



## RAPID RISK ASSESSMENT

# Outbreaks of highly pathogenic avian influenza A(H5N8) in Europe

Updated 20 November 2014

## Main conclusions and recommendations

On 6 November 2014, the German authorities reported an outbreak of highly pathogenic avian influenza (HPAI) virus A(H5N8) at a holding with 31 000 fattening turkeys in the north-east of Germany.

On 16 November 2014, Dutch authorities reported an outbreak of HPAI virus due to A(H5N8) in a holding with 150 000 laying hens kept indoor located in Hekendorp (municipality Oudewater), north east of Rotterdam.

On 16 November 2014, UK authorities reported another outbreak of HPAI virus due to A(H5N8) in an indoor holding with 6 000 breeding ducks in North Yorkshire, England.

Culling of the affected poultry is ongoing or completed, protection and surveillance zones have been established and investigations initiated to analyse how the birds became infected.

This virus has been detected among wild birds in Asia where it has caused several outbreaks on commercial poultry farms in South Korea, Japan and China. However, this is the first time it has been detected in Europe. It remains unclear how this virus was introduced simultaneously into closed indoor holdings in European regions far from one another and different poultry production sectors. The ability of this highly pathogenic avian influenza virus to sub-clinically infect wild birds increases the risk of geographical spread and subsequent outbreaks, as observed in South Korea. Ongoing monitoring and testing of wild birds and domestic poultry in the EU therefore plays an important role in the possible detection of further virus occurrences.

To date, no human infections with this virus have ever been reported world-wide and the risk of zoonotic transmission to the general public in the EU/EEA countries is considered to be extremely low. However, given the evolutionary history of the virus with the HA gene evolved from the widely circulating H5N1 viruses, people in direct contact with/handling diseased birds or poultry and their carcasses (e.g. farmers, veterinarians and labourers involved in the culling and rendering) might be at risk of infection. Given this potential zoonotic risk, contingency plans for the control of avian influenza in poultry and birds should be developed in collaboration with public health and occupational health authorities to ensure that persons at risk are sufficiently protected from infection. Appropriate personal protective equipment, including respiratory protection, should be made available and used.

People exposed at the affected holdings should be monitored for ten days in order to document possible related symptoms. Local health authorities may consider actively monitoring these groups and administering antiviral prophylaxis as recommended for persons with exposure to A(H5N1) dependent on the local risk assessment (i.e. intensity of exposure). Persons exposed as a result of their occupation should be offered vaccination against seasonal influenza, if they are not already vaccinated.

## Source and date of request

EC SANCO C3 Health Threats request to ECDC to update the rapid risk assessment on A(H5N8) dated 17 November 2014.

## Public health issue

This Rapid Risk Assessment (RRA) summarises the epidemiological, virological and environmental information relating to outbreaks of highly pathogenic avian influenza A virus subtype H5N8 in Germany, the Netherlands and the UK by 19 November 2014, and assesses the risk to public health in the EU/EEA associated with the outbreak. It builds on the [Rapid risk assessment on an outbreak of highly pathogenic avian influenza A\(H5N8\) in Germany](#) and the [Rapid risk assessment on human infections with avian influenza A viruses, China](#), which relates to A(H7N9) and A(H5N1).

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## Disease background information

Outbreaks caused by highly pathogenic avian influenza\* (HPAI) A(H5N8) viruses have been reported from Asia since 2010. The A(H5N8) virus was first detected in domestic ducks in China during routine surveillance activities at a live poultry market [1]. Since the beginning of 2014, several outbreaks involving novel reassortant influenza A(H5N8) viruses have been detected in poultry and wild bird species in South Korea [2-4] as well as in China [1,5,6] and Japan [7]. The viruses have been detected in captured and apparently healthy wild migratory birds and dead wild birds, as well as in domestic chickens, geese and ducks [4,5]. Avian influenza A(H5N8) viruses have shown moderate pathogenicity in domestic ducks in South Korea (0–20% mortality rate) and do not cause severe illness or death in wild mallard ducks. One study reported that viral replication and shedding was greater in mallards infected with A(H5N8) influenza viruses than in mallards infected with A(H5N1) viruses. Transmission of A(H5N8) viruses between wild bird species and poultry/domestic birds may occur by direct or indirect contact via fomites. Mammals such as ferrets, dogs and cats can be infected experimentally, but results indicate that a recent A(H5N8) isolate was less virulent in mice and ferrets than (A)H5N1 in mammalian species [8]. Natural infection of dogs with A(H5N8) has been reported from South Korea. Avian influenza A(H5N8) viruses from South Korea bind strongly to alpha 2-3 sialic receptors and, to a lesser degree, to alpha 2-6 receptors [8]. However, the results from the ferret model are inconclusive in terms of virulence for humans.

