Expert Views

Agriculture & Livestock Insurance

AVIAN INFLUENZA (AI): What is AI and what can be done to stop it from spreading?

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Introduction

Global poultry production is massive in scale, with tens of billions of chickens, turkeys, ducks, and other poultry species raised every year for meat and egg production. While most poultry are raised in commercial systems, there is also a great deal of village or backyard production, mainly in developing countries but also increasingly in developed countries. Poultry production is economically important worldwide, responsible for generating an estimated USD 20 billion per year in the United States alone. Diseases affecting poultry can have a devastating impact on productivity and production, as well as on the trade of live birds, meat, and other poultry products. Avian pathogens do not recognize national boundaries. Poultry farmers and the whole poultry industry invest significant sums to keep the poultry healthy. This newsletter looks at a disease that infects several bird types and causes significant losses to poultry, both within and beyond the agricultural sector: Avian Influenza.

What is AI and what can be done to stop it from spreading?

Description of Avian Influenza (AI)

Avian influenza (AI or bird flu) is a highly contagious viral disease of birds caused by avian influenza Type A viruses. Influenza viruses are common in wild birds and occasionally infect poultry and captive birds. Poultry can be defined as domestic fowls, including chickens, turkeys, geese, quails, and ducks raised for the production of meat or eggs. The world has over 23 billion poultry (2016) – about three birds per person on the planet.

According to the virulence (the severity of disease manifestations), the avian influenza A viruses can be characterized as:

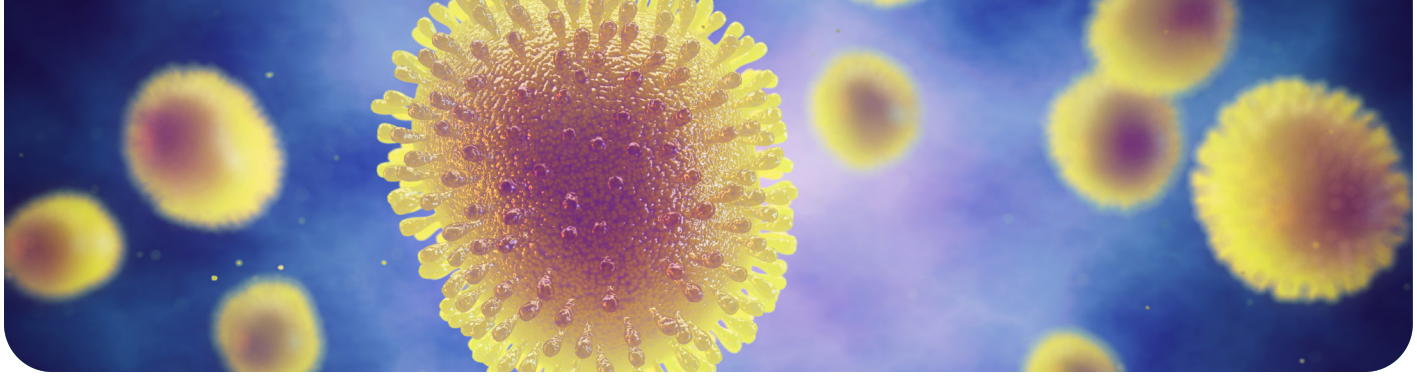
- non-pathogenic: causing no clinical signs
- low pathogenic (LPAI): causing no or mild signs of disease
- highly pathogenic (HPAI) – causing illness with high a death rate typically over 75% and occasionally reaching 100%.

When poultry are infected, they may have no symptoms, mild symptoms, or very severe symptoms. Chickens, turkeys, and quails are especially susceptible, while ducks often show no signs of the disease but act as a reservoir for the virus. Some low pathogenic types can change over time to become highly pathogenic.
Influenza viruses have two main surface antigens: haemagglutinin (H) and neuraminidase (N). There are many H and N subtypes, but highly pathogenic avian influenza viruses have historically been H5 and H7. The avian influenza viruses that have historically caused major epidemics are H5N1, H5N2 and H7N3. H9N2 has also become a problem of great concern.

