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Prevention is Better than Cure

By Joseph Lu

A pandemic, or global disease outbreak, is one of the top catastrophic risks faced by the insurance industry. So can we cope with a major pandemic? Last year, Bill Gates in his blog (bit.ly/1JX4s7B), and a World Bank poll, concluded that we can't.

The Ebola virus, with a fatality rate of 50%, has killed more than 11,000 victims since the West African epidemic began in December 2013.

Imagine an Ebola-influenza bug; an airborne germ that spreads as fast as influenza and with a similar fatality rate to Ebola. This could be expected to cause great global damage, including large insurance losses.

An independent panel of experts from Harvard and the London School of Hygiene & Tropical Medicine recently called in The Lancet for global reforms, based on lessons learned from the West African Ebola crisis, in preparation for the next pandemic.

The panel highlighted grave deficiencies in the global system in responding to outbreaks, and provided a series of recommendations. The work also exposes opportunities for actuarial techniques and modelling to play a part in managing pandemic risk.

Knowledge is power

The world needs to understand the risks of disease outbreaks, and any failure in preventing them, in various countries to inform resource allocation. The UK government has outbreak detection infrastructure, a developed healthcare system and specific policies to deal with future pandemics. However, this is not the case in poorer countries with a higher risk of outbreaks.

From December 2013 to March 2014, the first Ebola infections occurred in a remote area in Guinea and went unreported for several months, allowing it to spread to neighbouring Liberia and Sierra Leone. This was largely the result of a failure to detect and respond to the disease outbreak. This highlights the need for international aid or a move to prioritise national resources for public health in less developed nations.

In addition, there is a need to understand the likelihood of the emergence of new germs over time. From 1940 to 2004, 335 new infectious diseases appeared in humans. About 60% of these were caused by microbes transmitted from animals to humans. Of these, about 70% were from animals that typically live in the wild. So, it would be useful to monitor infectious agents in wildlife in order to improve our awareness of emerging pandemic risks.

It has been estimated there are 320,000 different viruses that currently infect mammals, and a project to identify and characterise them would require an investment of approximately £4bn.

Additionally, an independent expert panel has recommended an investment of about

£3.2bn per year to markedly improve global pandemic preparedness. To put these costs into context, recent calculations have estimated that pandemics could cost the world $4.2trn in the next 100 years, averaging £42bn per year.

Consider the 1918 Spanish flu, which experts suggest may have originated from birds. This has been the most severe flu pandemic over the past 100 years; the outbreak killed more than 50 million people and cost the insurance sector about £13bn worldwide in today's money.

If an animal disease database were created, factors that influence disease transmission from animals to people, as well as the potential spread of disease in human populations, could then be considered in order to understand and actively manage global pandemic risks more effectively.

This can be assisted by developing a mathematical model to estimate the risk of emergence of outbreaks. It should take account of drivers of epidemics such as:

- Likelihood of emergence of new infectious agents from the wild
- Animal-human interactions
- Population density
- Investment in healthcare
- Healthcare capability
- Government's ability to mobilise prevention measures.

International intervention will be needed when national preventive measures fail. The Ebola epidemic saw failures in reporting the outbreaks, technical capacity to contain them and mobilisation of global action.

Consequently, international help was delayed. Non-profit organisation Médecins Sans Frontières responded to the Ebola epidemic in March 2014, but it wasn't until July that the global community engaged with the issue and provided tangible help.

Modelling could potentially help answer some key questions forming part of the risk management process, such as:

- What are the benefits of an early call for help? This would help national leaders of affected countries prioritise communication with the global community

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- What is the best containment strategy? Policies to shut down travel and trade has harmed the economies of Ebola-affected regions and hindered epidemic control. Experts and equipment need to be transported in and out of affected countries as part of an effective strategy
- Can insurers do more to help their customers plan their travel or prevent infection?

Shared research and resources

The sixth issue of the IFoA's Longevity Bulletin on Pandemics suggested that recent advances in big data capability and social media data, when combined with genomics and spatial information, can potentially provide notably quicker information flows. Co-ordinated use of various data sources can theoretically help minimise the spread of infection and facilitate faster treatments. This wasn't particularly evident during the Ebola epidemic.

Direct exchange of data on the spread of Ebola was ineffective between the three most affected countries because of a lack of robust channels and coordination. Consequently, data sharing on infection and death in each country had to go through the World Health Organization (WHO), rather than directly between the countries, hampering speedy decision-making.

Global scientific collaboration was also problematic. For example, some scientists shared genomic sequencing data through an open-access database but others kept the data to themselves. Although thousands of virus samples have been collected from patients, there isn't any established arrangement for scientists to analyse them.

Clearly, more needs to be done to materialise the possible benefits of big data on pandemic prevention. Data, statistical and modelling experts in the actuarial community are well placed to contribute to this worthy task.

An effective system to prevent and respond to a pandemic requires complex co-ordination and resource sharing among many stakeholders.

This would include national governments, international agencies such as the WHO, non-governmental experts, a UN-related humanitarian system and research institutions. They play a wide range of important roles, including maintenance of national health, information sharing, fund raising, mobilising international actions and scientific research.

The insurance sector is a key stakeholder in all this as it could suffer large losses directly through insurance claims, and indirectly through business disruption. The Solvency II regime ensures that European insurers have the capital to sustain a severe pandemic.

In the US, the Society of Actuaries modelled the impact of recurrence of the Spanish Flu on the direct life insurance industry, showing that it would reduce the industry's capital by 25%. It reported: "It is clear that the industry as a whole can weather even a severe pandemic on the scale of 1918."

It is comforting that the insurance sectors of the main global economies are likely to be able to sustain the aftermath of a severe pandemic. However, in this instance, insurers' capital would be useful only after a global tragedy.

Could the industry use its financial capability, in a commercially viable way, to prevent or respond to epidemics before they get out of control in the first place? Financial modelling is required to examine whether there are more capital-effcient approaches.

A major pandemic could cause significant damage globally, including insurance losses, yet the world seems poorly equipped to cope with a fast-spreading and fatal disease. Actuaries have the skills to develop advanced models, not only to calculate capital requirements for the insurance sector but also to inform decisions needed to prevent and deal with pandemics.

As a key stakeholder of pandemic loss, the insurance sector could consider wider roles beyond setting reserves. These might include financing, technical sharing and dissemination of crucial information to fight pandemics. ■

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