Life & Health Risk Monitor

January 2008

The Life & Health Risk Monitor is a periodic review of the latest developments affecting mortality and morbidity risk for the clients of Risk Management Solutions.

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EDITORIAL

FROM GEO-SCIENCE TO GERO-SCIENCE

Welcome to this first edition of the RMS Life & Heath Risk Monitor.

Risk Management Solutions serves a growing number of clients managing risk to life insurance portfolios, health insurance, and annuity business. After initial studies of life insurance risk following the terrorist attacks on the U.S. in 2001, our work has helped clients manage their risks of excess mortality and morbidity across a wide range of life and non-life insurance lines, such as life, health, personal accident, AD&D, hospital coverages, travel insurance, workers compensation, and other financial services potentially impacted by the risk of human casualties and developments in medical science. RMS client analyses have ranged from natural and man-made catastrophes, through to global pandemic risk analysis and, more recently, to emerging diseases and longevity risk.

The science underpinning the assessment of risk is rapidly changing. At least 30 previously unknown diseases have emerged in the last few decades, including HIV, SARS, Ebola, and hepatitis C and E. Pandemic influenza remains a potent threat, with new outbreaks of avian flu providing the potential for a humanly transmissible influenza pandemic of unprecedented virulence. And equally as important, our measures of dealing with these threats are also constantly being updated and improved: Public health programs are changing. Medical technology is rapidly advancing. New bio-technical research is providing breakthroughs at a breathtaking pace.

RMS is committed to tracking these developments as they occur and to interpret their implications for life and health risk. This *Life & Health Risk Monitor* is intended to communicate, explain and alert clients to new developments that affect the risks that they manage.

The past two decades have witnessed the rapid rise of catastrophe modeling as a key tool for insurance risk management in property insurance and related non-life lines. RMS has provided the insurance industry with catastrophe models that embed world-leading science from the fields of seismology, engineering, meteorology, and the many other disciplines required. Access to this science has now become an integral part of managing property risk.

The risk managed by the life insurance vertical is dependent on a different set of scientific skills and disciplines, ranging from virology and epidemiology to medical disciplines and disease specializations. Managing mortality rates and forecasting life expectancy are increasingly seen as requiring an understanding of gerontology rather than knowing your way around standard actuarial tables. The scientific studies of disease, ageing and medical technology are converging in the interdisciplinary research field of gero-science.

RMS takes its lead from its clients. We welcome your feedback and guidance in the shaping of our research agenda to best support your risk management decisions. We invite you to contact us and engage us in the discussion of how our work can help inform your management of life and health risks.

Just as geo-science has provided a basis for managing insurance risk from natural disasters, so gero-science we believe will enhance the management of life and health risk in coming years.

Hemant H. Shah
President and CEO
Risk Management Solutions

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CELL-CULTURE VACCINE PROMISES BIG REDUCTION IN FUTURE PANDEMIC DEATHS

The announcement by Novartis that it has started construction of a factory to produce influenza vaccines using cell-culture technology brings the promise of large scale availability of vaccine to combat a major pandemic a significant step closer.

In November 2005, when George Bush announced a major Federal grant to support research into cell-culture methods of producing influenza vaccine, most commentators said it would take five to ten years. In fact it has taken just over two years for the first commercial version of a cell-culture vaccine process to be developed.

OptaFlu, produced by Novartis, is the first commercial cell-culture influenza vaccine and has now been granted approval by the European Medicines Agency (EMEA). U.S. Federal Drug Administration approval is expected shortly. The Phase III clinical trial data submitted for the seasonal flu vaccine version shows that it produces an immune response at least as strong as the traditional egg-based vaccine process (the Agrippal vaccine) for each of three influenza strains tested. It was also well tolerated, showing no meaningful differences in the safety profile compared to traditional egg-based vaccines.