Worldwide spread of AI

The first description of avian influenza dates to 1878 when a contagious disease of poultry associated with high mortality was noted in northern Italy. The disease was called "fowl plague." In 1901, it was determined that fowl plague was caused by a virus and, in 1955, the classical fowl plague virus was shown to be an influenza A virus. At the First International Symposium on Avian Influenza in 1981, the term fowl plague was replaced by the more appropriate term Highly Pathogenic Avian Influenza (HPAI).

The bird flu virus can infect people but rarely. If it does, the disease is usually not serious. Nevertheless, the highly pathogenic avian influenza H5N1 strain can be a serious health problem. In 1996, the now famous Asian H5N1 viruses made their appearance with the identification of an HPAI virus, fatal to geese, in Guangdong province in China. In 1997, Hong Kong experienced the first major outbreak of H5N1 causing seven human deaths. Clinical signs in people can include swelling and reddening of the tissues around the eyes and flu-like illness (fever, body aches).



Death can occur in rare cases. The outbreak in Hong Kong alerted the international community of the potential threat caused by this new strain of this virus. In 2003 numerous countries in Asia reported its occurrence over the course of several months. By late 2007 HPAI was reported in over 60 countries. While most countries have been able to limit its spread or occurrence in poultry, the virus has, nevertheless, become endemic in several countries with high poultry density, wildlife habitats, or unregulated trade. Currently, there are several outbreaks all over the world including Europe.

The increased demand for animal protein stimulated a rapid development of unregulated poultry production, notably in Asian countries. The highly concentrated domestic poultry production in areas with a large human population has, amongst other factors, provided ideal conditions for a development of a new virulent strains of avian influenza.

Avian influenza is not a food-borne disease. The bird flu virus is killed by the heat of normal cooking, so there is no risk of contracting avian influenza from properly cooked poultry meat and eggs. Nonetheless, sick chickens should not be eaten, as a sick bird often releases toxins and has other micro-organisms that may pose a danger to people.

HPAI can be an issue for people who work with poultry (e.g., farmers, transporters, slaughterhouse workers and veterinarians) and those who are in contact with infected poultry materials (e.g., veterinarians employed in laboratories, people employed by disease control activities). For hunters and ornithologists, HPAI is an issue only if they have handled sick animals or animals that have died from the avian influenza virus. Currently, no medicine exists to protect human beings from AI. The existing seasonal vaccines against human flu are effective only against known circulating human influenza strains.

Clinical signs

The clinical signs of AI infection are influenced by the virulence of the viruses involved and depend on the species infected and the age of the animals. The flu spreads very quickly within a flock.

Non-pathogenic viruses cause no clinical signs in infected birds, but through genetic mutation some of these viruses can become virulent. Birds need to be tested to confirm that the animals are infected.

Most avian influenza A viruses are low pathogenic. In chickens and turkeys, the animal show unapparent, mild, or severe respiratory disease and 3-15% of the animals die. In laying hens, egg production can drop by up to 50%. These viruses have the potential to mutate.

Only some avian influenza viruses are classified as HPAI A viruses. High pathogenic viruses cause a mortality of up to 100% of the birds. Birds can die suddenly, seemingly without warning, or signs such as lethargy and inactivity can be followed by a mortality within one to two days. Chicken and turkeys can show the following clinical signs:

- respiratory distress
- watery eyes
- oedema of the head and eyelids
- ruffled feathers
- sinusitis
- cyanosis of the combs and wattle
- diarrhea and nervous signs
- eggs laid with no shells.

In laying hen productions, the affected hen may recover but most often will not resume laying eggs. Often, the infection with the virus is followed by bacterial infections or fungal pathogens that can increase disease severity.

There are several other illnesses and diseases that show nearly the same clinical signs as virulent AI. When confronted with sudden high mortality, Newcastle disease, infectious laryngotracheitis, and poisoning must be considered in the

differential diagnosis of virulent AI. Acute fowl cholera or bacterial cellulitis of the comb and wattles can also cause swelling of the combs and wattles.

