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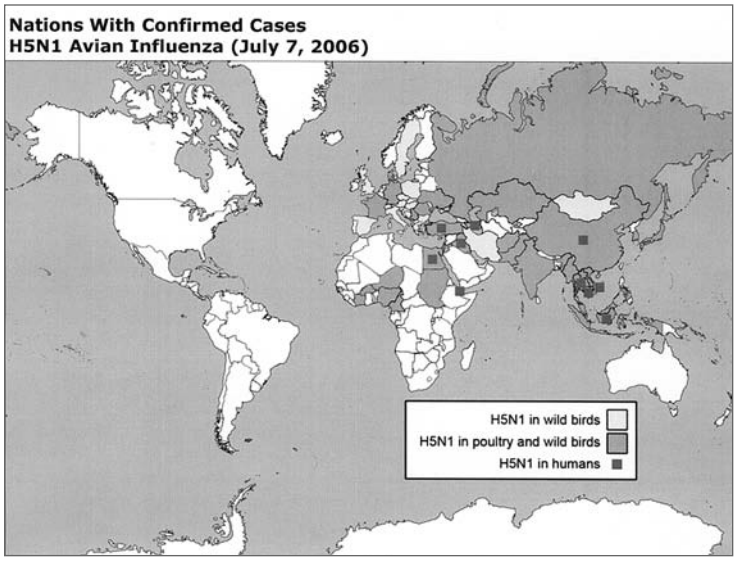
PANDEMIC INFLUENZA—WHAT CAN ACTUARIES DO?

by Sylvie Hand

For all those who attended the recent SOA Health 2006 Spring Meeting in Florida, not even the cheerful combination of blue water, white sand and sunny skies could detract from the sobering thoughts presented by Dr. Michael T. Osterholm in his keynote address on "Pandemics and Business Preparedness." Dr. Osterholm firmly believes that an outbreak of pandemic influenza is not a question of if, but rather, when. This speech was followed by a session entitled "Pandemics and Other Extreme Events: Is the Industry Ready?" where Jim Toole and Max Rudolph extrapolated the issues raised by Dr. Osterholm into an excellent overview of the potential impact from a pandemic on life and health insurance industries. I am sure that everyone who was present at the luncheon and the afternoon session came away with a heightened awareness of not only the potential business impact of a pandemic, but also the societal and personal impacts that such an event would have.

This raises an important issue for actuaries. Given all the "noise" surrounding the topic of avian influenza today, how can actuaries distill the mass of information—which is often conflicting—into the critical questions to raise and explore within their own organizations? The actions taken by actuaries today to address this threat are important for two reasons.

First, by helping to raise awareness and develop preparedness, actuaries will embody the SOA brand vision statement: "Actuaries will be recognized as the leading professionals in risk management." Actuaries (and those engaged in the business of risk management) are uniquely positioned to help companies and communities prepare for a pandemic.



These numbers are confirmed by the World Health Organization and may not reflect news or country reports. This map is reprinted with courtesy of the Pandemic Flu Web site which can be found at *www.pandemicflu.gov.*

Secondly, while the opportunity exists to reinforce brand awareness through the development of pandemic preparedness, it is important to keep in mind that any resulting brand benefits are merely a side-benefit, not the main event—raising awareness and helping people plan for the outbreak is simply the right thing to do, for our colleagues, our stakeholders, our communities, and our families.

So, what can actuaries do? How should risk management professionals address the pandemic threat within the context of their own organizations? First, by asking questions and creating dialogue. Every part of the organization needs to be aware of, and involved with, this preparation. How many companies today have formal preparedness plans? According to a recent survey,[1] 18 percent of respondents said they were confident their company was prepared to manage a pandemic flu. That is a low statistic given that such groups as the World Health Organization, the Centers for Disease Control and

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[1] Deloitte Center for Health Solutions and the ERISA Industry Committee, January 2006 survey.

the Center for Infectious Disease Research and Policy at the University of Minnesota all share Dr. Osterholm's view that a pandemic flu is almost a certainty. Even for that 18 percent, how many employees within those companies actually know what the plan contains? If your company has such a plan, do you know what it entails? Do you know what your department would do in such an event? It is not enough to develop a plan; it is vital that the plan be communicated, debated, tested and continually revised—a living document that is part of an organization's DNA.