Following on from this, Novartis recently announced that they have broken ground on the construction of the first cell-culture influenza vaccines manufacturing plant in the United States. The facility in Holly Springs, North Carolina, is expected to be completed in 2009 and start vaccine production in 2011. It is expected to have an annual production capacity of up to 50 million doses of seasonal trivalent flu vaccine. In the event of a pandemic declaration, the facility is expected to have a capacity of up to 150 million monovalent doses of MF59-adjuvanted pandemic influenza vaccine within six months of the outbreak.

The significance of the development is that it promises large scale availability of a vaccine to combat a pandemic, potentially much earlier in the lifecycle of the pandemic, and therefore much more effectively in immunizing the population, reducing spread, and limiting the death toll and number of people incapacitated by illness. The traditional method of manufacturing vaccine for an influenza pandemic is slow and limited in production capacity. It requires the incubation of each dose in an individual chicken egg. This is a lengthy process and not easily scaleable. This new method cultures genetically-modified vaccine in bacteria in a culture dish, promising a much easier production method, and one that should produce larger volumes of vaccine, potentially in many different countries simultaneously.

The availability of an effective vaccine has a very significant effect on the impact of a pandemic. If a well-matched vaccine were available at the outbreak of a pandemic, and people could be immunized fast enough, then modeling shows that death tolls from a severe pandemic could be cut as much as 90%. However, even with the availability of a cell-culture vaccine, there will still be practical reasons why the reduction in death tolls is unlikely to reach this level: delays in isolating the pandemic virus, or reduced efficacy of the vaccine, or most significantly, the time taken to vaccinate millions of people, will allow the pandemic to spread and kill.

A cell-culture vaccine process is a major breakthrough for pandemic management and promises to reduce the losses from future pandemics significantly. The degree and timescale over which this technology will reduce the risk to stakeholders like governments and insurance companies will depend on implementation plans and take-up by many parties. These developments will be monitored with interest.

The RMS Pandemic Influenza Risk Model currently includes an 'optimistic' outlook for vaccine production, in which well-matched vaccine is available in quantity early in the pandemic. The development of Optaflu makes this outlook more probable in future years.

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WINTER SURGE EXPECTED IN H5N1 CASES

In the past winter seasons since 2004, there have been surges in the number of cases of human infections of the H5N1 influenza virus contracted from birds. The World Health Organization (WHO) has put teams on standby to combat this year's surge, amid concerns that controls on poultry and wild bird migration may be slipping.

The number of human cases of avian flu is of concern not just because the infection is so virulent – more than half of the known cases have died – but because it poses the real threat of facilitating the mutation of the H5N1 virus so that it can be spread between humans to cause a pandemic. A pandemic from the H5N1 virus is likely to be particularly severe, even if the virus were to lose some of its virulence in the genetic shift.

The total number of known human H5N1 cases since the monitoring began in 2003, is 348 as of January 2008. Of these, 215 have died – a case fatality rate of 62%. At its peak in early 2006, nearly 20 new cases were being reported each month. Caseloads initially doubled during 2005, and grew by another quarter in 2006, leading to projections of escalating growth of H5N1 cases for future years, and a real risk of large numbers of cases providing the environment for a genetic shift occurring in the virus. However, 2007 saw stabilization and a drop in the number of human cases. During the past year, the average monthly rate has been around 6.

The stability and lack of explosive growth, of the number of reported human cases of H5N1 appears to be largely the result of public health education and prevention measures taken by health authorities in containing the spread of H5N1 in birds. In countries like China, Vietnam, Thailand, Egypt, and Turkey, outbreaks of H5N1 have been dealt with aggressively through eradicating infected flocks, increasing surveillance and testing, and mounting awareness campaigns to encourage people to be careful in dealing with live poultry. It is estimated that since 2003 over 200 million birds have been destroyed across the world in an effort to contain H5N1.