Disease transmission and spread

The AI virus survives not only in live birds but also in carcasses, eggs and dropping and other litter on the floor of the enclosure. Humans often unknowingly play a significant role in spreading the disease: the virus can easily be carried on shoes, dirty clothes, contaminated equipment, and vehicles, and it can be spread through the transportation of sick poultry. Within a country, the disease can spread in poultry through the movement of people, birds, and goods in an infected area, and through farming practices that cause infected poultry to meet with healthy birds.

A significant portion of poultry operations in countries affected by HPAI strains are still backyard activities. Biosecurity and surveillance, both keys to preventing the spread of AI, are minimal and farmers might not have the knowledge of potential disease spread and risks for animal and human health.

Confirmed AI represents a huge financial burden, especially for these small farmers. Because of this, poultry farmers are often reluctant to destroy their flocks or to inform the authorities about sick poultry. Some of farmers prefer to sell or eat the animals rather than accept this financial loss, which supports spreading of the disease. Additionally, both legal and illegal trade of birds, poultry, and poultry products facilitate the spread of the virus.

Wild birds are natural hosts and reservoirs for all types of avian influenza viruses and play a major role in the evolution, maintenance, and spread of these viruses. Close contact between wild birds and domestic poultry may provide an entry point for avian influenza viruses. During annual migrations, water birds present a serious risk of carrying AI viruses over distances. Different overlapping flyways provide the opportunity for dissemination of viruses. At overwintering sites and during breeding season, wild birds from different regions concentrate and the transmission of viruses can occur. Physical barriers between wild birds and domestic poultry and clean water help prevent domestic birds from contracting AI infections. Eradication of wild birds is not an option as they play an important role in the biological environment.

Prevention and control measures

Usually, poultry flocks are kept in enclosed and protected buildings. The areas need to be clean and ensure wild birds have no contact with domestic poultry. Animal-friendly keeping systems allow poultry to access outside areas, while protective nets help to avoid direct contact between wild birds and poultry and to keep unwanted animals and visitors out.

There should be a barrier between the poultry and the outside environment. Farms should be entered by authorized people only. All people that need to enter the poultry farm, including workers, should not have poultry of their own at home as this is a high risk for disease introduction. All people, including farmers, veterinarians, and care staff, and their vehicles need to be disinfected before entering the farm. Disinfection areas should be established at the entrance to the farm or in each of the poultry houses. People should wash their hands and use rubber gloves. They should change their shoes and clothing, and use the footwear and clothing provided by the farm.

Cleanliness prevents pathogens from accumulating and spreading health problems to the poultry. Therefore, the barn and all equipment need be kept as clean as possible. Cages, walls, and poultry eating and watering areas should be disinfected regularly, and any sick or dead poultry need to be removed quickly. The focus needs to be on farm biosecurity and hygiene.

Several existing practices help to prevent the spread of diseases. In poultry production, bird groups of several hundred or even several thousand animals are kept together. Usually, day-old chicks are put together, grown, used for production, and removed together as a closed group. At no time are other birds introduced into the enclosure. This practice is called "all-in/all-out" and helps to prevent the introduction of diseases. Once the entire flock is removed, the entire barn and all equipment gets cleaned and disinfected. After a rest period of at least one week, a new group of poultry is stabled in. Additionally, different poultry species should not be kept together.

To stop the spread of the disease as quickly as possible, early detection, fast reporting, and thorough culling is needed. Several bird diseases look quite similar and poultry owners must know to whom to report abnormalities on the farm. Whenever bird disease signs are observed, veterinary authorities need to be informed immediately.

Controlling an AI outbreak

Preparedness planning is key to preventing or managing an outbreak and minimizing the impact when an outbreak does occur. The focus should be on how to detect an outbreak rapidly, make a diagnosis, and put effective controls in place. For this, efficient veterinary services and knowledge of the set-up of the national poultry industry are needed. Good understanding of the virus and its way of spreading is needed to minimize the damage potential of the disease. In case of suspected disease, farmers need to inform their veterinarian and samples from dead poultry need to be analyzed in veterinary laboratories. If tests show a positives result, the state-ordered culling of animals follows. All infected or potentially infected birds get slaughtered, the carcasses disposed, and the premises get disinfected and decontaminated. A quarantine is imposed on all farms and regions in which infection is either known or suspected.

