in the Membership section of the Academy's actuary.org homepage, and please do not hesitate to contact me at president@actuary.org. ▲

TRICIA MATSON is president of the Academy.

LETTER TO THE EDITOR

Let's Not Wait for the Tipping Point

I received my January/February 2026 issue of *Contingencies* after returning from hearing Andrew Ross Sorkin speaking on his book, "1929: Inside the Greatest Crash in Wall Street History—and How It Shattered a Nation" in Jacksonville, Florida. Mr. Sorkin talked about the growing debt in the United States and stated that debt was the major cause of every financial crisis.

I opened *Contingencies* to find Sam Gutterman quoting that exact statement in his article, "Are We Close to the Tipping Point Yet?" How timely! Sam lists five theoretical methods for addressing our upcoming debt challenge but concludes that the likelihood of any of these occurring is low. He ends by saying that a major concern for actuaries is when the tipping point will be reached and what follows. My immediate thought was: Actuaries should not wait for that to happen. We actuaries need to jump into the political thicket. Our country needs people with strong financial and analytical skills and a reputation for integrity and unbiased decision-making to voice concerns and suggest solutions or even run for office. When a public issue is in our bailiwick of expertise (such as debt, health care, or retirement), we should not pull punches in our pronouncements.

—Roy Goldman

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Bringing Member Value to Life

ONE OF THE THINGS I VALUE MOST about the American Academy of Actuaries is the way our members bring actuarial expertise and passion to life in service of the Academy’s mission, which is to serve the public and the U.S. actuarial profession. The work our members do through the Academy demonstrates the powerful impact that actuarial insight and professionalism can have on some of the most complex financial and policy challenges facing our nation, while also reinforcing the value of membership and the credibility of the MAAA designation.

For all actuaries practicing in the United States, the Academy provides a unique opportunity to join the national organization focused solely on the actuarial profession in the United States and to contribute their knowledge and experience beyond their daily roles. An investment made in Academy membership is an investment in the U.S. profession. Academy membership empowers actuaries to help inform public policy, strengthen the U.S. profession and the structures that support it, build community and connection, and engage with stakeholders on issues that affect the financial security of millions of Americans.

This work takes many forms, but at its core, it reflects the profession’s commitment to bringing objective, independent, and balanced expertise to real-world issues while reinforcing professionalism and member value.

Ensuring Actuarial Expertise Informs Public Policy

The issues actuaries engage with today are increasingly complex and interconnected. From health care affordability and retirement sustainability to climate risk and emerging technologies such as artificial intelligence and cyber risks, policymakers and stakeholders are grappling with decisions that carry significant long-term financial implications.

The Academy helps ensure that actuarial perspectives are part of these conversations at the state, federal, and sometimes global level. Through issue briefs, comment letters, research, and public policy discussions, our volunteers contribute thoughtful, data-driven analysis that helps illuminate potential risks, tradeoffs, and solutions, and educates stakeholders about the critical role played by the actuarial profession.

Recently, Academy staff and volunteers visited Capitol Hill offices and committees for our Annual Hill Visits. As the voice on professionalism and public policy for the U.S. actuarial profession, Hill Visits are a direct manifestation of how the Academy brings its role to life, connecting actuarial expertise with the issues impacting policymakers and regulators today.

Such activities reinforce direct value for the members who are able to participate and broader value for all actuaries and their employers, who benefit from the enhanced positioning and reputation-building that result, along with the greater recognition of the actuarial perspective on real-world issues.

These conversations are an important way the Academy helps ensure that policymakers and regulators have access to objective, nonpartisan actuarial analysis as they consider policy decisions with long-term implications. Actuaries are uniquely positioned to help illuminate how demographic trends, financial risks, and policy choices interact over time.

For our members, these visits and other stakeholder outreach provide a powerful opportunity to see firsthand how actuarial expertise contributes to policy discussions at various levels of government. This work also reflects the profession’s broader role in helping society understand and manage financial uncertainty and underscores the reach and impact of the actuarial perspective. For policymakers and regulators, these interactions provide access to Academy members who bring a credible, nonpartisan perspective and trusted, data-driven insight that can help inform better decision-making.

Supporting the Structures That Uphold Professionalism

Professionalism is the foundation of the actuarial profession, and the Academy plays a leading role in housing and supporting the structures that sustain the profession’s self-regulatory status in the United States.

Through our support of the U.S. actuarial professionalism framework, including the Code of Professional Conduct, the Actuarial Standards Board, the Actuarial Board for Counseling and Discipline, and the U.S. Qualification Standards, the Academy helps ensure that actuarial work continues to be guided by rigorous standards, ethical conduct, and accountability.

These structures help maintain the credibility and trust that policymakers, regulators, and the public place in actuarial work and in the profession itself. They also provide opportunities for actuaries to get involved in the Academy and contribute their expertise in developing and stewarding the professional standards that guide practice across the profession through volunteer activities.

Maintaining the Standing of the MAAA Designation

Another important aspect of the Academy's work is promoting and defending recognition of the MAAA designation in more than 1,400 U.S. laws and regulations.

The MAAA signifies that an actuary meets the Academy's membership requirements and the competency framework, which outlines critical baseline knowledge of core competencies, U.S. laws and regulations, and professionalism on which principals, employers, and stakeholders rely. Maintaining recognition of the designation helps ensure that policymakers and regulators can rely on the professionalism structures housed within the Academy that support the profession's system of self-regulation, as well as the independent and objective actuarial expertise brought to bear when addressing complex financial issues.

The Academy works closely with regulators, policymakers, and other stakeholders to support continued recognition of the MAAA, to increase awareness of the critical role played by the actuarial profession in the United States, and to reinforce the value that Academy membership represents for the profession and the public.

A Community of Volunteers Making an Impact

A significant and meaningful expression of the Academy's membership value is the dedication and impact of our volunteers.

More than 1,200 actuaries contribute their time and expertise through Academy councils, committees, task forces, and leadership roles. These volunteers develop policy analysis, help support professionalism structures, enhance the member and volunteer experience, and advance the Academy's mission to serve the public and the U.S. actuarial profession.

In doing so, they also strengthen the actuarial community, including the employers of actuaries and actuarial science programs that educate and prepare the next generation of actuaries. Volunteers share that their involvement with the Academy deepens their understanding of public policy, broadens their professional networks, and provides valuable leadership experience, all of which makes them grow as actuaries and professionals.

Most importantly, it gives them the opportunity to see how actuarial expertise can help address real-world challenges and

contribute to the financial security of individuals, families, and institutions across the country.

Strengthening the Profession Through Service

The Academy's 60 years of work reflects the best traditions of the U.S. actuarial profession—bringing objective and independent expertise, professional rigor, and a commitment to the public good to the issues that matter most.

Every time an actuary volunteers, meets with a policymaker or regulator, contributes to a policy analysis, comments on an ASOP exposure, or helps uphold the profession's standards through practice, that actuary is helping bring the Academy's mission to life.

And together, these efforts ensure that the actuarial profession continues to play a vital role in shaping the financial systems and policies that support long-term security and stability in our society. ▲

WILLIAM J. MICHALISIN is the Academy's executive director and CEO.



Here's what we're working on:

- How geopolitical shifts are influencing actuaries
- How global trade dynamics affect risk and insurance markets
- How GLP-1 medications are affecting actuarial assumptions
- How actuaries have contributed to major U.S. social and financial programs since the nation's founding

Stay tuned for in-depth insights and expert analysis on the issues shaping the actuarial profession.

Have a topic that you would like to see covered? Send your ideas to editor@actuary.org.

Are You Offside?

AS THIS ISSUE OF *CONTINGENCIES* GOES INTO DISTRIBUTION, the world's biggest tournament in sports will just be a month away. From June 11 through July 19, the World Cup of soccer ("football" everywhere except in the United States, Canada, and a few other English-speaking nations—to distinguish it from other forms of "football" popular in those areas) men's tournament will feature 104 matches involving 48 national teams (expanded from 32 in 2022), hosted by the three major North American countries in 16 cities, including 11 in the United States.

The World Cup is sponsored by FIFA, the Fédération Internationale de Football Association. The only other time the United States hosted the men's tourney was back in 1994, when I was privileged to see nine matches in Washington, D.C., New York City, and Boston. There has been a major upsurge in domestic interest since then; for example, we've gone from having no top-tier men's professional league to 30 Major League Soccer teams in the United States and Canada. Further evidence of this growth is how much

harder—and expensive—it is to obtain match tickets this time. I am shooting for at least seven matches this time, if not to equal my 1994 total.

Non-soccer fans in the United States point to two main barriers to interest, beyond fierce competition from the other major sports: low scoring (but is a 3-1 result any different from a 21-7 football score?) and not understanding the rules (formally known as the "Laws of the Game"). While it is really a simple game—get the ball into the goal net

without using arms or hands—many point to the offside rule as the primary difficulty preventing enjoyment of the nearly constant action.

What constitutes offside in soccer? At the instant the ball is passed to you by a teammate, two (or more) opposing players must be closer to the goal line you are attacking (one, usually the goalkeeper)—otherwise, you are offside. Note that it does not involve your position when you receive the pass. Of course, there are some exceptions to when this offside rule is applicable: for example, on throw-ins; when the pass-receiving player is in their own half of the field; or when they are "behind the ball" when it is passed. Okay, it is still a bit complicated, compared to hockey or American football offside rules, which involve players crossing a fixed blue or scrimmage line, respectively.

Actuarial Offside: Staying Qualified and Onside

"Thanks for the brief tutorial," you might be thinking, "but why would this be in a *Contingencies* article?" The answer is because the actual topic is actuarial offside: How does one determine that? In our largely self-governing profession, it is crucial for us to remain mindful of our obligations. First and foremost, we need to maintain our credentials in whichever of the five U.S.-based actuarial organizations are relevant to us. After achieving initial



To draw an analogy to soccer, you must know your position when first accepting an actuarial assignment: You must be qualified for the task at hand, and you cannot expect to “play into form” or learn enough to become qualified as you proceed with it.

admission criteria, this is generally accomplished by paying annual dues and attesting that we meet other ongoing requirements. Chief among those annual obligations is compliance with U.S. Qualification Standards (USQS), in order to issue any statement of actuarial opinion (SAO). These standards include satisfying basic education and experience requirements, specific qualification standards for those signing an NAIC opinion, and continuing education (CE) requirements. As to the latter, actuaries are required to earn a minimum of 30 annual CE hours, including three hours on professionalism topics, one hour on bias topics, and six hours on organized activities.

Staying onside also means adhering to the many actuarial standards of practice (ASOPs) that guide the work we do in all areas of the profession, and—perhaps most important—not violating the Code of Professional Conduct (the Code), which contains 14 precepts. For U.S. actuaries, the Code requires compliance with both the USQS (Precept 2) and applicable ASOPs (Precept 3). To draw an analogy to soccer, you must know your position when first accepting an actuarial assignment: You must be qualified for the task at hand, and you cannot expect to “play into form” or learn enough to become qualified as you proceed with it.

Private-sector pension plan actuarial certifications of annual funding and Pension Benefit Guaranty Corporation premium requirements are exceptions to the self-regulating regimen. These are governed by the Joint Board for the Enrollment of Actuaries (JBEA) under the U.S. Treasury Department. To stay onside, enrolled actuaries must renew enrollment every three years, by answering a few questions (e.g., did you timely file your federal

income taxes?) and attest to meeting somewhat different CE requirements—with a clear possibility of having that CE attestation audited.

**Enforcement and Guidance:
The ABCD and VAR Analogy?
How is the offside rule enforced?**

In soccer, the rule is actively monitored by assistant referees (aka linesmen), the guys or gals running up and down each sideline with flags, which they point across the field to signal offside. Video Assistant Referee (VAR) technology and staff help referees and assistants confirm rulings in certain circumstances. For example, VAR determines whether an offside occurred whenever a possible goal was scored. To do that, VAR officials (who are qualified referees) in an offsite facility determine the exact instant the ball leaves the passer’s foot and then use technology to place an on-screen offside line where the second-most deep defender is positioned to see if it was breached by a pass-recipient at that moment.

VAR technology wasn’t incorporated into the World Cup until 2018. Before that, the referee’s on-field ruling was final. A similar technology is also used to determine whether the ball has completely crossed the goal line into the net. VAR is used in other matters, such as possible expulsion for serious misconduct (red cards), fouls committed in course of actual/potential goal-scoring, and penalty kick awards. VAR is advisory-only; the game referee decides after viewing any suggested footage provided by the VAR officials. Yes, VAR causes delays and hiccups in game continuity, leading to aborted or delayed goal celebrations. While once controversial, all major leagues and tournaments now use it.

What about actuarial offside— how is it enforced?

While we don't have a precise means of detection akin to VAR offside or goal-line technology, the five U.S.-based actuarial organizations have determined that possible "offside" violations—generally related to the Code—should be handled, at least initially, by the Actuarial Board for Counseling and Discipline (ABCD) as an essential part of our self-regulating regime. Is this body equivalent to soccer referees for the U.S. actuarial profession, or more like VAR?

Formal complaints can be lodged by actuaries under Precept 13, or by the principals and clients we serve. In my experience, complaints are often initiated by a successor actuary, or one hired to review the actuary's work. The ABCD follows a well-defined investigative and deliberative process, which takes a lot longer than a VAR review! After a complaint goes through initial and secondary reviews, a subject actuary deemed to have committed a possible material violation is entitled to an in-person hearing before the full board.

The result of an ABCD hearing may be formal guidance, counseling, or various forms of discipline. While the latter—ranging from a private reprimand to expulsion—can be recommended by ABCD, only the actuarial organizations of which the actuary is a

member (the ultimate referees) impose discipline—after their own review of the ABCD proceedings, and possibly their own hearing. So, perhaps the ABCD functions more like VAR's advisory role with respect to possible red cards (expulsion being the harshest form of discipline in both environments), rather than like our on-field referees.

Another important ABCD role is the handling of requests for guidance (RFGs); here, an individual ABCD member provides confidential consultation and advice to help an actuary work through any concerns involving their obligations under the Code. The ABCD stands ready to assist, responding to more than 100 requests per year. No such consultation is available to help a player avoid being offside in soccer!

On the new ABCD website (abcdboard.org), actuaries can learn more about the ABCD, submit an RFG, or learn how to file a complaint involving alleged violations of the Code. The website also includes resources such as informative prior "Up to Code" columns from *Contingencies* and information on the ABCD's structure, jurisdiction, and processes, including how to request a professionalism speaker at actuarial events. Check it out, and don't miss the opportunity to see World Cup—either in person, at a Fan Festival in the host cities, or on TV. Visit fifa.com for full details about the World Cup.

Special Note for Enrolled Actuaries

Of special note for enrolled actuaries, given the new three-year enrollment cycle starting in 2026:

If you were not renewed by March 31, 2026, you're offside (subbed out of the team?) and are prohibited from using the enrolled actuary (EA) credential; you must wait until the JBEA confirms renewal to resume use of the EA. As mentioned above, there are separate compliance and suspension rules in play—be sure to file your federal taxes! ▲▲

ELI GREENBLUM is a member of the Actuarial Board for Counseling and Discipline, and previously served as an officer on the boards of the American Academy of Actuaries and the Conference of Consulting Actuaries. He retired in June 2024 as senior vice president and actuary for Segal, based in the Washington, D.C. office. He has over 40 years of managerial and actuarial consulting experience serving multiemployer, single-employer, and public-sector clients.



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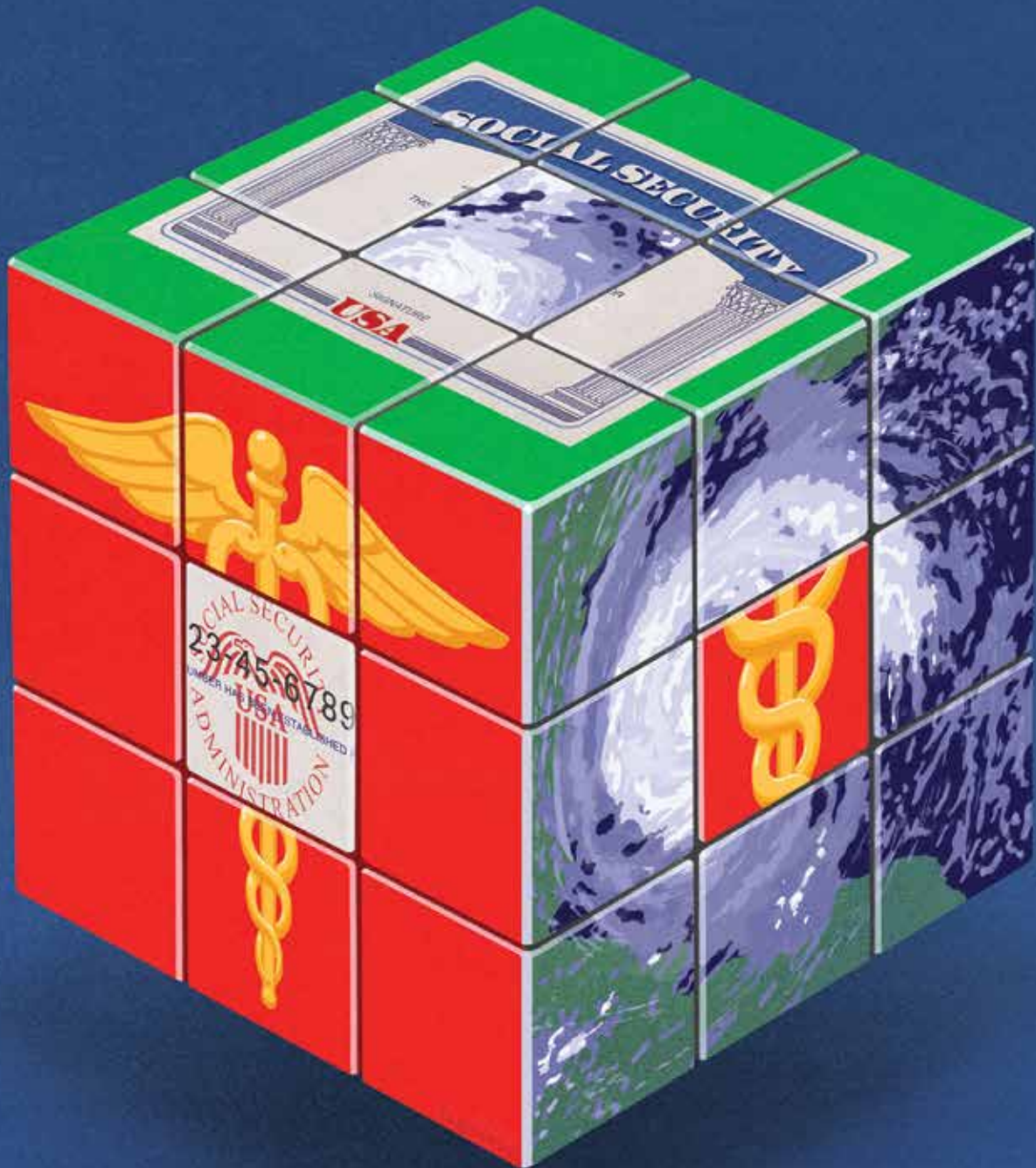
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The Many Sides of



Retirement PLANNING

An evolving Social Security, rising health care costs, and climate-driven insurance challenges are impacting retirement in ways that are increasingly interconnected. Actuaries are uniquely positioned to analyze how these pressures intersect and affect retirement outcomes.

BY NOAH KIRSCH



Americans have set aside more money than ever for their golden years. At the end of September 2025, total U.S. retirement assets hit a record high of \$48.1 trillion, according to third-quarter 2025 retirement market data from the Investment Company Institute—more than double the overall figure from 2015.

Still, huge gaps remain. According to the 2025 Vanguard Retirement Outlook, less than half of the country is on pace “to maintain their lifestyle in retirement.” Baby boomers—those born between 1946 and 1964—are even less prepared on average. Just 30% have the necessary funds to retire, according to the Vanguard report.

Millions of these retirees will therefore depend on monthly Social Security benefits, though the program faces a severe financial shortfall by 2032 if policymakers don’t enact significant changes, according to the 2025 OASDI Trustees Report.

For actuaries, this retirement preparedness crisis affects virtually every practice area, from pensions to health care to property and casualty insurance. Other looming issues, including climate change, economic pressure, longer lifespans, and an aging population, will exacerbate concerns about financial readiness and insurance affordability.

“People don’t have different incomes for home insurance and for medical coverage,” said Seong-min Eom, chairperson of the Academy’s Climate Change Joint Committee, as one example of

how financial stress can bleed from one practice area to another.

“If retirees are living longer, then their savings need to last longer,” echoed Ken Doss, chairperson of the Academy’s Homeowners’ Insurance Task Force.

