

newsletter

Epidemics as a result of natural catastrophes

In recent years, the cost to the insurance industry of natural catastrophes has been immense. This newsletter examines whether epidemics in the wake of natural catastrophes are also of relevance to insurers.

Introduction

Any region afflicted by a natural catastrophe is at risk from epidemics: dirty drinking water, sick people living in cramped conditions, and a lack of sanitary facilities to maintain proper standards of hygiene provide an ideal environment for harmful pathogens. But do major epidemics with dramatic consequences for the local population really occur in the wake of a natural disaster, or is their significance exaggerated, given our ability to predict the epidemic potential of a disease and to take effective counter-measures? The tsunami in the Indian Ocean of December 2004 again raised the question whether natural catastrophes really are a fertile breeding ground for epidemics.

Definition: natural catastrophe

A natural catastrophe is an event which usually results from a natural change in the earth's surface or atmosphere, and which has a devastating effect on the environment and local life. The scale of destruction usually means that the population is unable to help itself, and nation-wide or even international assistance is required. This is especially the case where there are thousands of fatalities, hundreds of thousands of homeless, or substantial economic losses. The insurance industry, however, also uses the term natural catastrophe to describe loss events that involve far fewer fatalities or persons made homeless.

Definition: epidemic outbreak, endemic, pandemic

The general term epidemic refers to the widespread, unspecific occurrence of cases of an infectious disease in a particular community or region with a frequency clearly in excess of normal expectancy. Depending on duration and localisation, we distinguish between

- epidemic outbreak: occurrence of a disease in an unusually high number of individuals in a given population at a given time,
- endemic: describes a disease that is constantly present in a population,
- pandemic: an epidemic disease that is widely distributed across countries and continents.

Diseases and bacteria

In principle, there are any number of micro-organisms that may trigger an epidemic. The common factor linking all such pathogens, however, is their high transmissibility, resistance to treatment, and ability to cause serious disease. While epidemics are always caused by infectious pathogens, not all infectious pathogens will result in an epidemic.

After a natural catastrophe, infectious diseases may be caused by pathogens which find fertile breeding grounds in

- stagnant water (eg after flooding),
- hot and humid conditions (climate),
- inadequately refrigerated food (germs cultures), or in
- areas of poor hygiene (eg untreated sewage, contaminated drinking water, cramped living conditions).

The consequences are mainly gastro-intestinal illnesses such as cholera, typhoid, dysentery, or diarrhoea, but also diseases of the lungs, the skin, and soft tissues (eg wound infections). In rarer cases, the illnesses are transmitted by vectors such as mosquitoes (dengue fever, malaria, Chikungunya fever, Japanese encephalitis) or rodents (leptospirosis). Even "children's illnesses" such as measles, chickenpox or other, in particular endemic, diseases (tetanus, diphtheria, hepatitis) can assume epidemic proportions. As well as causing infections, drinking contaminated water can lead to poisoning, although this depends on the concentration of pathogens or toxins (noxa) in the water.

**Current
relevance**

After the most recent natural catastrophes (floods in central Europe in August 2002, seaquake followed by tsunami in the Indian Ocean in December 2004, hurricanes Katrina, Rita and Wilma in the southern USA and Mexico in August, September and October 2005 respectively, hurricane Stan in central America in October 2005, earthquake in the Kashmir region in October 2005), bulletins warning of the danger of epidemics were issued. In reality, however, although several small epidemics were apparent, mass outbreaks were few and far between (CRED, Centre for Research on the Epidemiology of Disasters). The notion that a large number of fatalities per se will lead to an epidemic is, according to the Pan-American Health Organisation (2004), unfounded. Even World Health Organisation (WHO) experts subscribe to the view that corpses do not pose a direct risk of infection: that the idea that otherwise healthy people are at risk from dead bodies was essentially a myth; that contaminated drinking water was a much greater threat to survivors.

Measures

If an epidemic does break out, at least as many people can die from infectious diseases as from the catastrophe event itself. Effective counter-measures against both infection and poisoning include:

- Treating drinking water and sewage to remove pollutants, salts and harmful pathogens,
- Providing the local population with enough food to maintain their strength and resistance to disease,
- Ensuring food hygiene,
- Providing shelter (protection from the weather and extreme climatic conditions),
- Vaccination (to contain the spread of infectious disease and protect the individual),
- Providing medical care (rapid diagnosis and treatment),
- Removing corpses (psycho-social aspects).

The quicker the infrastructure of a disaster region is rebuilt and the supply of clean drinking water re-established, the greater the chance of reducing the risk of epidemics. Appropriate counter-measures can be initiated while the infection is still incubating. Wide-scale vaccination of the population is an important preventive measure and can stop at least some of the harmful pathogens from spreading. A vaccination campaign immediately after the natural catastrophe can also be an effective means of localising and thus halting the progress of epidemics.

Conclusions

Contrary to popular belief, past experience shows that infectious diseases with epidemic potential do not necessarily occur immediately after a natural catastrophe, and that they can actually be prevented by taking suitable counter-measures. Effective crisis management is therefore important. This policy has prevented the outbreak of epidemics in all recent natural catastrophes. Sporadic cases requiring immediate action must, however, be reckoned with. For example, after the Indian Ocean tsunami, a series of minor measles epidemics occurred in refugee centres, and there were isolated cases of diarrhoea and skin infections (*vibrio vulnificus*) after hurricane Katrina. These did not, however, have a seriously detrimental effect on general conditions of health. Here too, the overall picture was that the incidence of infectious diseases was no greater among disaster victims than among the general population. Typically, the number of people suffering from infectious diseases starts to tail off significantly around two weeks after the catastrophe event. Four weeks after the event, only a negligible number of people develop such diseases.

Information for the underwriter

Although the total cost of a natural catastrophe may be immense, infectious diseases appear to play a subordinate role in the overall bill, as experience shows that mass epidemics are the exception rather than the rule. It may be also assumed that (life and health) insurance payouts are dwarfed by the direct and indirect (material) costs of a natural catastrophe.

If a major epidemic does materialise despite all reasonable precautions (eg due to inadequate crisis management, spread of an unknown virus for which a vaccine or causal therapy is not yet available), the burden on insurance companies may well be significant. In order to assess the actual risk, developments in the field of infectious diseases and vaccines should be monitored.

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