The area in which HPAI has been detected is referred to as the "infected area." The meat of all dead and culled animals must be destroyed. It should not go into the food and food chain and should not get processed. This is the only way to ensure the human food chain remains free from any HPAI infection.

The infected area is surrounded by the "restricted area." In the restricted area, intensive surveillance takes place and movement is controlled. The restricted area can extend as far as 5km from the area where HPAI was detected. The movement of equipment out of this area is particularly critical and, therefore, prohibited.

The restricted area is surrounded by the "control area." Under certain conditions, poultry and poultry products are permitted to be transported out of this area and used for food and permitted to enter the food chain. The control area can be a maximum of 10 km from the area where HPAI has been detected.

If it is not possible to locate and isolate an occurrence of HPAI rapidly and dispose of the poultry of affected farms in time, some countries will vaccinate the animals in the restricted area to prevent the disease from spreading. If after several months no outbreaks are detected in any zone anymore, all vaccinated animals get killed to get the disease-free status without vaccination.

After complete cleaning and disinfection and three weeks following a disease-free status in the area, farmers can start restocking their barns. Repopulated poultry needs to be monitored daily for signs of HPAI. It is recommended to start with restocking a small number of birds and completely restock only after first birds remained healthy.
The risk that poultry could be infected is higher when migrating birds are arriving and countries

should perform studies on the introduction of AI for their specific situation to improve preparedness. Each AI outbreak and country is different and each country should, therefore, have its own plan of action to control an outbreak efficiently.

Vaccination

A wide variety of vaccines against AI have been developed for use in birds. Vaccination, in general, increases the resistance of poultry to disease but does not eliminate the possibility that infection may occur in a flock. Although the vaccines can reduce mortality, it is likely that some vaccinated poultry would still be capable of transmitting avian influenza if infected, increasing the time taken to detect and eradicate this virus. Influenza viruses can mutate rapidly, which could render a vaccine less useful. Furthermore, it is difficult to differentiate infected from vaccinated birds, unless a marker vaccine is used. Therefore, in most countries, vaccination of poultry and most captive birds against avian influenza is not permitted and is a practice restricted by legislation.

Early reporting, rapid action, biosecurity, culling, and surveillance remain the most effective ways of protecting against and controlling an avian influenza outbreak.

Potential economic ramifications

Avian influenza outbreaks can lead to devastating consequences not only for the poultry industry, but for many other sectors of the economy as well. Additionally, the reputation of governments and authorities may be damaged, reducing both travel and tourism in affected areas.

The value of destroyed/culled animals and the cost of disinfection procedures are not the only direct losses: the costs of all organizational aspects like monitoring of the farms in restriction zones also add to the financial burden. Due to movement restrictions and market disruptions, there are long-term consequential losses. After culling, farm buildings need to remain empty until movement restrictions are lifted and farmers suffer business interruption losses. Farms in restriction zones face long periods in which animals and manure cannot be transported from the farms. Animal welfare problems and higher costs (extra feeding costs, emergency measures for storage of manure, possible vaccination costs) are an unfortunate consequence of these necessary procedures.

Usually, livestock epidemics also have a severe impact on prices. In case of an AI outbreak, many countries impose bans on poultry products and poultry to avoid importing the virus. Export countries might face export limitations which will result in enormous losses, significantly exceeding the direct losses.

During the 2014/2015 HPAI outbreak in the USA, approximately 50 million chickens and turkeys died either directly because of HPAI or as part of a disease control effort, costing the poultry industry more than half a billion dollar.

A few words from our partners

Mr Albert Ziegler, R+V Versicherung

Albert Ziegler (1958) is an agricultural engineer. After a two-year agricultural education on a farm in 1977, he started his studies in agriculture with main focuses on animal production, plant construction and agrarian economy at the advanced technical college in Bingen (Germany). After his studies, he started his career with R+V Versicherung, which is the market leader in the German agrarian insurance market. Within R+V Versicherung, he is now responsible for product development, principle questions, and market and product strategy.