Although measures have reduced people being infected from their birds, measures have not prevented the geographical spread of H5N1 in birds. During 2005 and 2006 the avian epidemic spread from Southeast Asia, across the Middle East, to Eastern Europe and into Western Europe and as far as Western Africa. No cases have yet been reported in the North or South American continents. Individual cases and small clusters have been found across a large geographical area of the world, but the infection was not widespread in any country and appears to have been largely contained in most locations where it appeared.

Observation of the pattern of spread has increasingly suggested that human transportation of infected poultry may be a primary mechanism of long-distance transmission. Recent outbreaks of H5N1 in Europe, including outbreaks in farmed turkeys in Eastern England in February and November, are likely to have been caused by trucking infected meat from the European mainland. Tougher controls on transporting and importing birds, surveillance for disease, and new measures to prevent smuggling have been announced by many countries, which should further reduce the incidence of H5N1 virus outbreaks in birds.

However, vigilance has notably been relaxed in some areas, as the number of incidents and media headlines has declined, leading some authorities to warn of potential resurgence. The World Health Organization has warned against complacency and signaled the need to be ready for a surge of new cases again this winter. It has increased staffing and surveillance resources, particularly throughout the region of Southeast Asia. Stockpiles of drugs are being increased at their regional storage center in Singapore.

Winter appears to increase the ability of the influenza virus to infect humans. Seasonal flu is so named because of its annual prevalence in the winter, and H5N1 similarly appears to be more active at this time: most of the human cases (more than 70%) have typically been recorded in the first six months of each year. Although climate is an obvious contributor, the seasonal increase in infectiousness of influenza is not well understood – influenza cases increase even in tropical climates in the winter. The winter period is one of heightened risk for pandemic occurrence.

H5N1 mutation is one potential route to create a pandemic influenza virus, but there are many other variants that could also produce a pandemic influenza virus. H5N1 caseloads are not themselves indicative of pandemic likelihood. H5N1 is carefully monitored because of the potential severity of a pandemic if it were to result from an H5N1 genetic shift.

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BRITAIN DOUBLES PANDEMIC ANTI-VIRAL STOCKPILE

The U.K. Government has ordered another 15 million doses of Tamiflu to add to the existing 14.6 million in its stockpile. This makes it possible to issue anti-virals to half of the U.K. population during the period before a vaccine is available, covering the government's worst case scenario for an influenza pandemic. Now the proposed Tamiflu distribution system is coming under increased scrutiny.

In a major upgrade of the U.K. pandemic preparedness plan, the British Health Secretary announced on November 22, 2007, a substantial increase to the emergency stockpile of Tamiflu, the anti-viral drug that reduces the severity of influenza infection, and a number of other resources needed to fight a future pandemic.

In addition to Tamiflu, the U.K. government has ordered 14.7 million doses of antibiotics, used to treat complications such as pneumonia, and 350 million surgical masks and 34 million disposable respirators to protect medical staff as they treat contagious cases.

Tamiflu is a key weapon in reducing the impact and death toll of a future pandemic, particularly if it involves a virulent version of the influenza virus. Roche, the manufacturer, claims a 74% reduction in mortality risk for some strains, if the drug is administered within the first 48 hours of infection.

Professor Neil Ferguson, of Imperial College, London, and an RMS advisor, has modeled the effectiveness of having the anti-viral stockpile available, and has shown that it is one of the best ways of reducing deaths in a pandemic, providing it can be effectively distributed. Not only do the infected cases have a reduced chance of dying, the treated patient is also less infectious to others, slowing the spread through the population. In some severe scenarios modeled, with efficient and early distribution, deaths can be reduced by 50 per cent.

The timescale of the build-up has not yet been announced. The initial stockpile took nearly four years to build, so it may be 2010 or 2011 before the full capability is reached. Tamiflu in tablet form has a shelf life of only 5 years. The new proposal will reportedly extend this by storing it in powder form. The powder will need to be made into tablets before it can be used.

