The Role of Suicides in Trauma Claims

During the Great Depression of the 1930s, one heard anecdotally that suicide rates increased during the peak of the financial crisis. Now that the latest economic meltdown appears to have bottomed out, it seems appropriate to take a look at reinsurance trauma claims over the past few years to see if a similar trend is occurring today.

Transamerica Reinsurance maintains an historical database of paid claims, which keeps track of such things as policy issue date, age of death, reinsurance liability amount, original policy face amount and (most importantly for this analysis) cause of death. For incurred dates during calendar years 2007-2010, the database contains approximately 61,400 claims with a specific reported cause of death (other than miscellaneous, unspecified or unknown). The total reinsurance accepted liability on these deaths having a known cause comes to $3.8 billion.

Trauma Claims During Contestability Period

Figure 1 compares the distribution of reinsurance claim amounts arising from suicide, motor vehicle accident, other trauma and medical causes over the past four years. While the percentage of claims from medical causes (light blue bars) has remained stable, there has been a dramatic increase in the percentage from suicides.

This increase in the suicide claim payment percentage is due almost entirely to an increase in the average reinsurance claim amount. A review of the count of claims reveals that the suicide percentage has remained around four percent over the past few years with only a slight upward tick in 2010. However, the average reinsurance claim amount has increased from about $80,000 in 2007 to just over $139,000 in 2010. Figure 2 indicates a bias toward larger claim size for all trauma claims in recent calendar years compared to medical causes.

It is a little surprising that suicides are a significant portion of Transamerica Reinsurance’s trauma claim payments, given the two year contestable/suicide periods contained in most of our client policy forms. A deeper analysis of early duration claims (Figure 3) reveals some
The Role of Suicides in Trauma Claims (cont.)

interesting patterns. The astute observer should wonder why there are suicide claims in policy years one and two. Reasons for this include (1) a couple of states require a one year suicide period, (2) some client companies paid benefits on suicide claims where the cause of death was questionable, and (3) a small number of policy conversions/exchanges/re-entries have erroneous policy issue dates.

Comparing the three non-medical trends, the next question is: why the sharp drop in motor vehicle and other trauma claims in the same year suicide claims increase due to the end of the typical contestable period? The total percentage from these three causes combined stays level over the first five policy years. Could motor vehicle accident and other trauma claims filed during the contestable period actually be misidentified suicide claims? A detailed look at trauma claims provides some additional support for this case.

**Misreporting Effect May Be Worse at Higher Face Amounts**

Figure 4 provides a more detailed breakdown of trauma claims during the first three policy years. Motor vehicle, other injury, homicide and aviation accident claims all show decreased percentages in policy year three. Drowning, drug overdose-accidental and all other trauma claims show a decrease in policy year two. Also notice the overall percentage in year one is much larger than years two and three. Taken together, these patterns could imply that some of the trauma claims are misidentified suicides. On the surface, this might indicate that the insurance industry’s suicide clause is not providing adequate protection against individuals with a strong financial motivation to end their lives.

An examination of early policy year reinsurance claims, segmented by the size of the original underlying policy, provides further evidence. Figure 5 indicates a clear trend of increasing suicide percentages by face amount for claims occurring in the first five policy years. Notice, however, that the same trend appears for other trauma causes for policies of $500,000 and over. In the $1,000,000 and over segment, a large portion of the other trauma group consists of drug overdose, drowning and aviation accident claims. Could wealthier individuals have more choices available to disguise their suicides?

Figure 5 also shows the impact of the more thorough underwriting that takes place on larger policies. The percentage of early policy year claims due to medical causes declines from 75-80 percent for policies under $500,000 to under 70 percent for policies $500,000 and over.

A review of all trauma claims by age at death (Figure 6) reveals no unusual patterns. As age at death increases, medical causes overwhelm all other causes, and any anti-selective behavior related to suicides would have little financial impact on the business.

**Summary**

This brief review of recent trauma claims has uncovered a couple of potentially troubling issues. First, while the number of suicide claims remained stable during the economic crisis, the
In 2003, I wrote that reinsurers were conducting more client audits due to a “new reality” aimed at improving transparency and oversight. Although this shift had its growing pains, it appears that improved communications and diligence on the part of both reinsurers and direct writers have paid off; in many instances the audit results for our clients have improved significantly. Today, underwriting audits are still about verifying appropriate risk assessments. That’s never going to change, because overly aggressive underwriting will show up at claim time. However, there should be more to an audit than that. And while it’s great to verify that the business on the books is solid, direct writers want to get more good business on their books.

Can underwriting audits help increase placement rates?

As a matter of fact, they can!