In some cases, he said, retirees on a fixed income may seek to reduce their short-term costs by reducing their insurance coverage. In Doss’s view, actuaries can help consumers understand why under-protecting their assets can create larger, more expensive problems down the road. Doss was referring to homeowners’ insurance, though his analysis extends to many other forms of coverage, such as auto insurance, he said.

Aaron Wright, vice chairperson of the Academy’s Long Term Care Committee, said actuaries should prioritize cross-practice collaboration in order to understand the interconnectedness of these issues and help policymakers address the retirement crisis.

“How can we leverage learnings from, say, retirement or long-term care with traditional health care to better address the situation?” he asked.

That question frames the challenge facing the profession. This feature examines retirement issues from three distinct perspectives: the Social Security system and the gig economy; health and long-term care costs; and the role of property, insurance, and climate risk in retirement security. Together, they show how interconnected these systems are and why actuarial insights across multiple disciplines will be essential to shaping the future of retirement.



Social Security at Risk



Social Security's precarious financial position is well documented. In her letter explaining the financial effects of the One Big Beautiful Bill Act to Sen. Ron Wyden, Karen Glenn, the Social Security Administration's chief actuary, said the administration's Old-Age and Survivors Insurance (OASI) Trust Fund reserves will be depleted by the end of 2032.

Once that happens, benefit payouts will need to be reduced by 23%, the Bipartisan Policy Center reported in its article, "2025 Social Security Trustees Report Explained." Between 2025 and 2100, Social Security faces a funding shortage of \$25 trillion.

"An aging population is a major contributor to the problem," the report said. "In 1960, there were more than five workers paying Social Security taxes per beneficiary, but that ratio has dropped to less than three-to-one."

Claire Wolkoff, former chairperson of the Academy's Retirement Policy and Design Evaluation Committee, added that Americans are living longer, and net immigration counts have declined, both of which put pressure on Social Security funding.

Demographics aren't the only problem; tax collection is also less robust than it used to be. Payroll taxes are being applied to 83% of overall income, the Bipartisan Policy Center said in the same report, down from 90% in 1983.

"We've known it's a looming problem for decades," said Lee Gold, chairperson of the Academy's Retirement Policy and Design Evaluation Committee.

"The demographic projections were not wrong," Wolkoff added. "There are a lot of young people who don't believe Social Security is going to be there for them when they retire."

Nevertheless, lawmakers have been reluctant to address the issue, knowing that any change to benefits—or increase in taxes—will be politically unpopular, Gold said. "But certainly, something has to be done."

He outlined several possible changes: increasing the eligibility age to receive benefits, raising payroll taxes, cutting benefits for more affluent retirees, or making the program altogether means-tested, thereby targeting payments to those who are financially vulnerable.

"We see this in some other countries where they means-test their social benefits, so that if you have significant resources, even though you've paid into the system your whole life, you may not get anything," Gold said. "In countries where this is



done, we often see significant mandatory occupational pension programs." Such a proposal, however, would almost certainly face pushback if lawmakers sought to enact it.

The reality, Gold said, is that no single policy change is likely to fix the budget shortfall. "It's probably going to have to be a combination of all of those things together in some fashion to get you to long-term sustainability."

Rise of the Gig Economy

It is difficult to precisely quantify the percentage of workers who participate in the so-called "gig economy," not just because quality data is hard to obtain, but also because the definition of a "gig worker" is not always consistent. Some studies include freelancers and part-time staffers, in addition to independent contractors like Uber drivers and DoorDash delivery workers.

Clearly, though, gig workers comprise an increasingly large percentage of the workforce, Gold said. A fall 2024 survey of 1,000 American workers from TransUnion, for instance, found that nearly half (43%) of respondents participated in the gig economy in some way.

As it relates to Social Security, this introduces multiple possible concerns, Gold continued. The first is that gig workers may be tempted to underreport their income, or not report it at all. In the short term, that would lead to tax savings for the individual. But many of these workers may not realize what they are sacrificing by not reporting their full income and paying their required FICA (Federal Insurance Contributions Act) taxes, Wolkoff said.

Social Security benefits are calculated based on an individual's top 35 years of income. By failing to report earnings,

these workers will potentially lose retirement security down the road. Gig workers may also not realize that skirting taxes could impact disability coverage or survivor benefits if they die young, Wolkoff added.

Another challenge, Gold explained, is that many gig workers are lower paid and may not be positioned to prioritize retirement savings. “There are so many demands on their paycheck, and then we say, ‘Well, you should also be saving for retirement.’ With what money?”

Employees at larger firms—even those who are lower paid—are often eligible to contribute to a 401(k) and may also receive a match from their employer, Gold said. In some cases, these contributions are automated.

“All of that happens without the employee really doing anything,” he said. “They actually have to take action to prevent that from happening. That’s not the case with gig workers. They’re all on their own.”

Wolkoff and Gold noted that state and federal officials are already working to help gig workers improve their financial security. Some states, for instance, have introduced portable benefits programs, allowing workers to take advantage of insurance and savings programs even without “regular” employment. Multiple states have also created auto-IRA initiatives that allow workers to automatically deduct retirement contributions from their earnings in cases where their employer does not offer a savings plan option.

One possible policy change, Wolkoff said, is allowing employers to create benefit programs for their gig workers without needing to worry that lawmakers will then force them to reclassify contractors as full-time staff members.

“I think it will be good ultimately for retirement [if] somebody like Uber can say, ‘Look, we’d actually like to contribute 3% of pay to a 401(k) plan for these people, even though they’re not our employees,’” Gold said. “That’s not really allowed right now.”

Moreover, he said, bolstering the formal reporting process for gig workers’ earnings will not only strengthen tax collection but will ensure those individuals receive the maximum possible Social Security benefits later in life.

The gig economy has fundamentally changed the way people earn and save, Wolkoff said. Previously, retirement income was considered to be a three-legged stool: Social Security, an employer-sponsored plan,

There are a lot of young people who don’t believe Social Security is going to be there for them when they retire.

—Claire Wolkoff

and personal savings. Now, thanks to economic shifts and the advent of gig work, “there is talk about the need for a fourth leg of the stool during retirement, namely part-time work,” she said.

Actuaries can play a role in helping shine a light on these issues. For example, Wolkoff said, policymakers might consider enacting federal legislation that would allow gig workers to make automatic contributions to 401(k) or auto-IRA plans. They could also make Pooled Employer Plans (PEPs) “available to self-employed individuals and gig workers,” create national portable benefits legislation, and increase access to financial education and retirement planning tools.

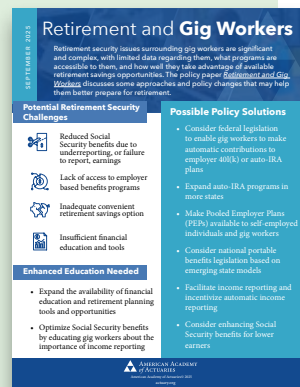
Gold offered other potential options, including supporting changes to the Employment Retirement Income Security Act (ERISA) that would “allow more flexibility in designing lifetime income options” with defined benefit and defined contribution plans, and pushing to reduce the cost and complexity of retirement planning options.

Ultimately, there are myriad possible ways to address the retirement preparedness crisis. Wolkoff recommended that actuaries monitor changes to the gig economy and retirement landscape in order to make informed policy recommendations. In the end, “the Academy’s goal is to help policymakers and provide them unbiased information,” she said.

Read More

- *An Actuarial Perspective on the 2025 Social Security Trustees Report* (policy paper from the Social Security Committee)
- *The Relationship Between Social Security and Federal Government Deficits and Debt* (issue brief from the Social Security Committee)
- *Retirement and Gig Workers* (joint policy paper of the Social Security Committee & Retirement Policy Design and Evaluation Committee) and an accompanying infographic

All publications are available online at actuary.org.





The Impact of Health on Retirement Stability



As Social Security's trust funds come under pressure, seniors are facing mounting health care bills as well.

Aaron Wright, vice chairperson of the Academy's Long-Term Care Committee, outlined a number of striking figures. Nearly half of individuals who make it to age 65 will require paid care for long-term support and services, he said, and about 24% will need at least two years of care.

These expenditures can be immense. Assisted living and home-care services cost about \$70,000 per year on average, Wright said, while nursing homes range from \$110,000 to \$130,000, depending on accommodations.

"It's a significant cost that can erode that retirement nest egg," he said, adding, "I don't expect costs to go down."

"Health care costs continue to outpace almost every other type of inflation," Gold concurred. "Obviously, that creates challenges for people in retirement. Their health care costs tend to increase as they get older, and it just becomes more and more of an affordability problem."

In its 2025 Retiree Health Care Cost Estimate, Fidelity Investments found that the average 65-year-old person who retired in 2025 will spend \$172,500 on medical bills over the remainder of their lifetime. The cost of prescription drugs, out-of-pocket expenses, and long-term care all contribute to that figure.

Moreover, America's demographic transformation is straining both individuals' budgets and the health care system at large. Wright cited three specific trends: declining birth rates, increasing life spans, and millions of baby boomers entering retirement en masse. (Life expectancies for Americans have steadily



increased for decades; the pandemic briefly eroded those gains, but estimates have since continued to climb.)

By 2040, Wright said, the number of Americans aged 65 and older is expected to grow by 42%, while those aged 85 and up will more than double.

That, of course, will incur enormous health care expenditures. National health care costs for adults over 65 are two-and-a-half times those for typical working adults, Wright noted, while the peak claim age for people seeking long-term care is during their early to mid-eighties.

Already—even before absorbing these increases—public health programs have been under stress. As of 2023, a third of Medicaid’s personal health care spending was devoted to long-term care for just 4.8% of the enrolled population, Wright said.

In other words, as the number of aging individuals grows, “the dollars [total Medicaid spending on long-term care] might grow faster.”

Addressing Affordability Gaps

Many Americans are utilizing family members as caretakers, rather than paying for assistance, Wright said. That may allow elderly individuals to save money, but it could cause their caretaker to exit the workforce early, compromising *their* ability to save more funds for retirement.

Considering these issues, Wright said, addressing affordability gaps will require an “integrated solution” between individual planning, product innovation, and changes to policy. Fortunately, he added, insurers and legislators are already engaging in conversations about how to tackle this problem.

Eom said that, globally, insurers have explored offering micro-coverage products that are more affordable for elderly

people on fixed incomes. One example is paramedic insurance as a standalone offering for individuals concerned about possible out-of-pocket costs.

Additionally, Wright said, it has become increasingly popular to combine long-term care coverage with an annuity or life insurance product. This kind of product really emerged roughly 20 years ago, he said, and more recently, insurers have also offered shorter-term coverage, for time frames of less than a year.

“The care varies,” he cautioned. Naturally, cheaper plans typically offer more limited benefits. But retirees need “to find that balance of what they can afford versus potential care.”

Broadly, Wright said, public and private players are looking for other potential innovations that could address rising costs, particularly for long-term care, considering the financial pressure caused by demographic shifts.

In Washington state, the WA Cares Fund is using tax revenue to create a public long-term care insurance program. On a federal level, the proposed Well-Being Insurance for Seniors to be at Home (WISH) Act would also carve out funding to grant financial aid to disabled seniors who need long-term care coverage.

One key way for actuaries to participate in improvements is to push for better education of the public, Wright said, helping people both understand the risks surrounding long-term-care needs and possible solutions. Additionally, actuaries should stay active in policy conversations. “The success of these programs is greatly impacted by the setup,” he added, “and actuaries have an important role in identifying and quantifying the risks.”

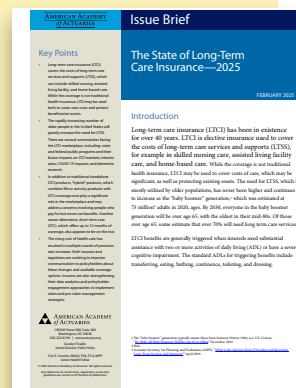
Eom emphasized again that “traditional comprehensive coverage plans may not be affordable or accessible” for many policyholders. Insurance products can be redesigned and priced differently to help address this, she said. For example, pivoting from traditional indemnity plans to fixed benefit or parametric plans can reduce delays in claims processing and payment. Moreover, she added, actuaries can help design products with a “broader range of potential embedded riders” that would add value while avoiding additional agent commissions and reducing onerous financial burdens.

“It’s going to be a combined effort,” Wright said, referring to public and private innovations.

Read More

- *The State of Long-Term Care Insurance* (issue brief by the Long-Term Care Committee)
- *Medicare’s Financial Condition: Beyond Actuarial Balance* (issue brief by the Medicare Committee)
- *Academy Comments to the Senate Committee on Finance’s hearing on the rising costs of health care* (offered by the Individual and Small Group Markets Committee)

All publications are available online at actuary.org.





How Climate Risk Affects Retirees



The intensity of natural disasters seems to worsen each year. Over the past two years, Hurricane Helene rocked the Eastern Seaboard, wildfires ravaged southern California, and flash

floods tore through central Texas. These events have affected millions of Americans, though retirees are especially vulnerable to the damage.

“Retirees tend to live in warmer climates,” Doss said. “What we continue to see ... within the homeowners’ market is how catastrophic events have increased over the last several years, and those events tend to happen more frequently in some of these warmer tropical areas.”

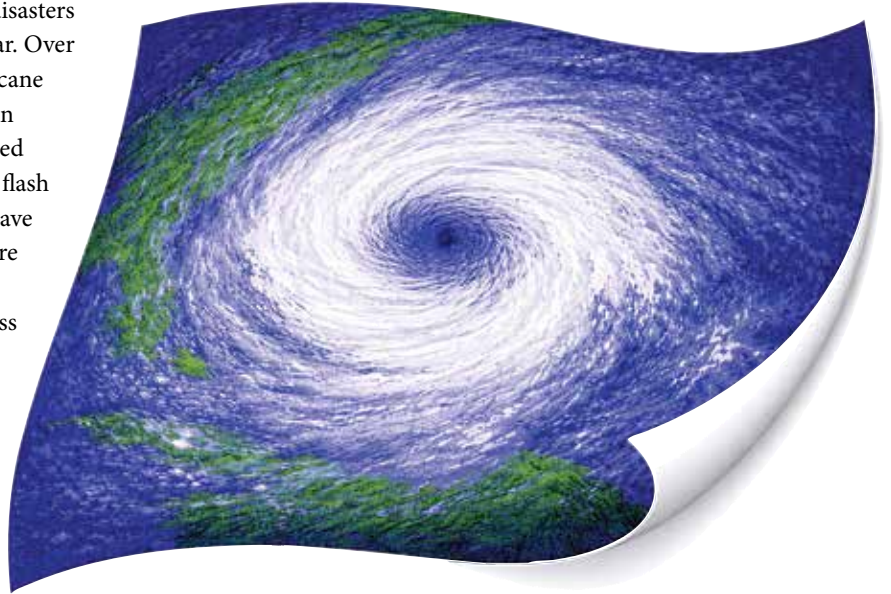
Property insurance prices have steadily increased, especially in areas prone to flooding and wildfires. In some cases, providers have pulled out of high-risk markets entirely.

“It’s a big affordability problem,” said Naomi Ondrich, an actuary at the National Flood Insurance Program (NFIP) managed by the Federal Emergency Management Agency (FEMA). Ondrich, who was speaking in her personal capacity and not on behalf of the government, was referring to flood insurance in particular.

Specifically, retirees and others moving to places like Florida and Texas might not realize how expensive their insurance premiums will be and may struggle to afford them, she said. Separately, people who already own property in these locations might have trouble finding buyers if they wish to sell, since those individuals would then have to find and pay high costs for homeowners’ coverage.

Simultaneously, many rural, low-income communities in places like Mississippi, West Virginia, Kentucky, and Louisiana lack the resources to recover from major climate events without federal government assistance.

For many retirees, their home is their largest asset, and failing to protect it could put their nest egg at risk. As Doss noted, many older Americans purchased their homes decades ago. By definition, “those tend to be older homes,” which may have a higher risk of damage following catastrophic events (particularly if they lack risk mitigation features and haven’t been modernized). “That definitely has an impact on the insurance premium that a retiree would pay,” he said.



Eom observed that the landscape for aging Americans is radically different depending on their level of affluence. Lower-income individuals, of course, may face dire choices, she said, such as choosing between maintaining their home or paying for their car or health care.

These issues intersect with other actuarial practices, Eom said. For instance, a climate event that destroys roads and infrastructure might make it challenging for an elderly person to access health care.

“Having insurance versus it actually being accessible can be a different thing,” she said. “The fundamental infrastructure is very important, [in addition to] the financial support.”

Possible Remedies

One avenue for actuaries to address climate-caused affordability is to ensure consumers understand their full risk profile before making financial decisions, Ondrich said.

For example, retirees considering moving to warmer areas aren’t always aware of how prevalent natural disasters are in their prospective new locations. They may not realize, for instance, that they are considering buying property in an area prone to flooding, even if it is outside of a designated high-risk flood zone.

The NFIP adopted a risk-based rating approach in 2021 that informs policyholders of their full risk premiums, Ondrich said—even if they are currently paying lower rates. (Federal

regulations cap annual renewal premium increases, resulting in some policyholders paying less than the full-risk premium.)

For years, Ondrich said, flood insurance premiums for structures outside of Special Flood Hazard Areas (SFHA) were on average discounted below full risk premiums. “Now people are really seeing what it costs or that they’re living in places that are only insurable with the NFIP.” The increased transparency is not always appreciated by consumers, Ondrich noted: “It’s not as though people said, ‘Oh, thank you for telling me my insurance really should be higher by \$8,000 per year.’” Still, policyholders are now able to make more informed choices.

Eom offered an additional way for actuaries to make property and casualty insurance more affordable: risk mitigation that can help individuals reduce their premiums. For instance, properties in hurricane or wildfire regions could be fortified.

The benefit of this approach is two-fold: increasing access to insurance and decreasing damage when natural disasters occur. These kinds of infrastructure improvements could come in the form of government subsidies, Eom said, which might yield a greater financial benefit over the long run than subsidizing premiums directly.

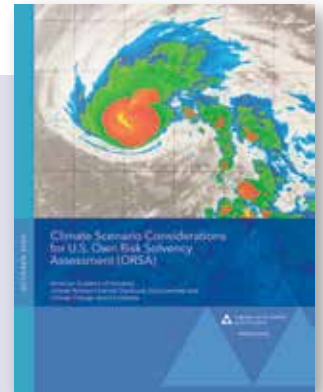
The Homeowners’ Insurance Task Force is working to address coverage availability and affordability, in part through these kinds of mitigation efforts, Doss said. Importantly, Eom noted, once actuaries help construct discounted plans, the public must be informed about these options, “because people may not know.”

In Ondrich’s view, raising awareness about risk—and taking steps to reduce

Read More

- *Climate Scenario Considerations: U.S. Own Risk and Solvency Assessment* (policy paper by the Climate Related Financial Disclosures Subcommittee and the Climate Change Joint Committee)
- *Attribution Science from an Actuarial Perspective* (issue brief by the Climate Change Joint Committee)

All publications are available online at actuary.org.



it—is best routed through community leaders, who are positioned to relay actuarial messages in a way that people will accept. Many communities, however, require federal and state government support to get the message out, she said.

Historically, more affluent communities have been better positioned to recover from major weather events and to benefit from federal assistance programs that require cost-sharing, Ondrich continued. These communities often have the financial resources, staff, and expertise needed to secure such funding. In contrast, less affluent communities often receive less help—not due to lack of need, but because they are unable to

meet cost-share requirements or navigate complex application processes. “Simply put, more affluent communities have gotten more help.”

Ultimately, Doss said, actuaries hold the power to help retirees make the most pragmatic choices for their individual circumstances. “We’re in the business of assessing risk. That’s our job,” he said. But the job also extends to educating customers, lawmakers, and the general public about their options.

The simple mission for actuaries, Doss concluded, is to ensure retirees “understand that there are things that can be done to help minimize their risk and help with the affordability of insurance coverage.”

Conclusion

From Social Security to long-term care, homeowners’ insurance to climate risk, actuaries can use their expertise to help Americans make better decisions, design more resilient products, and inform policymakers with unbiased analysis. By looking across practice areas, understanding how issues overlap, and communicating clearly with the public and decision-makers, actuaries can help ensure that retirement strategies are not only financially sound but also resilient to the uncertainties of longer lifespans, evolving work patterns, and environmental pressures. The actuarial profession has a critical role in shaping a future where Americans can retire with both security and confidence. ▲▲

NOAH KIRSCH is a freelance writer for *Contingencies*.

What Actuaries Need to Know About Emerging Therapies



BY ANKIT NANDA

As cell and gene therapies evolve, actuaries must adapt models to account for evolving regulations, uncertain clinical outcomes, and changing financial frameworks.

The U.S. regulatory environment for cell and gene therapies is evolving, although it is arguable whether its pace of evolution is at par with the speed of scientific and technological innovation in the field.

