

PROPOSAL AND DEVELOPMENT OF AN AVIAN INFLUENZA SURVEILLANCE SYSTEM IN PORTUGAL – EPIGRIPAVE PROJECT *

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SUMMARY: The surveillance of Avian Influenza (AI) in Portugal started in 2003 with a gradual increase of the number of samples analysed. Since 2006, a research line, established by the Calouste Gulbenkian Foundation, is financially supporting the implementation of a project for the improvement of the AI surveillance network in the country – EPIGRIPAVE, which is developed by the Veterinary Faculty of Lisbon along with the Veterinary Services, the National Veterinary Laboratory, the Nature Conservation Institute and other public and private institutions.

The Project aims to develop the existing AI monitoring activities and focus sampling on different avian subpopulations, to better organise data collection, retrieval and analysis and to improve information management and circulation. Training of county veterinarians and official veterinarians in safe sampling methodologies, data collection and surveillance attitude and cooperation are also key issues of the Project. Mathematical modelling of possible scenarios for AI spread will use data produced by the surveillance network as well as from specific epidemiological studies.

Keywords: Avian Influenza, HPAI surveillance.

RESUME : L'épidémiologie de l'influenza aviaire (IA) au Portugal a commencé en 2003 avec une augmentation progressive du nombre de prélèvements testés. A partir de Janvier 2006, le projet EPIGRIPAVE aidé financièrement par la Fondation Calouste Gulbenkian est destiné à améliorer le réseau d'épidémiologie de l'IA.

Le projet, proposé par la Faculté de médecine vétérinaire de Lisbonne, associe la Direction générale des services vétérinaires, le Laboratoire central de diagnostic vétérinaire, l'Institut pour la conservation de la nature et six institutions et entreprises publiques ou privées.

L'objectif du Projet est de développer les activités en cours avec une attention particulière au plan d'échantillonnage de différentes sub-populations aviaires de mieux organiser la récolte, la transmission, le traitement et l'analyse des données et d'améliorer la gestion et la diffusion de l'information.

Un effort significatif est fait pour la formation des acteurs de terrain, comme les praticiens et les vétérinaires d'Etat. Le programme de formation intègre la pratique de méthodes sans danger de récolte des prélèvements, la récolte et l'enregistrement des données et le développement de comportements ajustés à l'épidémiologie de l'IA.

La modélisation de scénarios probables de dissémination de l'IA utilisera les données du réseau d'épidémiologie et des éventuelles études épidémiologiques spécifiques.

Mots-clés : Influenza aviaire, épidémiologie.



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I - INTRODUCTION

Avian Influenza (AI) is a known zoonosis, which has been increasingly active in the last decade. Recent upsurges of a highly pathogenic strain of Influenza type A virus (H5N1) in different avian populations in Southern Asia, Eurasia, Eastern and Central Europe, Middle East and Northern Africa (OIE, 2006) showed its capacity of transmission and to be lethal to humans, under certain circumstances.

Transmission originated from migratory waterfowl was confirmed and illegal domestic poultry marketing or smuggling of exotic birds from infected areas is a suspected source of disease (EFSA, 2005). Early detection and efficient communication of the viral infection in avian subpopulations of resident, migratory and imported birds are considered to be cornerstones for successfully control and eradicate this menace (WHO, 2005).

From 2002, European Commission have proposed, co-financed and audited surveillance systems in order to allow an early detection and better response to eventual suspect cases of HPAI (Decision (EC) 2002/649/CE; Decision (EC) 2006/101/CE; EC, 2006).

In Portugal, since 2003, a National AI Surveillance Plan is implemented under the leadership of the Central Sanitary Veterinary Authority (CVA), which has the objective of

monitoring high and low pathogenic AI viral strains in bird populations. The avian subpopulations monitored were mainly from commercial poultry flocks and wild birds from natural parks and wildlife conservation areas.

