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Pandemics Working Party Update

Pandemic assumptions in ICAs

Russell Ward & Keith Woolnough

Life ICA Subgroup Terms of Reference

1. To review submissions to the FSA, in anonymous format, in order to survey current practice.
2. To provide descriptive ranges of parameters derived from this survey.
3. To provide a summary of risks posed by pandemic scenarios as they impact on insurance, operational, credit and market risks.
4. To provide a summary of key arguments for and against mitigation of the impact of a pandemic.

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Survey of ICA Practice

- 44 firms sampled
- 29 with useable data for a pandemic event stress
- Submissions up to Q3 2006
- Confidentiality:
  - Data analyses was carried out by an FSA employee at the FSA
  - No individual company data disclosed outside the FSA
  - Data made available for the survey has been aggregated to the level where it is not possible to identify individual firms
- Caveats:
  - Confidentiality has restricted analysis & disclosure
  - Some interpretation and adjustment of data was performed to aid comparison

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Key Findings

- 5.1‰ - Firms applying a rate per mille methodology (59% of firms in sample)
- 4.0‰ - Firms applying a percentage extra to a base underlying mortality table (41% of firms in sample)
- 4.6‰ – When aggregated together
- 4.7‰ - Weighted by net mathematical reserves
- 5.8‰ - Weighted by Pillar 2 capital resources

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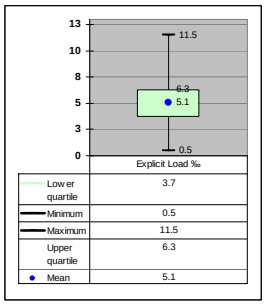
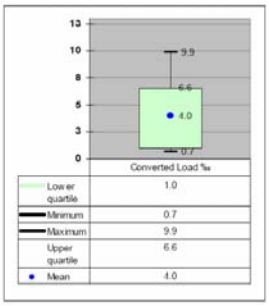
Per Mille Extra



Explicit Load ‰	
Lower quartile	3.7
Minimum	0.5
Maximum	11.5
Upper quartile	6.3
Mean	5.1

Percentage Uplift



Converted Load ‰	
Lower quartile	1.0
Minimum	0.7
Maximum	9.9
Upper quartile	6.6
Mean	4.0

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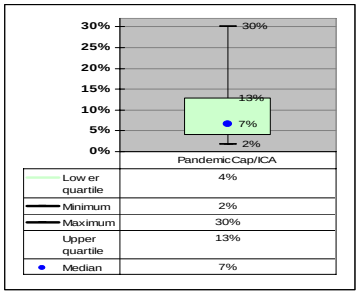
Pandemic Risk – Significance to ICA



PandemicCap/ICA	
Lower quartile	4%
Minimum	2%
Maximum	30%
Upper quartile	13%
Median	7%

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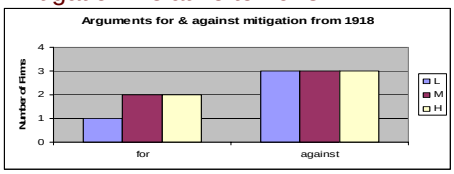
Mitigation Relative to 1918



For:

- Population mortality has improved markedly since 1918-19
- Improvements in monitoring and contingency planning
- Better medical care & treatment (e.g. anti-biotics / anti-virals)

Against:

- Treatments may fail to be effective (eg, anti-virals, vaccines)
- Treatment delivery may fail - melt down of national infra-structures and economy
- Crystallisation of other risks eg, operational risk

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Swiss Re's epidemiological model

- Swiss Re has built a pandemic influenza model that has been calibrated to the last three pandemics
- Basic reproduction rates and lethalities have been used to parameterise statistical distributions
- Values are randomly generated off these distributions to define an individual pandemic
- Thousands of runs have been used to produce a distribution of mortality outcomes

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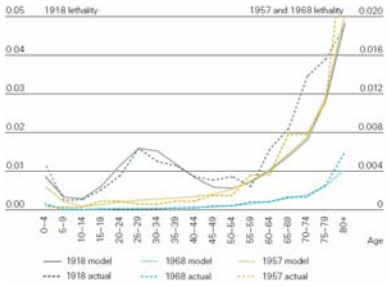
Age-specific lethality rates



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Influenza pandemics in history

1700–1900

Year(s)	Years since previous pandemic	Place of origin or of first report	Viral type
1729–1730	?	Russia?	Unknown
1732–1733	2	Russia	Unknown
1781–1782	48	Russia, China?	Unknown
1788–1789(?)	6	Russia	Unknown
1830–1831	41–48	Russia, China	Unknown
1833	2	Russia	Unknown
1836–1837	3	Russia?	Unknown
1889–1890	52–56	Russia	H2
1899–1900	9	Unknown	H3

