SURVEILLANCE, PREVENTION, AND DISEASE MANAGEMENT OF AVIAN INFLUENZA IN THE EUROPEAN UNION

Maria Pittman, Alberto Laddomada, Ramunus Freigofas, Valentina Piazza, Aart Brouw, and Ian H. Brown

1 Presentation at the FAO and OIE International Scientific Conference on Avian Influenza and Wild Birds, FAO, Rome, 30 and 31 May 2006
2 European Commission, Health and Consumer Protection Directorate-General, Rue Froissart 101, B-1049 Brussels, Belgium
3 Community Reference Laboratory for Avian Influenza, Veterinary Laboratory Agency, Waybridge, Woodham Lane, New Haw, Addlestone, Surrey KT15 3NB, United Kingdom
4 Corresponding author (email: maria.pittman@ec.europa.eu)

ABSTRACT: European Union Member States, cofinanced by the European Commission, began implementing avian influenza (AI) surveys in domestic poultry and wild birds in 2002. Surveys aim at detecting low pathogenic avian influenzas (LPAI) of H5 and H7 subtypes in the wild bird reservoir and their circulation in poultry. These subtypes potentially mutate into highly pathogenic avian influenza (HPAI). Different poultry production systems, particularly those at increased risk for AI virus introduction (e.g., free range), are tested serologically. Positive findings are followed by clinical, epidemiological, and virological investigations. Wild bird surveys focus on virological testing of migratory waterfowl targeted toward H5 and H7 subtypes. Following the westward spread of Asian HPAI H5N1 to Europe, wild bird surveillance was intensified by increased active surveillance of living and hunted bird species migrating from HPAI H5N1 affected areas, and passive surveillance of birds found dead. To date, more than 700 findings of HPAI H5N1 in wild birds (mainly Anatidae [swans, ducks, and geese] and birds of prey) were identified in 13 Member States. Four single outbreaks in poultry in four Member States also occurred. During early 2006, dead wild birds provided an early warning system for HPAI H5N1 introduction. Once the disease was identified in wild birds, disease prevention measures were strengthened. Surveillance in poultry and wild birds allows veterinary authorities to modulate prevention and control measures, and identify the most risky areas. Measures to prevent, detect, and contain HPAI H5N1 in the European Union have successfully kept the disease impact on animal and human health to a minimum. It remains difficult to foresee further disease evolution, so the European Commission and Member States maintain surveillance and control measures under continuous review.

Key words: European Union, H5N1, highly pathogenic avian influenza, legislation, surveillance, wild birds.

The westward spread of the Asian lineage of highly pathogenic avian influenza (HPAI) virus of subtype H5N1 from Southeast Asia constitutes a major challenge to animal and public health authorities in Europe and elsewhere in the world. In the European Union (EU), control of avian influenza (AI), like other contagious epizootic animal diseases and other animal health issues, is harmonized at the Community level.

Basic EU legislation on avian influenza provides for a stamping-out policy that includes the culling of infected birds, birds suspected to be infected, and flocks considered at risk of infection (European Council, 1992). Movement restrictions for live poultry and their products such as meat and hatching eggs, as well as a prohibition on spreading manure, apply in established protection zones (3-km radius around the infected holding) and surveillance zones (10-km radius). Cleaning and disinfecting of infected premises with approved disinfectants also must be carried out. Member States have contingency plans detailing the practical implementation of legal provisions approved by the Commission. EU legislation also provides for compensation of farmers’ losses in case of AI outbreaks in poultry, as well as rules on trade and imports of live poultry and poultry products.

Ongoing review based on experiences gained during the AI outbreaks in the EU in the past 6 yr, animal health and welfare
recommendations of the Scientific Committee on Animal Health and Animal Welfare (SCAHAW, 2000, 2003) and the European Food Safety Authority (EFSA, 2005), the role of migratory birds in the spread of avian influenza (EFSA, 2006), as well as Office International des Epizooties guidelines (OIE, 2006), resulted in new legislation (European Council, 2005) that must be transposed by Member States into their national legislation before 1 July 2007. The control measures for HPAI laid down earlier (European Council, 1992) are largely maintained but with a more flexible, risk-based approach. For example, the new Directive foresees possible derogations from culling certain types of holdings, such as valuable birds kept in zoos. It also stipulates that low pathogenic avian influenza (LPAI) H5 and H7 subtypes must be controlled, and therefore Member States must have surveillance programs for these subtypes in poultry flocks and wild birds. In addition, emergency preventive and prophylactic vaccination against AI may now be used.