In recent years, the Food and Drug Administration (FDA) has sharpened its focus on areas such as facilitating treatments for rare diseases, modernizing manufacturing, advancing regulatory science, and streamlining development pathways.^[1] The pace of innovation continues: In 2024, the FDA approved eight novel Cell and Gene Therapies (CGTs) and at least six new indications for existing products.^[2] Recent 2025 approvals include Waskyra, the first gene therapy for the Wiskott-Aldrich Syndrome—notably from a non-profit sponsor.^[3]

These developments come as many FDA watchers note a trend toward approving therapies based on limited data around their safety and efficacy.^[4] The agency maintains that it is simply responding to a less-than-ideal market environment where patients suffering from rare diseases often face a lack of choices. According to the FDA, risk-benefit assessments for these transformative therapies are anything but binary and must allow room for interpretation within the context of the disease's severity and the lack of existing alternatives.^[5]

Meanwhile, an adjacent regulatory development with far-reaching consequences for health care in

the U.S. involves the federal government's foray into negotiating—and effectively setting—Medicare drug prices for a set of high-value drugs under the Inflation Reduction Act (IRA).^[6] The pharmaceutical industry has unsuccessfully contested this as an overreach of government power.^[7]

Cell and gene therapies will eventually come under the Medicare drug price negotiation provisions of the IRA, though the timeline is longer than some observers initially expected. Under the law, biologics can only be selected for Medicare price negotiation after 13 years on the market—meaning most currently approved CGTs will not face negotiation until the early-to-mid-2030s.^[8] Moreover, current cell therapies such as CAR-T often do not meet the criteria for negotiation because they are typically administered in inpatient settings or serve too few patients to meet Medicare spending thresholds.^[9]

The more immediate policy lever is the Centers for Medicare & Medicaid Services' (CMS) Cell and Gene Therapy Access Model, a voluntary initiative that would allow state Medicaid agencies to participate in multi-state outcomes-based agreements with manufacturers. Originally planned for 2026, the

CMS accelerated its timeline and launched the model to 2025 in response to state demand.^[10] However, the current administration rescinded the Biden-era executive order that had directed the Department of Health and Human Services (HHS) to develop this and related drug pricing models, leaving the program's future uncertain.^[11]

Critically, U.S. policy has periodically explored international reference pricing approaches—including “most-favored-nation” proposals at the executive level.^[12] Actuaries should monitor both the IRA's long-term trajectory for biologics and the near-term evolution of Medicaid-focused CGT access models, as these developments will shape the financial environment for gene therapy coverage over the coming decade.

Perhaps the most consequential regulatory development in recent months is the FDA's February 2026 draft guidance establishing a “plausible mechanism pathway” for individualized gene editing therapies. Previewed by FDA Commissioner Marty Makary and Center for Biologics Evaluation and Research (CBER) Director Vinay Prasad in a November 2025 *New England Journal of Medicine* article, the new framework shifts the regulatory paradigm from approving each individual therapy to clearing therapeutic platforms—enabling approvals for bespoke treatments targeting individual genetic mutations based on demonstrated biological plausibility rather than traditional large-scale randomized trials.^[13]

For actuaries, this represents a structural change in pipeline modeling: Platform-level approvals could dramatically accelerate the volume of approved therapies, moving from a predictable cadence of individual biologics license application decisions to a potentially high-frequency stream of bespoke treatments that are harder to forecast using traditional incidence-based utilization models. The “plausible mechanism” standard is also inherently less defined than traditional efficacy endpoints, which widens the confidence intervals on both utilization projections and outcome durability assumptions.

Taken together, evolving approval standards, new platform-based regulatory pathways, and government price-setting are shaping a complex landscape where traditional actuarial tools may no longer suffice.

The prospect of government price-setting—coupled with the inherent uncertainty of long-term clinical outcomes—poses unprecedented challenges. Meeting these challenges requires moving beyond traditional models toward innovative actuarial solutions in pricing, reinsurance, and outcome-based contracts. Potential approaches include moving from fixed-assumption drug cost models (e.g., “70% success rate”) to probabilistic approaches such as scenario modeling, stochastic simulations, decision-tree analyses for confirmatory trial failures, and longevity-style models that help understand therapy durability.^[14]

The prospect of government price-setting—coupled with the inherent uncertainty of long-term clinical outcomes—poses unprecedented challenges. Meeting these challenges requires moving beyond traditional models toward innovative actuarial solutions in pricing, reinsurance, and outcome-based contracts.

Regulatory Takeaways from the Elevidys Case

The tensions inherent in this evolving regulatory landscape are not merely theoretical; they are vividly illustrated by the controversial approval and subsequent expansion of the first gene therapy for Duchenne muscular dystrophy (DMD), Elevidys.^[15] DMD is classified as a rare disorder by the World Health Organization.^[16] Affecting roughly one in 3,500 to 5,000 live male births in the United States, it is characterized by a gradual loss (dystrophy) of muscle strength, ultimately rendering the patient immobile and prone to cardiac and respiratory failure. Since the condition was first described in 1861 by a French neurologist, no drug had been found to alter its general trajectory.^[17]

In 2023, the FDA granted accelerated approval to Elevidys for a small subset of the potential patient population (4- and 5-year-olds) suffering from DMD, based on preliminary evidence of biomarker expression despite the therapy missing its primary clinical trial endpoint.^[18] The drug subsequently failed to meet

its primary endpoint in a larger phase 3 trial completed in 2024^[19], although company executives argued that it achieved its secondary and exploratory endpoints. The FDA nonetheless broadened the approval to include all patients over age 4.^[20]

The CBER approved the decision despite recommendations from its scientific staff,^[21] raising questions about the agency's standard decision-making process.

However, the Elevidys story took a dramatic turn in 2025. In mid-2025, two non-ambulatory patients died of acute liver failure following Elevidys infusion.^[22] The FDA investigated, and Elevidys developer Sarepta Therapeutics voluntarily paused all shipments in July 2025.^[23] Within a week, the FDA permitted shipments to resume—but only for ambulatory patients.^[24] By November 2025, the FDA had added a boxed warning for acute serious liver injury and acute liver failure, and formally revised the indication to exclude non-ambulatory patients entirely.^[25]

The commercial impact was immediate: Elevidys sales fell from \$282 million in Q2 2025 to \$131.5 million in Q3, and Q4 sales of approximately \$110 million missed analyst expectations.^[26] Sarepta has since initiated a clinical study evaluating an enhanced immunosuppressive regimen (using sirolimus) in hopes of restoring access to non-ambulatory patients, with results expected in late 2026.^[27]

The accelerated approval program is considered a noble, effective, and arguably necessary tool in the FDA's toolbox in its effort to bring quickly to market drugs with the potential to address urgent, unmet patient needs, based on science that is still evolving.^[28] It allows companies to demonstrate a treatment's impact on a biomarker that serves as a reliable proxy for clinical benefit. Conditional approval follows, pending results from larger confirmatory trials. Its origin lies in the 1980s HIV/AIDS epidemic, when patient advocacy groups like ACT UP pressured FDA to demand faster drug approvals.^[29] This historical pressure is compounded by a practical reality: Late-stage clinical trials are prohibitively expensive.

Consequently, results that seem imperfect in a purely scientific light can appear "good enough" from a practical, life-saving perspective. Confronted with cold data, regulators may appear objective but often respond to the pressures of popular opinion and medical urgency.^[30]

For actuaries, the Elevidys case illustrates not only how sudden label expansions can affect utilization forecasts, but also how quickly those expansions can reverse when post-marketing safety signals emerge. The 2025 developments underscore the need for dynamic reserving approaches that can accommodate rapid changes in approved indications. Pricing assumptions can no longer rely on fixed expectations but must be scenario-based,



with explicit contingencies for label restrictions, boxed warnings, and temporary market withdrawals. European precedents in Italy and Germany with "pay-for-performance" (P4P) contracts provide pathways to mitigate financial risks—with reimbursement directly tied to clinical outcomes.^[31] Reinsurers and stop-loss carriers should consider whether their contracts include provisions for indication changes that materially affect the insured population.

The Market Challenge

When a drug finally reaches the market, it may feel like a moment for cautious celebration. With the scientific frontier crossed, investors might expect windfall returns for their patience. Wall Street, however, is less convinced. Case studies abound of biotech firms that brought forward innovative therapies for unmet needs, only to see their stock prices stagnate—or worse, fall—and their futures clouded with uncertainty.^[32]

Despite new financing models, revenue—still the simplest measure of success—is a function of quantity and price. Or, as an actuary would put it: utilization times severity. Yet, limited uptake can prevent even the most transformative therapy from reaching its full impact.

Beyond pricing, manufacturing continues to remain a major barrier. Viral vector production for many therapies is highly inefficient, with downstream recovery often as low as 25%–30%, and in some clinical trials as little as 2% of manufactured drug substance reaching patients.^[33] Analysts estimate that a 10- to 100-fold improvement in manufacturing productivity is required to make gene therapies broadly accessible.

Recognizing these barriers, the FDA in January 2026 announced a more flexible approach to chemistry, manufacturing, and control (CMC) oversight for cell and gene therapies. Under the new framework, manufacturers are no longer required to meet current good manufacturing practice (cGMP) standards before Phase 2 or 3 trials, and the agency will permit flexibility in commercial specifications for small patient populations where limited manufacturing

other, potentially more promising candidates.^[35] For reasons of both safety and cost, these therapies are not considered first-line treatments.

Meanwhile, pricing missteps can alienate governments, regardless of a drug's potential. Bluebird Bio's Zynteglo was withdrawn from Europe after failed pricing negotiations,^[36] and its Skysona was also pulled from the EU market.^[37] At the same time, Hemgenix[®] launched at \$3.5 million per dose to treat Hemophilia B, justified by its potential to replace \$20 million in lifetime care.^[38]

Finally, insurance carriers and government agencies may balk at covering these drugs except under the strictest conditions.^[39] Taken together, FDA approval resembles less a decisive victory than a temporary, conditional reprieve. This leads to the question posed in a recent Goldman Sachs biotech report: Is curing patients with expensive, one-off therapies a sustainable business model?^[40]

Analysts estimate that a 10- to 100-fold improvement in manufacturing productivity is required to make gene therapies broadly accessible.

lots are available. Process validation flexibility now includes concurrent release of qualification lots without mandating the traditional three-lot requirement.^[34] While these reforms may lower production barriers over time and potentially accelerate time-to-market for pipeline therapies, their near-term effect on list prices remains uncertain given the monopoly positions many of these therapies occupy. For actuaries modeling high-cost claim frequency, this development suggests that manufacturing-driven constraints on utilization may ease sooner than previously assumed.

Why limited uptake? After all, who would not prefer a one-and-done treatment to the agony of repeated hospitalizations? Surely the \$1 billion-plus spent on drug development relied on accurate uptake forecasts as the most critical assumption. The science behind these therapies is still emerging, and with it comes risk: A treatment may misfire, irreparably damaging human DNA and precluding

The Commercial Reckoning of 2025

The Goldman Sachs question proved prescient. By early 2025, several high-profile commercial failures had crystallized the sector's challenges into stark financial realities.

Bluebird Bio—once valued at over \$10 billion and widely considered a pioneer of modern gene therapy—was acquired in early 2025 by private equity firms Carlyle Group and SK Capital Partners for less than \$30 million.^[41] Despite having three FDA-approved gene therapies (Zynteglo, Lyfgenia, and Skysona), Bluebird's commercial uptake had been devastatingly slow: By late 2024, fewer than 60 patients had started treatment across all three products.^[42] Real-world data presented at the 2025 American Society of Hematology meeting revealed that of 312 patients enrolled for Zynteglo or Lyfgenia treatment, only 77 (25%) had actually been infused, with an average time from enrollment to stem cell collection of over five months.^[43]

Bluebird was not alone. Pfizer discontinued commercialization of its hemophilia B gene therapy Beqvez in February 2025—less than a year after FDA approval—after extremely limited post-launch uptake.^[44] The \$3.5 million therapy, priced identically to the competing Hemgenix, found no takers among patients or their physicians.

Key Takeaways for Actuaries

As cell and gene therapies reshape the health care landscape, actuaries face new challenges in modeling risk, pricing, and access.

- **Evolving Approvals:** Accelerated Food and Drug Administration (FDA) pathways and label expansions can quickly shift utilization and reserve needs. But as the 2025 Elevidys experience shows, safety signals can just as quickly narrow indications. Models should incorporate scenarios for both expansion and contraction of approved populations.
- **Dynamic Pricing:** Fixed assumptions are risky; scenario modeling and outcome-based reimbursement can help manage financial exposure. The 13-year biologics exclusivity under the IRA provides some near-term pricing stability, but Medicaid outcomes-based models may reshape expectations sooner.
- **Manufacturing Limits:** Low production efficiency and high costs can restrict patient access and



revenue. Real-world data shows only 25% of enrolled patients progressing to infusion—operational constraints, not just pricing, determine uptake.

- **Long-Term Uncertainty:** Therapies may lose effectiveness or cause delayed side effects, requiring long-tail reserving and stochastic simulations. The FDA currently recommends up to 15 years of post-treatment follow-up for certain gene therapies, though this may evolve.

- **Commercial Viability Risk:** The 2025 exits of Bluebird Bio, Pfizer (from Beqvez), and other major players raise counterparty risk concerns for outcome-based agreements. Actuaries should assess manufacturer financial stability when structuring long-term payment arrangements.
- **Data Gaps:** Limited historical data demand probabilistic approaches and longevity-style models to forecast outcomes decades ahead.

The retreat extended beyond individual companies. Major pharmaceutical firms that had once positioned gene therapy as a portfolio cornerstone began exiting the space: AstraZeneca sold its preclinical gene therapy portfolio in 2023; Roche disbanded the Spark Therapeutics brand in early 2025; Takeda announced discontinuation of its cell therapy efforts in October 2025.^[45] Even Gilead Sciences, among the most commercially successful CAR-T developers, saw its cell therapy franchise sales decline 11% year-over-year in Q3 2025.^[45]

For actuaries, these developments have profound implications. First, they suggest that utilization assumptions based on eligible patient populations may systematically overstate near-term demand—the “build it and they will come” thesis has not materialized. Second, they raise counterparty risk concerns for outcome-based agreements: Manufacturers exiting the market may be unable to fulfill long-term payment commitments. Third, they underscore the importance of manufacturing and operational constraints—not just pricing—in determining patient access.

The Hope Dilemma: A Case Study in Adverse Selection and Misaligned Incentives

What options does a patient like Hope have when she faces a debilitating genetic disease and a miraculous but unaffordable cure? If able, Hope could consider finding employment with an employer whose drug formulary includes coverage for the therapy. Unlike other benefits (e.g., disability insurance) that have long waiting periods to prevent adverse selection, health benefits typically have a minimal waiting period of one month or less.^[46] To make herself a more attractive candidate, she could even offer to join at a significant discount to her market-rate salary. It is highly unusual—and a public relations disaster—for an employer to deny specific drug coverage to certain classes of employees.

After receiving the one-time therapy in her first year of employment, Hope could then switch employers the next year to command her full market salary. For her, and most employees, the financial math of this arrangement is rational and

If actuaries can develop structures that distribute costs across time, stakeholders, and uncertainties, they will not only help preserve the solvency of insurers and employers but also extend the access to cures for patients who might otherwise be excluded.

compelling. This scenario presents a severe case of adverse selection and illustrates the acute problem plaguing risk designers structuring financial arrangements for these drugs: The sky-high costs are borne in the short term by a single entity, while the long-term benefits are enjoyed by others.^[47]

This misalignment of cost and benefit is a fundamental barrier to sustainable financing. Companies covering these therapies could become magnets for high-cost patients, driving premiums into a “death spiral.” Consequently, efforts to form large employer and carrier risk pools, using subscription models and per member per month (PMPM) fees, are gaining traction.^[14] Public payers like Medicaid and Medicare, meanwhile, must evaluate each therapy on a case-by-case basis.^[39]

CRISPR: The Vanguard of Scientific and Ethical Disruption

CRISPR/Cas9, a flexible and efficient, Nobel Prize-winning gene editing platform, illustrates the balance between rapid scientific advancement and regulatory oversight.^[48] Based on a bacterial immune system, it uses a protein that can cut DNA and a short strand of programmed RNA that identifies the desired location of the cutting. Discovered in 2012, the technology moved rapidly from lab to market, with the first therapy, Casgevy, approved by the FDA in November 2023 for sickle cell disease and beta thalassemia at a price tag of \$2.2 million.^[49] In 2018, Chinese biophysicist He Jiankui used CRISPR to edit the genes of two newborn girls to resist HIV, an action that prompted global condemnation and a prison sentence.^[50]

Real-world uptake data for CRISPR-based therapies has tempered initial expectations. Public reporting suggested that Casgevy saw fewer than approximately 30 patients commercially treated in its first 18 months on the market.^[45] The complex treatment process—requiring stem cell collection, genetic modification,

conditioning chemotherapy, and extended monitoring—creates operational bottlenecks that limit throughput regardless of demand. Actuaries modeling CGT utilization should incorporate these operational constraints alongside clinical and financial factors.

For actuaries, CRISPR presents unique modeling challenges. Its efficiency and flexibility imply a rapid succession of therapies across multiple conditions. This necessitates stop-loss coverage and pooled subscription models to distribute risk, while also prompting underwriters to refine definitions of “medical necessity” to prevent performance-enhancement misuse. Long-tail reserving becomes critical, as therapies may show waning effectiveness or delayed side effects. FDA guidance has historically recommended up to 15 years of post-treatment follow-up for certain gene therapies, though these expectations may evolve over time.^[2] With no historical data, stochastic modeling and longevity frameworks must simulate outcomes decades ahead.

Managing Costs

As these remarkable therapies move from miracle to medicine, the central challenge for the health care ecosystem is to build financial and ethical frameworks robust enough to support the cost of hope. If actuaries can develop structures that distribute costs across time, stakeholders, and uncertainties, they will not only help preserve the solvency of insurers and employers but also extend the access to cures for patients who might otherwise be excluded. In the end, the actuarial role is clear: to translate the uncertainty of discovery into sustainable access.^[51] ▲