THIS IS WHERE ACTUARIES WILL BE SO VALUABLE IN THE PLANNING PROCESS WITHIN THEIR ORGANIZATION—TAKING HIGH-LEVEL ASSUMPTIONS AND DEVELOPING THESE CASCADING QUESTIONS INTO DECISION TREES IS A SKILL AT WHICH ACTUARIES EXCEL.

For life and health insurers, we know that a pandemic will have an impact in all areas of the business—mortality, morbidity, possible asset impairment, operations, liquidity and business continuity. From a risk management perspective, questions for each can be generated. For example, let's look at the potential operational impacts. What absentee rate should be assumed? What is the appropriate duration to which the rate will be applied? Will the rate rise and fall during that period, following the outbreak waves in each community? How should the rate be developed and applied? If the rate used is based on an estimate of people who will become "clinically ill," which is defined as unable to attend work or other activities for at least one and a half days, then the estimate may be understated if a number of people choose to absent themselves from work for reasons such as providing care to clinically ill dependents. And does (or should) the estimated rate include a "fear factor?" As both Dr. Osterholm and Max Rudolph emphasized, the fear factor should not be ignored. Fear will cause people to behave in irrational, or at least unpredictable, ways. Will people elect to quarantine themselves as a preventative mechanism, thus dramatically increasing the absenteeism rates?

From taking one seemingly straightforward assumption such as absenteeism, you can see the difficult questions that quickly arise. This is where actuaries will be so valuable in the planning process within their organizations—taking high-level assumptions and developing these cascading questions into decision trees is a skill at which actuaries excel.

Let's take another simple example—the issue of paper. We have been talking about the paperless office for years now, and while improvements definitely have been made, I have yet to actually see a paperless office. Can we function without paper? When planning for the business interruption caused by a pandemic (or any other extreme event for that matter), let's assume that all non-essential functions are delayed or temporarily halted. One of the critical functions for an insurance company is the timely payment of benefits—this is the heart of our business. Within your insurance company, how are benefits paid? Are they paid electronically, or are cheques cut and mailed? If it is the latter, how large is the stock of cheque forms that normally is maintained on-site? Who supplies the cheque forms? How much stock does that company maintain, and how long does it take for it to re-supply your company? What if its supply chain breaks down?

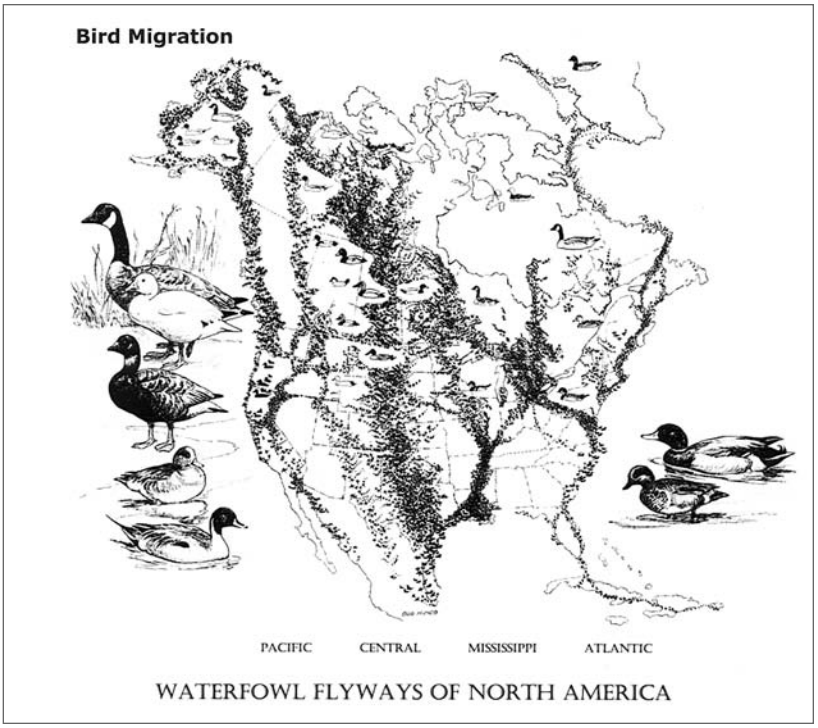
These questions can be applied to all critical areas of a company, and they demonstrate an important issue raised by Dr. Osterholm at the Spring Health Meeting—the just-in-time nature of global supply chains, and what may happen when they are interrupted. Again, this type of planning will benefit from the unique view provided by actuaries.