The availability of the drug is a key factor in fighting a future pandemic. However, the focus is now on how best to administer the drug most effectively under pandemic conditions. The drug is a prescription medication – counter-indicated by some – so needs a physician to diagnose and administer. The drug is most effective when given within two days of infection. The challenge is to manage the prescription process when hundreds of thousands of cases may be presenting in a single week, far more than can be seen by the existing General Practitioner network. One plan is for patients to phone a national medical call center where doctors will diagnose over the phone. The drugs would then be authorized for collection from local pharmacies, and the patient will be able to nominate a friend to pick them up. However other processes are being considered, and it is recognized that providing the medication early enough to be effective is a massive logistical challenge. Some proposals suggest trying to distribute Tamiflu to households in advance, or try to roll out Tamiflu dispensing just ahead of the pandemic spread, giving it to uninfected people who are in contact with known cases.

The British government is negotiating its bulk order at around $20 per dose. For a country like the U.K. with a relatively small population of 60 million, the cost of providing drug coverage for 50% of the population will total $600 million. Other countries, particularly those with large populations, find this level of stockpiling too expensive or of lower priority than other measures. Germany, population 82 million, has committed to a target of 25%, but is currently lagging well behind (its current stockpile is estimated at 17%). The U.S. estimates it will complete a 25% stockpile by 2009, if individual states allocate appropriate funding. Canada, France and Australia have some of the largest current stockpiles and should each reach close to 50% by 2010. Tamiflu however is too expensive to be a major element of the pandemic preparedness plans of developing countries, even those in Southeast Asia which may be in the first wave of a future pandemic. Some of the countries who may need it most are the least able to afford it. WHO stockpiles of Tamiflu may help but are small by comparison.

The RMS Pandemic Influenza Risk Model incorporates government preparedness measures for each country. The size of the anti-viral stockpile is an important variable in determining the resultant mortality rate from a future pandemic in each country.

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VIRULENT ADENOVIRUS 14 OUTBREAKS THREATEN HEALTHY ADULTS

A new variant of Adenovirus 14 has emerged and is spreading in the United States. It is virulent and untreatable, and is having a surprisingly severe impact on young and healthy people.

A new variant of Adenovirus 14 has emerged and is spreading in the United States. Since its initial appearance in May 2006, over 1,000 individuals have been infected with Adenovirus 14 and surprisingly it has taken a particularly significant toll on young and healthy populations, particularly in the military. Since June 2007, almost 200 recruits on the Parris Island, South Carolina military base have been diagnosed with a severe form of the emerging Adenovirus 14. Despite being a population that is significantly younger and healthier than the average population, 24 required hospitalization. Another outbreak at Lackland Air Force Base in Texas resulted in the death of a healthy 19 year old.

Adenoviruses are a common cause of respiratory infections. Outbreaks are common in the late winter, spring, and summer, and the virus is transmitted like the common cold. This class of virus is also a common waterborne illness and has been known to cause other illnesses, depending on serotype, such as gastroenteritis, conjunctivitis, and rashes. Although symptoms of the respiratory illness infection range in severity from the common cold to pneumonia and bronchitis, rarely does it result in serious illness. There are 51 different strains of adenoviruses and infection rarely requires medical attention. Until the outbreak of Adenovirus 14 only patients with compromised immune systems were especially susceptible to severe complications.

In May 2006, an infant in New York died from a severe respiratory illness caused by Adenovirus 14. Over the months that followed, 140 cases were confirmed in patient clusters in four U.S. states: New York, Oregon, Washington, and Texas. The severity distribution of illness is shown from the statistics of 140 recent patients: 53 (38%) required hospitalization, 24 (17%) were admitted to intensive care units, and nine (5%) of patients died. This is a drastically more virulent adenovirus than has ever been previously identified.

Adenovirus 14 was initially described in 1955 and was associated with an epidemic of acute respiratory disease in military recruits in Europe in 1969, but has been detected infrequently. Isolates from the recent outbreaks in all four U.S. states were found to be genetically identical, but are distinctly different from the 1955 reference strain. Its transmission among the military and other groups of young adults makes it a community-acquired disease with potential for spread across campuses and corporations.