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References

- [1] FDA Strategic Priorities 2022–2025; U.S. Food and Drug Administration (FDA); 2022.
- [2] Cell & Gene Therapies: Will 2025 Represent A Continuation of FDA's 2024 Developments?; Cell and Gene; January 2025.
- [3] FDA Approves First Gene Therapy Treatment for Wiskott-Aldrich Syndrome; FDA; Dec. 9, 2025.
- [4] Trends in FDA Approval of Cell and Gene Therapies; *JAMA*; April 2023.
- [5] Risk-Benefit Perspectives in Rare Disease Approvals; *New England Journal of Medicine*; 2022.
- [6] The Inflation Reduction Act: Drug Pricing Reforms; *Health Affairs*; Aug. 16, 2022.
- [7] Pharma Industry Sues to Block Medicare Price Negotiation; *The New York Times*; July 11, 2023.
- [8] The Inflation Reduction Act's Potential Impact on Cell Therapies; *Guidehouse*; 2024.
- [9] *Ibid.*
- [10] More Drug Cost Initiatives: CMS Updates Drug Pricing Models for Cell and Gene Therapies; *Sidley Austin*; November 2025.
- [11] Inflation Reduction Act Continues to Reduce High Medicare Drug Prices as New Administration Rolls Back Other Efforts; Center for Medicare Advocacy; Jan. 23, 2025.
- [12] Executive Order on Most Favored Nation Drug Pricing; White House; September 2020.
- [13] Makary M, Prasad V. A New Pathway for Individualized Genetic Medicines; *New England Journal of Medicine*; November 2025. See also: FDA Unveils Rules for Bespoke Gene Therapies, Predicting Flood of Rare Disease Applications; *STAT News*; Feb. 23, 2026.
- [14] Risk Corridors and Innovative Insurance Models for Gene Therapies; *SOA Health Section Newsletter*; May 2024.
- [15] FDA Approves First Gene Therapy for Duchenne Muscular Dystrophy; FDA; June 22, 2023.
- [16] Rare Disease Facts; World Health Organization; 2024.
- [17] History of Duchenne Muscular Dystrophy; *Orphanet J Rare Diseases*; 2019.
- [18] Elevidys Phase II Trial (NCT03375164); *ClinicalTrials.gov*; accessed 2025.
- [19] Elevidys Phase III Trial (NCT04655408); *ClinicalTrials.gov*; 2024.
- [20] FDA Expands Approval of Gene Therapy Elevidys; FDA; June 20, 2024.
- [21] FDA's Internal Debate over Elevidys Approval; *STAT News*; July 2024.
- [22] FDA Investigating Deaths Due to Acute Liver Failure in Non-ambulatory Duchenne Muscular Dystrophy Patients Following ELEVIDYS; FDA; June 24, 2025.
- [23] Sarepta Therapeutics Announces Voluntary Pause of ELEVIDYS Shipments in the U.S.; *Sarepta Press Release*; July 21, 2025.
- [24] FDA Informs Sarepta That It Recommends That Sarepta Remove Its Pause and Resume Shipments of ELEVIDYS for Ambulatory Individuals; *Sarepta Press Release*; July 28, 2025.
- [25] FDA Takes Action on New Boxed Warning for Acute Serious Liver Injury and Acute Liver Failure Following Treatment with Elevidys; FDA; Nov. 14, 2025.
- [26] Sarepta falls after gene therapy Elevidys misses estimates; *The Boston Globe*; Jan. 12, 2026.
- [27] Sarepta gets FDA's go-ahead to study immunosuppressive Elevidys regimen; *Fierce Pharma*; Nov. 25, 2025.
- [28] Accelerated Approval Program; FDA; 2024.
- [29] ACT UP and the Early History of the FDA's Accelerated Approval Pathway; *The Atlantic*; June 2, 2017.
- [30] Surrogate Endpoints in Drug Approvals; *NEJM*; 2022.
- [31] Outcome-Based Contracts in Europe; *Health Policy*; 2021.
- [32] Commercial Realities of Gene Therapy Launches; *Nature Biotechnology*; October 2023.
- [33] Manufacturing Bottlenecks in Gene Therapy; *Molecular Therapy Methods & Clinical Development*; 2022.
- [34] Flexible Requirements for Cell and Gene Therapies to Advance Innovation; FDA; January 11, 2026. See also: FDA Outlines Flexible Approach to CMC Oversight for Cell and Gene Therapies; *OncLive*; January 2026.
- [35] Risks of Gene Therapy Misfires; *Science Translational Medicine*; 2021.
- [36] Bluebird Bio to Withdraw Zytenglo from Europe; *Endpoints News*; Aug. 18, 2021.
- [37] Bluebird Bio Pulls Skysona from EU; *Fierce Pharma*; November 2021.
- [38] Hemgenix: FDA Approval and Cost Justification; *Reuters*; November 2022.
- [39] Medicare and Medicaid Coverage of Gene Therapies; *Health Affairs*; 2023.
- [40] Biopharma Outlook 2024; Goldman Sachs Research; December 2023.
- [41] Bluebird Bio's cut-price sale highlights challenges for gene therapy field; *Nature Reviews Drug Discovery*; March 2025.
- [42] 50 cell and gene therapy leaders to watch in 2026; *Drug Discovery Trends*; January 2026.
- [43] Gene therapy in the real world: High priced, a long process and still relatively few patients; *Managed Healthcare Executive*; ASH 2025.
- [44] StockWatch: Bluebird Bio Plunges on Buyout, as Gene Therapy's Woes Grow; *GEN*; Feb. 24, 2025.
- [45] Why Big Pharma is Retreating from Cell and Gene Therapy; *Brain Trials Substack*; Oct. 24, 2025.
- [46] Employer Health Benefits 2023 Survey; *KFF*; 2023.
- [47] Adverse Selection in Health Insurance; *J Health Econ*; 2020.
- [48] CRISPR Technology Overview; *Nature Rev Genet*; 2017.
- [49] FDA Approves First CRISPR-Based Therapy; FDA; Dec. 8, 2023.
- [50] Chinese Scientist Who Edited Babies' Genes Jailed; *BBC News*; Dec. 30, 2019.
- [51] Financing Innovation in Cell and Gene Therapies; World Economic Forum; 2022.



ADVANCING
ADVANCING

BY BARBARA BRYANT

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EDGE



Academy membership helps actuaries stay ahead with the tools, knowledge, and networks to grow professionally, enables employers to tap into this expertise, and strengthens the U.S. profession.

Actuaries join the Academy for many reasons, but the benefits go beyond individual career growth. Membership provides access to a wealth of resources, opportunities to share expertise, and a professional network that helps actuaries develop their skills, expand their knowledge, and advance their careers while supporting their employers and the profession as a whole. A diverse group of members share their experiences with the Academy.

A Foundation for Growth

For many actuaries, Academy membership provides the foundation they need to meet professional requirements, grow into new roles, and strengthen their credibility.

Maria Moliterno, specialist leader at Deloitte Consulting, joined the Academy when she first attained her ASA (Associate of the Society of Actuaries), at the urging of her colleagues. They spoke of the benefits of membership, including webinars and events which Moliterno has put to great use. “The Academy is a great resource of information through its webinars, issue briefs, practice notes, and other publications,” she said. “I have been able to use these resources to improve client deliverables and think through challenging moments.”

Kyle Wan, actuarial governance leader and assistant appointed actuary at Genworth Financial, explained that membership is “essential for fulfilling my professional responsibilities” because it’s “a professional requirement for issuing actuarial opinions in

the United States,” as are “meeting the U.S. Qualification Standards (USQS) and continuing education requirements.” He also relies on Academy resources such as actuarial standards of practice (ASOPs), practice notes, issue briefs, and the Life and Health Valuation Law Manual to keep up with developments in the actuarial space and the insurance industry.

When she was preparing to become the appointed actuary at Erie Insurance, Kayla Robertson, chief reserving actuary at Berkshire Hathaway GUARD Insurance Companies, decided to become an Academy member. “The statements of actuarial opinion and appointed actuary responsibilities feel nebulous until you are tasked with doing them. Academy resources such as practice notes and the annual P/C Effective Loss Reserve Opinion Seminar provided a more than sufficient knowledge base. They helped me understand not just what an appointed actuary does, but also why the role exists in the first place.”

Membership has been a valuable source of credibility. It was important to me to have this distinction. Holding the MAAA reflects actuarial experience and credentials and confirms compliance with U.S.-specific professional standards.

—Karissa Burgess

For Karissa Burgess, actuary at the Employment Security Department for the state of Washington, joining the Academy was an important milestone in her career. Membership “has been a valuable source of credibility,” she said. “It was important to me to have this distinction.”

Holding the MAAA reflects actuarial experience and credentials and confirms compliance with U.S.-specific professional standards, Burgess said. In certain contexts, or depending on the reviewer, it may be a required designation to establish full qualification. While maintaining flexibility in career opportunities is important, the designation provides her maximum assurance of expertise and professional qualifications.

An Advantage for Employers

For employers, Academy membership is an investment in workforce development and quality—strengthening technical rigor across the organization while enabling actuaries to build confidence in their work and their professional community, all of which delivers value back to their employer.

Wan said that insurance companies value the Academy for ensuring that actuaries meet the USQS, which stipulate education, experience, and ongoing professional development actuaries need to issue statements of actuarial opinion (SAOs). “Employers gain confidence that actuarial opinions and work products are prepared by professionals who meet nationally recognized education, experience, and continuing education requirements,” he said.

Moliterno echoes that view. “The Academy helps improve consistency among the actuarial practices,” she said. “This helps make it easier for companies to navigate their actuarial results when it comes to things like their pension plans. For example, consistency will help streamline a company’s coordination between third parties for its pensions, such as their actuaries, auditors, and investment advisors.”

Robertson, who has been working with the Committee of Property and Liability Financial Reporting (COPFLR), explained how her work “adds value to my employer by deepening my expertise on the NAIC statement of actuarial opinion, which is a core part of my role.”

Robertson values the Academy’s ability to provide timely guidance when sudden, unforeseen events create issues. “Many appointed actuaries were unsure how to reflect exposure to the January 2025 California wildfires in their statements of actuarial opinion,” she recalled. COPFLR responded by issuing guidance that addressed common questions, Robertson said, and that guidance was incorporated into the Academy’s practice note, *Statements of Actuarial Opinion on Property and Casualty Loss Reserves*, providing companies with a consistent framework they could rely on not only for that disaster, but for future events as well.

“The Academy did something similar during COVID-19, publishing an issue brief with an extensive set of FAQs to help actuaries think through unprecedented data, uncertainty, and regulatory



Employers gain confidence that actuarial opinions and work products are prepared by professionals who meet nationally recognized education, experience, and continuing education requirements.

—Kyle Wan

expectations,” Robertson added. “Situations like these show the value of a centralized, profession-wide resource that can quickly bring together experts, synthesize perspectives, and provide practical guidance. For companies, this means they have access to clear, credible direction when the industry is navigating complex or rapidly evolving challenges.”

Wan also recalled turning to the Academy during the COVID-19 pandemic to help address urgent actuarial questions. The rise in mortality raised questions about the disease’s short- and long-term effects on assumptions, prompting the Life Experience and Assumptions Committee (LEAC) to study the issue and publish a paper. “It answered many pressing questions actuaries were facing and

provided practical guidance on how to set COVID-related assumptions and identify appropriate supporting materials,” he explained.

Wan said the Academy helps companies and regulators adjust to changing economic and regulatory developments. “High inflation in recent years has created significant challenges for insurers, requiring insurance companies to reevaluate reserves and capital adequacy,” he said. “LEAC presented a paper examining the potential impact of high inflation on insurance companies.”

Access to Practical Tools and Resources

The Academy provides practical resources that help members tackle workplace challenges.

“Academy webinars have been an extremely popular source of professional development for actuaries at my company,” said David Tate, senior actuary at USAA. “For the last few years, I’ve been in charge of coordinating professional development opportunities and the Academy’s virtual events have been invaluable to us.” The webinars focused on life and annuity principle-based reserves have been particularly relevant to the team along with Tate’s favorite Tales from the Dark Side.

New Membership Requirements Effective Jan. 1, 2026

New Education/Basic Education Requirement

- Compliance with the Competency Framework, which includes baseline knowledge of key actuarial competencies, knowledge of U.S. laws and practices and U.S. actuarial professionalism; and
- Achievement of an actuarial credential from an actuarial organization, both of which are recognized by the Academy.

Responsible Actuarial Experience Requirement

- Three years of responsible actuarial experience, including at least one year of responsible U.S. actuarial experience, defined as work that requires knowledge and skill in solving actuarial problems

In addition to virtual events and structured learning opportunities, Tate also enjoys reading *Contingencies*. “The magazine always has interesting articles and some really fun and creative puzzles,” he said. “And it’s another good way to get some unstructured professional development credit.”

Moliterno points to the Academy’s continuing education (CE) offerings as a key benefit. “The Academy’s frequent webinars make it easy to get all your continuing education credits. They cover a wide variety of topics, which helps you attain CE.”

Burgess, who is working on state paid family and medical leave issues, credits Academy webinars, studies, and papers with helping her to master this “fast-growing, relatively new area of expertise.” These resources also helped her adapt to health care changes introduced by passage of the Affordable Care Act. “At the time, I hadn’t yet worked in Medicare or other lines of business that had concepts like risk adjustment that the new legislation introduced,” Burgess said. “Webinars, publications, and connecting with other actuaries was an important part of preparing for those changes.”

Eric Unger, financial actuary for the Colorado Division of Insurance, said he and other regulators also rely on Academy resources “because of exposure to emerging issues like the use of artificial intelligence by insurers, private credit in asset portfolios, and emerging political changes that affect policyholders.”

Professional Growth Through Volunteering

For many members, volunteering and committee involvement represent the most transformative aspect of Academy membership, providing them with unique learning experiences and career development opportunities.

Wan credits his current role as LEAC chairperson with strengthening his leadership skills while deepening his understanding of insurance assumptions and experience studies. “The qualification seminars, in particular, have helped me apply what I learned directly to cash-flow testing, valuation work, and actuarial opinions and memoranda,” he said.

He has also addressed regulatory concerns about the growing use of offshore reinsurance through his participation in the Academy’s Asset Adequacy and Reinsurance Issues Task Force, which provided industry perspective on regulatory changes to Actuarial Guideline 55, *Application of the Valuation Manual for Testing the Adequacy of Reserves Related to Certain Life Reinsurance Treaties*.

Moliterno, a member of the Pension Committee, said she had learned a great deal by collaborating with pension actuaries from different companies and clients. “Everyone on the committee brings a unique perspective to the current issues and topics at hand,” she said. The committee has given her the opportunity to contribute to working groups for several publications, including ERISA at 50 and *Pension Risk Transfer* issue brief. Moliterno has also moderated the committee’s annual webinar on capital markets three times. “Speaking to with such large audiences was not something I had previously done, but the Academy gave me this opportunity,” she said.

Moliterno, who has spent her career at two consulting firms focused primarily on single-employer plans, said the committee has broadened both her professional network and her technical range. “The committee has also allowed me to work on and review projects I otherwise wouldn’t have had the opportunity to in my current day job,” she said. She is currently collaborating with members of the Public Plans and Multiemployer Plans committees on an issue brief examining different valuations of pension liabilities.

Collaboration Counts

Members view the Academy's role as central to bringing together actuaries from a broad range of disciplines to exchange ideas and information, share experiences, and collaborate on projects.

"The further I get in my career, the more I realize how important it is to have a strong network of technical experts, and being an Academy member has opened doors to those relationships for me," Robertson said. "Through committee work and events with other actuaries, I've built a network of peers I can learn from, bounce ideas off of, and reach out to when facing new challenges. The Academy has connected me with actuaries across companies, which has helped me grow technically, broaden my perspective, and navigate change with more confidence."

Burgess enjoys meeting actuaries from different industries and learning from their varying experience and points of view. "They may have insights to share or ways to approach an issue you haven't thought of," she said. "I also appreciate that the Academy represents actuaries as a whole, not just one field of study, because there are so many things, such as economics, that can affect multiple fields of expertise."

Wan says that working with other actuaries as chairperson of LEAC has made him a more effective employee. "It allows me to compare my company's approaches with broader industry standards and analyze my results accordingly," he said. "Through discussions with other experts, my perspective on enterprise risk management and governance has broadened significantly."

Wan values the face time he gains with other actuaries at the Academy's events. "I learn about new developments and build relationships with other actuaries," he said. "Through networking, we share experiences, exchange ideas, and strengthen the actuarial community. This collaboration means that I rarely approach complex topics in isolation, which strengthens the justification for my work and increases my confidence in my professional judgments."

Unger also prizes the professional connections he's made through other members. "Academy actuaries have referred me to consultants who had specific knowledge about an issue I faced at work," he said. "These contacts are valuable for me and my employer."

Get Involved

- Serve on the Academy's Practice Council (Health, Life, Casualty, Retirement, and Risk Management and Financial Reporting) and Professionalism & Education committees, task forces and work groups, through which you can collaborate with your peers in writing publications on key actuarial topics.
- Serve as a peer reviewer of Academy issue briefs, policy papers, practice notes and comment letters.
- Represent the Academy by joining its public speakers pool.
- Join the Academy content contributor pool, writing articles for cross-practice quarterlies or *Contingencies* magazine.
- Participate in *Actuary Voices*, the Academy's official podcast, which airs thoughtful conversations on the role of public policy and/or professionalism in actuaries' jobs and the Academy's volunteer work.
- Contribute to "Member Spotlight" as an interview subject, providing a glimpse of your professional life and personal interests.
- Join the Academy's focus group and feedback pool, offering input on public policy, professionalism, education, engagement, events, benefits, the evolving needs of the U.S. actuarial profession, and periodic requests for input from the CEO on issues and opportunities impacting the Academy and its members.



Members view the Academy as an inclusive community where growth, guidance, and collaboration come together.



Unger values the diverse range of perspectives he's exposed to through his work on the Prudential Regulation Committee, which provides guidance to national and international bodies, responds to regulatory requests, and ensures that the interests of U.S. actuaries are well represented—making the experience directly relevant to his role as a regulator. “I’ve heard from actuaries in different lines of business and opinions regarding the appropriate level of regulation on a variety of issues,” he said.

Trusted Standards

The Academy is committed to building public trust by helping members and ensuring they meet high ethical and operating actuarial standards through adherence to the Code of Professional Conduct, the actuarial standards of practice, and the USQS. Collectively, they ensure that the actuarial profession is effectively self-regulating and has the guidance and oversight needed to support and ensure sound actuarial decision-making.

The Member of the American Academy of Actuaries (MAAA) designation attests to members’ commitment to actuarial professionalism and demonstrates their alignment with the Academy’s mission to serve the public and the U.S. actuarial profession. And members appreciate it as a symbol of accountability.

“Using the initials is a privilege and a responsibility,” Unger said. “It gives me credibility with stakeholders and an expectation that I’ll be knowledgeable, aware of relevant policy, and thoughtful enough to see multiple stakeholder points of view.”

Moliterno said, “being a member of the Academy has strengthened my professional credibility. Having the MAAA at the end of my title has allowed others to know that I’m committed to the profession and its standards.”

This personal accountability is reinforced by the Academy’s broader framework, which ensures that actuaries—not just individually, but as a profession—are recognized as reliable, objective, and capable of addressing complex issues.

“The Academy provides the structure that keeps our profession credible and resources that help actuaries navigate real-world issues responsibly,” Robertson said. “Its work ensures that policymakers, regulators, and other external stakeholders can rely on actuaries as independent, objective experts. The effort the Academy puts into public policy engagement, professionalism, and standards-setting directly translates into credibility for the profession and the MAAA designation reflects that commitment.”

Burgess recognizes the support and advice she received from the Actuarial Board for Counseling and Discipline (ABCD) while navigating the transition to a new actuarial field. “The ABCD was a wonderful resource, providing guidance when confirming how to interpret qualification standards,” she explained. “The board was fast to respond, and it was great to discuss concerns with them and get feedback. Having that support when I needed it was a big relief. My employer can feel comfortable knowing that my quality of work is high and that resources are available to help me meet and thrive under new challenges.”

Wan values the credibility the Academy confers as well. “Employers gain confidence that actuarial opinions and work products are prepared by professionals who meet nationally recognized education, experience, and continuing education requirements.”

A Community Ready for You

Members view the Academy as an inclusive community where growth, guidance, and collaboration come together.

Burgess said, “Being an Academy member has only been a benefit to me and my career. I believe it provides another level of credibility, and the resources available are broad. Your career is what you make of it. It may be a straight line, or it may be a long and winding road with jumps to different lines of business or different

roles within the same line, or you may move more into management or risk-adjacent fields. Wherever you go, the Academy provides resources to help you thrive in whatever you want your career to be.”

For many members, that support becomes most visible through the Academy’s resources and volunteer-driven expertise.

Wan said, “The Academy is an invaluable resource for career development, particularly because so many experienced industry professionals volunteer their time and expertise. I encourage new members to use the resources available, read the newsletters and articles, attend seminars and meetings, and expand

their professional networks.

To keep pace, I always follow the Academy’s seminars and webinars which are valuable in preparing actuaries to operate effectively in an increasingly complex economic environment.

“I also highly recommend volunteering,” Wan added. “To those who are interested, I’d ask ‘what actuarial areas or functions genuinely interest you?’ There

are many options such as pricing, enterprise risk management, valuation, investments, and more. And if you are unsure or have multiple interests, join several committees to explore different areas and, over time, your interests often become clearer through hands-on involvement. Even if a committee does not currently have an open position, you can often participate as an ‘interested party’ and begin contributing while building your professional network.”

Robertson hopes all new members are ready to fully engage. “Commit to it fully,” she advised. “The best part about the Academy is the members who volunteer, contribute, and show up for the profession. Whether you’re on a committee or simply attend Academy events, being engaged strengthens your development and our profession.” ▲

BARBARA BRYANT is a technical writer for the Academy.


The effort the Academy puts into public policy engagement, professionalism, and standards-setting directly translates into credibility for the profession and the MAAA designation reflects that commitment.

—Kayla Robertson

Professionalism in the Age of AI

BY VIRGINIA HULME

As emerging technologies transform actuarial work, actuaries should be prepared to face challenges in transparency, control, and accountability—while continuing to uphold the principles of professionalism.



Editor's Note: This article concludes a two-part series exploring professionalism in the actuarial profession. To read the first installment—focused on the role of Academy members in upholding professionalism—see the November/December 2025 issue of *Contingencies*.

Emerging technologies, including artificial intelligence (AI) and other types of complex models, are bringing new challenges to actuarial professionalism. The main issue with these models from a professionalism perspective is that the actuary does not always know how they work, what data they were trained on, or what biases they may have. Yet professionalism requirements have not changed.

“One of the biggest challenges I see is navigating the gray areas where traditional actuarial frameworks intersect with emerging fields—especially AI, machine learning, and advanced analytics,” says Yukki Yeung, a former member of the Committee on Professional Responsibility (COPR). “Emerging technologies are expanding what actuaries can do—but they’re also expanding the ethical and professional questions we need to consider,” she says. “These tools are powerful, but they often operate as black boxes. When actuaries rely on AI or complex data models, we may be accountable for outputs we didn’t fully build or control, or for models that evolve over time in ways we didn’t anticipate. That challenges our traditional ideas of documentation, replicability, and control of work product.”

AI tools are already playing a big role in writing reports, which has implications for documentation and disclosure. “We need to keep in mind that these tools are not a replacement for our professional judgment and oversight,” says Michelle Iarkowski, a member of the Casualty Committee of the Actuarial Standards Board (ASB) and chairperson of Committee on Property and Liability Financial Reporting. “For example, while an AI tool might see the words ‘significant’ or ‘material’ as having many synonyms in the English language, those words have very specific meaning in actuarial disclosures.”