Estimating the potential mortality and morbidity impacts actually may actually be more straightforward than trying to plan for the varied operational impacts. For life insurers, it is not the total number of fatalities that generates questions, but the age group into which those deaths may fall, i.e., what will be the shape of the excess mortality curve?

For the 1918 influenza, the statistics show a W-shaped curve, with an unusual number of deaths in the 20-40 year-old age bracket. The W-shaped curve is naturally the real concern for life insurers, as a "normal" influenza excess mortality curve, which is typically V-shaped with higher numbers of deaths in the young and old age brackets, would have much less of a financial impact. While this is an important question, it is not one that any amount of planning can mitigate, apart from estimating the financial consequences of such an excess mortality curve.

This raises another issue for life insurers. The mortality risk posed by any new outbreak is not something that can be avoided, as it is embedded within existing policies. Reinsurance credit risk should therefore fall under greater scrutiny, and once again, there are questions to be asked. It is not only important to examine how the net retained amount at risk will be impacted under various excess mortality curves, but also to consider different credit risk scenarios. If payments from reinsurers are delayed or not made, how will it impact the life insurer's financial condition? What concentration of risk from an influenza pandemic do your reinsurers have, and what are their plans for managing this risk? What percentage of their capital is at risk? Given the dominant position of a relatively small number of reinsurers in the proportional mortality reinsurance sector, credit risk concentration is a valid concern.

Beyond proportional mortality reinsurance, catastrophe reinsurance should also be considered. While there are possible reinsurance solutions for a pandemic, both pricing and capacity remain uncertain. By contrast, traditional catastrophe reinsurance, designed to respond to occurrence-based perils such as earthquakes and terrorism, offers relatively stable price and capacity. In fact, these coverages make excellent sense when considering the stressed operating conditions that a pandemic outbreak will cause. What would happen to a life insurer's financial condition if such a catastrophe occurred during the course of a pandemic outbreak? The modeling firm Risk Management Solutions (RMS) estimates that a pandemic could last up to three years. Certainly, it may take several years for a life insurance company to recover fully from a pandemic. During that time, the company may need the additional protection from volatility caused by catastrophic events that such reinsurance provides. Finally, there is a positive aspect in that this type of reinsurance may be purchased from different companies than the companies supplying proportional mortality reinsurance, thus adding diversification in credit risk.



Flyway map demonstrates how migratory birds blanket North America. This map is reprinted with courtesy of the Pandemic Flu Web site which can be found at *www.pandemicflu.gov.*

Beyond generating questions, what analysis can actuaries provide? There are many publicly available estimates of the potential impact of a pandemic, both in terms of the number of fatalities and the number of hospitalizations that may be required. It is therefore possible to perform an approximate market share analysis on the number of death and medical claims an insured population might generate. In his presentation, Max Rudolph demonstrated a deterministic scenario approach based on the 1918 epidemic in the United States, assuming an infection rate of 25 percent (i.e., 25 percent of the population became ill, and of those, 2.5 percent died). Thus, 0.25 *

