Ebola – Preliminary Damage Assessment For a Catastrophe

by Dr. Gundula Asshoff and Annika Tiedemann, Gen Re, Cologne

On 9 May 2015, more than a year after the outbreak of the most recent Ebola epidemic, Liberia announced that 42 days had passed since the last new case of infection. The country was therefore declared Ebola-free. In contrast, following a long period of reduction, its neighbours Sierra Leone and Guinea have been registering increasing numbers of cases since early June; although the scale is relatively small, it is no less unsettling as the route of transmission cannot be determined in many of the cases. Even if it has now effectively vanished from the headlines, this serious crisis plaguing West Africa – an Ebola epidemic of a previously unknown scale that has claimed the lives of more than 11,000 people so far – is certainly not over.

However, and as cynical as it sounds in light of all the suffering, this epidemic now also seems to have had a positive effect, which might help those affected by the current outbreak as well as future ones. For one, it has shed more light on Ebola and its effects in particular – for the first time, there have been many survivors. The catastrophe also accelerated the hunt for both a cure and a vaccine. This article will consider these aspects in more detail, as well as the relevance of the issue to the insurance industry.

Post-Ebola syndrome
The term ‘post-Ebola syndrome’ first appeared in the media in early 2015, as the number of cases was falling and the world hoped for a speedy end to the crisis. The term was coined by the medical assistants working in Africa; it does not refer to the physical or psychological trauma suffered by patients alone, but also hunger, poverty, illness, unemployment and the consequences of these for everyone living in the region.

In total, approximately half of all survivors continue to suffer from health complications even after being infected. The virus attacks the immune system and vital organs. Once infected, a person develops fever and vomiting and often suffers from life-threatening internal bleeding and shock. But there are also thousands of survivors who have reported other symptoms beyond pain in the eyes and visual problems: they suffer from joint, muscle and chest pain, hair loss and memory loss. Many experience constant exhaustion, which makes their everyday lives more difficult.

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About This Newsletter
A series of articles for life assurance professionals. Their purpose is to share knowledge gleaned by Gen Re as we carry out research into the risks that affect the profitability of life protection business.
The Ebola virus is known to be able to survive for months in semen, and as such patients must take suitable precautions. In one case, the virus was isolated in the aqueous fluid of the eye months after the patient was infected. Ten weeks after the start of the infection, the patient complained of increasing visual difficulties and was diagnosed with inflammation of the retina and the underlying choroid. As none of the treatments worked, doctors decided to take samples of the patient’s aqueous fluid in an attempt to reach a diagnosis, and discovered the virus. The conjunctival scrapings were negative, however, so the patient was not deemed at risk of infection. The patient then went into spontaneous remission within days. The patient appears to have fully recovered.

Doctors do not know what causes the various symptoms or how long they last. There are not many scientific publications on this subject. Past outbreaks in Africa were too small in scale for clearly defined secondary complications and their causes to be named.

Psychological trauma, such as anxiety disorders, panic attacks and depression, also occur frequently. People carry anxiety with them wherever they go. They shirk contact with others and their public lives collapse. Family members always end up facing the quandary of whether to care for their loved one as best they can or avoid contact in order to protect themselves and the rest of the family. For the survivors, the period of illness was traumatic; many were forced to watch helplessly as their children, parents, husbands and wives died next to them in excruciating pain.

Not only did the epidemic lead to a large number of deaths, it was an existential catastrophe for the populations of several countries. For months, the majority of the few clinics in the region were closed. Even the new wards operating with international assistance are so far apart that in some regions there is still no functional hospital within a radius of several hundred kilometres. In open clinics, people suffering from malaria or diarrhoea were and are being turned away because the clinic staff suspect the presence of Ebola and are unwilling to put their own lives (and the lives of their other patients) at risk, given the lack of protective equipment and isolation wards.

The setbacks in health care will continue to have an effect for years to come. In the affected states, vaccination programmes (primarily against measles) and measures designed to combat malaria, tuberculosis and HIV/AIDS have fallen by the wayside. According to its latest World Malaria Report, the World Health Organization (WHO) now fears that the Ebola outbreak could negate the successes of previous years in malaria prevention.