Joyce Hwu, a member of the task force revising ASOP No. 30, *Treatment of Profit and Contingency Provisions and the Cost of Capital in Property/Casualty Insurance Ratemaking*, says, “As AI becomes increasingly embedded in our day-to-day work, there’s no doubt some amount of human intervention is still needed to check any decisions made or work produced. But how much of that output is truly considered the human’s [contribution]? Once that work is ingested by AI, will other actuaries be able to trace its origins? Or said another way: Is AI now considered another ‘party’? This will have implications for actuarial communications, disclosures, even Precept 8, Control of Work Product.”

AI and other tools can pose challenges in areas beyond documentation and disclosures. Tim Geddes, member of the Actuarial Board for Counseling and Discipline (ABCD), points out that receiving data in a potentially near-final form will present a challenge to actuaries trying to assess reasonableness. “Finding ways to interact with the technologies as you could with human staff to determine reasonableness, for example, will be a significant professionalism challenge,” he says.

Standards to the Fore

Even though these technologies make ensuring transparency, fairness, and accountability more difficult, “our standards of practice continue to require the same level of professionalism in our work,” ASB Chairperson Laura Hanson says.

The good news is that there are resources available for actuaries trying to uphold professionalism while using these new technologies. First, remember the Code of Professional Conduct, particularly Precept 1: integrity, competence, skill, and care are required when you provide actuarial services. Second, while there is no one actuarial standard of practice (ASOP) on artificial intelligence or other new technologies, several existing ASOPs address many of the issues that arise when working with them. ASOP No. 56, *Modeling*, ASOP No. 23, *Data Quality*, ASOP No. 12, *Risk Classification (for All Practice Areas)*, and ASOP No. 41, *Actuarial Communications*, make “a pretty good set of standards when you use AI,” says Darrell Knapp, immediate past president and former ASB chairperson. “I consistently refer actuaries to ASOP 56 and the need to have a basic understanding of the model you are using,” he says, and goes on to caution, “One important facet of emerging technologies is that it may make it much easier for an actuary who takes a few shortcuts on professionalism to really mess up.”

Another good resource is a recent discussion paper, *Actuarial Professionalism Considerations for Generative AI* by the COPR. “We wanted to provide a starting point for actuaries to think critically about how long-standing principles—like integrity, competence, and communication—apply in this new landscape,” says Yeung, who was involved in writing the paper. “Technology may change, but our responsibility to serve the public interest does not.”



Tricia Matson, Academy president and former ASB chairperson, suggests ways the profession can keep up with changing technology. First, actuaries must make sure standards keep up, she says. She recommends making sure the individuals involved are familiar with emerging technologies, for example, by adding to their teams ASB or ABCD representatives with knowledge of such technologies and incorporating that knowledge into new standards. Second, she continues, actuaries can leverage strong professionalism practices to their advantage. Because actuaries, who are among the professions leading this change, have a strong professionalism ethos, we are better positioned to ensure professionalism is a key consideration as we change, she says. Last, new technologies can help incorporate professionalism into actuarial work. As an example, she says, “I asked ChatGPT which ASOPs would apply if I were using AI in pricing, and it suggested I look at ASOPs 1, 12, 23, 41, and 56! And although I didn’t ask explicitly, it also recommended Precept 1 of the Code of Conduct. Not a bad answer for me to start with and validate appropriately!”

Other Challenges

Emerging technology may be top of mind as a challenge to actuaries, but there are others. Geddes and Knapp both raise the issue of competition from non-actuaries performing actuarial work. “Although they can produce an answer that may sometimes be right, they do not have the standards of practice, code of conduct, and qualifications standards behind their work,” says Knapp.

Geddes sees competition not just from other professions, but from technology itself, as computers take on “much of the raw analysis actuaries have historically completed.”

“This competition can pressure us financially, by offering a supposedly cheaper and faster alternative, and developmentally, by removing a lot of the work many of us did to hone our craft,” he says.

“We must find a way to cultivate learning in the next generation of actuaries, who will need to understand these competitors’ abilities to simplify some work while still providing the high-level, true analysis skills that have made actuaries indispensable.”

Another recent challenge is the new environment facing the insurance

industry, says Matson. Major changes are taking place in both public and private insurance due to changes at the federal level and increasing claim costs across most types of insurance, which, in turn, are driven by factors such as medical trends and climate change. These changes are creating financial pressure on financial security systems, many of which are already under pressure, she says. Actuaries—the stewards of sound pricing and reserving—may find it challenging to focus on actuarial soundness in the face of these external pressures. But, she points out, “Our professionalism system is a great support for that!”

Demand for solutions to social issues is another new challenge, says Hwu, who often works with non-actuarial trade associations. “Actuarial concepts often come up in discussions about proposed regulation or legislation,” she says. “As the pace of technological advancement continues to accelerate and policymakers (and thereby the public) demand solutions to many growing social issues, there is more pressure than ever on actuaries to find these solutions. We, of course, have the expertise to meet the challenge, but how we do it while maintaining public trust becomes paramount.”

Yeung sees another risk as demands for efficiency, automation, and business outcomes increase: Professionalism may come to be regarded as a procedural requirement rather than a set of guiding principles. “We need to stay grounded in the principles that define our profession—especially in a world that’s moving fast and getting more complex by the day,” she says.

Implications for Professionalism

Actuarial professionalism exists for a reason—to protect the public and to ensure that organizations that provide insurance, pensions, and other benefits are solvent when people need them.

The rapid pace of change in the environment in which actuaries work presents a new set of challenges for professionalism. “Navigating AI can be challenging for actuaries today, as the rapid pace of AI development brings many questions and uncertainties,” says Judy Liu, COPR member. “As actuaries, we have to stay informed and adaptable, and work together to regulate and promote ethical AI use. This involves continuous learning, collaboration, and proactive measures to ensure that AI is used responsibly and ethically.”

The use of emerging technologies “raises new questions about bias, fairness, and explainability—especially when models are used in underwriting, pricing, or claim decisions that affect real people,” says Yeung. “It also raises serious questions about transparency, accountability, and professional responsibility. We’re being asked to interpret results, make judgments, and

The Stewardship Role

It is well known that actuaries play key roles in helping to maintain financial security systems. Their analytical skills and their ability to adapt to changing circumstances, including evolving technology have served the profession well over time. As this article discusses at length, the profession benefits greatly from the Code of Professional Conduct and the standards of practice. Other professions may not have the same benefits.

Add to this the domain knowledge that actuaries have within their respective practice areas, and one can’t help but envision a leadership role for actuaries as AI technologies continue to roll out and evolve. In short, actuaries can lead from a position of strength with emphasis on professionalism, governance, innovation, education, and balance.

No doubt, the hype around AI is significant. However, there is also little doubt that its application will continue to expand within financial security systems. Accordingly, the National Association of Insurance Commissioners (NAIC) has spent significant time and effort seeking to understand the impact of AI on insurance consumers, and their work is ongoing. To date, it has offered guidance on AI systems that are fair and ethical, compliant, transparent, and secure (Principles on Artificial Intelligence (AI)). Further, it has indicated the need to consider governance, risk management and controls, and reliance on third-party models and data (Use of Artificial Intelligence Systems by Insurers).

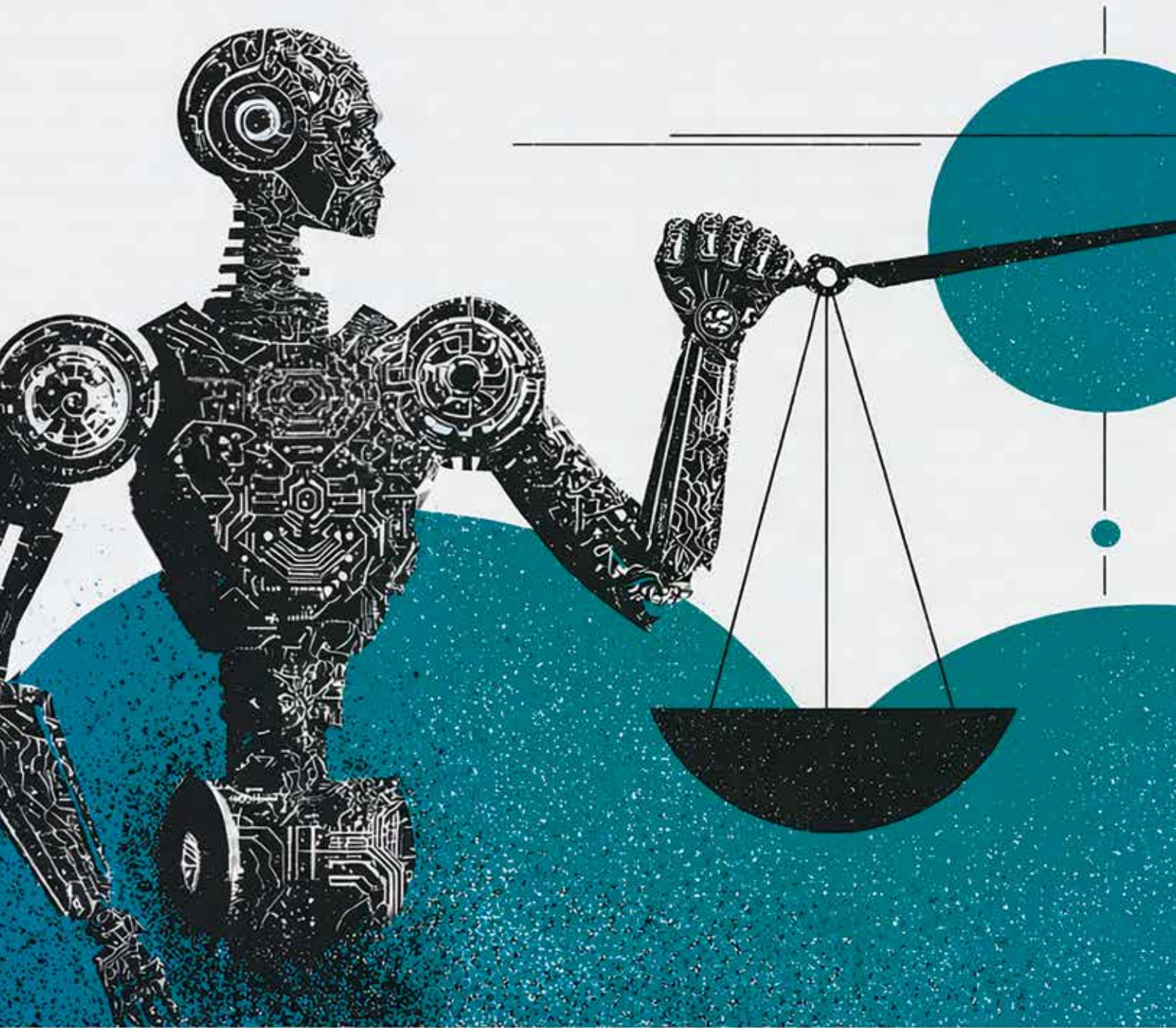
When one adds all this up, it is clear that much work remains to be done, and actuaries have a significant stewardship role to play as we move forward.

—**Rich Gibson**, *Former Senior Casualty Fellow*

sign off on things that might go far beyond traditional actuarial models. That’s not inherently bad—but it does require a deeper understanding of our ethical obligations and the boundaries of our expertise.”

“Professionalism today isn’t just about knowing the calculations or citing the right ASOP—it’s about understanding the broader implications of the tools we use and being willing to ask tough questions about risk, equity, and trust,” she says. ▲

VIRGINIA HULME is the Academy’s assistant director of professionalism.



CALIBRATING

By Amarnath Suggu

GenAI



Generative AI can boost efficiency in underwriting, claims, and IT, but overuse risks eroding judgment and empathy. A balanced framework ensures benefits without losing the human touch.

Many see generative artificial intelligence (GenAI) as a technological breakthrough with the potential to change the course of human civilization, largely because of its remarkable language capabilities. With the recent advances in agentic architecture, it has been heralded as a way to improve productivity of large enterprises by automating various business processes and reducing the need for human intervention. It's no surprise that many enterprises, big and small, have rushed to adopt this technology.

GenAI is still in its early stages of evolution. It will take a while before we fully understand its advantages and drawbacks, especially its long-term effects on both people and the business world. Enterprises would be wise to keep this in mind and proceed with caution while recognizing the benefits of this technology.

The GenAI Dilemma

While it's too early to understand its impact on socioeconomic systems and humans, researchers are aware of the many challenges, including technical and legal issues, that GenAI raises. It can hallucinate and generate misleading or incorrect information, and it reflects the biases present in its training data. In addition, if training data have not been procured through legal means, the generated content can potentially infringe on copyrights and other intellectual property rights. Early research indicates that the prolonged use of GenAI can impair the cognitive abilities^[1] of humans, especially in knowledge acquisition, reasoning, learning, and creativity and critical thinking.

GenAI can automate many routine tasks, even some that require intelligence, in today's business environment. As a result, its adoption may displace humans from existing roles, posing a challenge to the insurance industry. On one hand, the industry has an aging workforce and is unable to attract new talent.^[2] On the other hand, it needs to effectively utilize the displaced employees, or risk losing both them and their valuable business knowledge.

This puts many organizations in a dilemma: whether to embrace the technology and reap its benefits, or resist and play safe. The choice largely depends on the leadership, the nature of the business (whether customer-centric or not), and the type of activities involved, including their criticality and complexity.

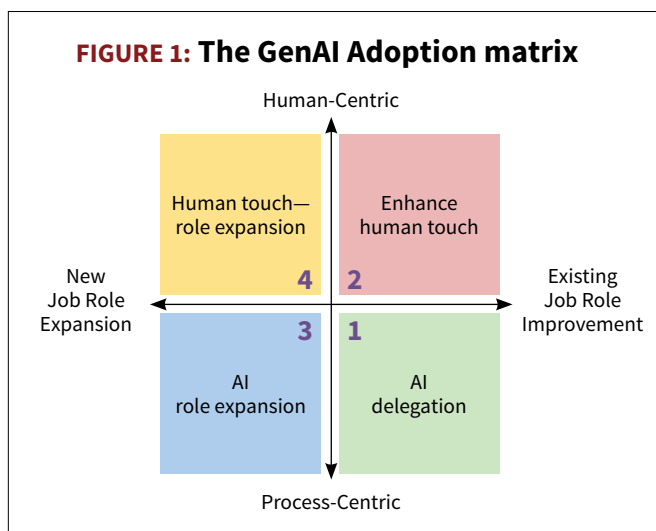
The GenAI Adoption Matrix

To overcome this dilemma, I propose a simple framework—the GenAI adoption matrix—which helps identify tasks in a business process best suited for GenAI deployment to maximize the benefit realization while limiting potential negative impacts. The framework is based on the premise that human emotions are essential for building customer relationships and tasks that do not require a human touch can be considered for automation. It also draws on research into strategies^[3] employed by writing professionals to remain relevant in the GenAI age.

The GenAI adoption matrix consists of a horizontal and vertical axis that divides the plane into four quadrants (see Figure 1 on page 44). The vertical axis denotes human-centric activities at the top and process-centric activities at the bottom. The right side of the horizontal axis denotes the current role performed by an individual, and the left denotes new or additional roles that can be performed by the same individual.

Human-centric activities, as the name says, are tasks that are better performed by humans. They include understanding customers’ needs and guiding them to choose a suitable product or showing empathy when the customer has lost a loved one or a valuable item. They also include critical tasks like judging people for financial eligibility, insurance coverage, or for criminal activities.

Process-centric activities, on the other hand, are a predefined set of instructions performed by a persona. These can be delegated either to another individual or to a machine. Examples include extracting information from documents, performing calculations, generating reports, and retrieving or updating data from various data sources.



Understanding the Adoption Matrix

The adoption matrix requires identifying the persona—whether an incumbent, a displaced subject matter expert, or a recruit—and the business tasks associated with the role, whether customer facing or routine activities. The recommendations generated by the matrix vary by persona for a given role.

Let’s apply the matrix to some of the scenarios described earlier to see how it works.

In the case of an individual performing the current role, the matrix makes two recommendations. First, embrace GenAI for repetitive tasks (quadrant 1) that result in process efficiency and improved customer satisfaction. Second, resist GenAI or limit its use to support activities that enhance and strengthen the human presence where it is essential (quadrant 2) to establish a customer connection and improve loyalty.

With the adoption of GenAI, an individual’s productivity increases, creating the bandwidth to take on more work or new

role in some cases. In the new role, the individual can delegate new tasks to GenAI (quadrant 3—AI role expansion) and focus on new human-centric tasks (quadrant 4—human touch expansion) as the role demands.

It’s important to understand that delegating everything to AI is not sustainable in the long run as a lack of human touch in the business processes can adversely impact customer satisfaction and result in business loss. At the same time, humans who delegate work to AI should be held accountable for its output. This ensures that humans constantly monitor and review the AI systems and their output. In the process, they hone their reasoning and debugging skills which prevents cognitive skill impairment and other negative effects of AI. In the same vein, resisting AI and delegating all tasks to humans is also impractical, as it is not scalable. Hence, it’s essential for organizations to strike a balance between delegating tasks to humans and AI.

Applying the Adoption Matrix to Insurance

The insurance industry is a solicited business, unlike banking or retail/consumer goods, where products are sought by customers. Empathy and human touch are still important for advisors when selling policies and for adjusters when settling claims.

Let us consider a few business processes to identify areas where GenAI can be adopted using the matrix.

■ **Talent management.** The insurance industry is currently grappling with talent shortage issues. An aging workforce is approaching retirement and needs to be replaced, yet younger talent is reluctant to join, perceiving the industry as dull, boring, and not tech savvy.^[4] This creates an ideal opportunity to embrace GenAI, which can attract new talent by offering the promise of working with emerging technologies. At the same time GenAI-based tools could act as a coach or assistant, reducing the learning curve as new talent transitions into roles previously held by existing staff.^[5]

■ **Sales and marketing.** A sales agent or risk advisor occupies a highly customer-centric role, where establishing a genuine connection, earning trust and convincing customers are essential to conducting business. The human touch is critical and cannot be replaced by AI. Insurers have attempted to bypass agents through direct-to-consumer channels. However, except for a few lines such as personal auto and property, direct sales have not been successful.

Instead, insurers can support agents with product feature extraction and comparison tools, financial calculators and personalized marketing content generators to make their jobs easier. The sales personnel can utilize the additional bandwidth from AI delegation to strengthen their bond with the customers.

They can improve customer awareness on various product benefits and recommend coverages based on their needs. In the process, they can expand their roles to become advisors. This can result in additional sales and win customer loyalty.

■ **Underwriting.** Underwriters collect information from various third-party sources and review the information in detail to arrive at the risk profile. They ultimately decide whether to cover the risk or not, exercising their own discretion. GenAI can automate underwriters' operational tasks, though not the decision-making itself. Automation opportunities include data extraction, guideline comparison, and premium calculation. With the increased productivity from AI automation, underwriters can expand their current roles to include new lines of business as part of their job.

■ **Claims.** A claim intimation or a first notice of loss (FNOL) call requires the handler to show empathy toward the insured's loss whether it involves a disability, a human life, or a valuable item. The call is typically handled by an intermediary or a call center, where all the information is collected before handing it to a claim adjuster. While this task cannot be replaced by AI, the information capture can be supported by a bot. GenAI can automate most of the claim adjuster's tasks, such as validating the claim information, estimating the loss, and determining the settlement amount. This can significantly increase the claim adjusters' bandwidth for additional work.

A claim adjuster can enhance their customer interaction skills and expand the role to handle claim intimation calls. This will ensure that all the required information and clarifications are captured in a single call, improving the customer experience, especially in difficult times. At the same time, the claim adjuster can leverage composite AI to detect fraudulent claims and take up additional responsibility of a claim investigator as well.

■ **Information Technology.** GenAI can perform developers' tasks such as drafting requirements, generating code, and creating test cases and test data. As a result, adopting GenAI in IT will increase team productivity and provide plenty of opportunities for role expansion. A business analyst can now leverage GenAI to draft requirements, allowing more time with business teams to elicit details. The analyst can also become a developer and create a Proof of Concept for new business functionality. A developer or a business analyst can play the role of a tester and improve code quality in the early stages of development.

A Balanced Approach

GenAI is a powerful technology that can take automation to new heights in the digital world. Embracing GenAI will improve process efficiency and employee productivity, leading

to cost savings and customer satisfaction. But it comes at a cost. Extended exposure to this technology can make employees complacent and weaken their cognitive abilities. Excessive integration into every job and task, though cost effective, lacks the much-needed human touch in customer interactions.

Insurers can take a balanced approach to GenAI adoption. The matrix provides a good starting point to identify tasks where this technology is suitable and where it's not. We should embrace it to automate the mundane tasks that boost overall efficiency and productivity. At the same time, we should resist its use in tasks requiring an emotional connection with customers. After all, our end customers in this business are humans, not machines. ▲

AMARNATH SUGGU is a senior consultant at Tata Consultancy Services' Insurance Business Unit.

