



SOCIETY OF ACTUARIES

Article from:

Forecasting & Futurism

December 2014 – Issue 10

Parables And Prophecies Prevent Proper Predictive Prowess (human biases in forecasting)

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You work in the actuarial department of a smaller health insurance company, and recent claim experience is through the roof. The success of the firm hinges upon determining a reasonable forecast of where your members will seek services over the next 24 months, so that your negotiating team can properly weigh the costs and benefits of contracting with different provider groups. Fortunately, you've seen this very problem at your last company, and you know exactly where to look to solve it. Sure enough, the historical data show precisely what you expected. Following your recommendations, your company develops its utilization forecast, the contracting teams are fully armed, and everyone sets sail toward the brighter future ahead. All is well.

Two years from now, the company is suffering from even poorer claim experience. Fortunately, you've moved on to other opportunities, but your erstwhile colleagues are left to wonder: what went wrong?

There are many great things about being human, and advantages to not being built on an assembly line. However, our human experiences and preconceptions could be influencing our work as actuaries.

HOW DO OUR BIASES INFLUENCE OUR PREDICTIONS?

Randomness bothers us. Randomness suggests that there are things in the world that we cannot adequately explain. Randomness must be eliminated! As actuaries, we have a desire to explain. We have a desire to find patterns in the randomness (whether a true pattern exists or not). We also like a good story, preferably one with good guys and bad guys, one with a beginning, middle, and end, and one with a moral imperative. When one has a good "story," it is easier to find data that support those preconceived notions. It's also easier to filter out anything that doesn't support the story, even inadvertently.

Narrative bias occurs when we look for the convenient explanation—when we look for the good story. It's even better if we have our story prepared before starting our analyses, because having the story ready to go makes the analyses that much easier.



At the time of this writing, the risk mitigation components of the Patient Protection and Affordable Care Act (ACA) are of particular interest to commercial health insurers, and these provisions (risk adjustment, transitional reinsurance, and risk corridors) will ultimately have a significant impact on the bottom line for many carriers. The most difficult of these provisions to estimate is the risk adjustment program, because one needs to know both the calculated risk of the carrier of interest and the calculated risk of the overall marketplace.

Ultimately, the risk adjustment program is revenue-neutral across each marketplace, where issuers with healthier-than-average populations pay into the program to compensate those carriers with sicker-than-average populations. Here's the curious thing—nearly every carrier I've come across believes that its population is sicker than average, and are

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expecting to be recipients of risk adjuster transfer payments. Once you have the premise in your head, it's easy to find examples to support the story; Milliman's Health Cost Guidelines™ estimate that 19 percent¹ of a typical commercial population is sicker than the average member, so it's always easy to find anecdotes about “the hemophiliac” or “the transplant recipient” (and if you're not specifically looking for them, your chief medical officer will be happy to help)—there is plenty of support for the story. As for the portion of the population that incurs very few claims in the year (or none at all), they don't make any noise, so there's no narrative there.

Actuaries also like to be right, because being right feels good. This is a trait common to humans (of course), but applies to our profession in particular. We spend a good portion of our formative years passing a series of “right or wrong” credentialing tests. Actuaries are trained to believe that knowing the answer in advance is a very good thing.

Confirmation bias occurs when we seek out (overtly or otherwise) data and information that supports what we already believe to be true; it can also occur when we interpret neutral data in favor of our preconceived notions, or assign more weight to the data that support our opinions. As data become more and more plentiful, it becomes easier and easier to find the data that support what we already believe to be true.

Given that predicting the future involves a great degree of uncertainty, we typically rely upon our own experiences and history when setting our assumptions. Regardless of what data and evidence we have to support a given trend rate, we're always going to remember the last time that we were burned by an inaccurate trend forecast, and this will guide our opinion for years, possibly inappropriately. Typically, the more that is at stake (and the more that we have to lose), the more susceptible we are to confirmation bias.

WHAT CAN WE DO TO MITIGATE THESE BIASES?

The first step in remedying these human deficiencies is edu-

cation and awareness. Now that you're aware of these biases, awareness should lead to education. One of my favorite recent books is *Thinking, Fast and Slow*, written by economist Daniel Kahneman, a Nobel Prize winner. The book explores a lot of what makes us irrational as humans, including the various heuristics and biases that we use every day (even when we're aware of these issues in advance). It's an easy read, and the exercises are certainly eye-opening (it's particularly humbling when Kahneman tells you in advance that you'll react irrationally, and then you follow suit exactly as predicted). In addition to understanding your own failings better, you'll better understand why irrational humans act in ways different than your rational models expect them to act.

When forecasting, it is important to take the extra time to actively seek out data and examples that dispute your hypothesis. As I said above, there's a lot of information out there these days, and it's not all going to support what you believe. Challenge your assumptions. Test the sensitivity of your forecast to each assumption. Seek out different approaches to modeling your problem. If diverse methods lead to the same outcome, it could be a nice sanity check on your results.

When we talk with stakeholders, we typically spend much of the time formulating a response. We want to impress those that we work with—to prove our value immediately by providing a solution. Always remember that “our solution” is based upon our past experiences and biases, and not necessarily on the current situation. Remember to listen to the stakeholders. *Really* listen to the stakeholders. You'll be surprised what you will hear if you listen, and you will end up with a more informed solution (and a more accurate forecast).

It's also important to quantify and communicate the uncertainty involved in our forecasts, with confidence intervals, significant digits, or other methods. Forecasting necessarily involves uncertainty, and to think otherwise (consciously or otherwise) is a recipe for disaster. Reminding yourself of uncertainty will also keep you cognizant of what could

cause your projection to fail (and potentially identify biases underlying your work). Often, our audience demands certainty (or implied precision, which they may view as the same thing). Make sure that uncertainty is a part of your message; our job is to manage risk and to provide education on the impact of uncertainty (upside and downside).

Ultimately, no matter what cautions we take, we are only human. Peer review is a fundamental concept of actuarial work, and this needs to be more than just a compliance check box. Find someone who will really test or challenge your assumptions. If you can't find that person within your organization, seek an external audit. There have been a lot of unknowns in the ACA implementation, and some of the most interesting work I've done has come when insurers have called upon us to challenge their pricing assumptions. Beware of "groupthink" in these solutions, or cases where the dominant personalities control the outcome. One option may be a Delphi study, which our section has explored as a hedge against these deficiencies (a nice introduction to Delphi studies may be found in the Society of Actuaries' "Land this Plane: A Delphi Research Study of Long-Term Care Financing Solutions"²).

In the end, this is a human problem that will be with us long after we're retired. Instead of lamenting our collective deficiencies, take the opportunity to build and grow your skill set. There's nowhere to go but up! ▼

ENDNOTES

- ¹ 2014 Milliman Health Cost Guidelines, Commercial Claim Probability Distributions, Table 1A (All Coverages).
- ² Society of Actuaries (2014). Land This Plane: A Delphi Research Study of Long-Term Care Financing Solutions. Retrieved September 11, 2014, via <https://www.soa.org/Research/Research-Projects/Ltc/research-2014-ltp-ltc.aspx>.



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