Experimental treatments and vaccines
If a patient is diagnosed with Ebola, he/she is treated in a special isolation ward for highly contagious diseases. Here, the patient undergoes intense medical scrutiny, which involves two basic types of treatment. Symptomatic treatment is currently applied first, yet in light of the ongoing Ebola epidemic in West Africa there are signs of novel treatment methods. However, not enough research has been done on them yet and as such they are highly experimental.

In symptomatic treatment, the symptoms of Ebola fever are treated as a priority. Due to the severe depletion caused by vomiting and diarrhoea, for example, it is particularly important to regulate the body’s liquid, electrolyte and glucose levels. Additionally, antipyretic measures and – if the patient is infected with the Zaire, Sudan, Tai Forest or Bundibugyo virus – precautions against the bleeding which occurs in connection with the fever can be implemented (haemorrhagic fever). It is important to ensure that the patient receives a sufficient supply of erythrocytes. Specific experimental treatments are e.g.: ZMapp, convalescent serum, favipiravir and small interfering RNA (siRNA).

All of these drugs and various other therapies and vaccinations are still undergoing tests. At the moment, no definitive statements can be made as to effectiveness against Ebola viruses and the range of side-effects.

Two vaccines designed to prevent infection are currently in the third and final phase of their clinical tests. In this phase, the effectiveness and safety of a new drug are tested on thousands or even tens of thousands of participants. Therein lies the crux of the matter: the abatement of the epidemic in the affected countries is making it difficult for manufacturers to demonstrate the effectiveness of their products beyond a shadow of a doubt. Essentially, there are too few people in these countries to come into contact with the virus – people who could help demonstrate the effectiveness of a vaccine. In the ongoing studies, researchers are evaluating how many people contract Ebola in spite of having been vaccinated. These data are compared against groups of participants who have received a different Ebola vaccine or a placebo.

In Liberia, in collaboration with New Link Genetics, the pharmaceutical companies Glaxo Smith Kline and Merck Sharp & Dohme vaccinated a total of 27,000 people for their phase III studies in late February. The studies focused on members of the medical teams and other assistants who were in direct contact with infected people. Merck Sharp & Dohme is carrying out two other studies involving 6,000 subjects in Sierra Leone and 9,000 in Guinea. As there are currently no
new cases in Liberia, the companies have cast doubt on the possibility of concluding the studies promptly. Nevertheless, the American pharmaceutical group Merck Sharp & Dohme hopes to submit the results of its vaccine rVSV-ZEBOV-GP for approval in the second half of the year.

Working on the site of a catastrophe

During the recent epidemic, medical personnel and numerous volunteers on site were the subjects of intensive reporting. A number of cases showed the world the dangers of working in the affected regions. Despite this, people all over the world were and are willing to travel to the worst-affected regions in order to help alleviate the pain and suffering.

The German Red Cross (DRK), for example, offers courses in collaboration with the Medical Mission Institute and the Medical Mission Hospital in Würzburg to prepare volunteers for working in Ebola regions. In addition to basic hygiene, the training focuses on how to use personal protective equipment. With this equipment, aid workers can come into close contact with patients without being exposed. However, these workers need to know how to put on and take off the various components properly – the suit, rubber boots, hood, safety goggles and gloves. Even storing the protective equipment is not without its risks. A weary and unfocused aid worker can easily become infected by his/her own suit. Therefore, a second aid worker must carefully disinfect the suit and supervise its removal. Upon their return, the helpers from the DRK take part in a three-week follow-up course. It is normally not necessary for volunteers to take time off work; however, aid workers returning home are obliged to ensure that they and their health authorities remain mutually available. They are also required to monitor themselves and, if they so much as suspect that they have been infected with Ebola, isolate themselves and contact the relevant health authority. Doctors Without Borders (MSF), Technisches Hilfswerk (THW) and the German Red Cross (DRK) operate continuously available hotlines for returning aid workers.

In spite of all precautions, personal protective equipment can be breached. If potential exposure to the virus is noticed immediately, it can be possible to return home without intense medical supervision due to the incubation period of 2-21 days. Between the outbreak of the epidemic and 20 March 2015, 65 people have been evacuated or repatriated from affected countries. It is highly problematic to evacuate patients exhibiting symptoms and those in need of treatment in small air ambulances. Long flight times, cramped conditions and quarantine in a protective suit or transport isolator limit the treatment options.