The country has no history of outbreaks of AI which makes it difficult, for field veterinarians, poultry producers and other bird handlers, to be aware and recognize AI clinical signs. At another level, installed AI diagnostic capability is relatively recent and exclusively dealt by the Central veterinary diagnostic laboratory (LNIV). Samples from different sources are submitted to LNIV with a questionnaire requested by CVA to collect information on the sample. This questionnaire is not always filled in and there are difficulties in relating the results of the diagnosis with the epidemiological data collected in the field. Furthermore, the transfer of data produced at the laboratory level to the veterinary services is only made periodically.

In 2003 the total number of samples submitted to the Laboratory were 2 400 and in 2004 the number of samples duplicated to 5 000 (DGV, 2006). This increasing number was obtained by a more representative sample of wild birds.

In 2005, the total number of samples was 6 387. The sub-populations are indicated in the table 1.

Table 1
Number of samples for each sub-population for 2005

Samples 2005	N =6,387	%
Free range chicken	1,545	24.2
Wild birds	1,290	20.2
Laying hens	1,260	19.7
Turkeys	1,016	15.9
Pet / Zoo birds	444	6.9
Domestic ducks	355	5.6
Chicken breeders	182	2.8
Quails	157	2.5
Ratites	138	2.2

Source: MADRPa (2006)

It was recognized that the Surveillance Plan needed improvement in order to allow the production of timely and adequate information necessary for sanitary decision making and eventual management of a disease outbreak. Identified constraints include the deficient organization of data collection and handling, difficulties of maintaining a continuous data flow between partners and an insufficient data analysis and information interpretation and circulation. The reinforcement of data capture in certain avian subpopulations and a better enrolment of different partners in the surveillance system are also aspects that need to be addressed.

In order to help CVA on the implementation of an efficient surveillance system, the Veterinary Faculty of the Technical University of Lisbon,

designed an outline of a project, negotiated the adequate partnerships, prepared the project proposal and initiated the implementation of an AI surveillance project - EPIGRIPAVE. The opportunity for the initiative was made available, in the summer of 2005, by the Calouste Gulbenkian Foundation (CGF) call for proposals of research and development projects dealing with the understanding and surveillance of AI virus. This funding line was aimed to allow the Portuguese Competent Authorities (human and veterinarian) to be able to join in partnerships with universities and research institutes to better respond to the challenges imposed by AI. The present Project was one of the four (out of 16) proposals selected and financed.

II - THE EPIGRIPAVE PROJECT

The Project has focused its main objectives in five packages of activities addressing the following issues:

1. The development and modernisation of the information system, that needs better organisation of data collection, storage and analysis;
2. The improvement of the existing monitoring activities and the focus of sampling on specific avian sub-populations;
3. The support of CVA on information management and dissemination;
4. The training of field veterinarians in surveillance activities and in the utilisation of new information technology tools;
5. The development, through modelling, of different scenarios of evolution of AI outbreaks in Portugal;
6. The establishment of a biological sample bank.

The first four activity packages were due to start in the first six months of implementation. The modelling package will only start when sufficient information is made available through the previous packages and other specific data collection activities.

The Project attracted a broad partnership gathering together different public and private institutions and enterprises with diverse approaches and competencies to better face

the challenges posed by the AI world wide threat.

Besides the CVA (Direcção Geral de Veterinária) and the LNIV (Laboratório Nacional de Investigação Veterinária), a northern regional veterinary service (Direcção Regional do Entre-Douro e Minho) and the national nature conservation institute (Instituto para a Conservação da Natureza) are public institutional partners. The national federation of poultry producers (FEPASA) and a wildlife specialist group from an agricultural institute of Coimbra (Escola Superior Agrária de Coimbra) are partners, as well as four private enterprises dealing either with synanthropic birds control (Volataria), wildlife and game populations (Pygargus Vet) and viral diagnostic (Controlvet and SEGALAB).

1. DEVELOPMENT AND MODERNISATION OF THE INFORMATION SYSTEM

This activity includes the design and implementation of an Internet based system for data registration at field level and transference of information between all entities, at different levels – field, regional, laboratorial and central. This important tool is under development and some components have already become operational.