The spread of the virus may occur via migratory bird flyways [5,9]. Transmission between migratory birds and domestic poultry could occur through direct or indirect contact as A(H5N8) is shed in the faeces of wild birds [4].

Legal import of live poultry and live captive birds into the EU is not authorised from the east Asian region. Treated egg products and eggs for processing may be imported into the EU from South Korea and China. Heat-treated poultry meat products are authorised for import into the EU from South Korea and from one Chinese province (Shandong). No imports of any poultry commodities are permitted from Japan, where outbreaks caused by the A(H5N8) virus have also occurred. Given the very heat-labile nature of all influenza viruses, these commodities are not considered to pose a risk of influenza virus transmission to consumers [10].

No human cases of avian influenza A(H5N8) have been reported in relation to the current circulating virus or any other virus of this subtype.

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\*According to Council Directive 2005/94/EC: 'highly pathogenic avian influenza (HPAI)' means an infection of poultry or other captive birds caused by:

- avian influenza viruses of the subtypes H5 or H7 with genome sequences codifying for multiple basic amino acids at the cleavage site of the haemagglutinin molecule similar to that observed for other HPAI viruses, indicating that the haemagglutinin molecule can be cleaved by a host ubiquitous protease; or
- avian influenza viruses with an intravenous pathogenicity index in six-week old chickens greater than 1.2;2.