Endnotes

- [1] *Protecting Human Cognition in the Age of AI*; Cornell University; April 11, 2025.
- [2] "Insurance Brain Drain: Tackling The Talent And Knowledge Crisis With AI"; *Forbes*; July 15, 2024.
- [3] *AI Rivalry as a Craft: How Resisting and Embracing Generative AI Are Reshaping the Writing Profession*; Cornell University; March 12, 2025.
- [4] *Insurance Industry Talent Crisis*; AmTrust Financial.
- [5] *A fresh look at HCM through the GenAI lens*; Tata Consultancy Service.

Academy Resources on AI

The Academy offers a wide range of articles, publications, and events focused on artificial intelligence (AI), including:

- **"The Future Is Here":** A *Contingencies* article on how AI is transforming actuarial work.
- **Actuarial Professionalism Considerations for Generative AI:** A discussion paper on the use of AI and professionalism issues actuaries should consider.
- **Discrimination: Considerations for Machine Learning, AI Models, and Underlying Data:** An issue brief that defines discrimination; outlines methods for testing and monitoring algorithms; provides a regulatory overview; and highlights considerations for actuaries, model creators, and regulators. These publications are available on the Academy website at actuary.org.
- **Analysis of NAIC AI/Machine Learning Surveys:** A webinar examining how AI and machine learning are being adopted across the insurance industry, based on NAIC survey findings. Access it on Academy Learning (learning.actuary.org).



MIND THE GAAP

With the adoption of Accounting Standards Update No. 2018-12, Targeted Improvements to the Accounting for Long-Duration Contracts (LDTI), current-assumption net premium valuation became the norm for most long-duration insurance contracts. LDTI also made it easier to separate the performance of three different functions—insurance, investment, and expenses. Yet, for many, the effects of retrospective catch-up adjustments remain mysterious.

Making sense of that performance does require an understanding of basic arithmetic—how to add, subtract, multiply, and divide. And, though actuaries need to perform complex calculations, simple awareness of this need should suffice for others to understand performance.

With that context, the starting point for understanding performance is expected profit. In aggregate, expected profit is sometimes called the earnings run rate. Beginning with a run rate, the challenge is to understand deviations from expected. Typically, investment professionals and accountants can explain investment income and expenses. What's left is to make sense of deviations from expected performance of the insurance function.

Simple concepts
that can enable financial
statement users to make

BY STEVE MALERICH

sense of the performance
of long-duration insurance
contracts.

Key Concepts

Understanding deviations from expected insurance income depends on four key concepts that are not defined in accounting standards: fundamental gain, profit margin, margin gain, and shares of lifetime revenue.

Actuaries need to apply present value techniques to measure each of these concepts. Financial statement users, however, need only to understand the concepts and to know their values.

To begin—all four concepts account for what is popularly known as the “time value of money.” For simplicity, “gain” is used here to represent either a gain (positive result) or a loss (negative result).

■ **Fundamental gain.** The contribution of an event to the present value of future cash flow is fundamental to understanding the performance of long-duration insurance contracts.

For this purpose, “cash flow” refers to contractual revenue and benefit costs. (Under definitions of Generally Accepted Accounting Principles [GAAP], these are not always synonymous with an exchange of cash.) An “event” is anything that causes a change in expected cash flow. Common events include:

1. issuance of a new contract,
2. a deviation from expected experience,
3. an assumption change.

Other events include:

4. a contract modification,
5. assumption of existing business, and
6. ceding of existing business.

To make sense of performance, an actuary needs to identify first the events driving a material deviation from expected income and then the contribution of each event to the present value of future cash flow. As a fundamental step toward understanding performance, we’ll call this the fundamental gain. It is also fundamental in the sense that it represents the contribution of an event to expected lifetime profit.

Understanding current income requires a matching of fundamental gain to past and future revenue. This matching

depends on the three remaining key concepts.

■ **Profit margin.** The Financial Accounting Standards Board recognized the concept of profit margin in LDTI’s Basis for Conclusions paragraph BC50, which notes that the “net premium insurance accounting model” results in “a constant profit margin over the entire contract life.”

Profit margin is the proportion of expected lifetime revenue that is not needed to fund expected lifetime benefits. If, for example, the present value of lifetime benefits is 70% of the present value of lifetime revenue, then the profit margin is 30%.

■ **Margin gain.** Within the fundamental gain are changes in present values of future revenues and benefits. As noted above, the net premium model separates revenue into the portion needed to fund benefits and the profit margin.

Multiplying the profit margin times the revenue portion of fundamental gain produces a margin gain. GAAP does not permit immediate recognition of a margin gain. This portion of fundamental gain will be recognized in income over the remaining life of the business.

■ **Shares of lifetime revenue.** The remaining portion of fundamental gain, after subtracting margin gain, is matched to revenue for the entire life of the business (past and future). The portions matched to past and current revenue are recognized in current income. To determine these portions, we need to know the past and current shares of lifetime revenue.

The past share of lifetime revenue is a ratio of present values—past revenue divided by lifetime revenue. The current share of lifetime revenue is also a ratio—current revenue divided by the present value of lifetime revenue.

Effects on GAAP Net Income

Once the four key concepts are understood and measured, making sense of GAAP performance is just a matter of applying them. Events contribute two elements to current deviations from expected income: remeasurement gain (an immediate, one-time effect) and run rate change (a recurring effect).



Properly measured, reinsurance behaves like underlying benefit costs so that aggregate performance effectively accounts for the cost and the protection.

■ **Remeasurement gain.** Remeasurement gain is the portion of fundamental gain matched to past revenue.

Beginning with the fundamental gain, subtract the margin gain. The past share of lifetime revenue tells us the proportion of the difference matched to past revenue and recognized in current income as a remeasurement gain.

■ **Run rate change.** There are two parts to a change in the run rate. Both parts, along with the remeasurement gain, contribute to the difference between actual and expected income.

One part is the portion of the fundamental gain, after subtracting margin gain, that is matched to current revenue. This portion equals the difference multiplied by the current share of lifetime revenue. When aggregated across multiple cohorts, this is an estimate of how much the aggregate run rate will change because of the events. This is often immaterial, but there will be exceptions.

The other part—amortization of the margin gain—is found by multiplying

the profit margin times the difference between actual and expected revenue. This is usually immaterial and can often be ignored when explaining results.

Illustrations

The following illustrations are of a cohort of 30-year term life insurance contracts. For traditional life insurance contracts, premium is revenue and death benefits are benefit costs; there are no surrender benefits in this cohort. Analysis results are rounded to the nearest hundred dollars; summary results are rounded to the nearest thousand.

■ **New business.** At issue, estimated present values are \$1,087,400 of premium and \$761,200 of benefits. The difference is \$326,200 of fundamental gain. By design, the present value of net premium is set equal to the present value of benefits. In this example, that's 70% of expected gross premium, leaving a 30% profit margin.

Applying the profit margin to the present value of future premium reveals a

margin gain of \$326,200. It is no coincidence that this equals the fundamental gain; this is a natural consequence of applying LDTI's net premium model to a new cohort. Subtracting it from fundamental gain leaves nothing available for remeasurement gain.

In terms of GAAP reserving, the actual premium this quarter is unexpected. An aggregate run rate, however, assumes new business will substantially replace the run off of existing business. For the purpose of estimating run rate change, it is usually best to ignore new business.

To summarize—new business has no material effect on current income.

■ **Renewal events.** The remaining illustrations cover two events—lapse and mortality assumption changes—both in the cohort's fifth year. Though GAAP calls for updating all assumptions at the same time, these changes are separated by one quarter to highlight the dynamics of each event.

Each illustration begins with expected income (the cohort's share of the aggregate run rate) and actual income, and then shows how this framework explains the difference. Variances from expected lapse and mortality will usually perform similarly to assumption changes, but at a smaller scale.

■ **Lapse assumption change.** Before changing the lapse assumption, expected income is +\$5,400. Actual income of -\$16,400 is \$21,800 less than expected.

Reducing annual lapse rates by one percentage point increases the present value of future premium, +\$78,800, and the present value of future benefits, +\$126,400. The fundamental gain from this event equals the difference, -\$47,600. Multiplying the additional premium by the 30% profit margin, the margin gain is +\$23,600.

We see here a seemingly strange occurrence—fundamental gain is negative but margin gain is positive. Odd as this might seem, there is some sense to it.

For long-duration contracts, expected claims normally increase as a percent of expected revenue. (That's why the net premium method produces a liability.) Thus, it makes sense that favorable persistency would have a larger effect on the present value of future benefits than on the present value of future revenue, resulting in a negative fundamental gain. In contrast, as long as the profit margin remains positive, favorable persistency will produce a positive margin gain.

With the assumption change, the past share of lifetime revenue is 29%. Subtracting margin gain from fundamental gain and then multiplying the -\$71,200 difference by the past share of lifetime revenue, the remeasurement gain is -\$20,600.

Multiplying current share of lifetime revenue, 1.4%, by the -\$71,200 difference between fundamental gain and margin gain, contributes -\$1,000 of run rate change.

To summarize—the lower lapse assumption reduces expected lifetime profit by about \$48,000, (a fundamental gain of -\$48,000), but the increase in expected premium creates a margin gain of about +\$24,000. Subtracting that from the fundamental gain means that -\$72,000 must be matched to lifetime revenue. As a fairly new cohort, about 30% (past share of lifetime revenue) is recognized immediately as a remeasurement gain of about -\$21,000. The remaining -\$27,000 of fundamental gain will be recognized in subsequent income. Near term, that's about -\$1,000 change in the quarterly run rate, beginning with the current quarter. Together, the remeasurement gain and run rate change explain all of the \$22,000 difference between expected and actual income.

■ **Mortality assumption change.** Before changing the mortality assumption, expected income of +\$4,300 is very close to expected income in the previous quarter adjusted for the run rate change (\$5,400-\$1,000). Actual income of +\$10,000 is \$5,700 more than expected.

Reducing assumed mortality rates by 2% has little effect on the present value of future premium, +\$100, but reduces the present value of future benefits significantly, -\$17,500. The fundamental gain from this event equals the difference, +\$17,600. With a negligible effect on the present value of future premium, margin gain is about \$0.

The past share of lifetime revenue, now 31%, is multiplied by the +\$17,600 difference between fundamental gain and margin gain to produce a remeasurement gain of +\$5,500. This is nearly all of the +\$5,700 difference between actual and expected income; there is no material effect on the run rate.

To summarize—the lower mortality assumption increases expected lifetime profit by about \$18,000 (a fundamental gain of +\$18,000) with no material effect on expected premium. As a fairly new cohort, about 30% (past share of lifetime revenue) is recognized immediately as a remeasurement gain of about +\$6,000—the entire difference between expected and actual income. The remaining +\$12,000 of fundamental gain will be recognized in subsequent income, but that's too small to have a material effect on the quarterly run rate.

Aggregate Performance

In practice, aggregate performance is what matters most. Typically, there will be multiple events affecting multiple cohorts and an actuary will use cohort-level analysis to identify and explain material events. Often, detailed explanations can be summarized as just a few major events.

The same basic concepts can be used to explain performance even when other complicating factors are involved.

Reinsurance adds another cost and provides some offset to underlying contract performance. Properly measured, reinsurance behaves like underlying benefit costs so that aggregate performance effectively accounts for the cost and the protection.

Limited-payment contracts require deferral of profit margins. The concepts, however, are the same as for other contracts, but the fundamental gain is allocated on the profit amortization basis rather than revenue.

For universal life contracts that do not require a net premium reserve, any deviation from expected claims will be recognized immediately in income and other events will affect only the run rate.

Loss recognition and caps on traditional net premiums pull 100% of fundamental gains into the remeasurement gain and reduce a cohort's run rate to zero.

When a reserve is floored at zero, remeasurement gain must include the effect of flooring; the effect on run rate will likely be unpredictable but insignificant. ▲

STEVE MALERICH recently retired from full-time employment after 46 years—40 in life insurance companies and six in consulting. He has served on the Academy board, as vice president of the Risk Management and Financial Reporting Council. He remains active in professional volunteer work, serving as member of the Life GAAP Reporting Committee, and as a writer.

Balancing Protection and Performance in Retirement

Retirees face the challenge of balancing income security with investment growth. This article explores key factors influencing retirees' need for guaranteed income and offers a framework to better understand how to optimize retirement spending while managing risk.

WHILE EVERY RETIREE IS UNIQUE, they all want to use their fixed retirement assets to maximize their annual spending in retirement without running out of income before death. This is the safety-performance balance that every retiree seeks to optimize.

In our previous November 2023 *Contingencies* article, “Security, Safely—Evaluating the effectiveness of a combined investment-and-annuity strategy for retirement planning,” we introduced the SecureVest retirement planning model, which balances annuities with a risky investment portfolio to maximize retirement spending at a given ruin probability. Our model demonstrates that this integrated (i.e. guaranteed annuities plus investments) financial planning model can outperform a 100% risky investment strategy in many scenarios.

In the previous article, we assumed the retiree had a predetermined allocation of retirement assets in guaranteed investments based on individual preferences. In this article, we present a qualitative model to estimate this guaranteed allocation, drawing on several articles and studies about the various factors that determine the level of confidence a retiree has in the safety and security of their annual retirement income. The greater the level of confidence, the lesser the proportion of retirement assets allocated to guaranteed investments. We have quantified the various factors impacting safety and confidence into an index—the SecureRetireIndex (SRI)—inspired by our SecureVest retirement planning model.

Both SecureVest and SRI provide a carefully constructed methodology for how actuaries and insurers can demonstrate the value of incorporating

guaranteed investments in retirement planning. Ultimately, that decision is in the hands of the retiree and their financial advisor, who could incorporate many more variables than those we consider in these articles.

The companion model, SecureVest, uses classic stochastic projections and actuarial assumptions to develop an optimal integrated retirement planning strategy for a predetermined level of guaranteed investments. The SRI builds on the SecureVest model to estimate the level of guaranteed investments needed. It uses a qualitative model to calculate the SRI.

Factors Impacting the Need for Safety and Security

There are several factors impacting the need for safety and security during

retirement. Based on an extensive literature review and internet search, we narrowed down the following factors that contribute to a retiree’s need for safety and security.

- 1. Dependents:** If someone has financial dependents, they may prioritize having a guaranteed income to ensure that the support they provide to their dependents is consistent and stable.
- 2. Social connectedness:** The more socially connected a retiree is, the lesser the need for guaranteed investments, because there is a social network for the retiree to rely on.
- 3. Health/longevity:** If someone is in good health, there is a greater appeal to hold more guaranteed investments to protect against longevity risk.



- 4. Lack of other income sources:** The greater the availability of other sources of retirement income, the lesser the need for a guaranteed stream of income and dependence on stable retirement income.
- Influenced by level of education and skills to earn additional income during retirement
- 5. Low tolerance to risk:** Some retirees are more risk averse than others, preferring a more predictable and stable source of guaranteed income.
- 6. Value simplicity:** Some retirees dislike complex investment arrangements as they are harder to manage/understand.
- Influenced by the retiree's level of financial literacy
- 7. Discipline:** Some people don't trust themselves to manage overspending or withdrawing too much money from their investments, and prefer the stability of guaranteed income to keep them in check.
- There could be other factors impacting the need for security at retirement, but these are the key considerations.

Calculating the SecureRetireIndex

To create a quantitative value from qualitative factors, we first developed an ordinal scale for these factors. We made the scale discrete with five values ranging from 1 to 5, where 1 represents the greatest need for retirement safety and 5 represents the lowest need for retirement safety. The scale for each of the factors is described below:

- **Dependents:** 1 = 4 or more dependents, 2 = 3 dependents, 3 = 2 dependents, 4 = 1 dependent, and 5 = no dependents
- **Social connectedness:** 1 = minimal social connectedness and the lack of a safety net, 2 = low social connectedness, 3 = average social connectedness, 4 = above-average social connectedness, and 5 = a high level of social connectedness
- **State of health:** 1 = excellent health, 2 = above-average health, 3 = average health, 4 = below-average health and 5 = poor health
- **Availability of other income sources:** 1 = no other sources of income, 2 = limited other sources of income, 3 = average other sources of income, 4 = above-average other sources of income, and 5 = several other sources of income
- **Risk tolerance:** 1 = highly risk averse, 2 = below-average risk tolerance, 3 = average risk tolerance, 4 = above-average risk tolerance, and 5 = high level of risk tolerance
- **Value simplicity:** 1 = a low level of financial literacy and need for investments that are easier to understand, 2 = below-average level, 3 = average level, 4 = above-average and 5 = a high level of financial literacy

- **Discipline:** 1 = a retiree with very little discipline in managing their investments and spending, 2 = low discipline, 3 = average discipline, 4 = above-average discipline, and 5 = a high level of discipline in financial management.

The next step in calculating the SRI is recognizing that all these factors are not equal in importance. We analyzed several sources to determine weights for these factors; links to these sources are provided at the end of the article. Based on our literature review, we assigned the following weights for each of the seven factors and calculated the weighted average for a given response:

- Other income sources—25%
- Health/longevity—20%
- Risk tolerance—15%
- Dependents—10%
- Discipline—10%
- Financial literacy/value simplicity—10%
- Social connectedness—10%

To construct the SRI, we use simple linear interpolation. We first determine the maximum weighted score if each response is 5 (i.e., the lowest need for retirement safety) and set this value to zero. We then determine the minimum weighted score if each response is 1 (i.e., the greatest need for retirement safety) and set this value to 100. We then interpolate between the minimum and maximum weighted scores for each given weighted outcome using the formula:

$$SRI = 100 \times (\max. \text{score} - \text{given outcome}) / (\max. \text{score} - \min. \text{score})$$

To illustrate, suppose we have the following responses for each of the seven factors:

Fac 1=3, Fac 2=1, Fac 3=5, Fac 4=2, Fac 5=4, Fac 6=3, Fac 7=4

Factors	Response	Weight	Weighted Score
Other income sources	3	0.25	0.75
Health/longevity	1	0.20	0.20
Risk tolerance	5	0.15	0.75
Dependents	2	0.10	0.20
Discipline	4	0.10	0.40
Financial literacy	3	0.10	0.30
Social connectedness	4	0.10	0.40

Weighted score = 0.75 + 0.20 + 0.75 + 0.20 + 0.40 + 0.30 + 0.40 = 3.00
 SRI = 100 × (5 - 3) / (5 - 1) = 50

Next Steps

To facilitate the SRI calculation, we have developed a simple Excel calculator that determines the SRI for a given response to the seven key factors impacting the level of safety and security a retiree may need at retirement. To access the calculator, visit the University of Connecticut Goldenson Center website and find the SRI calculator under their Projects tab.

The SRI can be used to estimate the desired percentage of investments that should be allocated to guaranteed investments in a retiree's investment portfolio. Then we can use the SecureVest retirement planning tool to determine the optimal integrated investment strategy that maximizes annual spending for a given level of certainty.

The SRI can be generalized to include upper and lower bounds on the desired level of guaranteed investments. If we denote the lower bound as SRI(min) and the upper bound as SRI(max), then the SRI formula can be generalized to:

$$SRI = SRI(min) + (SRI(max) - SRI(min)) \times (max. score - given outcome) / (max. score - min. score)$$

This article provides a novel qualitative approach to estimating the level of safety and security needed by a retiree. This approach is unique and, together with SecureVest, provides an actuarially sound framework to determine how retirement assets should be allocated between guaranteed and risky assets to maximize retirement spending for a given ruin probability. This framework could appeal to financial planners, actuaries, and annuity producers, and a financial planning app could be developed that combines the features of both SRI and SecureVest.

However, like all research on retirement planning, there are limitations to its practical application. There may be other criteria such as the need to leave behind a legacy or cover unexpected future expenses, that could influence a retirement planning strategy beyond safety and performance. Additionally, despite the rigorous analysis we conducted to determine the factors and weights influencing the need for safety at retirement, there is always an element of arbitrariness in any qualitative model.

To quote Jonathan Clements, "Retirement is like a

long vacation in Las Vegas. The goal is to enjoy it to the fullest, but not so fully that you run out of money."

Our SecureVest model, combined with the SRI calculator, customizes an investment strategy for a retiree that maximizes investment performance with a desired level of safety and security. ▲

JEYARAJ (JAY) VADIVELLO is professor and director of the Goldenson Center for Actuarial Research at the University of Connecticut.

KARISHMA GUPTA is a junior majoring in Bioengineering at The University of Pennsylvania, with minors in Computer Science and Engineering Entrepreneurship.

