Assessment of different Surveillance Systems for Avian Influenza in commercial poultry in North-Eastern Spain.

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INTRODUCTION

The protection of domestic poultry from Highly Pathogenic Avian Influenza (HPAI) viruses infection constitutes a priority and a major concern for the public and animal health authorities of many different countries over the world.
In order to detect an early incursion of HPAI and notifiable Low Pathogenic Avian Influenza (LPAI) viruses and to give a rapid response in the event of an AI outbreak in domestic birds, many veterinary surveillance activities in domestic poultry and wild birds have been stepped up since 2005 in European Member States.

GOALS OF THE STUDY

To **evaluate the sensitivity** of **different designs of serological surveys** used for AI surveillance on a same poultry population.

MATERIAL AND METHODS

REFERENCE POPULATION

Commercial Domestic Poultry of Catalonia (North-Eastern Spain)

TOTAL CENSUS: 2,033 flocks
46,723,522 birds

- Chicken
- Ducks
- Geese
- Ostriches
- Quails
- Turkeys

SEROLOGICAL DESIGNS for AI SURVEILLANCE from 2007 to 2009

Design 2007
136 flocks
4,093 samples

Design 2008
173 flocks
4,167 samples

Design 2009
287 flocks
5,797 samples

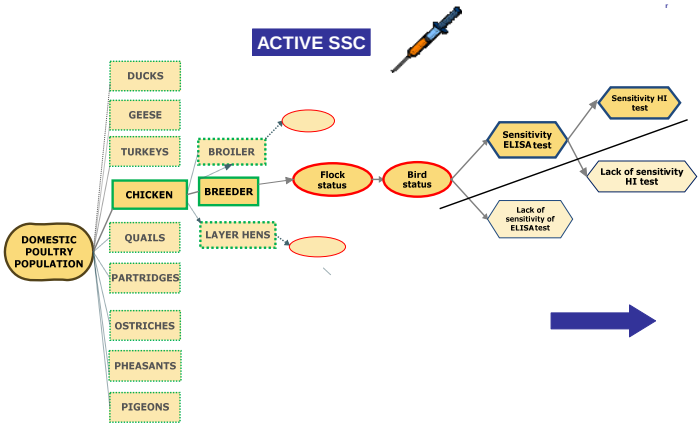
SCENARIO TREE APPROACH

It **represents each one of the elements that take part in the process of detection of AI infection** in each of the Suveillance System Components (SSC) (Martin, 2007).

Category node Describe the different **relative risk** for AI infection that have the **diverse strata** of the population of study.

Infection node Indicate **hypothetical prevalence** that has to be detected at different considered stratus (at individual or at flock level).

Detection node Define all the **processes** that should take place **to notice** the infection.



Node-Branch	Type of nodes	Range of values considered	Probability of distribution function used	References or sources of information
Species – Ducks	Risk	2.3 – 7.5 – 4.5	Pert	
Species – Geese	Risk	1.4 – 1.9 – 4.5	Pert	
Species – Turkeys	Risk	1.3 – 1.9 – 9.6	Pert	
Species – Chicken	Risk	1 (reference stratum)	—	
Species – Quails	Risk	1.4 – 3.0 – 5.1	Pert	
Species – Partridges	Risk	1.4 – 3.0 – 5.1	Pert	
Species – Ostriches	Risk	0.9 – 1.0 – 1.3	Pert	
Species – Pheasants	Risk	1.4 – 3.0 – 5.0	Pert	
Species – Pigeons	Risk	0.5 – 0.5 -0.5	Pert	
Production – Breeders	Risk	1.7 - 4.3 – 10.9	Pert	
Production – Meat	Risk	1 (reference stratum)	Pert	
Production – Laying Hens	Risk	2.5 - 4.5 – 9.6	Pert	
Flock status P_F*	Infection	0,05 – 0,01 , <10 flocks	Fixed values	
Bird status P_U*	Infection	0,3 – 0,1	Fixed values	
Sensitivity ELISA	Detection	0,957 – 0,992 – 0,999	Pert	
Sensitivity HI	Detection	0,957 – 0,992 – 0,999	Pert	

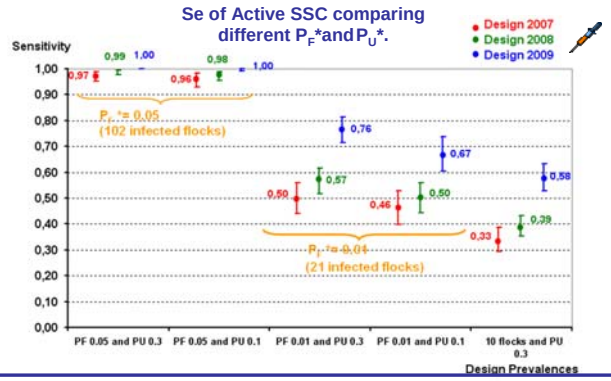
$$Se_{Fi} = 1-(1- P_U^{*}{}_{ij} \times SeELI_i \times SeHI_i)^{n_i}$$

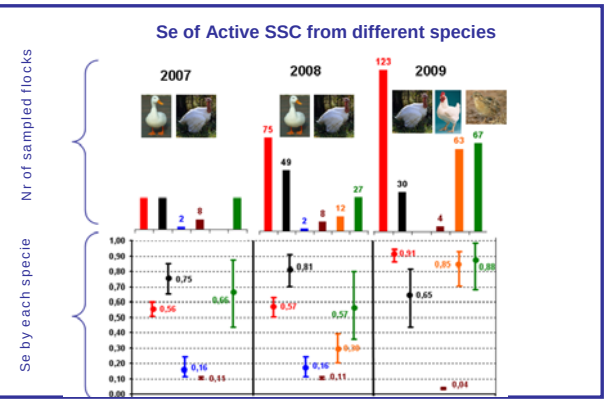
$$Se_{ActiveSSC_j} = 1- \prod_{i=1}(1- (EPIH_{f(strata)} \times Se_{Fi})$$

Time period analysis: Quarterly

Used software: Microsoft Office Excel 2003 @RISK 5.0 for Excel

RESULTS





MAIN CONSTRAINTS OF THE MODEL

Broad variations between **different strains** and susceptibility to **different poultry species.**
Difficulty to identify and **quantify** all the **risk factors.**
No differentiation between **free-range** and **non free-range in the husbandry systems.**
Time elapses between the infection and the appearance of **clinical signs.**

CONCLUSIONS

- It is important to **increase the degree of awareness of farmers** and **veterinarians** for the **early detection of HPAI.**
- The **sampling of target species as ducks, turkeys or quails increase the efficiency of the active SSC**.for LPAI.
- There is **no need of increasing the sampling within flock for LPAI**.
- It is important to **implement the serological surveys over the whole year** to obtain a high Sensitivity by quarter or month.

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