By offering innovative products such as a "profit damage insurance for the agricultural animal production" (1993), an animal epidemic insurance, and an "agrarian insurance policy" (2003), a bundle insurance policy with all agricultural insurance sections, R+V Versicherung has strongly influenced the German agricultural commodities market and has increased its market share considerably.

Insurance solutions for avian influenza - examples and experiences

Since 1993, state compensation programs have been complimented by insurance offers that come into play in the event of outbreaks of animal diseases such as HPAI in Germany and the neighboring European countries. When there is a state-ordered culling of poultry flocks due to HPAI infection (governmental slaughter order), only the value of the animals gets reimbursed by the state. There is no state compensation for the consequential losses or for the neighboring farms located in the restricted areas around the outbreak. They can no longer market their products, or only under considerable constraints, and therefore have significant loss of income while costs remain the same or even increase.

There are major problems for the rapidly growing number of farms keeping free-range laying hens: during an AI outbreak, they are no longer allowed to keep their laying hens outdoors. As a direct consequence, the price for the produced eggs severely drops as retailers pay higher surcharges for free-range eggs. This kind of loss of value can be hedged through insurance solutions which have established themselves in the market.

The insurance penetration of specialized poultry farms in Germany is well above 50%. Demand in neighboring countries such as the Netherlands, Denmark, and Poland is also high. R+V Versicherung is the market leader in Germany and also offers insurance solutions in the neighboring countries.

It is currently becoming apparent that the increasing frequency of outbreaks of HPAI and increasing regional spread, will lead to increased rates. This will also lead to regionally differentiated pricing approaches and even greater differentiation according to the respective production process. Here, the higher loss ratio in areas with a very high density of poultry will be considered to a greater extent than before. When it comes to fattening poultry, for example, experience clearly shows that commercial turkeys are much more susceptible to disease than broilers (chickens raised for meat). In free-range keeping systems for example, HPAI can enter more easily through contact with wild birds. The effects of bans on free-range keeping systems also lead directly to significant price reductions for the products, while there are no price changes for pure indoor keeping systems. As a result, the share of commercial turkey and free-range laying hens in the total loss volume is currently significantly higher than the share in the total premium volume. Countermeasures are taken by making the premium tariffs more risk-based. This is necessary because free-range keeping systems still have great growth potential.