There is at present no cure for Adenovirus 14 infections. Treatment is focused on supportive care and relieving the symptoms associated with infection. Symptoms can be similar to bacterial infection, but because it is a viral illness antibiotics are ineffective at treating it. Antivirals have also been ineffective at treating adenovirus infection. There is a vaccine for some strains of adenovirus infection, but it is currently unclear what its efficacy would be against the Adenovirus 14 strain.

The virus is causing concern because it seems to have picked up genetic material that makes it significantly more virulent without compromising transmissibility. The virus progresses very rapidly and within a day or two of developing a cough and fever, patients are in severe respiratory distress. The virus is particularly unusual in that it is causing severe infection, pneumonia, and death in populations of young healthy individuals. At this point public health officials are unsure of the potential long term threat that Adenovirus 14 poses, but it has the potential to causes significant morbidity and mortality in working age populations.

Emerging diseases potentially pose significant threats of excess mortality and morbidity in insured portfolios, because at least initially, medical responses are limited. The greatest threats to life and health insurance is from diseases that have high prevalence in the young and middle-aged adult population, such as this new strain of virulent Adenovirus 14. RMS monitors emergent diseases to alert insurance clients of potential risks. Outbreaks of Adenovirus 14 will continue to be monitored and clients will be alerted if caseloads appear likely to reach epidemic proportions.

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LONGEVITY INCREASINGLY POLARIZED BY SOCIO-DEMOGRAPHIC GROUPS

New figures from the U.K. Office for National Statistics published in October show where gaps are widening in life expectancy between rich and poor, social groups, and gender. This has important implications for life insurers, pension companies, and other managers of longevity risk.

Mortality rates underpin analyses of excess mortality and annuity risk but they are a rapidly moving target. In the U.K., new statistics highlight continuing increases in life expectancy but demonstrate large differences in the rates of change between social groups and gender.

During the past 30 years, life expectancy at birth in the wealthier socio-demographic groups has increased at a rate of about two years in every ten years, but the report shows a sudden increase in the rate of change, particularly in higher social groups, and most significantly for women. For women in Social Class 1 (professional and high income) life expectancy has increased from 82.6 years in 2001, to 85.1 years in 2005, an increase of 2.5 years over the four years of observation, a rate of increase more than three times faster than they have averaged over the past 30 years.

This contrasts with women in Social Class 5 (unskilled workers and laborers) who increased from 77.9 years in 2001 to 78.1 years in 2005, a gain of only ten weeks. The difference in life expectancy between women in Classes 1 and 5 has widened from 4.7 years in 2001 to 7.0 years in 2005, bringing it close to the social differential seen in men.

Male life expectancy over the past 30 years has generally been catching up with women, but the last four years has seen the gap increase again and the gap between social classes for males has slightly narrowed. For men in Social Class 1, life expectancy has changed from 79.5 years to 80 years, an increase of six months over the four years, which is below their average rate of increase in the past 30 years. The 2001 to 2005 increase for Social Class 5 males rose from 71.5 to 72.7 years.

Researchers in economic and social health issues point to combinations of factors that are influencing the recent changes in mortality rates. The influence of wealth on life expectancy is well known, and is related to general health, diet, and access to medical treatment. Alcohol, smoking, poor diet and better health services are all factors that affect life expectancy. There have been different smoking patterns between British men and women over the past 40 years – the peak mortality rates for men with lung cancer were seen in the 1970s, whereas the peak rate for women occurred in the 1990s. Some of the observed benefits may result from changes in smoking patterns in professional women that have only happened relatively recently, and may yet to have occurred in unskilled women.

The class divide in obesity and dietary health issues is much greater for women than in men, with far higher levels of female obesity in the lowest classes. Obesity rates in men are similar across the classes.

