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**Vaccination and Surveillance for HPAI in Poultry :
Current Situation and Perspectives**



Field experiences on surveillance in vaccinated populations; the Netherlands

J.J. (Sjaak) de Wit

DVM, PhD, EBVS® European Specialist in Poultry Veterinary Science

Royal GD (Deventer) and Faculty of Veterinary Medicine, Utrecht University, the Netherlands

LP-HPAI surveillance program *the Netherlands*

- Commercial poultry:
 - No endemic LPAI of any subtype, no HPAI (culling of infected flocks)
- National AIV surveillance program
 - *Active* and *passive* surveillance of commercial poultry
- Screening (healthy) wild birds by EMC
- Testing suspicious death of wild birds and mammals by WBVR
- **Goals:** show freedom, detect infections as early as possible to prevent spreading, risk assessment (wild birds – poultry)

LP-HPAI surveillance program *the Netherlands*

- National AIV surveillance program (costs payed by farmers)
 - *Serological screening of all farms (≥ 250 birds)*
 - *Indoor poultry: once per year, ≥ 30 samples**
 - *Pullet flocks: every flock, ≥ 30 samples**
 - *Free range / organic: 4x per year, ≥ 30 samples**
 - *Turkeys: every flock, ≥ 30 samples**
 - *Ducks: once per year, ≥ 40 samples**
 - **at least 5 samples per house*

Passive surveillance, *the Netherlands*

- Commercial poultry: **obligatory notification** in case of :
 - laying hens, breeders or broilers >10 days:
 - increased mortality of $\geq 0.5\%$ per flock per day for 2 consecutive days,
 - *or* has tripled for 2 consecutive days compared to the average mortality in the week prior to death
 - (meat) ducks >7 days:
 - $\geq 0.15\%$ mortality for 2 consecutive days
 - *or* $\geq 0.5\%$ mortality on 1 day and a simultaneous decrease in feed intake of 5%
 - meat turkeys: increased mortality on 2 consecutive days of $\geq 1\%$ per day
 - bird flu-susceptible animals: more than 3% per week
- When should a **veterinarian immediately be consulted** (commercial poultry)?
 - For animals susceptible to bird flu:
 - show symptoms of bird flu
 - the animals consume 5% less food or water for 2 consecutive days
 - laying 5% fewer eggs for 2 consecutive days (reproductive animals and laying hens)
 - The veterinarian then takes a smear (swab) from the throat and cloaca and sends it to WBVR for PCR testing

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90% of infected flocks are culled within 24 hours after notification

Vaccination against H5

- The Netherlands does not vaccinate against AIV (any subtype)
- A vaccination-challenge study is being performed
 - Two layer flocks vaccinated against H5 (eggs destroyed)
 - Aims:
 - Efficacy of vaccines under field conditions
 - 2003-2004: results in field were disappointing compared to experimental conditions
 - Duration of protection
 - health, shedding, transmission
 - Correlates of protection
 - Performance diagnostics, complications?
 - Selection of H5 vaccines was based on results of experimental vaccination-challenge study at WBVR with pullets and challenge at 8 weeks with H5 2.3.4.4b
 - Both HVT-H5 vaccines: **full protection against illness and mortality, some shedding, no transmission (R = 0)**

Field vaccination-challenge study (funded by Dutch government)

- 2 (small) layer farms (started September 2023)
 - Each farm:
 - Group 1: HVT-H5 A (D0)
 - Group 2: HVT-H5 B (D0)
 - Group 3 HVT-H5 B (D0) and H5 subunit vaccine at week 12
 - Negative control group
 - Weekly RT-PCR, monthly 60 sera (Np antibody ELISA), 120 sera for the HI-test H5 (homologous vaccine-like antigens)
 - Birds to WVBR for challenge (W8, W24, W52, W83)
 - Results W8: very similar to the results in the earlier experimental study
 - Results W24: will become public very soon
 - Results W52: challenge is recently performed
 - Results W83: ...

Surveillance test results so far (1)

- Weekly RT-PCR's: all negative
- Monthly serology (up to July 2024):
 - Np-ELISA on 2880 sera of vaccinated birds: 99,76% negative
 - Np-ELISA on 1920 sera of both negative control groups: 99,79% negative
 - HI H5 ('homologous to vaccine'): >99% positive
 - HI H5 2.3.4.4b antigen: much lower titres

Surveillance test results so far (2)

- Specificity screening Np antibody ELISA is not affected by the used HVT and subunit vaccines
- 0.2% false positives
 - Samples were sent to WBVR for confirmation
 - Retested with another Np-ELISA (inhouse) and HI H5 test
 - Part sera negative in second Np-ELISA
 - High homologous HI titre, low/negative 2.3.4.4b titre
 - No results yet by Luminex testing for antibodies against NA

Surveillance test results so far

- Note: 0.2% of 60 sera x 24 months = on average 2.9 samples/suspicious per vaccinated layer flock
- What to do with (these) single reactors?

Labor, costs (for vaccination)

- Vaccine(s), application
- Weekly RT-PCR, monthly 60 sera and farm visit (based on EU Delegated Act)
 - Who takes weekly samples?, transport, paper work
- Number of extra veterinarians required for the Netherlands for the routine screening (excluding suspicions):
 - Estimation by association of poultry vets:
 - between 32 and 73 (all 2200 farms)
 - between 6 and 15 for the free-range / organic layer farms (about 400)

Rough estimation of costs surveillance for farmer per year: 7,500-15,000 euro per flock

A big challenge for the applicability of vaccination against H5, especially for small farms

Thank you for your attention!