**Strategies to Maximize the Value of Audits**

**Electronic Auditing.** These days most underwriting systems are very sophisticated; they can do much of the grunt work. If you have a system that receives electronic applications, lab values and exam information (blood pressure, height and weight, etc.), see if it can be programmed to sort cases into the correct standard or preferred classes and use it to generate a list of cases that were issued outside of those parameters. This is a quick way to find “exception” cases and free up auditors to review cases that don’t pass the first round of testing. Depending on what information is captured, these systems also can track patterns by underwriters and even by agents. The types of exceptions also can be tracked to see if adjustments should be made to the criteria. Transamerica Reinsurance has strategic

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By Andrea Moody, FLMI, FALU, AIRC, ACS
Manager, Underwriting Standards

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Back to the Future: Low Interest Rates

A period of prolonged low interest rates has beset life insurers for several years now, forcing writers of long term guarantees to face some tough decisions on their management of assets and liabilities, products and pricing. While rates will probably climb again at some point, no one can say when or how quickly this will occur. Companies have to prepare for both upward and downward shifts in interest rates. However, at the moment most companies are more worried about sustained low interest rates.

Low rate concerns are hardly unprecedented; for example, life insurers were particularly concerned about a steep drop in yields in the early 1990s, as the savings and loan crisis unfolded in the wake of sharply declining residential and commercial real estate values. Capital grew scarce, and hedging grew expensive. Then as now, insurers assessed risks, widened the range of their extreme event scenarios, made adjustments to products and waited out the storm until favorable conditions and strong sales returned.

The Situation Now

For the past three years, life insurers have operated in an environment with very low interest rates and bond yields, thinner margins and greater volatility than was the case two decades ago. While a slow recovery in rates is the most likely scenario according to Moody’s, carriers continue to be concerned about sustained low rates. This situation has already affected life insurers in a number of ways:

- **New premiums invested in low yielding assets.** As older bonds mature and insurers go looking for new paper, low rates would pose significant reinvestment risk. According to the July 2010 Moody’s Statistical Handbook: Life Insurance, median net investment yield for individual life companies was 5.64 percent. During the month of July 2010, yields on 30-year Treasury bonds ranged between 3.83 and 4.14 percent, a 150-181 basis point difference.
- **Portfolio returns.** Companies support their product guarantees with investment returns on their portfolios of assets held. So long as companies are replacing maturing assets with low-yield “new money” their overall portfolio returns will decline. Stock companies that are heavy in whole life or UL policies with high guaranteed minimums are probably the most exposed to this particular challenge but everyone’s returns are affected.
- **Guaranteed level term products.** Low rates have put the brakes on term carrier price competition, which has had an impact on lapse rates. When yields were higher, companies could afford to lower premiums to stimulate replacement of coverage; ultimate level period lapse assumptions were in the six to seven percent range. Now, with yields as low as they are, term rates are fairly stable and level period ultimate lapse rate assumptions are closer to two or three percent.
- **Bond investment values.** There is some good news. With current yields down, bonds held as assets have risen in value, strengthening companies’ balance sheets.
- **The amount of statutory reserves that must be held by direct writers depends on the statutory discount rate.** In principle, falling interest rates should drive down the statutory discount rate, thereby increasing reserve expenses for insurers. In practice, the statutory discount rate has tended to fall only slightly in recent years.

By George Hrischenko, FSA, MAAA
Marketing Actuary Leader

Figure 1: Historical U.S. Treasury Yields, 1980-2010

<table>
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<tr>
<th>Year</th>
<th>3 Month T-bill</th>
<th>5 Year Note</th>
<th>10 Year Bond</th>
<th>30 Year Bond</th>
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<td>12.59</td>
<td>12.43</td>
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<tr>
<td>1985</td>
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<td>8.49</td>
<td>9.00</td>
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<td>7.68</td>
<td>8.08</td>
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<td>5.11</td>
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<td>0.12</td>
<td>2.02</td>
<td>3.31</td>
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</table>

As low as rates are today, there is room for rates to fall further. In late 2008, 30-year bond yields were in the sub three percent range. In fall 2010, 10-year bonds were under three percent.
discount rate has been pegged at four percent since 2006, despite significant declines in market yields, so it unlikely that statutory discount rates will increase quickly if and when interest rates pick up.

**What Companies Can Do**

Some options available to companies include:

- **Re-price products.** Carriers can always raise premiums on new business to cover changes in expected mortality, operating expenses and interest rates. However, no one wants to be the first to move into the spotlight and raise premiums to cover not only lower rates but higher uncertainty around future trends.

- **Adjust guarantees and minimum credited rates.** While companies have to honor guarantees like minimum crediting rates on inforce and level-term premiums, they can adjust dividends and credited rates on UL designs and pass on some of the impact of reduced investment returns to the consumer.

- **Redesign products.** To make more efficient use of capital, many insurers are modifying products to reduce the duration of liabilities, the costs of guarantees and exposure to tail risk scenarios. Term-in-a-UL-chassis is one such development.