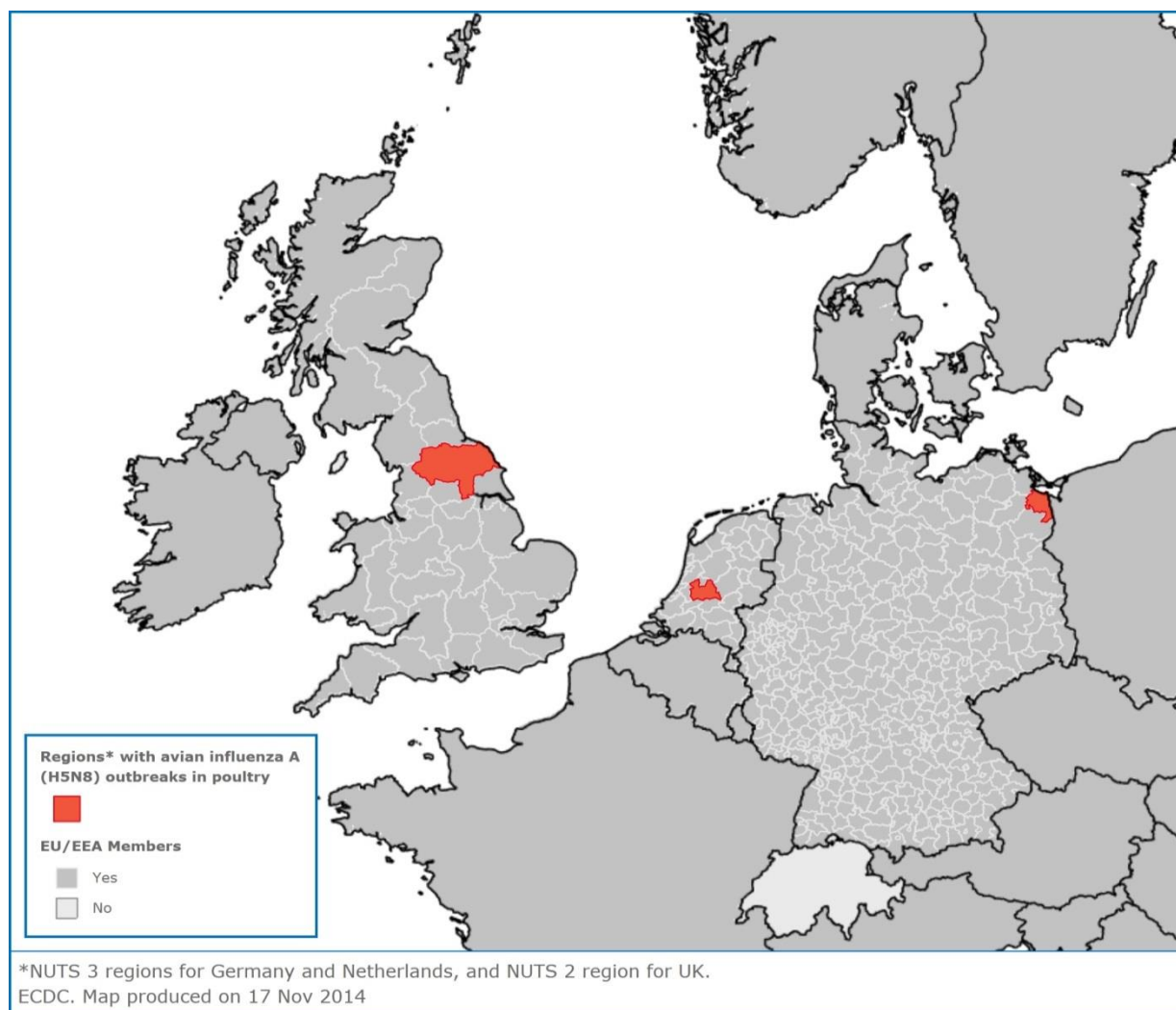
## Event background information

On 6 November 2014, Germany notified the European Commission and the World Organisation for Animal Health (OIE) of an outbreak of highly pathogenic avian influenza of subtype A(H5N8) at a poultry holding in the north-east of Germany [11] (Figure 1). The holding was keeping approximately 31 000 fattening turkeys, 5 000 of which were infected, and 1 880 died within two days. The outbreak affected 15-week-old birds in one of five sheds at the holding. An increase in mortality was observed after 1 November 2014 and a private laboratory subsequently identified an avian influenza A(H5) virus. The National Reference Laboratory for avian influenza at the Friedrich-Loeffler-Institute (FLI) in Germany confirmed the highly pathogenic avian influenza A(H5N8) on 5 November 2014. The virus is of South Korean origin, clustering in clade 2.3.4.6. There was no evidence of this virus being present in wild birds captured for routine surveillance. The German authorities placed the infected holding under restrictions as of 4 November 2014. All measures required by Directive 2005/94/EC were performed, including the establishment of a protection zone of 3 km radius and a surveillance zone of 10 km radius [12]. Culling and safe disposal of the turkeys at the infected holding, and of poultry kept at other farms located within the protection zone, was completed by 8 November 2014. No evidence was obtained of further virus spread from the index farm to contact holdings. Active surveillance of wild birds, through the sampling of faeces droppings from the environment around the holding and in the protection zone, has increased and so far samples have been negative for A(H5N8). Additionally, the local (human) health authority together with the local veterinary health authority has identified all persons potentially exposed to the birds. These persons have been informed and monitored in accordance with the Robert Koch Institute recommendations for persons with an increased risk of exposure to birds infected with HPAI H5. For instance, antiviral post-exposure prophylaxis has been offered to unprotected exposed persons [13].

On 15 November 2014, the chief veterinary officer of the Netherlands informed the European Commission of the detection of an avian influenza virus H5 in a holding with 150 000 laying hens kept indoors in Hekendorp (municipality Oudewater), north east of Rotterdam (Figure 1). An increase in mortality was noted in the holding on 14 November, which rose to 25% in one of the premises on the following day. On 16 November, the Dutch Central Veterinary Institute confirmed an HPAI A(H5N8) virus, indistinguishable from the virus responsible for the outbreak in Germany. Dutch authorities implemented very stringent measures in accordance with Directive 2005/94/EC to prevent further disease spread [12]. All birds at the affected holding were culled starting 16 November 2014. Protection and surveillance zones of three and 10 km were established around the affected holding. Tracing of eggs, manure, etc. from the holding in question and their treatment/destruction are ongoing. Furthermore, a complete standstill of poultry and poultry products was initiated throughout the territory of the Netherlands. This measure will be reviewed on 17 November 2014 depending on how the situation has evolved. The closest commercial holding is located at 2.6 km and 16 commercial holdings are located within the 10 km zone. According to the Dutch authorities this is not an area with a high density of poultry. In addition, wildlife surveillance is ongoing, and has been enhanced in the region near the affected premises.

Protective measures have been recommended in accordance with national guidelines for HPAI, including personal protection equipment and oseltamivir prophylaxis for up to 10 days after the last contact [14]. Persons exposed to the virus are requested to report any symptoms to the municipal health service and in the event that they develop conjunctivitis or influenza-like-illness, sampling material will be obtained for diagnostic testing.