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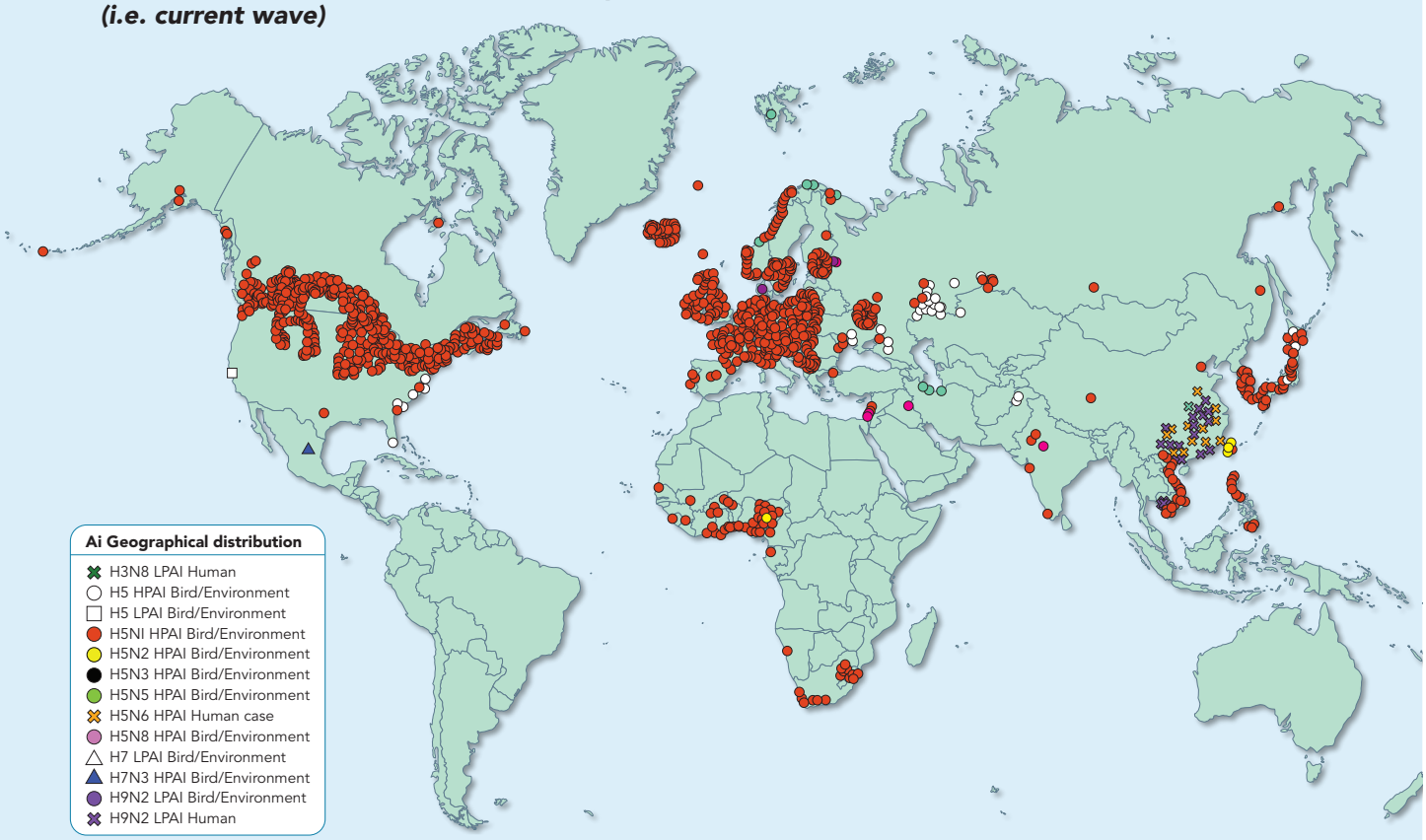
In 2016/2017, an HPAI epidemic occurred in 29 European countries. A massive effort of all the affected EU Member States allowed a descriptive epidemiological overview of the cases in poultry, captive birds, and wild birds. In 2020, another HPAI epidemic occurred in 31 European countries.

The most recent 2021/2022 highly pathogenic avian influenza (HPAI) epidemic season is the largest HPAI epidemic so far observed in Europe affecting 37 European countries and 50 million birds culled in the affected establishments.

Africa and Asia have also experienced significant HPAI outbreaks during the past months and there have been scattered HPAI outbreaks in the US and Canada.

Global distribution of AIV with zoonotic potential* observed since 1 October 2021 (i.e. current wave)



Note: Symbols may overlap for events in similar geographic locations.
** includes H5Nx, H7Nx highly pathogenic avian influenza (HPAI) viruses and H5Nx, H6N1, H7Nx, H9N2, H10N7, H10N8 low pathogenic avian influenza (LPAI).*

Reinsuring AI cover: Conclusion

AI is a risk with an extremely high loss potential, with potentially tremendous costs. The disease can break out in one single location or simultaneously in several locations. The events are not independent, and the frequency is not well known. Recent outbreaks show that frequency is probably higher than expected so far. The extent of the losses involved is heavily dependent on the early detection of an outbreak, the correct reaction of everyone involved, the number of disease sources, the efficiency of the control measures in place in a country, and its capabilities to mobilize to combat the disease.

Amongst other factors, poultry inventory and accumulation risk control are important at the individual farm level. Insurance portfolio balance cannot be achieved by focusing on poultry insurance alone, but must also include other types of livestock insurance (e.g. cattle, swine, sheep, etc.). In some markets, ROL (Rate On Line) and deductibles should be increased after some years of heavy loss.

SCOR restricts its capacity for diseases like AI to countries where the government is heavily involved in disease prevention, control, and compensation, and only gets involved after a thorough client and insurance product selection process.

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