This is the case of the registration system for census data on non-industrial owned bird

populations named – SIREA (Information System for Registration of Poultry Farms). The system consists in a web-based database and platform for data entry and aims to identify and characterize the backyard poultry units and the non-closed ornamental and sport bird populations kept by private owners, allowing the mapping of these populations. The recording of data on the system is performed at field level by parishes, counties (or municipalities) and other local authorities.

SIREA has already registries of 2 846 parishes (over a total of 4 260) and allowed, in the first two months of operation, the registration of 146 503 owners and the corresponding avian species existence (3 681 478 birds) (MADRPb, 2006). Data adjustment and population estimation for non-reporting administrative units is under development based on human demographic data.

Still regarding the population data management, another system is under development to register the industrial poultry producers.

For the other bird populations, synanthropic birds are controlled at municipal level and wild birds are monitored and their movements recorded by the Nature Conservation Institute, a Project partner.

The second part of the information system development is related to the surveillance activities. The data collection questionnaires, which have to complement the biologic samples, have been revised and updated. This validation included their use in hypothetical exercises during the training sessions promoted by the Project with the regional and county veterinarians. Three new forms were proposed for approval by the CVA. These forms relate to the collection of samples in (1) poultry backyard or industrial farms, (2) slaughterhouses and (3) exotic, synanthropic and wild bird species.

The platform for the online introduction of data collected by the questionnaires is under development. The system will allow municipalities (the county veterinarian) and regional/local veterinary services to upload the questionnaires and made them available to the Laboratory.

An interface for the transfer of data to and from the Laboratory is being developed in collaboration with LNIV and CVA, to facilitate the continuous update of the results and sanitary information.

The complete information system will connect in an easy, secure and fast way, the field units, the Laboratory and the regional and central veterinary services. Outputs will be, among others: i) the geographical distribution of passive surveillance (suspected cases) and active surveillance samples, by population group; ii) the distribution of suspected cases by notifying entity; iii) the geographical distribution of low pathogenic AI virus (LPAI) by population group. Another important use of the information system is the outbreak characterization and management in the event of introduction of HPAI in the country. In this case, possible outputs are: iv) the geographical and temporal distribution of highly pathogenic AI virus (HPAI) outbreaks; v) the time period between the starting of infection and outbreak confirmation; vi) the characterization of outbreaks in relation to several parameters, including possible source of infection; vii) the morbidity, mortality and slaughter rates; and viii) the implementation of eradication measures: temporal sequence of activities and results.

2. SAMPLING ON SPECIFIC AVIAN SUBPOPULATIONS

To improve the existing monitoring activities, some specific avian subpopulations, especially in higher risk areas (where migratory waterfowl concentrates), should be sampled and characterised. As an example, some population sampling has been increased within the scope of the Project, addressing specifically wild waterfowl and migratory and resident seagulls and synanthropic pigeons. These efforts aim to validate HPAI virus absence in these subpopulations.

3. INFORMATION MANAGEMENT AND DISSEMINATION

Information management and circulation is a part of the development of the information system but a specific Project activity will be devoted to the issue, due to its importance.

Production of specific reports to facilitate information transfer from CVA to all partners is the most critical aspect, with the attempt to produce a feedback of information which not only fulfils the identified needs but also stimulates on-going cooperation within the network. Production of reports in the format requested by the European Commission, the OIE and other bodies is another aspect of the activity.

An internet site is being build-up containing broad information for professionals, bird producers and consumers. Issues like Project description, biosecurity, personal safety, food security, legislation and updated information on national and international occurrence of the disease, will be available in the site.

At present, pamphlets with clear and practical rules to increase biosecurity by backyard producers have been design in collaboration with CVA, and distributed during the period of registration of SIREA.

4. TRAINING OF FIELD VETERINARIANS IN SURVEILLANCE ACTIVITIES

To train field veterinarians in surveillance activities, the Project has started a one-day training course to be performed in all the seven agricultural regions of Portugal. This course aims to develop a surveillance attitude and stimulate the cooperation with the network by field veterinarians both from regional and county services.

