

## **DEFINING THE ELEMENTS FOR RISK EVALUATION OF AVIAN INFLUENZA**

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### **Summary**

Highly pathogenic avian influenza (HPAI) a contagious poultry disease notifiable to OIE (List A) causes high economical losses and negative effects for the international trade in the region of the outbreak. Besides general approach to disease control through implication of measures, such as providing biosecurity, improving management practice, monitoring and vaccination, the member countries of OIE have imposed several measures and procedures for the control of HPAI through national programs.

Eradication procedures are applied for the diseases on List A OIE, whereat fast spreading and great economical impact of the diseases, such as HPAI, is stressed. Recommendations of OIE, especially the European Union (EU) Regulations for the control of avian influenza, are integral part of Council Directive 92/40/EEC.

In February 2006, the Republic of Serbia notified its first case of avian influenza to OIE from one swan carcass found in the upper Danube region in the north of Vojvodina Province. The disease was detected in two more cases, in one swan and one cock in the south of Serbia. Serotype H5N1 virus was isolated from all the cases. In both cases an infected zone 3 km in radius and endangered zone 10 km in radius and specific elements and measures of biosecurity were formed. The Ministry of Agriculture, Department for Veterinary Medicine, along with general measures and recommendations of OIE, adopted several Directives for tracking and control of AI outbreaks in wild birds and domestic poultry. By these Directives, import of poultry and poultry products from the countries with registered AI, game birds hunting, keeping poultry in open and trade of poultry and poultry products from farms that were not under veterinary control were all prohibited. Some other preventive measures were also adopted.

**Key words:** avian influenza, poultry, control.

Contagious diseases of poultry in most cases cause heavy economic losses. In order to control spreading of the disease, eradication procedures and killing of poultry are applied in the cases when there is a suspicion that presents a threat for public health and is of economic importance on regional or national level. Euthanasia procedures for eradication of Newcastle disease proved beneficial effects indicating that such method should be applied in the case of AI outbreak.

List A Office of International Epizooties (OIE) includes poultry diseases that spread fast and have great economic value, such as Highly pathogenic avian influenza (HPAI) and Newcastle disease (ND). Regulations for the control of avian influenza are presented in Council Directive 92/40/EEC (EEC, 1992a) which proposes measures for EU countries to control avian influenza.

**Elements and control measures for prevention of introduction of AI**

Effective control programs or eradication programs for all AI virus serotypes, especially highly pathogen, should have the following elements:

- integrated surveillance and diagnostics on national level;
- increased biosecurity measures at all production scale;
- education programs for farmers and other poultry employees;
- quarantine and controlled transport of infected poultry;
- stamping out or slaughter program for all the cases of HPAI and some H5 and H7 serotypes (Mildly pathogenic avian influenza, MPAI);
- the use of vaccines under stringent control of national veterinary authorities.

**Surveillance and diagnostics**

Integrated surveillance and diagnostic procedures are necessary for determination of presence of AI in commercial poultry flocks and wild birds, especially migrating species. For fast and accurate diagnosis of AI and determination of pathotype (HP or MP) developing national or regional veterinary medicine infrastructure is of high importance. Early and accurate diagnosis of HPAI provides fast reaction and elimination of the disease before new subjects are infected and the disease becomes endemic.

The Ministry of Agriculture, Department for Veterinary Medicine formed a professional team that consists of veterinarians, ornithologists and doctors, responsible for the implementation and conducting integrated surveillance for prevention of AI in poultry flocks and wild birds. Currently, in Serbia, mobile teams of veterinarians are formed at all local community levels and three laboratories are equipped for surveillance and diagnostics of AI, namely at the Veterinary Institutes in Belgrade, Novi Sad and the Referent Laboratory in Kraljevo. Their task is diagnostics, detection and isolation of viruses and serological monitoring of poultry and wild bird on Avian influenza.

Serological surveillance is conducted, according to special program, over the poultry farms that are registered at the Ministry of Agriculture, as the isolation of viruses of AI are performed from dead wild birds tissues that are systematically brought to all three laboratories.

The Republic of Serbia reported OIE its first case of AI at the beginning of March 2006. The virus was isolated from the organs of one swan that died on the north of Vojvodina region, at the border with Hungary. The isolation of the virus was performed in Virology Laboratory at the Scientific Veterinary Institute in Novi Sad, and was confirmed by the Referent Laboratory in Weybridge, UK. That was the first case of AI in Vojvodina region and Serbia. The second and the third case of AI were isolated from one swan and one cock on the south of Serbia. That were the first cases of AI in Serbia. In all three cases, the isolated virus was serotyped as H5N1.

### **Biosecurity**

The Ministry of Agriculture, Department for Veterinary Medicine, adopted a Directive that proposed all necessary measures for the increase of biosecurity in poultry industry. This increase of biosecurity is important part of prevention and control program of AI with two main goals:

- to keep and quarantine the virus on the infected farms exclusively, and
- to prevent the spread of virus to uninfected farms.

