



Department
for Environment
Food & Rural Affairs

HPAI Vaccination in poultry – pros and cons

Dr Helen Roberts,

Senior Policy, Science and Risk Advisor

Exotic Disease Control

Defra

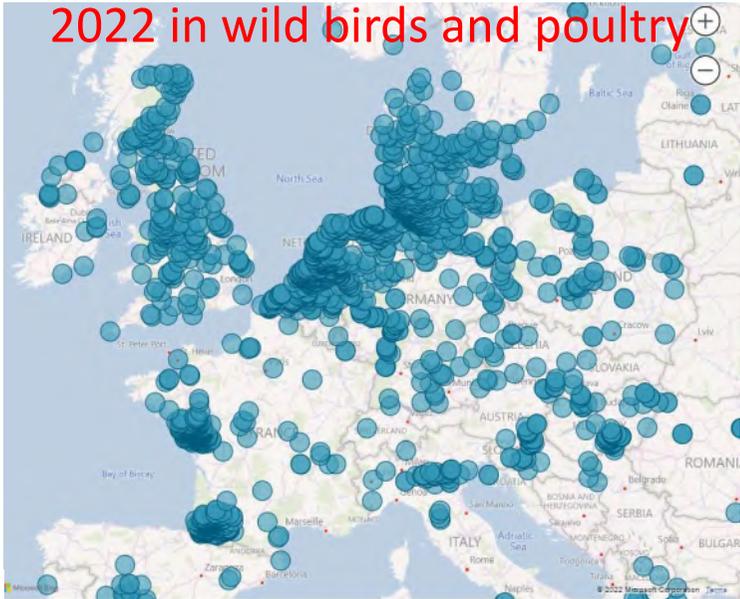
Professor Ian Brown

Head of Virology

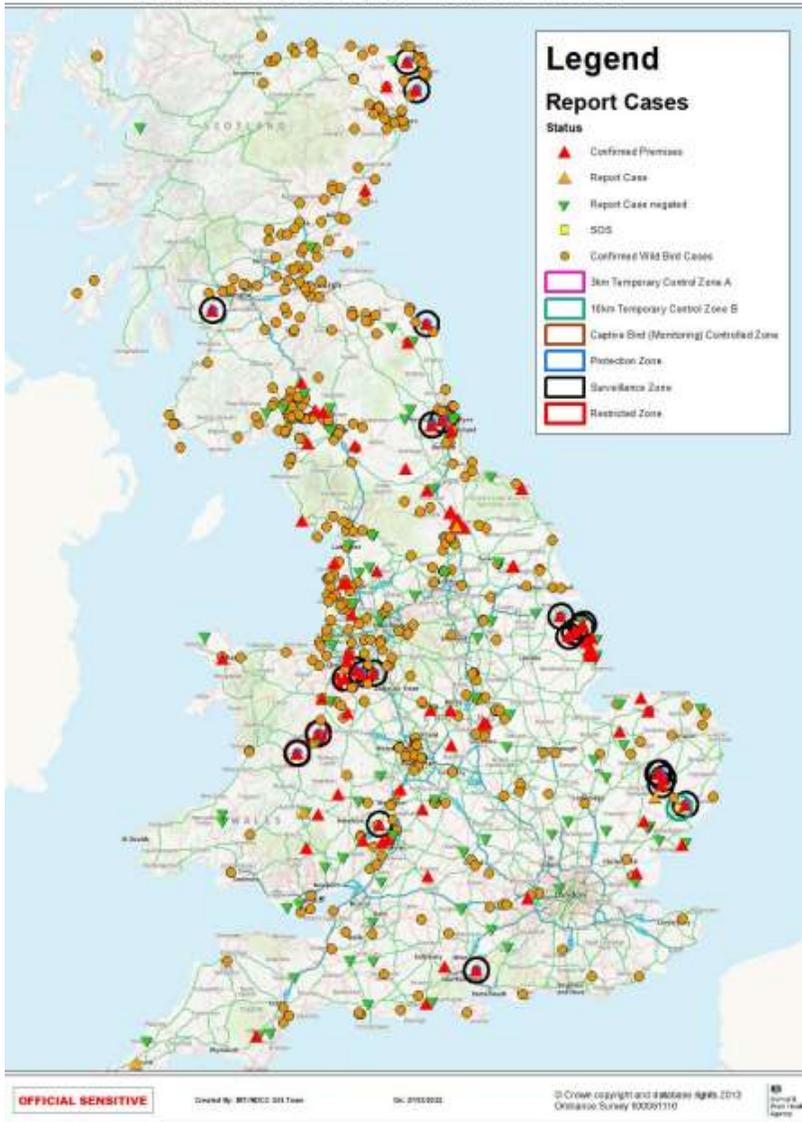
APHA



Global situation with avian influenza



Avian Influenza - HPAI H5N1

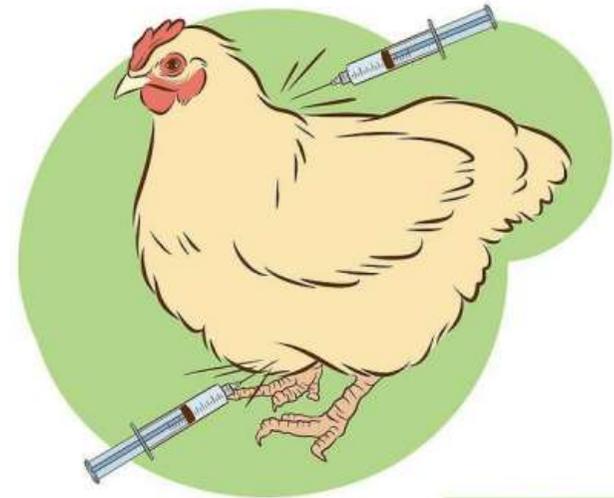


GB Current Situation

- **102** outbreaks in GB
- Policy intent remains the same: the eradicate disease, to regain disease freedom as swiftly as possible, to maintain trade and access to the countryside, to protect public health.
- **29** IPs still have zones in place – Lincs are latest to be revoked; two new IPs in Suffolk not on map