On 16 November 2014, the UK reported an outbreak of HPAI virus of the H5 subtype. A(H5N8) has been confirmed at an indoor duck-breeding holding with 6 000 ducks aged approximately 60 weeks in North Yorkshire, England (Figure 1). The affected birds showed a gradual reduction in egg production and a slight increase in mortality but the aetiology of symptoms is potentially complicated by concomitant disease. Subsequent analyses have confirmed an A(H5N8) virus closely related to the other 2.3.4.6. viruses isolated in Germany and South Korea. The UK authorities have applied disease control measures as defined by Council Directive 2005/94/EC [12]. The breeding ducks in the affected holding are being culled and protection and surveillance zones have been established.

**Figure 1. Regions with confirmed outbreaks of highly pathogenic avian influenza virus A(H5N8)**

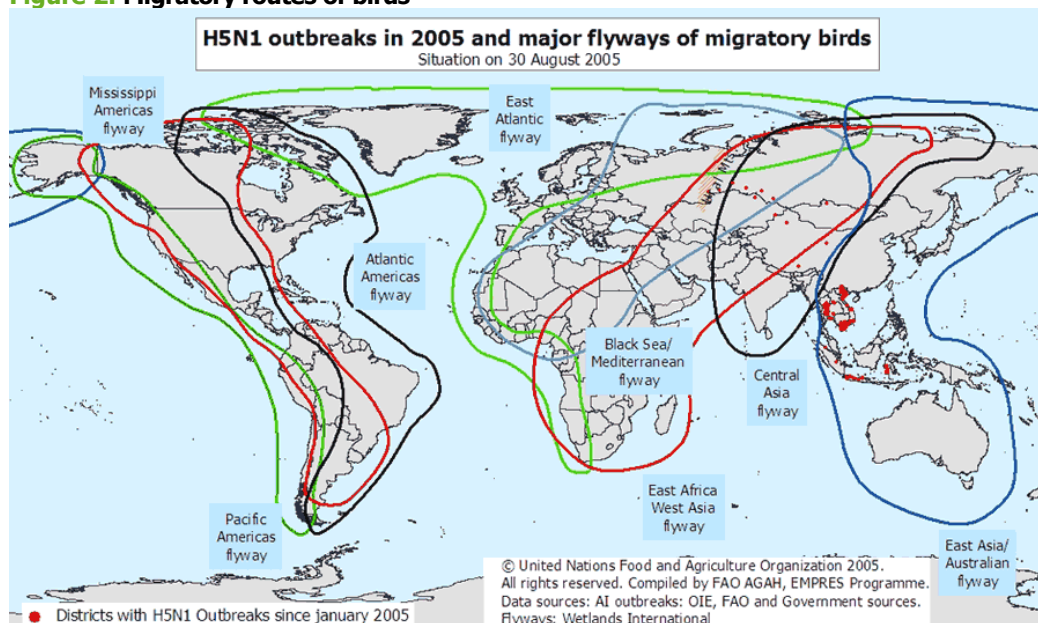
The reports of influenza A(H5N8) identified in the Dutch, German and UK outbreaks may suggest a common source of infection. An analysis comparing the respective sequences will provide more details regarding the homology of these viruses. The haemagglutinin identified from the German and UK outbreak is of South Korean origin, clustering in clade 2.3.4.6, the same clade that was recently detected in A(H5N6) and A(H5N1) viruses from Asia [15]. WHO has suggested representative viruses from this clade as a target in the development of candidate vaccine viruses for pandemic preparedness [16].

The source of virus introduction to the affected holdings remains unknown. Thorough epidemiological enquiries are still ongoing to examine potential routes for virus introduction. However, the available information may indicate wild migratory birds as a source of virus introduction. This is in line with the FAO statement that wild birds may play a role in the long-distance spread of the virus from Asia to Europe [17]. There is evidence that A(H5N8) has not been associated with high mortality in ducks, as seen in the UK. Thus, it cannot be excluded that syndromic surveillance might miss incursions into fattening ducks as described for A(H5N1) [18]. At this stage, further virus shedding from wild migratory birds cannot be excluded. Therefore, enhanced surveillance in the wild and in the commercial bird and poultry populations is needed to identify outbreaks of this HPAI virus. No influenza A(H5N8) virus has been detected in wild birds on a migratory route between east Asia and Europe, but the levels of wild bird surveillance are unknown. Most wild birds usually migrate earlier during the autumn, with routes going from northeast to southwest (Figure 2). However, there are still significant migration movements of geese at this time of the year and of Whooper and Bewick's swans even later. A(H5N8) has been identified in swans in early November in Japan, indicating a possible role in transmission [19]. The regions currently affected by A(H5N8) were previously identified in a study of A(H5N1) spread in Europe to be areas at high risk for the spread of the avian influenza virus in wild bird populations [20].