One of the major differences observed in socio-demographic groups is early diagnosis of treatable medical conditions. Women in the top social groups appear more likely to get breast cancer, but are now less likely to die from it. Better screening techniques and drug treatments such as Tamoxifen have had a significant impact on mortality in recent years. Professional groups appear to have higher awareness, self-screening and are more demanding of their healthcare services. This may be translating into improved mortality at a faster rate than previously estimated.

Longevity risk is of increasing concern to annuity providers and pension fund managers. The ability to forecast life expectancy is increasingly central to financial risk management. Life insurance is commonly hedged with pension provision, but without a clear model of both excess mortality and longevity, it is difficult to manage the hedging process. Excess mortality risk transfer, particularly for multi-year deals and securitization, needs a good projection of mortality baselines built on detailed understanding of longevity processes.

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NEW ADVANCES IN REGENERATIVE MEDICINE

Regenerative medicine seeks to develop ways of combating degenerative diseases and providing treatments for previously fatal conditions. Recent advances in stem cell research bring the prospect of significantly extending healthy life spans another step closer.

Holders of longevity risk have financial reason to be very watchful of medical advances that have the ultimate potential of allowing damaged organs to repair and renew themselves. This is the 'science-fiction' agenda of regenerative medicine, which is a pioneering medical research field developing treatments for diseases that result in the loss of major tissue function. Two important scientific announcements in November 2007 bring this futuristic vision closer to reality.

The significance of these two announcements is that they give public notice of important milestones in the scientific discovery of ways to produce cells which can develop into almost any of the body's several hundred types. These most remarkable cells, which might serve as a repair system for the body, are called pluripotent. Human embryonic stem cells have this property. The stem cells used in research are taken from embryos created during in vitro fertilization. Apart from ethical issues associated with embryos, their clinical use is not ideal genetically: researchers really want to create pluripotent cells specific to the genetic characteristics of patients. These would have the potential to offer new treatment of degenerative diseases, while avoiding immune system rejection risk.

The first major announcement is of progress in cloning primate embryonic stem cells. This was recently reported by Dr. Mitalipov's team at Oregon Health & Science University. The nuclei of skin cells taken from a nine-year old rhesus monkey were inserted into eggs from which the genetic material had been removed. This procedure generated a family of constantly-dividing cells, retaining their embryonic pluripotent nature. The success of this research is partly attributable to the invention of superior technology: an imaging machine that allows the egg DNA to be extracted without damage to the egg. With use of this imaging machine, Mitalipov is hopeful that his group's process should work also in human cells.

The second major announcement in November 2007 concerns another way of creating pluripotent cells, which involves neither egg experimentation, nor embryo destruction. Dr. Yamanaka's team at the University of Kyoto has created pluripotent cells from human skin cells, by cleverly reprogramming them into an embryo-like state. These induced pluripotent cells have passed all the tests for embryonic stem cells, and have exhibited properties, such as forming neurons and beating cardiac muscle cells, that encourage the future prospect of regenerative medicine.

Many scientific and regulatory hurdles remain to be overcome in the years ahead. However, these two milestones passed in 2007 are galvanizing research in this medical field, and suggest that the uncertainty over regenerative medicine is a matter of when it will be realized, rather than if it ever will. In the context of longevity risk estimation, this uncertainty over timing may be quantified through the elicitation of expert medical judgment. Conditional on the advent of regenerative medicine capable of mitigating the effects of degenerative disease, substantial gains in life expectancy of the elderly may be anticipated.

The advent of regenerative medicine as a viable treatment for degenerative diseases would provide substantial increases in life expectancy for elderly populations, beyond current trends. This would have major implications for managers of longevity risk. Advances in stem cell research such as these suggest that practical applications of regenerative medicine could be common within the multi-decadal timescales of longevity risk currently being managed.