Biosecurity measures must be applied on all the levels of poultry production and are obligatory for all employees. These measures are related to farm personnel, laboratories and national authorities that are or may be in contact with poultry, poultry products, waste materials, equipment and other objects at farm premises. The first preventive measure includes proper disinfection and decontamination of all equipment used on more than one farm; the personnel must undertake appropriate preventive actions in order to prevent the contamination of clothing and footwear with contaminated feces and infectious respiratory excrete. Ideally, workers should perform only one operation, but should not be involved in any activity at other farms and should not keep their own poultry. Biosecurity program should be more than words. On the contrary, application of all the measures must be carried out in every detail by all personnel on all the farms. If it is necessary that personnel works on more farms, like in the case of vaccination and similar activities, the highest level of biosecurity must be provided. Unsuccessful biosecurity pose realistic threat for continuing the outbreak and spreading the field virus between farms.

### **Education**

In order to accept and successfully carry out the control programs, continual education about the disease status and biosecurity measures is needed and informing the farmers, workers, veterinarians, state employees and media is necessary. The lack of information flow provokes panic reactions and guarantees a failure in control program. Providing false information to media has negative effect on public confidence related to biosecurity and safety of all poultry products for human consumption, in general. It is of most importance to stress the low risk of AI virus transmission on human population by consumption of poultry products.

The Ministry of Agriculture, Department of Veterinary Medicine conducts continual activities to educate the public and farmers about AI, by publishing brochures, giving lectures and informing public media. The information on the first case of AI in Vojvodina and later cases in the south of Serbia was provided on time.

### **Quarantine**

The Ministry of Agriculture, Department of Veterinary Medicine prohibited keeping poultry on open premisses and backyards. The backyard poultry is quarantined in order to prevent contact with potentially infected wild birds.

Biocontainment of the disease on infected farms or regions, controlled transportation of poultry, equipment and personnel are important to prevent

spreading AI on uninfected areas. During the HPAI outbreak, it is necessary to depopulate and safely remove the carcasses and materials in the quarantine zone. The safe removal should be performed by burning, composting, alkaline hydrolyze or burning according to ecological regulations. All the equipment must be cleaned and disinfected before it is carried out from the infected farm.

#### **Depopulation**

The Ministry of Agriculture, Department of Veterinary Medicine, have anticipated the possibilities for euthanasia in the case of AI outbreak. After the official confirmation of Avian influenza, the state authorities will ensure zoning the area by forming security of infected zone 3 km in radius as minimum for the infected center, and surveillance zone around, with minimum 10 km in radius. During the zoning procedure, geographic, administrative, ecologic and epizootiological factors, related to AI, must be considered as well as necessary conditions for monitoring.

Once officially confirmed AI infection obligates that all the poultry in that area to be killed at the same site, without any prolongation. The poultry that died or has been killed and all the eggs must be destroyed. These actions will be performed in such a way to minimize the risk of AI virus spread. OIE and EU state that, in the case of HPAI outbreak and other diseases from List A, depopulation is an important control measure that starts in the early phase of the outbreak in order to be effective and economically justified, because of high costs of the disease.

The Republic of Serbia applied OIE procedures on both occasions of AI outbreaks, and formed 3 km and 10 km infected and surveillance zones. In both cases when the AI virus was isolated from the organs of a swan and a cock, high biosecurity measures were undertaken and in a case of isolated AI virus from poultry (one case of infected cock) all the poultry in the infected zone were killed. Increased biosecurity and prohibition of poultry and the poultry products trade were conducted in the surveillance zone. The killing was performed by injection of T-61 preparation, product *ad us vet* registered for the euthanasia of animals.

#### **Vaccination**

Vaccination can be used as one element in eradication program of HPAI. The use of vaccines against AI would have negative effects in terms of elimination the infection if not accompanied with other eradication measures. Alternatively, antiviral drugs are proposed to treat AI infection. Poultry that has been treated with such drugs can not be used for consumption. Permission from OIE is needed for conducting of vaccination.

According to present data, only serotypes that belong to H5 and H7 groups, can cause HPAI in susceptible species, but not all H5 and H7 serotypes are highly virulent.

Based on so far accepted OIE standards for diseases on List A, presence of HPAI in certain country prohibits exportation of poultry and poultry products. The confirmation of free status on HPAI can be provided by serology control. Negative AGPT or ELISA test result is reliable evidence of free HPAI status. However,

positive serology finding can indicate HPAI or MPAI infection. To avoid such situation, the exporting country must provide that positive titre is from MPAI infection, by virus isolation and *in vivo/in vitro* pathotyping. The risk of importation of MPAI through poultry meat and meat products is minor, because MPAI viruses replicate in digestive and respiratory tissues but not meat. On the other hand, HPAI is systemic disease and the virus may be present in most tissues including meat.

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