- Wild birds: **841** wild bird positive detections, in **242** locations, involving **39** species in **73** Counties.
- **AIPZ** remains in place across GB

Aims of vaccination programmes

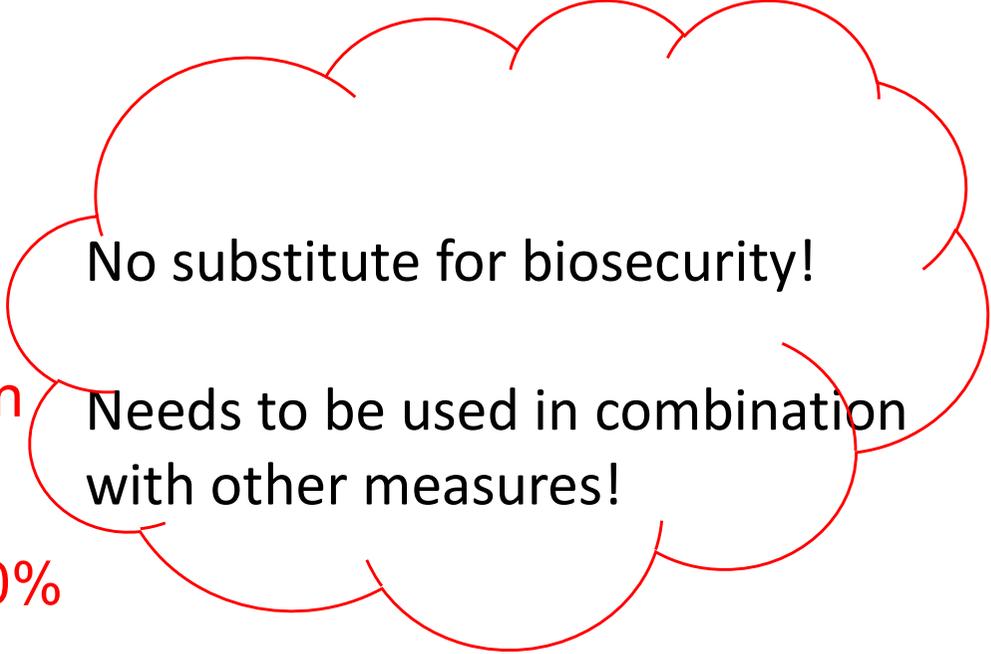
- Freedom from disease
- No effect on production or high expense
- No trade issues
- Eradication for zoonotic strains



Wild How to Vaccinate Chickens

Current vaccines

- Protect against clinical signs
- Decrease susceptibility
- Reduce virus excretion
- Reduce virus transmission
- BUT
- Won't prevent infection / replication
- HPAI could still be confirmed
- Coverage will need to be >60%-80%
Ro dependent
- Could lead to endemic situation



No substitute for biosecurity!