Sources for Factors

- [1] "Buying an Annuity"; Annuity.org; March 3, 2025.
- [2] "5 Key Factors That Affect Annuity Rates (And How to Use Them to Your Advantage)"; The Annuity Expert.
- [3] "How Behavioral Factors Shape Retirement Wealth; Knowledge at Wharton"; July 15, 2024.
- [4] "How to feel financially secure in retirement"; Fidelity Viewpoints; July 9, 2025.
- [5] "What Is a Single Life Annuity?"; PlanEasy; Nov. 6, 2024.
- [6] "Pros and cons of annuities that experts say to know now"; Money Watch; May 19, 2025.
- [7] "Structured Annuities and Settlements: Maximizing Financial Stability With Market Protection"; National Debt Relief; April 17, 2025.
- [8] "Individuals' challenges managing pensions through retirement"; The Pensions Review; April 1, 2025.
- [9] "Annuity beneficiary payout options: What happens to my annuity when I die?"; Thrivent; May 13, 2025.

Sources for Weights

- [10] "Coping with the Stress of Retirement"; Harvard Business Review; May 5, 2024.
- [11] "Annuities: Whose Cup of Tea?"; Retirement Income Institute; December 2020.
- [12] "Pension Plan Distributions: The Importance of Financial Literacy"; Pension Research Council; Aug. 24, 2011.
- [13] "Time Inconsistent Preferences and the Annuity Decision"; Journal of Economic Behavior and Organization; Sept. 10, 2016.
- [14] "Annuity Puzzles; Journal of Economic Perspectives"; Fall 2011.
- [15] "Security, Safely—Evaluating the effectiveness of a combined investment-and-annuity strategy for retirement planning"; *Contingencies*; Nov. 1, 2023.

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What H.R. 1 Changes Mean for Medicaid’s Future

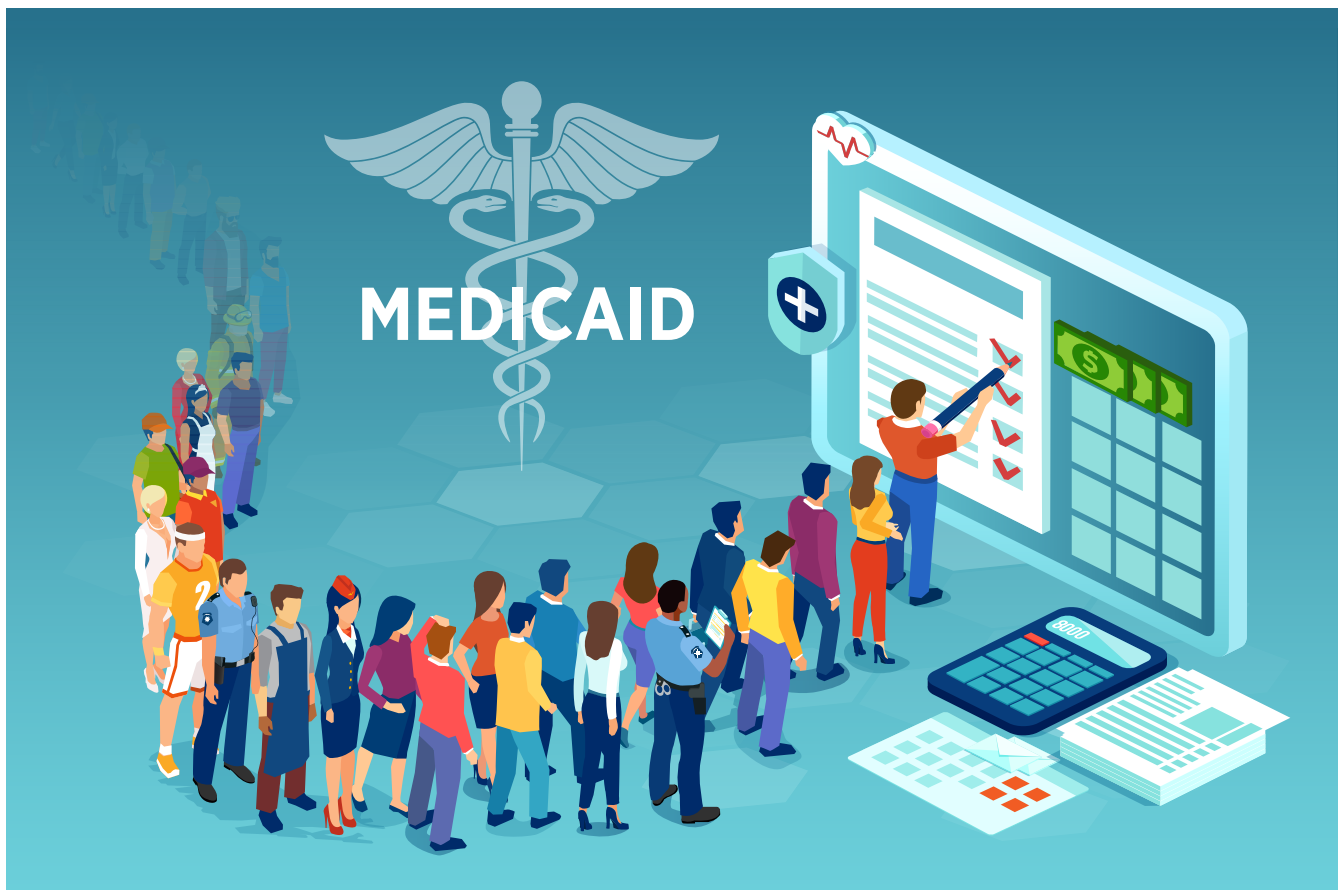
MEDICAID IS A LARGE AND COMPLEX HEALTH INSURANCE PROGRAM, with its sustainability depending on sound financing, accurate projections, and well-designed payment and risk-sharing structures. So it’s natural for the Academy and its membership to have a significant interest in ensuring the program remains on firm footing.

For decades, the organization’s volunteers have tracked and reviewed Medicaid and offered nonpartisan insights on how to avoid consequences that could ripple out to beneficiaries, providers, insurers, and taxpayers. In 2025, however, Congress enacted dramatic changes to the program, raising concerns about Medicaid’s ability to continue providing health care services to the approximately 76 million Americans (adults and children) enrolled in the program as of October 2025.^[1]

The Impact of Federal Spending Reductions

The \$911 billion reduction in federal Medicaid spending over 10 years is estimated to increase the number of uninsured Americans by 10 million, according to the Congressional Budget Office.^[2] Those cuts are expected to fall disproportionately on rural areas, reducing access to health services, although the creation of the Rural Health Transformation Program (RHTP)^[3] under H.R.1 is intended to help counteract that impact.

The new program was a late addition to the One Big Beautiful Bill Act (OBBBA), following concerns raised by several lawmakers about the scope of the Medicaid cuts included in the legislation. KFF (formerly the Kaiser Family Foundation) has noted that the \$50 billion replaces a little more than a third of the estimated loss of federal Medicaid funding in rural areas. KFF also pointed out that the rural health program funding is temporary, while many of the Medicaid cuts are ongoing.



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As part of RHTP, the Centers for Medicare & Medicaid Services (CMS) will review applications filed by states to determine funding levels for each state's program. In 2026, states will receive first-year awards ranging from \$147 million to \$281 million.

"Thanks to Congress establishing this investment and President Trump for his leadership, states are stepping forward with bold, creative plans to expand rural access, strengthen their workforces, modernize care, and support the communities that keep our nation running," CMS Administrator Dr. Mehmet Oz said in a statement.^[4]

New Work Requirements

Other Medicaid changes include new work requirements, which are expected to raise administrative costs for states. The law mandates that most non-disabled, non-elderly adults complete at least 80 hours of work or related activities each month, unless they are students, pregnant, or serving as caregivers.^[5]

CMS has acknowledged that promulgating and finalizing the new work rules by 2027, as mandated by the law, will require significant changes to state programs, but the agency promised to work in close partnership with states.

"Community engagement has potential to empower Medicaid beneficiaries through employment, education, or volunteer service so they can escape isolation and dependency, build confidence, and achieve self-sufficiency," wrote Dan Brillman, deputy administrator, Center for Medicaid and CHIP Services, in a CMCS informational bulletin last December.^[6]

Additional Medicaid modifications expected to affect the program include limits on Medicaid provider taxes, which will tighten rules on health care-related taxes used to draw down federal Medicaid funds; the phase-in of a lower cap on tax rates; and reduced state financing flexibility.

The Academy's Ongoing Focus

The Academy's Medicaid Committee is examining these changes this year, with a focus on actuarial considerations regarding Medicaid eligibility. The committee is also expected to explore issues related to waste, fraud, and abuse, as well as pharmaceutical pricing.

Ensuring Medicaid's financial health supports the Academy's mission to serve the public by promoting programs that are sustainable, transparent, and able to meet their promises over time.

Ensuring Medicaid's financial health supports the Academy's mission to serve the public by promoting programs that are sustainable, transparent, and able to meet their promises over time. It also helps protect the nation's broader health care provider infrastructure, as Health Practice Council leaders explained in depth during a presentation made to the National Association of Medicaid Directors last September.^[7]

The full effect of changes enacted under OBBBA are likely only beginning to emerge, as implementation moves forward this year. The Medicaid Committee will continue to monitor developments closely to better understand implications. Readers can follow the committee's latest efforts through the Academy's website at actuary.org. ▲

TED GOTSCH is policy content and publications manager at the Academy.

Endnotes

- [1] October 2025 Medicaid & CHIP Enrollment Data Highlights.
- [2] "Estimated Budgetary Effects of Public Law 119-21, to Provide for Reconciliation Pursuant to Title II of H. Con. Res. 14, Relative to CBO's January 2025 Baseline;" Congressional Budget Office; July 21, 2025.
- [3] "A Rural Health Program Worth Knowing About;" American Academy of Actuaries' Actuarially Sound Blog; Nov. 20, 2025.
- [4] "CMS Announces \$50 Billion in Awards to Strengthen Rural Health in All 50 States;" Centers for Medicare & Medicaid Services; Dec. 29, 2025.
- [5] H.R. 1, the One Big Beautiful Bill Act.
- [6] Dan Brillman, CMS Deputy Director, Dec. 8, 2025, Section 71119 of the "Working Families Tax Cut" Legislation, Public Law 119-21: Requirements for States to Establish Medicaid Community Engagement Requirements for Certain Individuals [CMCS Informational Bulletin], Center for Medicaid & CHIP Services.
- [7] "Health Insurance Market Dynamics," presentation by Health Practice Council (HPC) Vice President Annette James and HPC Vice Chairperson Julia Lerche to the National Association of Medicaid Directors' CFO/Finance Affinity Group, Sept. 8, 2025.

Counting on Public Good

Scott Merkord, a 2025 Rising Actuary Award recipient, blends analytical rigor with a passion for public service. Merkord, who works at Risk & Regulatory Consulting, serves on the Climate Change Joint Committee, where he applies his actuarial expertise to emerging risks. Drawn to the profession by a love of calculus and catastrophe modeling, he has built a career grounded in professionalism, clear communication, and a commitment to public good—all while staying true to his personal values and interests outside the office.

What led you to become an actuary, and what attracted you to the profession?

I loved high school calculus. In college, I saw some presentations about catastrophe modeling and hurricanes, which further piqued my interest in the profession. I completed an actuarial life insurance internship with American National Insurance Co. in Galveston, Texas, and an actuarial property and casualty internship with Allstate Insurance Co. in Northbrook, Ill., which confirmed that this would be a good career for me.

Describe a time when your professionalism training has helped you in your career.

Precept 2 (Qualification Standards) of the Code of Professional Conduct is especially important for us in regulatory space, given the breadth of our work. We evaluate each analysis to determine whether we are qualified to perform it. Precept 7, which addresses conflicts of interest, is also important, as we assess potential conflicts of interest for every assignment we undertake.

Actuarial standards of practice (ASOPs) help guide our review of rate filings and predictive models. We rely heavily on these standards to write strong objections when working on behalf of state departments of insurance. Ongoing professionalism training continues to remind me of the importance of both the Code and ASOPs in our work.

What's one of the biggest lessons you've learned in your career?

The ability to communicate complex topics in a way that is clear to non-analytical audiences has been extremely helpful. A few elements that help me in this regard are developing my own presentations, emphasizing benefits over features, and recognizing that formatting and design matter.

What advice do you wish you were given at the beginning of your career?

Be aligned with your true self and pursue a career that aligns with your values, rather than simply following what you see others doing.



What do you value most about your Academy membership and volunteer work? What does the MAAA designation mean to you?

I like the Academy's volunteer opportunities, which span so many practice areas, including joint committees like the Climate Change Joint Committee, of which I'm a member. The Academy stands out for offering high-quality continuing education with a strong emphasis on professionalism. I appreciate the opportunity to work with other credentialed actuaries on relevant, interesting topics such as climate change considerations.

What is the value of your MAAA designation?

The Academy's mission is to serve the public and the U.S. actuarial profession. As actuaries, I feel that we have a similar mission related to the public, so I appreciate that the MAAA shows that commitment to supporting the public good.

Beyond work—what are your hobbies or personal interests?

My days include coffee, fitness, and spending time with the people closest to me. A few things that I really enjoy are the Texas Longhorns, baseball, hiking, cooking dinner at church on Wednesday nights, and playing the saxophone. ▲

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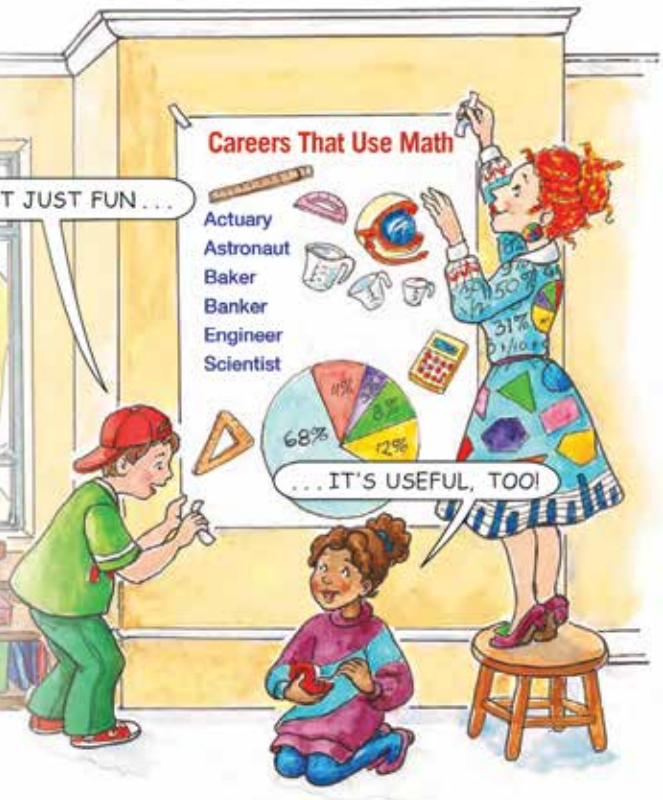
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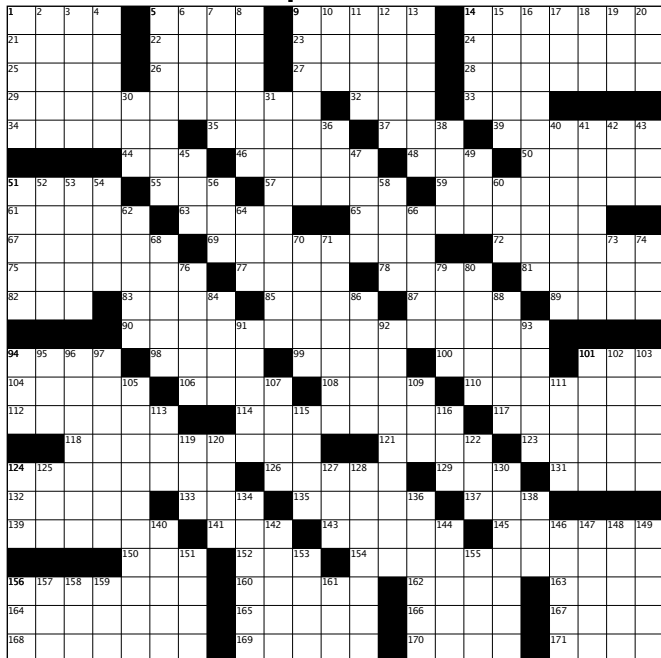


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Nhomme de plume



Across

- 1 Gaiter
- 5 Storm preceder
- 9 Capital of Bulgaria
- 14 Typical Messi adjective
- 21 California indians
- 22 Cause of some shaking and fever
- 23 Safari sighting
- 24 Like some mathematical proofs
- 25 "Killing an ____" (controversial Cure song)
- 26 Kruger National Park terrain
- 27 Knuckled under
- 28 Came to rest
- 29 Mary Ann Evans
- 32 It's left of center?
- 33 Essential tool for healthcare actuaries (abbr.)
- 34 Put on display
- 35 Going to experience
- 37 AC/DC classic
- 39 It's sometimes hidden
- 44 Flying Circus lead-in

Down

- 46 They give people big heads
- 48 Bombshell feature
- 50 Add a rider
- 51 Memory foam developer
- 55 Alberta export
- 57 They're often in chains
- 59 Small oil producers
- 61 "Witness" witnesses
- 63 Drilling grp.?
- 65 Louisa May Alcott
- 67 Often seen in streams
- 69 Woodcarving tool
- 72 Gourmandize
- 75 City once called Terminus
- 77 A spouse, in Savoie
- 78 Épouse, in Epping
- 81 Juicy bits
- 82 "Fight Club" agent
- 83 Royal symbols
- 85 Orioles' complement
- 87 Intentions
- 89 Typical SV job openings
- 90 JK Rowling
- 94 Type of agreement
- 98 Paddington Bear's place of origin
- 99 "____ coward?": Hamlet
- 100 Set straight
- 101 "Lenore" poet
- 104 Memento
- 106 Sail support
- 108 An office may have one
- 110 "...Lamentings heard i' th' air, strange ____ of death": Macbeth
- 112 Pennsylvania, notably
- 114 First Roman emperor
- 117 Its highest point is Mount Sunflower
- 118 Violet Paget
- 121 A blue moon
- 123 Pledge from the faithful
- 124 Clippers
- 126 "Delphine" author Madame de ____
- 129 Comedy routine
- 131 DeLeo of Stone Temple Pilots
- 132 Balderdash
- 133 Nautical rope
- 135 Ticket imperative
- 137 X, at times
- 139 Aver
- 141 Current outlet
- 143 On the move
- 145 They're not standard
- 150 Comedy routine
- 152 It has a bad rep

- 154 Alice Mary Norton
- 156 Question to one who just got in
- 160 What holds hold
- 162 Barnyard plaint
- 163 "____, sing America" (Langston Hughes poem)
- 164 "No doubt"
- 165 Washington State ____ Island
- 166 Womanizer
- 167 2005 Emmy winner for Dramatic Series
- 168 Report holders
- 169 Lean and lanky
- 170 Lost one's grip
- 171 Canards

- 51 Like Horatio Hornblower's career
- 52 Island town in "Jaws"
- 53 Sneak by
- 54 Addled
- 56 Cattle call
- 58 Duck also called white nun
- 60 East of North
- 62 Coveted distinction
- 64 Divinity degree
- 66 Kind of patch
- 68 Put an edge on
- 70 Three-horse chariot
- 71 Ostrich relative
- 73 Oklahoma native
- 74 ANOVA calculation
- 76 Religious residence
- 79 It must be followed
- 80 Kuwaiti haves
- 84 Evening, along the Arno
- 86 Hebrew prophet
- 88 In a predicament
- 91 Arcadian
- 92 Division division
- 93 Afghan city on the Hari Rud
- 94 "Anywhere" singer Rita
- 95 New Testament bk.
- 96 Exeter exams
- 97 Blue blood's pride
- 101 Tomato product
- 102 Nebraska tribe
- 103 City on the Ruhr
- 105 Charlotte Bronte
- 107 Form 1040 deduction
- 109 O, as opposed to X

- 111 City in Oklahoma
- 113 North of East
- 115 Japanese sandal
- 116 Possessive in Paris
- 119 Brief association?
- 120 Mixed "suns"
- 122 Hyp/Adj
- 124 Mom-and-pop org.
- 125 Possessive in Pittsburgh
- 127 Computer programming language
- 128 Site of many a protest
- 130 Acknowledged
- 134 River or sea
- 136 Royals of the 1500s
- 138 Conclusion of a singles match?
- 140 Every book has one
- 142 Really fancy
- 144 Hardship
- 146 Base exercise
- 147 First Holy Roman emperor
- 148 A pirate's "hempen halter"
- 149 Little monsters
- 151 Attic collection, perhaps
- 153 Oxford part
- 155 Sumerian god of wisdom
- 156 USPS concerns
- 157 On a roll
- 158 LGA posting
- 159 Criticism, so to speak
- 161 Jack Lemmon/Ted Danson film

Previous Puzzle: Al-tourney-tiv



Solvers: Dean Apps, Alan Clark, Jared Dashoff, Todd Dashoff, Ken Kudrak, George Levine, Jim Muza, Madhumathi Windon, and Wendy Windsor

Solutions may be emailed to puzzles@actuary.org. In order to make the solver list, your solutions must be received by June 1, 2026.