Specific experimental treatments

The drug ZMapp, which is produced by the American company Mapp Biopharmaceutical and which has not yet been approved, is one of the few experimental treatments available. This drug contains a mixture of three different antibodies obtained from genetically modified tobacco plants; this is the reason why doses are only available in low quantities. The antibodies in ZMapp target the epitope of the Ebola virus. The epitope is the portion of an antigen to which antibodies can bind themselves. Currently, however, the effectiveness of ZMapp is questionable. Tests carried out on apes did prove successful and two American patients recovered and were released from hospital after being treated with the drug, yet there are also documented cases of death in spite of treatment with ZMapp.

Another experimental therapy involves the treatment of patients with convalescent serum. If the infection is diagnosed in its early stages, a blood transfusion with the antibodies present in the blood serum of Ebola patients who have recovered can be successful. It is important that a whole blood transfusion is not carried out, but rather that the patient only receives the serum, as the patient might produce antibodies against the rest of the transfused whole blood. The injection of the antibodies contained in the blood serum serves as a passive vaccination that can improve the patient’s chances of recovery. However, the exact effectiveness of this treatment is still unknown.

Another treatment involves the use of favipiravir, also known as T-705. This is a virostatic drug that fights the influenza virus group. The drug has already been approved in Japan and it has proven effective against the Ebola virus in animal tests. It prevents the virus from replicating in the cells of the patient by inhibiting the viral RNA-dependent RNA polymerase.

Administering small interfering RNA (siRNA) is also a therapeutic option. Likewise, this prevents the virus from replicating in the cells. The drug TKM-Ebola is based on this principle. The outbreak of infection was prevented in clinical studies involving primates.
Relevance to the insurance industry

The insurance industry is not normally affected greatly by epidemics like this because the percentage of people with insurance amongst the inhabitants of the acutely affected regions is often extremely low. This does not apply to international aid workers, however. These people can become relevant in two ways – as applicants who want cover for the time they plan to spend abroad or as survivors seeking insurance cover while suffering from the complications described above, i.e. post-Ebola syndrome.

So far it has not been possible to assess the general danger of travelling to an Ebola region. It depends on a number of different factors which, for the purposes of a personalised evaluation, have to be queried and analysed as part of a risk assessment. These factors include, for example:

- the location and spread of the epidemic,
- the general medical care available on site and treatment options in the event of illness,
- the organizations involved in the relief efforts by sending volunteers, their experience and professionalism when preparing for and performing their work (e.g. training, equipment and on-site support)

and much more. During the current crisis, protective measures were noticeably improved after the first international aid workers fell ill and new cases were almost completely prevented as a result. Therefore, continuous re-evaluation throughout the crisis might be necessary in order to produce a reasonable risk assessment. Complete safety has not yet been achieved, as demonstrated by the case of an Italian volunteer who was diagnosed with Ebola after returning to Italy in May 2015. If an effective drug or even a vaccine is developed, as is hoped, this would trigger a complete re-evaluation of the situation.

Aid workers preparing to travel to an Ebola region and survivors alike should be subject to a risk assessment based on the facts specific to each case; there is too little experience, and too many possible consequences and impacts.

Summary and outlook

The Ebola epidemic in West Africa is not over, yet its dramatic impact on the region has already become apparent. For the survivors and the rest of the population, the epidemic will leave behind a legacy of health problems and place strain on an already ailing health system for years to come. We can only hope that the medical research so heavily driven by the catastrophe will produce results and that the scale of the current epidemic will not be matched in the future.

For the insurance industry, dealing with an epidemic like this is unavoidable – in spite of its remoteness – for the purposes of reasonably assessing the risks if aid workers and survivors apply for insurance cover in the future.

About the authors

Dr. Gundula Asshoff, Chief Medical Officer, leads the medical team in Cologne. She supports the case assessment in underwriting and claims as well as the area of product development. She also supports R&D in the development and update of our manuals and trainings on medical topics.
Tel. +49 221 9738 912, gundula.asshoff@genre.com.

Annika Tiedemann is Head of Underwriting Research, Research & Development, based in Gen Re’s Cologne office. As such, her tasks include Gen Re’s underwriting manuals as well as providing support to international clients in questions of underwriting.
Tel. +49 221 9738 345, annika.tiedemann@genre.com.