The course has a theoretical part of three hours on updating on AI viral, clinical, epidemiological and worldwide situation, both for domestic and wild bird populations. Another hour is dedicated to the explanation of clinical and post-mortem signs of AI and its differential diagnosis. Two hours of practical training on a

necropsy room, dealing with safe handling and sampling on live poultry, sampling from death poultry and wild birds and data registration, is also included. The course ends with a session of one hour on epidemiological surveillance and the current network status of development and a general discussion with the group. Four editions have already been completed, involving 127 veterinarians.

5. DEVELOPMENT OF EPIDEMIOLOGICAL MODELS FOR AI IN PORTUGAL

The development, through mathematical modelling, of different scenarios of evolution of outbreaks in Portugal, will use the data generated by the operating surveillance system and data generated in specific epidemiological studies. These models aim to predict major viral spread pathways in bird populations, in case of an outbreak.

6. ESTABLISHMENT OF A BIOLOGICAL SAMPLE BANK

A tissue and sera bank of samples will be created and maintained in order to allow the repetition of suspected results, validate negative ones or perform future epidemiological studies.

III - CONCLUSIONS

The availability of an efficient surveillance system is a fundamental tool for the preparedness of any country against HPAI. The development of such systems is not an easy task and strongly benefits from the partnership of public and private institutions, from different areas of intervention (official veterinary services, diagnostic laboratories, academia, nature conservation and bird control services and the industry) which is the main

objective of EPIGRIPAVE Project - to join expertise and efforts at national level.

The activities under development since January 2006 have already allowed for an improvement of available information on bird population in the country as well as relevant information for the monitoring of these populations regarding AI.

BIBLIOGRAPHY

- Commission Decision (EC) 2002/649/CE of 5 August 2002 on the implementation of surveys for avian influenza in poultry and wild birds in the Member States, Official Journal of the European Union. [Online: <http://eur-lex.europa.eu/>]<http://eur-lex.europa.eu/>, consulted in May 2006].
- Commission Decision (EC) 2006/101/CE of 6 February 2006 on the implementation of survey programmes for avian influenza in poultry and wild birds to be carried out in the Member States in 2006, Official Journal of the European Union. [Online: <http://eur-lex.europa.eu/>, consulted in May 2006].
- EC - Guidelines on the implementation of Survey Programmes for Avian Influenza in Poultry and Wild Birds to be carried out in the member states in 2007. European Commission SANCO/10268/2006 Rev5. Working Document, 16 May 2006.
- EFSA - Scientific Opinion on Animal health and welfare aspects of Avian Influenza. European Food Safety Authority 2005. [Online: http://www.efsa.eu.int/science/ahaw/ahaw_opinions/catindex_en.html, consulted in May 2006].
- MADRPa - Reports on the surveillance of avian influenza in Portugal. (Plano de Vigilância – resultados globais) Ministério da Agricultura, Desenvolvimento Rural e Pescas, 2006. [Online: http://www.min-agricultura.pt/oportal/extcnt/docs/folder/prot_temas/f_pecuaria/f_gripe_aviaria/gripe_aviaria_plano_vigilancia.pdf, consulted in May 2006].
- MADRPb - Portugal regista 3,7 milhões de aves. Ofícios e Comunicados Oficiais - Ministério da Agricultura, Desenvolvimento Rural e Pescas, 2006. [Online: http://www.min-agricultura.pt/oportal/extcnt/docs/FOLDER/PROT_TEMA_S/F_PECUARIA/F_GRIPE_AVIARIA/GRIP E_AVIARIA.HTM, consulted in May 2006].
- OIE - Outbreaks of Avian Influenza (subtype H5N1) in poultry. From the end of 2003 to 15 June 2006. Update on Avian Influenza in animals (type H5). Office International des Epizooties, 2006. [Online: <http://www.oie.int/download/AVIAN%20INFLUENZA/AI-Asia.htm>, consulted in May 2006].
- WHO - Global influenza meeting sets key action steps, agrees on urgent need for financing. World Health Organization. Joint News Release WHO/FAO/OIE/WORLD BANK, 9 November 2005. [Online: <http://www.who.int/mediacentre/news/releases/2005/pr58/en/>, consulted in May 2006].