Needs to be used in combination
with other measures!

Types of vaccines

- Need to match to the field strain to reduce shedding, clinical signs, TX
 - **Inactivated**
 - Inactivated AI with adjuvant – cheap, easy to adapt to new strains
 - Need two doses, no DIVA, no mass application, poor in chicks (matAb)
 - **Vectored**
 - Uses another avian virus – cheap, DIVA, mass application
 - May have immunity to the avian virus, host specificity important
 - **Other**
 - Nucleic acid vaccines – DIVA, host unspecific
 - Expensive, unknown how to apply in the field
 - Licensure, cost benefit, vaccine bank, perception, surveillance, trade agreements and EU AHL vaccine decisions
-

China

- Vaccinating since 2000 in all commercial poultry but not live bird markets
 - 14 updates to date as the H5 HPAI/Guangdong lineage continually evolves
 - Drives emergence of new fitter variants
 - Co-circulation of sub-families means cross-protection is not assured
 - Clade 2.3.4.4b H5N6 emerging public health threat
 - However, varying reactivity in different host species, the short production cycle of these birds and generally low immunogenicity prevent broad usage
 - A 'universal' influenza vaccine is a possible strategy to elicit antibodies targeting conserved regions across all known influenza strains, and a number of clinical trials are ongoing.
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OIE recommendations

“Vaccination will not affect the high pathogenicity avian influenza status of a free country or zone if surveillance supports the absence of infection, in accordance with Article 10.4.28,...”

“Vaccination can be used as an effective complementary control tool when a stamping-out policy alone is not sufficient. Whether to vaccinate or not should be decided by the Veterinary Authority on the basis of the avian influenza situation as well as the ability of the Veterinary Services to implement the vaccination strategy,...”

Requirements to do surveillance in vaccinated populations, zones or compartments to provide evidence of absence of infection

Current work in the EU

- France have substantial problems dwarfing our outbreaks 6.5 to 1.0! Unsurprisingly this is having an impact to push on with vaccine evaluation. A small pilot field trial will start very shortly (details not yet available).
 - NL: work commissioned to evaluate three vaccine technologies (vector, DNA and HA protein only) all applying the DIVA principle and will assess impact on clinical protection, virus shedding and importantly transmission (assuming to naïve and vaccinated contacts). A small field trial under discussion whereby birds would be vaccinated under field conditions and brought into biosecure licensed lab housing for challenge.
 - Some trials underway in EURL builds to EU seriously looking at intervention and preparedness ahead together with possible revisions to AHL.
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Vaccination as a tool for prevention/control

Summary issues

- Although many vaccines are used few have proven utility to prevent H5 HPAI infection at population level
 - Lack ease of delivery and efficacy versus a diverse family of viruses
 - Prime/boost (vector followed by inactivated)
 - Innovations in vaccine design have largely not been invested in for AI for different field applications
 - Universal vaccines?
 - Target hosts: anseriformes present greatest challenge
 - Differentiating Infected from Vaccinated Animals
 - Relevant for some areas/regions likely important for trade
 - Produced in accord with international standards (OIE)
 - **Surveillance needs to support trade; OIE Animal Health Code**
 - USA small vaccine stockpile since 14/15 epidemic
 - rgH5N1 inactivated vaccine, RNA particle vaccine (i.e defective alphavirus vaccine) and recombinant HVT
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Emergence of H5N8; EMI 2020

Nicola S Lewis^{1,2}, Ashley C Banyard^{1*}, Elliot Whittard¹, Talgat Karibayev³, Basem Al-Adhahd⁴, Ilya Chvala⁵, Alex Byrne¹, Saduakassova Meruyert (Akberovna)⁶, Steve Essen¹, Adam Brouwer¹, Azimkhan Tegzhanov³, Victor Irza⁵, Ron AM Fouchier⁷, Sultanov Akhmetzhan (Akievich)⁶

Royal Veterinary College

National Veterinary Reference Centre, Infectious Diseases Laboratory,
The Committee for veterinary control and supervision, Nur-Sultan city,
Republic of Kazakhstan.

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National Reference Laboratory for Avian Influenza and Newcastle
Disease, Federal Centre for Animal Health" (FGBI "ARRIAH") Yur'evets
Vladimir 60090 Russia

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PCR



Professor Ian
Brown, Head
Virology