1900s

Year(s)	Years since previous pandemic	Place of origin or of first report	Viral type	Estimated global deaths	Estimated number of US deaths	US excess mortality per 1000
1918–1919 (Spanish flu)	18	France, US	H1N1	40–50 million	500000–550000	5.3‰
1957–1958 (Asian flu)	38	China	H2N2	1–2 million	70000	0.41‰
1968–1969 (Hong Kong flu)	10	China	H3N2	1 million	34000	0.17‰

Chart sources: see Pandemic influenza: A 21st century model for mortality shocks

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Unadjusted 1918 excess mortality is not appropriate for a 1-in-200 year mortality shock assumption

- 1918 was exceptional among all of the pandemics that have been recorded since 1580 – it is a 1-in-500 year event
- A pandemic equivalent to 1918 would result in materially lower mortality today
- A mortality outcome as severe as unadjusted 1918 could only occur today if a virus with substantially higher lethality and a better ability to spread were to emerge – a 1-in-3 000 year event

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Moving 1918 to today

The world is better prepared today than at any other time in history:

- Global agencies to manage disease situations in animals and humans, including the World Health Organisation, were founded in the 20th century
- Antibiotics are available to treat bacterial pneumonia
- Virological research and knowledge has grown rapidly
- International Health Regulations (IHR) adopted in 1951
- Influenza vaccines available since the 1950s
- Antiviral drugs to treat influenza first approved in 1970s

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Moving 1918 to today

Population age structure:

- rate of spread changes as populations age – older people mix less; children have higher viral shedding
- 15% reduction in excess UK population mortality

Underlying health status:

- higher life expectancy = better underlying health status, especially in developing world
- uses life expectancy as a proxy
- 2% reduction in excess UK population mortality

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Moving 1918 to today

Antibiotics:

- antibiotics reduce bacterial pneumonia deaths by 60-80%
- access varies by country: max. 80% (USA, UK, etc); min. 14% (Bangladesh)
- approximately 57% of deaths in 1918 assumed mainly due to bacterial pneumonia
- bacterial pneumonia deaths predominantly in elderly and very young
- 31% reduction in UK population excess mortality

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Moving 1918 to today

Antivirals:

- make infected people less infectious to others: slower spread, reduced peak, lower serological attack rate
- lower lethality: when effective and available assume 38% reduction in viral pneumonia mortality and 67% reduction in bacterial pneumonia mortality
- assumed to reach only 65% of sick people in 48 hours, even in developed countries
- assumes application restricted to treatment only
- 20% reduction in UK population excess mortality

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Moving 1918 to today

Vaccines:

- because a pandemic is generated by a novel virus, a new vaccine needs to be produced
- largely ineffective in reducing mortality in pandemic's first year given today's production technology and capacity
- 0% reduction in UK population excess mortality (in first year)

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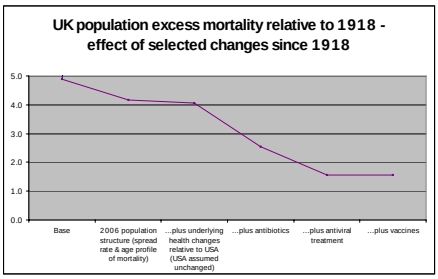
Moving 1918 to today



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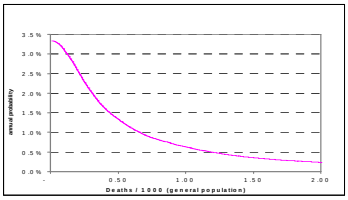
1-in 500 severity to 1-in-200 severity

In the UK, a 1-in-200 year severity pandemic would give rise to excess mortality of around 1.2 deaths per 1 000 lives within the general population



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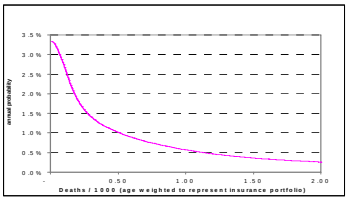
General population to insurance aged

In the UK, a 1-in-200 year severity pandemic would give rise to excess mortality of around 1.1 deaths per 1 000 lives within an insurance *aged* portfolio

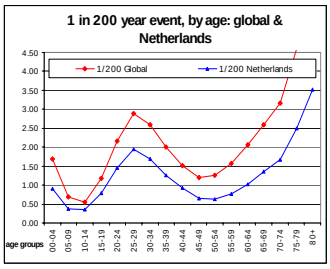


Excess mortality by age group

Description of diagram:

A 1/200 year event includes a "hump" of mortality amongst young adults, although this is not as severe as was the case in 1918.

Mortality for Netherlands is lower than Global at all ages mainly because of better than average health system, antiviral stockpile and access to antibiotics.



Suggested Improvements to ICA

- Use of historic data – additional clarity needed
- Fuller justification of the methodology used for the stress
- More explicit consideration and justification of specific factors that could increase/reduce exposure
- Well reasoned views on the wider implications of a severe pandemic event and associated correlation with other risks contributing to the overall ICA.