Ongoing epidemiological investigations to identify the source of the outbreaks also include checking the possibility that the virus was introduced into closed poultry holdings through contaminated material.

Detailed investigations are needed to explain how a virus of apparently the same strain can cause three outbreaks within 10 days in closed commercial holdings in Germany, the Netherlands and the UK. The air distance between the affected holdings in Germany and the Netherlands is approximately 800 km, between Germany and the UK 1 000 km, and between the Netherlands and the UK 400 km.



**Figure 2. Migratory routes of birds**

Source: [http://www.fao.org/ag/againfo/photo/EMPRES\\_Watch\\_global\\_flyways.gif](http://www.fao.org/ag/againfo/photo/EMPRES_Watch_global_flyways.gif)

## ECDC threat assessment for the EU

To date, no human infections with this virus have ever been reported worldwide and the risk of zoonotic transmission to the general public in EU/EEA countries is considered to be extremely low. However, this event is another indication of the widespread circulation and continuous re-assortment of avian influenza viruses, and specifically H5 viruses in animal populations, which continues to pose a long-term risk of human influenza pandemics.

Investigations in the countries concerned have been initiated to determine how the virus entered the affected holdings. Germany reported that no live poultry or poultry meat from the affected holding has been shipped to other regions of Germany, other EU Member States or third countries. To date, there is no epidemiological evidence that avian influenza can be transmitted to humans through the consumption of cooked food, notably poultry meat and eggs.

The German reference laboratory for avian influenza viruses reported that the virus is detectable using EU-recommended laboratory methods (M 1.2 and H5). However, further adjustments of these methods could still improve performance. Optimising test performance in the context of the newly emerged strain can enhance test sensitivity when supporting outbreak investigations. This needs to be balanced against broad sensitivity of assays for application in wider passive and active surveillance programmes where the virus subtype(s) is unknown. The National Influenza Centres are assessing whether the available validated assays are sufficiently sensitive for detection of the A(H5N8) viruses in humans and they should be contacted if there is suspicion of human infection.

In order to prevent virus spread, Directive 2005/94/EC [12] requires that Member States have contingency plans detailing measures for the killing and safe disposal of infected poultry, feed and contaminated equipment as well as the procedures and methods for cleaning and disinfection. Reinforcing biosecurity measures to prevent contact between domestic poultry and wild birds is expected to reduce the risk of infection if wild birds are identified as a source of infection.

The Directive also requires the development of contingency plans for the control of avian influenza in poultry and birds in collaboration with public health and occupational health authorities to ensure that persons at risk are sufficiently protected from infection. Personal protective equipment, and in particular respiratory protection, should be considered. Persons at risk are mainly those in direct contact with/handling diseased birds and poultry, or their carcasses (e.g. farmers, veterinarians and labourers involved in the culling).

Vaccination with seasonal influenza vaccine is recommended for exposed workers having contact with birds and poultry to avoid the possibility of co-infection with human and avian influenza viruses and to reduce the risk of re-assortment.

Persons in direct contact with infected poultry before or during culling and disposal, including poultry workers, should be monitored for ten days, in order to document possible related influenza-like symptoms, fever or conjunctivitis. Local health authorities may consider actively monitoring these groups. Administration of antiviral prophylaxis for exposed persons as recommended for A(H5N1) can be considered as a precautionary measure

depending on the local risk assessment (i.e. intensity of exposure) and in the context of the start of seasonal influenza in the EU to prevent reassortment [21].

## Conclusions

There is wide diversity in the re-assorted avian influenza viruses circulating among wild bird populations across Asia. The ability of this highly pathogenic avian influenza virus to sub-clinically infect a broad range of wild birds increases the risk of geographical spread and subsequent outbreaks, as observed in South Korea. Therefore, ongoing monitoring and testing of wild birds and domestic poultry in the EU plays an important role in the detection of further virus incursion.

It remains unclear how a highly pathogenic avian influenza virus A(H5N8) was simultaneously introduced into holdings in Germany, the Netherlands and the UK. The ongoing investigations into the transmission chain may provide important information for the prevention of further outbreaks in the EU.

It is important to remain vigilant, identify early transmission events to humans and ensure active surveillance of exposed workers at the affected holdings for human health complaints, particularly during and after culling operations. As a minimum, exposed workers should be instructed to report health complaints (passive monitoring).

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