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A01:
Pandemic Influenza

A Timely Example of what a Mortality Stress Scenario Might Look Like

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Agenda

- Pandemic Influenza Primer
  - What Is Pandemic Influenza?
  - What Would Happen?
  - Current Avian Influenza Threat?
- Mortality Impact?
- Wider Implications?
- Opportunities to Mitigate Risk?

- Institute of Actuaries Pandemics Working Party

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What Is Pandemic Influenza?

- Influenza is caused by a virus that primarily attacks the upper respiratory tract; the nose, throat and sometimes the lungs
- Influenza pandemics have typically occurred every 10-50 years throughout recorded history (last 400 years)
- Influenza viruses evolve easily and unpredictably:
  - No "proofreading" mechanism => "adaptive mutation"
  - Swapping gene segments during co-infection => "reassortment"
- Once a fully transmissible human pandemic virus emerges, it is expected to spread worldwide quickly
- Possible containment approach – uncertain effectiveness
- Quarantine measures – generally ineffective
- Expect pandemics to recur in second and sometimes third waves, potentially causing more severe disease

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What Would Happen?

- Spread from the source country to UK in no more than 1-2 months
- Most people will be susceptible to the new virus
- Influenza is mainly spread by the respiratory route; it may also be spread by hand/face contact
- Vaccine will not be available for at least 6 months and then given according to “nationally agreed priorities”
- Antiviral drugs are available but in limited supply and may be used initially to try to contain small outbreaks
- A cumulative total of 25% of workers might be expected to take some time off – possibly 5-8 working days – over a period of 3 months. Absenteeism may increase this
- There is the potential in a more severe scenario for as many deaths in 12 weeks of a pandemic as in the rest of the year

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Current Avian Influenza Threat?

- H5N1 began circulating in the poultry population of Asia some time before 1997, with human cases reported in Hong Kong. An extensive cull of the poultry population eliminated the immediate threat
- The virus has since mutated and by late 2005 had become established within the avian population in Asia and is spreading worldwide. The rapid elimination of diseased birds is no longer feasible to contain the virus
- Wild birds can be asymptomatically infected
- To become a human pandemic influenza virus, H5N1 must mutate into a virus that is capable of being passed easily among humans

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Current Avian Influenza Threat?

- The questions of whether H5N1 will improve its transmissibility, and when this might happen, cannot be answered with any certainly.
- What we can conclude however is that:
  - The world has moved closer to a pandemic than at any time since 1968 and that based on the recurring pattern of past pandemics, the next one is overdue
  - The H5N1 virus has demonstrated considerable pandemic potential
  - The ecology of the virus has changed in ways that increase opportunities for a pandemic virus to emerge
- There is a reasonable chance, however, that the next pandemic will arise from a strain other than H5N1

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Mortality Impact?

- Reliable statistics on which to base estimates are limited. What we know is this:
  - Records of influenza pandemics only really go back 300 years, during which time there were have been 10 influenza pandemics, with a few additional events which may have been pandemics
  - More detailed statistical records are only available for the three pandemics which occurred in the 20th century (1918, 1957 and 1968)
  - High morbidity and low mortality, with most deaths among infants and the elderly, were characteristics of all influenza pandemics in the last 300 years with the exception of 1918
  - The 1918 pandemic was, so far, a singular event in terms of the high death rates among young adults

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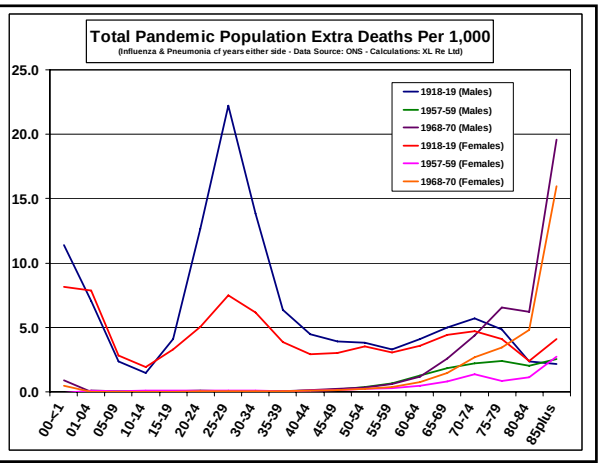

Mortality Impact?