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OTHER DEVELOPMENTS IN BRIEF

'Universal' flu vaccine passes first tests. Acam-Flu-A, a new vaccine that aims to protect people against all strains of A-type influenza, holds out the hope that strain-specific vaccines could eventually be redundant. In a pandemic, matching the strain for a vaccine forces a major delay in vaccination, but a 'universal' vaccine would enable stockpiles and pre-pandemic vaccination programs that would be more effective in reducing pandemic impact. The new vaccine targets the M2e peptide, common across strains, although some doubts remain about whether M2e peptides could evolve faced with a vaccine challenge. Acambis announced successful human trials on Jan 4, and said that if further tests prove positive, the vaccine could be on the market within three to five years.

Businesses unprepared for pandemic according to Roche report. A survey by YouGov, sponsored by Roche, the manufacturer of Tamiflu, shows that 30% of companies have no pandemic preparedness plan. Less than a quarter of companies have preparedness plans that executives are comfortable with. Less than 18% of plans entail individual company stockpiles of Tamiflu, warn Roche, launching a sales drive of Tamiflu to corporates.

Mass testing technique developed for H5N1. An important part of dealing with a pandemic from a highly pathogenic influenza virus like H5N1 would be diagnosis of the infection. A new test to detect H5N1 has been announced by eGene. The HDA-GT12 system is reported to be a simple and sensitive assay for H5N1 that can detect as few as 10 copies of the viral RNA. Approximately two samples can be tested per minute, at less than $1 per sample, making it ideal for mass screening.

Drugs extend lifespan of primitive animals in experiments. One goal of research into ageing is to find drugs that will increase lifespan and vitality. A mass screening program at the Howard Hughes Medical Institute in Seattle has involved testing 88,000 chemicals for the ability to extend the lifespan of adult nematodes (microscopic multi-cellular worms). A drug used to treat depression in humans has been shown to increase nematode lifespan, possibly by mimicking dietary restriction, an established mechanism of increasing longevity.

Centenarians reach record numbers. The number of people living beyond a 100 years has reached an all time record in England and Wales. There are now 9,000 people older than 100, which is 90 times more than in the first reliable count in 1911. Estimates suggest the number will continue growing at around 6% a year, reaching 40,000 by 2031. At present women centenarians outnumber men by seven to one, although this ratio is falling as male longevity rates improve.

Trans fats face ban in moves to combat obesity. The U.K. government looks set to follow New York restaurants in banning the use of trans fats in the food industry. An enquiry instigated in October by the Food Standards Agency will review the case for a proposed ban as part of a strategy to combat a health care crisis of rapidly increasing incidence of obesity and heart disease in the population. Trans fats are artificial additives, used extensively in fast foods, ice cream, and other products, and have been consistently linked with heart disease and obesity. U.K. healthcare spending on obesity-related diseases, such as diabetes, has increased rapidly in recent years and now accounts for as much as an estimated 20% of healthcare costs.

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RISK MANAGEMENT SOLUTIONS FOR THE LIFE & HEALTH INSURANCE INDUSTRY

Risk Management Solutions (RMS) applies the latest science in analytical tools for making risk management decisions in the life and health insurance industry, including management of excess mortality, excess morbidity, and longevity risk.

RMS licenses its models in software to clients, and also provides consulting services, technical support, model outputs, and other applications of its research and development.

RMS has a suite of catastrophe risk models to assess the frequency and severity of excess mortality in life insurance portfolios resulting from a number of potential causes of high fatality events. RMS models are stochastic, objective, and transparent, derived from scientific analysis of each of the threat phenomena. The models provide an independent assessment of risk metrics for use in portfolio management, pricing, and risk transfer decision making.

PROBABILISTIC MODELS

- Influenza Pandemic
- Other Infectious Disease Pandemics
- Terrorism Mortality and Morbidity
- Earthquake Casualty
- Other Natural Catastrophes

CONSULTANCY SERVICES

RMS provides consulting services to help life and health insurers across many areas of risk management. Projects include balance sheet analyses and implementation of regional portfolio management, specific loss liability areas, business continuity management, insurance product design, alternative risk transfer, and reinsurance optimization. RMS has provided risk management services for a number of the leading life and health insurers worldwide.

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PUBLICATIONS

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