Since mid-2005, the European Commission, with support of Member State experts on the Standing Committee on the Food Chain and Animal Health and with technical advice of the Community Reference Laboratory, adopted several additional legal acts (Commission Decisions) to counter the threat of Asian HPAI H5N1 virus strain in Europe. Although under constant review, the main objectives of the Commission have been: 1) To prevent the disease from entering the EU via measures on trade in live birds and their products; 2) To raise awareness, particularly among poultry owners, so as to detect any sign of disease quickly; 3) To require Member States to identify areas considered at higher risk for introduction and occurrence of Asian HPAI H5N1 due to proximity of poultry holdings to mixing and resting areas of migratory birds, particularly birds using flyways connecting with HPAI-affected areas; 4) To prevent the disease from entering poultry holdings by limiting contact between wild birds and poultry and by enhancing biosecurity measures, especially in high-risk areas; 5) To detect and report the disease in wildlife, and to adapt disease-prevention measures in areas where the virus is detected. Measures include establishing zones around sites where H5 HPAI has been identified in wildlife. Passive surveillance in wild bird populations has been intensified, movements of live poultry and captive birds are controlled, and hunting of wild birds is banned in these zones; 6) To ensure that additional measures are taken when H5N1 subtype is suspected or confirmed in poultry holdings. These include regionalization by establishing an Area A (higher-risk area) and an Area B (lower-risk area) around the holding in question.

Detection of HPAI H5N1 in wild birds requires Member States to establish a 3-km control area and a 10-km monitoring area, where restrictions on movements of live poultry and poultry products apply (European Commission, 2006a). Gatherings of poultry and other birds, hunting, and release of captive game birds for hunting are prohibited. Poultry must be kept indoors. Clinical inspections and, if necessary, laboratory investigations are required in poultry holdings in order to detect possible virus introduction. Biosecurity and disease awareness must be raised.

The European Commission also approved preventive vaccination programs for birds kept in zoos in 17 Member States. In France and the Netherlands, pilot projects of preventive vaccination as an alternative to confinement for certain poultry received EU approval. All vaccination campaigns against AI in Member States must follow the strategy of Differentiating Infected from Vaccinated Animals (DIVA). This enables the separation of vaccinated animals and those infected with the field strain. The ongoing vaccination campaign implemented in parts of Italy following repeated incursion with LPAI has been adapted to the new situation.
Early detection of Asian HPAI H5N1 through enhanced surveillance in wild birds and domestic poultry has been a key measure to ensure rapid disease control in the EU. To enhance collaboration between animal and public health authorities in Member States, the European Commission held joint meetings of Chief Veterinary Officers and Chief Medical Officers in collaboration with the European Food Safety Authority and the European Centre for Disease Control.

The occurrence of HPAI in poultry must be reported to competent authorities of the Member State, and outbreaks of disease must be reported to the European Commission via the Animal Disease Notification System (ADNS) (European Council, 1982). However, in the framework of additional measures to prevent and control HPAI H5N1, notification of abnormal wild bird mortalities and reporting of HPAI positive findings in wild birds via the ADNS were made compulsory (ADNS, 2006).

This article summarizes information on Asian HPAI H5N1 virus in the EU, as indicated by preliminary results of the surveillance carried out in Member States, particularly with regard to wild birds. The results were reported to the European Commission via the ADNS and other official communication channels, including the exchange of information and views during frequent meetings of the Standing Committee on the Food Chain and Animal Health. The Avian Influenza National Reference Laboratories in Member States and the Community Reference Laboratory also were of valuable importance in this context.

Since 2002 Member States carried out annual surveillance programs for AI in domestic poultry and wild birds according to agreed-upon EU guidelines (European Commission, 2002, 2004, 2005, and 2006b). Because of the threat of HPAI H5N1 introduction these ongoing programs were amended in late summer 2005 to require intensified wild bird investigations focused on a selected list of higher-risk species; examinations of dead birds are part of this surveillance. During the surveys the veterinary authorities and their National Reference Laboratories for AI in Member States liaise closely with the Community Reference Laboratory for AI. In accordance with OIE and EU standards, this ensures rapid diagnosis, virus subtyping, and further genetic characterisation of isolates. The Commission co-financed Member States’ surveillance programmes in poultry and wild birds from July 2005 to December 2006 with ~€2.9 million.

From 1 July 2005 to 31 January 2006, 47,572 samples from 39,143 wild birds were tested for avian influenza viruses by virus detection and/or isolation techniques. The sample included over 150 species of 17 orders, but 71% of the tests involved samples from Anatinae and Anserinae. No HPAI viruses were detected in wild birds or domestic poultry. However, 314 (0.8%) LPAI viruses were detected in 22 species in six wild bird orders and in 12 Member States. Birds of Anatinae and Anserinae accounted for 96% of the LPAI cases.

From February to May 2006, surveillance for avian influenza was strengthened and the number of wild birds tested increased. Although the overall number of samples tested is not yet available, according to the data reported in the ADNS, more than 700 wild birds with HPAI H5 were found in 13 Member States (ADNS, 2006; Figs. 1–3). Almost all samples originated from wild birds found dead.