- **Suspend sales/discontinue products.** When modifications to pricing and product features aren’t enough, the choices are limited to either running with the same risk/return profile or exiting the market. Some carriers are suspending sales in product lines – sometimes permanently. Examples include long-term care insurance and retirement-income products with minimum-income levels. Certain carriers are even dropping new term and UL sales.

- **Seek better asset risk/return mix.** But where? All markets are volatile, and regulatory guidelines and credit rating agency pressure compel companies to invest mostly in high-quality fixed-income assets. Most corporate paper is too short in duration to be useful to carriers, and hedging in general is much more expensive than it was before the crash. Some insurers might be able to acquire higher yield commercial paper at acceptable risk levels but for most companies’ investment guidelines, it’s Treasury bonds or nothing.

- **Lower ROI targets.** In 2011, Towers Watson conducted its *Pricing Methodology Survey* of 82 individual life companies, 17 of them mutual or fraternal organizations. According to survey results: In 2009, the median ROI target for stock life carriers was 12 percent; the median actual return was 9.6 percent. In contrast, the median ROI target for mutual life carriers was 9.0 percent; the median actual return was 8.9 percent. Stock companies may have to accept ROI targets closer to those of their mutual counterparts.

**Reinsurance Can Help**

No one knows how long low yields will continue, but even if rates start to pick up soon, the positive benefits won’t show up for a while. Portfolio returns would only recover slowly. Statutory discount rates would rise slowly as well. Regardless of what happens – rates stay flat, go up or go down – the impact of low interest rates will be with us for a while.

A reinsurance partner can help carriers mitigate the impact of reduced expected profitability caused by low rates on their new and inforce business. One way we can help is to analyze your post-level-term pricing to mitigate lapse and possibly improve your inforce block performance. As an expert in both mortality and financial risk, Transamerica Reinsurance is well positioned to help you make the most of the situation.
Editor’s Note: Interest in predictive modeling is growing as capabilities based on this technique begin to be marketed to life insurers. New tools like mortality scoring systems are said to add efficiencies to preferred underwriting processes. However, as our authors illustrate in their point/counterpoint discussion, the industry as a whole needs to be involved in order to successfully move this technology forward.

The Potential – David Wesley

Multivariable predictive models are used extensively in medical research and epidemiology. They have become important tools for companies in credit card, banking and P&C/health insurance industries to identify preferred customers and improve risk selection. It is thus not surprising that the major life insurance laboratories would use their massive databases to model the chief concern of their clients, mortality.

In the late 1980s insurance labs upgraded their IT infrastructures and insisted on using Social Security numbers for identity matching. The labs are now well positioned to use the Social Security Administration’s Death Master File as a source of mortality follow-up for all the life insurance applicants in their databases, whether insured, lapsed, or never issued.

The insurance labs appear to be using the two flavors of statistical modeling that lend themselves to analyzing the relationship between laboratory/examination data and mortality outcomes. These are logistic regression and Cox proportional hazard modeling. At least one lab then translates model results by hand into a mortality scoring system.

A multivariable approach allows the modeler to identify associations not seen when considering underwriting factors such as total cholesterol or systolic blood pressure in isolation. It can also identify non-linear or paradoxical relationships such as low cholesterol values and high mortality risk. These capabilities are at the core of the promise implicit in the mortality scores offered by the insurance labs.

By contrast, the knock-out criteria used by most underwriters to select preferred risks (or even sub-standard risks) generally consider factors in isolation or as simple ratios. Also, knock-out thresholds assume a linear relationship to mortality (e.g., a higher value is always a worse risk). The labs’ mortality scores promise to better estimate risk (predict mortality) by taking into consideration the interactions between lab test values/exam findings and their non-linear relation to mortality.

Underwriting Concerns – Steve Zimmerman

Underwriters see the potential of multivariate predictive models. However, we must be vigilant to assure that the techniques are not only accurate and reproducible but also acceptable to our clients and their attending physicians.

In all states, insurers are charged with providing explanations for adverse underwriting decisions to the proposed insured on request. It might be debatable whether a policy issued at a preferred rate but not at the best preferred rate constitutes an adverse decision; most consumers would consider it as such. The insurer must be ready to explain characteristics about that individual that caused the decision.

Today underwriters use easily recognized and clinically acceptable parameters to make mortality risk decisions. The explanations are straightforward and understandable. Many may not be happy using a knock-out system whereby missing any criteria causes an individual to be moved to the next class, but at least the criteria are generally based upon published clinical data. With the approach that the insurance laboratories are marketing, lab results would be
entered into an algorithm and, based upon age and gender, a risk score would be generated. An underwriter would then use this score, alone or with other criteria, to determine the class for which the individual would qualify. How does a company provide an acceptable explanation based upon generally accepted clinical parameters when it cannot elaborate on the components of the score?