- In making assessment of the impact of future pandemics actuaries should consider how the world has changed since the pandemics of C20 and the likely impact of these changes
- For example:
  - Specific circumstances affecting historic pandemics
  - Changes to overall levels of health and treatment
  - Changes in “disease management”
  - Changes in the environment
- Actuaries also need to consider which characteristics of insurance portfolios are important, e.g. age profile, geographic spread, etc.

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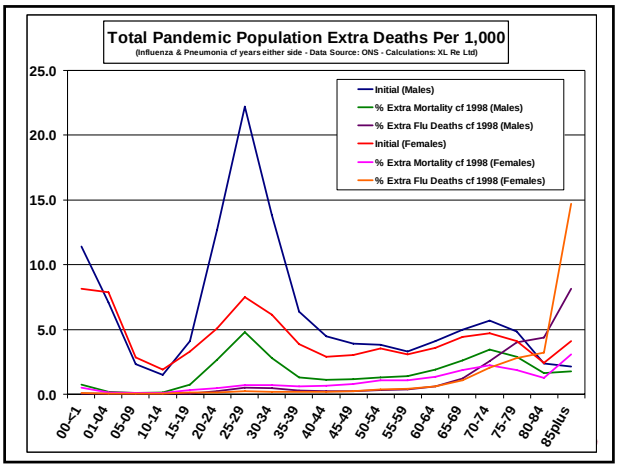

Mortality Impact?

- The impact of an influenza pandemic will certainly vary by age, however the age profile is difficult to predict and will likely vary with pandemic severity
- Age profile of the insured population in question will also be important and "all age summary figures" used with extreme care:

Impact of Age/Sex Mix on Per 1,000 Extra Deaths

Age Mix	1918-19	1957-59	1968-70
Population	5.5	0.4	0.9
Term Assurance	8.1	0.1	0.1
In-Payment Annuities	4.5	1.6	3.4

Data Source: ONS, Calculations: XL Re Ltd

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Wider Implications?

Financial System

- Immediate reaction – liquidity is key – credit spreads, funding
- Financial markets volatility caused by uncertainty and social disruption
- Longer term - loss in value of investment assets as a result of losses in particular industries and general economic downturn

Non-Life Insurance Claims

- P&C – business interruption, quarantine, crop losses (2005 hurricane examples)
- Liability – med mal, workers comp, negligence, travel – limited by event specific wording
- Health – interesting offest due to resource rationing
- Marine – little impact - exclusions

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Wider Implications?

Business Interruption

- Loss of key persons, through illness or death, at own company, distributors, brokers and suppliers
- Disruption to own business processes and at distributors, brokers and suppliers
- Third party risk for outsourced functions

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Opportunities To Mitigate Risk?

Life Insurance

- Balanced risk portfolio (buy longevity risk)
- Reinsurance – catastrophe is event linked – need whole account or stop loss
- Securitisation / mortality cat bond (watch that correlation!)

Investments

- Credit diversification
- Liquidity management

Business Interruption

- Business continuity planning
- Coordinated planning with trading partners

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Pandemic Working Party: Objectives

- Identify the key drivers shaping influenza pandemics in the 20th and 21st centuries
- Consider the implications of influenza pandemics for mortality, morbidity and financial services, including the pensions and insurance industry, in the early 21st Century
- Review publications in order to identify important and original research and place their citation details on the proposed pandemics website
- Bring out the underlying assumptions behind different models and the approaches taken by different organisations
- Communicate the uncertainty underlying these models and define the range of uncertainty underlying different scenarios
- Contribute to the wider discussion about influenza pandemics among interested parties by holding and attending seminars and drafting papers

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Pandemic Working Party: Contacts

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