Solutions for a world at risk™

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An advertisement for the journal "Contingencies". It features a large orange background with the text "WRITE FOR CONTINGENCIES" in white and yellow. Below the text is an illustration of a yellow and black fountain pen writing a blue line on a dark blue surface. The text reads: "We're looking for authors who can translate complex insights into compelling narratives on a variety of actuarial topics, such as AI, climate events, cyber, and more."

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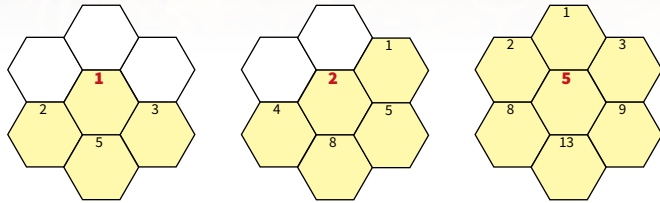
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Honeycombs

THE SOLUTION DIAGRAM FOR THIS PUZZLE contains 25 “rosettes”—clusters of seven hexagon-shaped cells—plus a few extra cells on the far left and far right. Each rosette is identified by the number in its central cell. For example, rosettes #1, #2, and #5, respectively, look like the following:



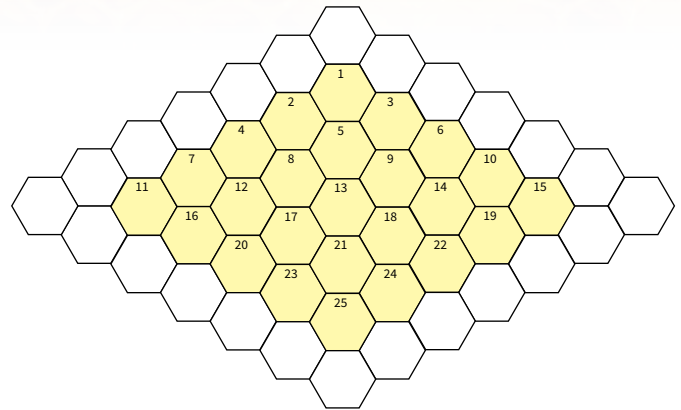
All of the clues yield seven-letter answers, which are to be scrambled before entry. When the diagram is completed, the central row (blank, 11, 12, 13, 14, 15, blank) will yield a seven-letter answer pertinent to the theme. Another two-word phrase will emerge from rows 2 (blank, 2, 3, blank) and 8 (blank, 23, 24, blank).

There are eight unchecked cells, one each from rosettes 1 and 25, two each from rosettes 11 and 15, one at the far left, and one at the far right. The unchecked letters in rosette 1 (and 25) will be determined from the placement of the other six letters. The far left and far right cells will be determined by the theme entry. And the other unchecked cells in rosettes 11 and 15 spell out a common four-letter word that could describe the overall shape of the diagram, especially if you squint.

There are three proper nouns. (One wouldn't have to be but is as clued.) Everything else is playable in Scrabble. And to quote Stephen Sondheim, who brought cryptic puzzles to the United States in the 1960s, “Ignore punctuation, which is designed to confuse.”

Thanks to Jerry Miccolis for test-solving and editorial suggestions.

1. Mule carrying some Peruvians back to mineral deposits
2. Mingler operating an old economy car
3. EU evils might be hard to pin down
4. That lady's band? They probably ran into each other during school days
5. Despicable one knighted may be called obsequious
6. They say plotless musicals can get raves and pans from the critics



7. Uncontrollable greed instilled in high school investment club that focuses on futures
8. Greece is nonbelligerent until peacetime ultimately, and it's hard to swallow
9. Pivots in two directions and lives wantonly
10. Advantages seen in junk drawers
11. Skip's heavyhearted, edgy—it can't be avoided. Or can it?
12. Snakes found in garrets? Unfortunately
13. Some middle distance runners gobble up turkey at first, then some fish
14. Woes expressed in work-song series at the Fringe
15. Doctor, after one, who can come up with a treatment?
16. “Namaste America” is all over ship
17. Wise-ass is bashing imarets
18. Pretty half of a philosophical statement of acceptance
19. A basketball player like LeBron James is so pushy
20. Make an error on your Tinder profile and go out with Mr. Wrong?
21. Unfortunately Tim, Ian's pagan
22. Knotty entanglement, in more ways than one
23. Adam gets excited returning to a children's novel
24. Onanism runs rampant at chateau
25. Perhaps in name only? Yen does not exist “in name only”

Center row: _____

Rows 2 and 8: _____

Four-letter word from unchecked cells in groups 11 and 15:

TOM TOCE is an FCAS and a seasonal director at KPMG. He is a member of the Jeopardy Hall of Fame. Solutions may be emailed to ttoce@nyc.rr.com. In order to make the solver list, you should send him your solutions by June 1, 2026.

Solution to Previous Issue's Puzzle—Stop! And Go Play in the Park!

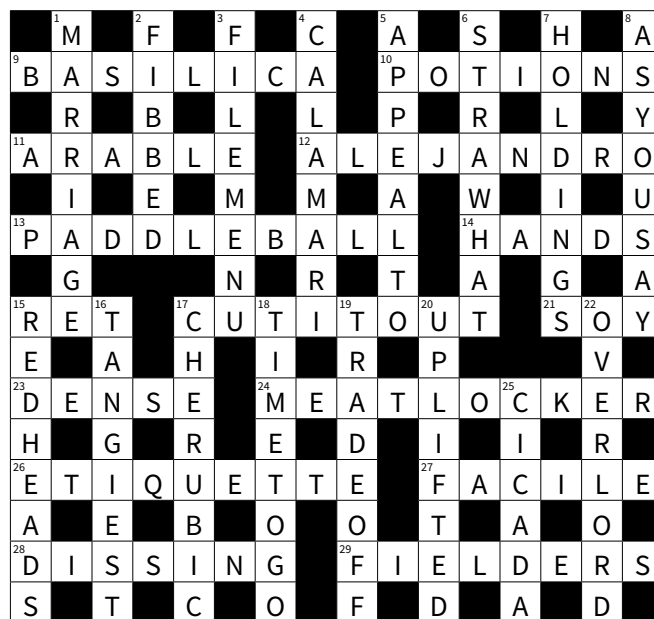
The three consecutive letters that needed to be excised from each of the eight too-long-to-fit theme answers each represent a common IT initialism (ROM, LTE, USB, GIF, URL, ISP, SIM, GUI). This was hinted at by the alternative enumeration in the clue for 17-Across, rendering “cut IT out.” Also, you’d be correct in assuming that the names of the family members were not random—they are subtle tributes to past generations of IT innovators: Charles Babbage and Ada Lovelace of the 19th century, and Alan Turing and Claude Shannon of the 20th. Each of their stories is fascinating.

ACROSS

- 9 BASILICA—BA + SILICA—Simple Charade
 10 P(PROM)OTIONS—“PRO MOTIONS” pun—Double Definition/Pun
 11 A(LTE)RABLE—(w)ALTER + (c)ABLE—Comb. Construction/Deletion
 12 ALEJANDRO—ALE(x) + J + AND + R + O—Construction
 13 PADDLEBALL—PA + DD + LABEL(rev.) + L—Comb. Construction/Reversal
 14 H(USB)ANDS—H + US + BANDS—Simple Charade
 15 RE(GIF)T—(el)F inside TIGER rev.—Comb. Insertion/Reversal
 17 CUT IT OUT—Given by Down Entries
 21 SO(URL)Y—S(O)URLY—Insertion
 23 D(ISP)ENSE—“dips seen” anag.
 24 MEAT LOCKER—“mackerel to” anag.
 26 ETIQUETTE—“Quiet” Letter Bank
 27 FAC(SIM)ILE—FA + CSI + MILE—Simple Charade
 28 DIS(GUI)SING—“Dig is using” anag.
 29 FIELDSERS—Sufi elder statesmen—Hidden

DOWN

- 1 MARRIAGE—CARRIAGE -> MARRIAGE—Letter Replacement
 2 FIBBED—F(ancy) + I + B + BED—Construction
 3 FILE MENU—FRILLIER MAE IN FUR—Hidden in Odd Letters
 4 CALAMARI—CA + LA + MA + RI—Construction
 5 APPEAL TO—(d)APPE(r) + ALTO—Construction
 6 STRAW HAT—“what tars” anag.
 7 HOLDINGS—HOGS around (L + DIN)—Container
 8 AS YOU SAY—A + S + Y + O + U + S + A + Y—Hidden Last Letters
 15 REDHEADS—“he dreads” anag.



- 16 TANGIEST—TEST around ANGI—Container
 17 CHERUBIC—ache: Rub ice—Hidden
 18 TIME TO GO—EMIT(rev.) + TOGO—Comb. Construction/Reversal
 19 TRADE-OFF—“draft foe” anag.
 20 UPLIFTED—U + P + L + I + F + T + E + D—Hidden in Initial Letters
 22 OVERLORD—“old rover” anag.
 25 CICADA—CIA around CAD—Container

Solvers: Steve Alpert, Dean Apps, Jack Brauner, Laura Cremerius, Jared Dashoff, Todd Dashoff, Christopher Dickens, Mick Diede, Deb Edwards, David Handelman, Jason Helbraun, Pete Hepokoski, Catharine Hornby and Bruce Harvey, Max Jackson, Ruth Johnson, Joe Kilroy, Paul Kolell, Ken Kudrak, George Levine, Tim Luker, Ben Lynch, David McGarry, MEP and the Connors, Jon Michelson, Molina Team (Michael Manos, Lillie Honeychuck and Erick Whitescarver), Jim Muza, Ram Raman, Bill Scott, Andrew Shewan, Sally Smith, Zig Swistunowicz, Tim Tebbe, T.O.C.E. (Josh DenHartog and Sam Donohoe), and James and Betsy Uzzell



Jigsaw-Puzzle Puzzles

EVERY WINTER, WHEN THE DEEP SNOW COMES, making going out uncomfortable and unsafe, we open a jigsaw puzzle to distract us from that beautiful white carpet outside. Our daughter drives over in her four-wheel-drive with the express purpose of putting together the border. This winter I was afraid the deep snow would never come. When finally enough snow arrived in February, it stayed around so long that we could have done two or three puzzles.

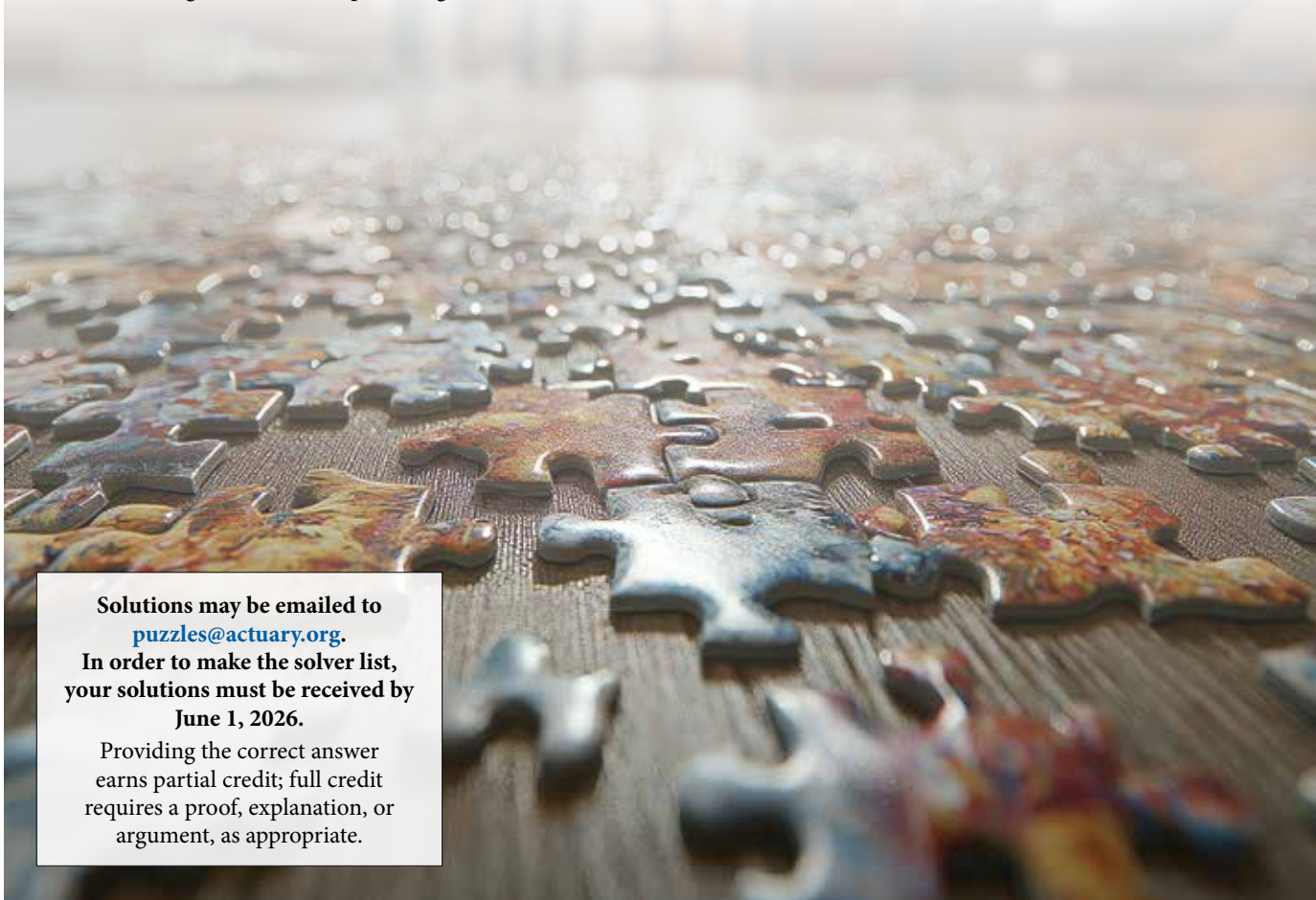
Meanwhile, I have come up with three entertaining jigsaw-puzzle puzzles for you. (Some may feel that the title of this column is entertaining enough.) In puzzles 1 and 2, we assume ordinary rectangular jigsaw puzzles, with rows and columns running cleanly from one edge to the opposite edge.

■ **Puzzle 1.** A jigsaw-puzzle manufacturer wants to make puzzles with at least 1,000 pieces. Among those puzzles she wants the total number of pieces to be as small as possible. She also wants the ratio of the number of columns to the number of rows to be as close as possible to the Golden Ratio. She agrees that minimizing the sum of the percentage deviations from her

two targets would be appropriate. Determine the number of rows and columns she should have in her puzzles.

■ **Puzzle 2.** A jigsaw puzzle has n edge pieces, where n is an even integer. How many pieces can the puzzle have altogether? For example, if $n=14$, then the puzzle could have 14, 18, or 20 pieces. (Your answers should be in terms of n .)

■ **Puzzle 3.** So far in this column, I have written “jigsaw” followed immediately by “puzzle” six times. Half the time I used a hyphen and half the time I didn’t. Provide the reason for hyphen use and non-use.



Solutions may be emailed to puzzles@actuary.org.
 In order to make the solver list, your solutions must be received by **June 1, 2026**.
 Providing the correct answer earns partial credit; full credit requires a proof, explanation, or argument, as appropriate.

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Solutions to Last Issue’s Puzzles—Hole-In-One JOSH FELDMAN

1. What is the probability that Hoss does not make a single hole-in-one in a round? For the easiest six holes, Hoss’ probability of not making a hole-in one is $(1 - 1/3) = 0.666$. For the toughest six holes the probability is $(1 - 1/20) = 0.95$. For the remaining six holes it is $(1 - 1/6) = 0.8333$. As there are six holes of each type, the overall probability is $(0.666)^6 * (0.95)^6 * (0.8333)^6 = 0.0216$.
2. What is the probability that Hoss gets seven or more holes-in-one during his first round? There are two ways to approach this problem. The first is to figure out the probability of making exactly six easy difficulty holes-in-one, one medium difficulty hole-in-one, and no hard difficulty hole-in-one. This is just $(0.333)^6 * 6 * (0.1666) * (0.8333)^5 * (0.95)^6 = 0.000405$. Continue doing this for every combination, sum the results, and you will get a probability of 0.0264. Or, one can program in Excel the probability of getting a hole in one on each of the 18 holes, and run a quick simulation to figure out the number of holes in one for a round. Once you run the simulation once, running it multiple times is as easy as copying rows. To get the number of days in the challenge,

just take the reciprocal of 0.0264 which equals approximately 37.8 days.

3. What is the probability that Hoss gets eight or more holes-in-one on the first time he breaks the challenge? We could use Excel for this part as well, or we could build up our results. If we know the probability of getting exactly 0, 1, 2, ... 7 holes-in-one during a round, we know the remaining

probability leads to 8 or more holes-in-one. Doing the math (or simulation) leads to a 24.5% chance that this occurs.

Solvers: Anthony Salis, Al Spooner, David Promislow, Bob Conger, Bill Feldman, Jason Shaw, Cindy Hu, Michael Schachet, Sam Ellis, Jerry Miccolis, Daniel Wade, Douglas Levy, Rui Guo, Anna Quady, and Clive Keatinge

AD INDEX

To add our company’s name to this list, call Jeff Rhodes, MCI USA at 410-316-9857, or email jeff.rhodes@wearemci-group.com.

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The Long View on an Aging World

LET'S FACE IT: WE'RE ALL GETTING OLDER. This process applies not only to you and me but also to societies. Actuaries, demographers, and economists have discussed population aging for decades, but it is now making a material difference in numerous ways.

It is already affecting countries such as Japan and Italy—in their economies, businesses, and public services. In extreme cases, nursery schools are being converted into geriatric care facilities, and small rural towns are disappearing. The ratio of benefits to contributions in national pay-as-you-go retirement programs is rising, and health care costs will increase faster than inflation, with the pace depending on each country's stage in its demographic transition from high mortality/high fertility to low mortality/low fertility.

Declining fertility and rising life expectancy are driving dramatic population aging worldwide, with population decline already underway in some areas. The net effects of these forces pose fundamental challenges to the sustainability and adequacy of retirement, health care, and other social programs.

Although period fertility is at an all-time low in many countries (in the United States, now somewhat below 1.6 children per woman), some have argued that the tempo effect (women having children at older ages) means that true fertility isn't as low as period fertility statistics suggest. However, the fertility rate among women in their 30s and early 40s has also decreased somewhat over the last decade; the rise in the average age of mothers at birth is being driven by significantly fewer births among teenagers and women in their twenties. Total fertility rates are just as likely to continue declining as to increase—no country has yet managed to sustain an increased level of fertility, even

though more are spending a lot of money trying. And the growing sex imbalance in higher education may exacerbate the fertility situation and raise additional sociological issues.

The solution to this conundrum of population aging and decline in some countries could be to increase immigration. However, the emotional response can be considerable, and the return on investment from immigrants can take a generation to materialize. How much return did my immigrant grandfathers, a shoemaker and a house painter, earn? I'm confident that immigrants can add significant value. But, given the current political environment, this source should not be relied upon.

Not only is the labor supply in certain economic sectors beginning to decline due to a shortage of immigrant labor, but the overall economy and the financial support for Social Security and Medicare may also suffer. Perhaps the solution lies in artificial intelligence to address our productivity shortfall and, as with prior technological waves, to facilitate more effective use of both personal and societal resources.

Mortality is another key demographic factor driving population aging. I trust it will continue to improve—many actuaries are banking on it. Smarter behavior and technology may accelerate healthy aging more than overall aging, improving our ability to cope. Nonetheless, our focus will shift to a greater emphasis on care for older adults.



If the theory that innovation and societal dynamism diminish as a population ages is correct, it points to another problem. How much of the Japanese economic malaise of the last several decades has been the result of its advanced population aging?

Although I have focused on the number of people, the stock of human capital may be more important for macroeconomic growth. Effective investments in education, foundational research, and workforce development will enable innovation and economic growth.

Most segments of our economy are geared toward a young, growing, vibrant population. I don't know all the ramifications of a declining and aging one.

Yet what should be done? Or maybe aging isn't all that bad—just something to take advantage of, or maybe there are too many people on the planet anyway. When I put on my environment hat, I'm OK with a somewhat smaller population.

It isn't the extreme situation I am concerned about, as I am mildly optimistic about our ability to adapt and overcome many age-related problems. However, changes in societal attitudes will also be needed, whether at the global, national, or community level. In some areas, these problems will likely take the form of the frog in a boiling pot—aging is a slow process, but its effects will be monumental when the boiling pot (reality) hits home. ▲▲

SAM GUTTERMAN is chairperson of the Social Security Committee and member of the Retirement Practice Council.

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