This issue of transparency concerns applicants, physicians and agents; it also concerns insurance regulators and legislators. Underwriting decisions must be based upon “sound actuarial principles or reasonably anticipated claims experience,” and it is not clear that the mortality scoring approach would meet either of these criteria.

Another concern is assumption of risk. When underwriters and actuaries develop underwriting criteria, they balance risk assumptions and marketing pressures. With the proposed mortality scoring system, the laboratory – whose business is selling lab tests – provides insurers with risk scores that are based on a dataset of applicants, not insured lives. This is a key concern: Who is to say that such models will produce the mortality they predict? Remember, the insurer and reinsurer – not the laboratory – are taking the risk.

Response – David Wesley

My colleague presents valid concerns about the use of predictive modeling in life underwriting, but none are beyond mitigation if the industry works together on this.

One key step is to provide clarity around the modeling process to the risk-takers: the pricing actuary responsible for profitability, the underwriter explaining adverse decisions to the field, the medical director interacting with clinicians, the corporate counsel defending company policies before regulators/judges, and the reinsurer assuming mortality risk.

Another key step in the process is checking predictions against actual outcomes. It is not surprising that a model performs well when used on its own modeling data. Validation requires predicting outcomes for a separate dataset. Currently this is a weakness in what the labs have presented since their modeling is based on results from insurance applicants, not insured lives. This new scoring approach must be validated with client data.

In scientific inquiry, publishing detailed methods, sharing data and replicating results are required before new ideas can be widely accepted. This must be the standard in the life insurance industry if predictive modeling is to be as effective as it has become elsewhere.

Promoting an open debate and validation would result in industry acceptance of predictive models and cement the role of full-blood testing and paramedical examinations in life insurance underwriting for the long term. As a reinsurer, we are committed to the advancement of underwriting practices and procedures. We look forward to working with insurance labs and clients to help validate these models and determine how best to use the associated scoring systems.

Conclusion – Steve Zimmerman

While I look forward to the development of predictive models for life insurance mortality, I do so with guarded optimism. Transparency of approach and understanding of risk are essential. This requires a logical and disciplined assessment of data and results. The industry historically has pursued such an approach, using reinsurers and their resources to support these efforts. Unlike the laboratories, we share the risk with the direct insurers, so we stand ready to help our clients make an objective and informed decision as to the validity of the results.

If you would like more information, you may contact Dr. Wesley at David.Wesley.md@Transamerica.com or 704.344.4218 or Dr. Zimmerman at Steve.Zimmerman@Transamerica.com or 704 344.4275.

More on Predictive Models

Zhiwei Zhu, Vice President, Risk Modeling & Analytics, provides an in-depth look at predictive modeling for life insurance. To read his article, visit our website at www.TransamericaReinsurance.com.
Underwriting Audits Can Increase Placement Rates (cont.)

partnerships with vendors that specialize in such underwriting systems.

**Auditing Rated and Declined Cases.** It’s no secret that preferred criteria have converged in recent years. While subtle differences in blood pressure and cholesterol parameters may exist, companies are within a few points of each other for most criteria. Price points are very competitive as well. While standard and better business represents the largest share of a company’s portfolio, there is value in rated business if it’s assessed appropriately. If you free up time with electronic processing, you gain time to review larger samples of rated and declined cases. Be sure to track cases that may have been rated aggressively as well as cases that could have been rated better by your guidelines. Placed business is critical but don’t forget about not-taken business and even declines. A review of these cases can quickly identify teaching opportunities for your staff.

**Build a Dedicated Audit Team.** In smaller companies the chief underwriter typically performs underwriting audits. In larger organizations it may be the underwriting supervisors. Whether it’s one underwriter or an army, if you don’t have dedicated resources you could be missing an opportunity to improve the consistency of your results. You may want to consider outside resources. There are a growing number of independent contractors with years of experience underwriting complex cases. Hiring contractors to work as a dedicated audit team could provide an “arm’s length” relationship for auditing. And with today’s technology, you don’t even need to incur travel and lodging expenses – just set them up at home or in their office with remote access. Use their expertise to design reports that track patterns of behavior, APS ordering, common medical impairments – the possibilities are many.

**Summary**

Ultimately, the best audit programs are ones designed to analyze appropriate underwriting behavior not just aggressive behavior. Using electronic tools for “bulk” reviews, keeping an eye on rated and declined cases, and maximizing the real value of audit results will lead to more appropriate assessments. Improved accuracy elevates agent confidence in underwriting, increases success with harder-to-place cases, improves overall agent satisfaction and ultimately generates more sales. Who knew audits could be so powerful?

If you would like more information, you may contact the author at Andrea.Moody@Transamerica.com or 704.330.5551.