On August 9, 2011, SCOR SE, a global reinsurer with offices in more than 31 countries, acquired substantially all of the life reinsurance business, operations and staff of Transamerica Reinsurance, the life reinsurance division of the AEGON companies. The business of Transamerica Reinsurance will now be conducted through the SCOR Global Life companies, and Transamerica Reinsurance is no longer affiliated with the AEGON companies.

While articles, treaties and some historic materials may continue to bear the name Transamerica, AEGON is no longer producing new reinsurance business.

**Archive Materials**

**Black Swans and Mortality Risk**

Reprinted from the October 2009 Messenger newsletter

In The Black Swan: The Impact of the Highly Improbable, Nassim Taleb explains the realm of the black swan. The former Wall Street “quant” turned philosopher describes two worlds: “Mediocristan,” where events far from the ordinary rarely happen, and “Extremistan,” where unexpected and unpredictable events – black swans – can occur.

The goal of an actuarial modeler is to assign levels of confidence around outcomes, and knowing whether the model is in Extremistan or Mediocristan is important. Consequently, since mortality risk is a major component of many insurance products (especially term insurance), actuaries need to understand its potential volatility well.

Taleb, who will be a keynote speaker at the SOA Annual Meeting later this month, places mortality risk in the realm of Mediocristan. Conversely, he places financial markets risks in Extremistan. In light of the all too familiar events that have taken place (such as the Dotcom bubble in 2000-2001 and our current financial crisis) no one is disagreeing.

The difference between modeling mortality versus modeling financial indices, equities or real estate is vast because of the variables involved. Just consider buyer behavior: the value of market-driven securities is determined by whims of buyers and sellers, whereas mortality is not a policyholder “decision.”

While obvious to life actuaries, key influencers outside the immediate industry may not fully appreciate the differences. Given the current debate about the role and performance of models within the financial markets crisis, it may be advisable to develop a stronger message about the validity and reliability of mortality modeling.

**Mortality Trends**

Mortality rates by nature are tractable and stable. Changes in life expectancy are almost quantum in nature – of the smallest measure. These granular improvements in life expectancy typically are attributed to a combination of underlying factors – advances in health care, auto safety and better living habits, for example.

We expect mortality improvement to continue. But the potential for sizeable unexpected shifts in mortality improve-
ment are limited as the shoulder on the survival curve continues to square and as some causes of death decrease only to be replaced by others in the wings. Because of this, it is reasonable to assume that any significant swings in mortality would be increases as opposed to decreases. This has been the case historically, where significant mortality jumps have formed upward spikes as opposed to downward steps (see figure below).

The spike in mortality during 1918 and 1919 resulted from the Spanish Flu – the most significant mortality event of the century. During this peak, mortality had risen only to the vicinity of what was normal experience just 20 years before – in the realm of Mediocristan.

**Modeling and Monitoring**

Whether mortality trends continue or spikes are in our future, the financial impact to our company ultimately is determined by how we structure, model and monitor our mortality risk.

The modeling of term life insurance depends mostly on initial mortality assessment and mortality projections. While mortality may be initially assessed higher or lower than actual, this mortality error may be identified and adjusted as claims experience develops on the block. And, typically, as experience continues to develop, the adjusted mortality “error” will be identified and reduced.

While initial pricing may be locked in, the modeler continues to gain clarity on the block’s mortality performance over time. For large blocks of business, this is not an environment laden with black swans.

However, unexpected mortality risks still exist – for example, terrorist attacks, epidemics and natural disasters. These risks may materialize regionally.

The impact of the Spanish Flu differed significantly among states (see figure below). New Jersey’s mortality rate increased by 41 percent in 1918, while Michigan’s increased by only 13 percent. Therefore, insurers having regional risk concentrations could benefit by ceding risks and reducing the impact of a regionalized event. Simultaneously, the reinsurer can reduce its risk and diversify its own portfolio by accepting these risks.
Conclusion
Unlike the modeling of equities and other Extremistan forecasting, mortality models do not lend themselves well to black swan events. This does not rule out the possibility of significant mortality spikes (e.g., potential human-to-human transmission of the H5N1 avian flu), but the causes of mortality spikes are rare and less significant in magnitude compared to the environment that governs the financial markets.

As far as the current financial crisis, we have yet to see the entirety of its effects. But modeling exercises, regardless of their sophistication, should be assessed based on their level of overall reliability. And, considering that mortality models are less prone to black swans, mortality modeling will continue to provide valuable projections for risk assessment.