Full virus subtyping of most of the HPAI H5 isolates from wild birds was carried out by the National Laboratories in the Member States and/or by the Community Reference Laboratory. Asian H5N1 was confirmed for all HPAI H5 isolates for which subtyping has been completed. The only known HPAI circulating in wild birds is subtype H5N1, and therefore we assume the data reported
herein are indicative of the actual occurrence of Asian-lineage HPAI H5N1 in the EU during February to May 2006.

During the same 4 mo, Member States reported (through ADNS) only four HPAI outbreaks in poultry holdings. They were all confirmed as H5N1 of the Asian lineage by the Community Reference Laboratory. In France (23 February) a housed turkey flock involving 11,000 birds and in Sweden (17 March) one feathered game farm keeping 500 birds, mainly mallards (Anas platyrhynchos) became infected. Both holdings were in areas already under restrictions due to positive findings in wild birds. In Germany (5 April) a farm keeping ~15,000 chicken breeders, turkeys, and geese, of which the latter were permitted part-time free range, experienced an outbreak. The last notified outbreak in poultry was in Denmark (18 May) at a time when the overall positive wild bird findings had sharply decreased. This outbreak concerned one backyard farm with a mixed population of about 100 chickens, ducks, geese, and peacocks that had been kept outside. All poultry outbreaks were eradicated swiftly and did not lead to further spread of infection. Circumstantial evidence and preliminary epidemiological investigations clearly suggest that occurrence of disease in all the poultry holdings most likely originated from wild birds.

Findings of HPAI H5N1 in mammals were reported from Germany (three cats, one stone marten: Martes foina), Austria (three cats), and Sweden (one mink: Martes vison). Evidence indicates these mammals were infected following direct contact with infected wild birds or their carcasses. There was no suggestion of mammal-to-mammal transmission.

Surveillance of wild birds, particularly dead wild birds, provided an excellent early warning system for the introduction of HPAI into Member States. The EU made major efforts to prevent, detect early, and contain Asian-lineage HPAI H5N1 in late 2005 and early 2006. Surveillance indicated unprecedented numbers of HPAI H5N1 detections in

---

**Figure 1.** Highly pathogenic avian influenza H5 cases in wild birds per European Union Member State (MS).
wild birds, mainly waterfowl, in early 2006. Circumstantial evidence suggests that in some cases the occurrence of disease was related to "cold winter" movements of wild birds from eastern Europe, induced by prolonged bad weather there in late 2005 and early 2006. EU surveillance data seem to confirm the capability of wild birds to disseminate the virus along their migratory routes.

**Figure 2.** Highly pathogenic avian influenza in wild birds in European Union Member States per week.

**Figure 3.** Highly pathogenic avian influenza in European Union Member States by categories of wild birds.
presumably over long distances, although relay transmission via bird staging and mixing points seems plausible as well. However, surveillance along the typical flyways has not shown any evidence of disease introduction from Africa.

Community control measures to prevent introduction of HPAI H5N1 from wild birds to poultry seem to have been effective in avoiding major outbreaks in poultry, provided the established biosecurity rules are applied. Experience showed that more flexibility was needed for the implementation of zoning around positive findings in wild birds. The revised measures as laid down in Decision 2006/563/EC (European Commission, 2006a) allow Member States’ authorities to refrain from establishing control and monitoring areas on the basis of the favorable outcome of a risk assessment. Such assessment shall take into account geographical considerations and the ecology of the infected bird species, in particular when it can be concluded that HPAI H5N1 is not present in the area in poultry, other captive birds, or wild birds, or that the infected wild bird did not present a risk for virus spread to poultry, other captive birds, or wild birds in the area. Attempts shall be made, in liaison with other Member States or other countries if necessary, to identify whether the wild birds are resident or migrating and whether HPAI H5N1 exists in wild birds in other areas. Assessments should be made with support from ornithological experts. Based on natural barriers or the absence of suitable habitats for wild birds presenting a risk of spreading HPAI H5N1, the size and shape of the control and monitoring areas may be amended (e.g., to the banks of a river or the shores of a lake or coast).

Based on the experience gained in early 2006, revised guidelines for surveillance in poultry and wild birds were agreed upon with Member States for 2007 (European Commission, 2006c). In particular, the focus is on dead bird sampling, proper identification of bird species, refinement of target species and sampling techniques, as well as more detailed and frequent reporting obligations.

Measures taken in the EU successfully reduced the impact of HPAI H5N1 on animal and public health to a minimum. No human case of AI occurred in the EU and the virus did not spread widely within the poultry population. The system in place effectively coordinated animal health measures among Member States and constantly adapted them to the evolving disease situation. It remains difficult to foresee the evolution of the HPAI H5N1 virus in Europe. Therefore, surveillance, prevention, and control measures must be kept under constant review, not only in the short term but also as regards their sustainability in the long term.

LITERATURE CITED


Received for publication 15 December 2006.