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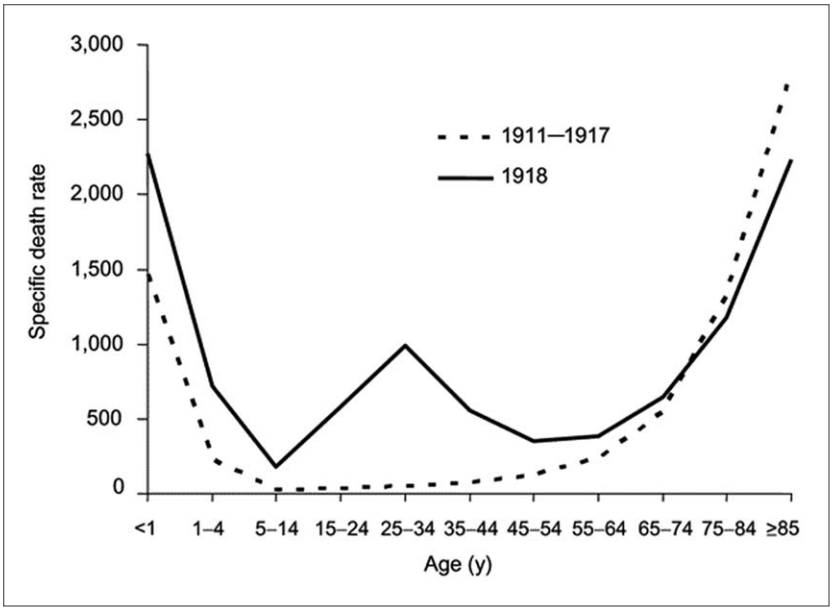
1918 Influenza: the Mother of All Pandemics



"U" and "W" shaped combined influenza and pneumonia mortality, by age at death, per 100,000 person in each age group, United States, 1911-1918. Influenza- and pneumonia-specific death rates are plotted for the interpandemic years 1911-1917 (dashed line) and for the pandemic year 1918 (solid line). Reprinted with permission from the CDC Web site (*www.cdc.gov/ncidod/EID/vol12no01/05-0979-G2.htm*).

0.025 = 0.6 percent excess mortality, on a population-wide basis. While the general population mortality may be worse than what is experienced within an insured population, this excess mortality rate can be applied to a life insurance portfolio to approximate the impact of the 1918 influenza on today's insured lives.

RMS recently developed a model to assess the impact of a pandemic influenza on a life insurance portfolio. Their model looks at 1,890 different possible pandemic scenarios and then simulated the outcomes by varying assumptions that will impact the outcome, such as infection rate, vaccination development and deployment and other intervention measures. The model is based on the current avian influenza virus H5N1 and estimates the likelihood that it may evolve into a form that is easily transmissible between humans. However, no model can assess or predict whether or not the next pandemic will exhibit the same excess mortality curve as in the 1918 outbreak.

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In conclusion, the keynote address provided by Dr. Osterholm and the panel session given by Jim Toole and Max Rudolph demonstrated clearly that planning for a pandemic will make all the difference in how our organizations, and our society, respond to such an event. While a great deal of information was presented, the audience was left with two overall impressions:

1. Actuaries have a key role.
Due to their unique skill set, actuaries will have an important role to play in helping companies plan and prepare for a pandemic influenza outbreak. This role extends beyond the pure actuarial function into that of business planning. By helping to develop and prioritize key questions, actuaries can help to define the issues that will impact their own organizations and, by extension, their own communities. By doing so, actuaries will fulfill the SOA's vision statement as the leading risk management professionals.

2. A pandemic won't happen in isolation.
While planning for a pandemic will help us all deal with the various impacts, there are many factors we cannot control or influence. It is important to review the financial consequences that may result, but financial flexibility will be needed more than a pre-determined set of financial responses. As such, risk transfer options—and the associated reinsurer credit risk—must be carefully examined. One cannot assume that a pandemic will occur in isolation, and we must therefore plan for the occurrence of catastrophic events happening within the same two-to-three-year period within which the financial impacts of a pandemic are being experienced. In this light, traditional catastrophe reinsurance, providing protection against specific occurrences such as natural disasters or terrorism, may make the difference between financial failure and survival. ✹