



Department
for Environment
Food & Rural Affairs



Mapping and reviewing existing risk management priorities and countermeasures

**Animal disease risk assessment, management &
simulation exercises training workshop Abu Dhabi, United
Arab Emirates, 17-19 October 2023**

Foor and Mouth Disease, Peste des Petits
Ruminants, Lumpy Skin Disease, Rift Valley
Fever, Sheep and Goat Pox



Learning Objectives

- Prioritising risk management measures
- Mapping risk management measures
- Reviewing effectiveness

Prioritisation of the risk



- Comparing multiple hazards
- If they all have the same likelihood or probability of occurring ...
- Value of the target livestock and the economic losses expected
- Impact of the hazard on the welfare of the livestock
- Public health impact (including mental health impact)
- Trade and losses of different value commodities
- Wider Society losses

Prioritising risk management measures



- Political will
- Economic cost benefit
- Availability and practicality of the measure

- Risk Appetite – The degree of uncertainty an entity is prepared to accept in pursuit of its objectives.
- Risk Tolerance – The degree, amount, or volume of risk impact that an organisation or individual will withstand.
- Risk Threshold – The level of uncertainty or impact at which a stakeholder will have a specific interest. Below the risk threshold, the stakeholder will accept the risk. Above the risk threshold, the stakeholder will not accept the risk.

Tools to assess risks, costs and benefits for risk managers



- Benefit cost analysis
- Cost utility analysis
 - Compare the particular measure such as a QALY or DALY with the cost
- Cost effectiveness analysis
 - Compare the cost of vaccination or treatment with the loss of production and value of the animal

livestockmovements.shinyapps.io/movement_control/
mintrisk.wecr.wur.nl – for comparing the incursion and impact of vector borne diseases which can help identify the most likely pathways for control

Costs



- Data are required on both production losses and the costs of interventions
 - This will guide resource prioritisation and allocation
 - How much does a disease cost?
 - How much does a control measure cost?
 - How much does the control measure reduce the impact of disease?
 - What other effects can the control measure have?
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Impact of disease



- The number of epidemiological units infected within each functional group, both for domestic animals and wildlife populations
- Severity of disease in each functional group (based on the proportion of animals with predefined disease status)
- Expected spatial extent of spread
- Time period during which disease spread is observed, i.e. the length of the epidemic or if longer than one year, a one-year period

Impact of controls

- Are animals being culled or slaughtered (meat entering food chain) and is compensation paid?
 - Will animals be vaccinated – who pays? Livestock keeper or industry or government
 - How many will be vaccinated? What is the scenario? Is it a firebreak or to vaccinate the national herd?
 - Is the infection preventing sale of meat or skins or a zoonotic disease risk?
 - Welfare impacts of both the disease and the controls – short or long term movement restrictions can be problematic
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Welfare – apply a score to the population



Impact of restrictions and control measures on Animal Welfare at the farm level	
0	No controls applied, no observable clinical signs in livestock
1	No welfare impact observable in any livestock species beyond the disease control measures.
2	Some short-term welfare impacts – easily reversible (for example movement restrictions for several days or weeks) [Freedom from expressing natural behaviours]
3	Welfare likely to be compromised but direct impacts may not be necessarily visible to the assessor (e.g. animals with no lighting – they can survive if they are still getting food and water, their welfare is compromised but the animal would have to be restricted for a very long time) [Freedom from heat stress, physical discomfort, fear & distress]
4	Unnecessary suffering caused – immediate action required [Freedom from hunger, malnutrition, thirst]
5	Unnecessary suffering caused – immediate action required (including option for humane killing) [Freedom from pain, injury, disease]

Effectiveness

- Is there a model to look at applying the measure?
 - Surveillance plans – can be very expensive and can take a long time but they are necessary to show disease freedom
 - If vaccination is used, is there a DIVA test? What happens with vaccinated animals – are they allowed to live?
 - C&D – can have detrimental effects on the environment but is there enough evidence about the different disposal methods?
 - Insecticide use – impact on pollinators
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Example Vaccination scenarios for avian influenza



- Recent EFSA opinion for the EU
<https://onlinelibrary.wiley.com/resolve/doi?DOI=10.2903/j.efsa.2020.271>
- Model simulations in France, Italy and The Netherlands revealed that
 - duck and turkey farms are more infectious than chickens,
 - depopulating infected farms only showed limitations in controlling disease spread, while 1-km ring-culling performed better than or similar to emergency preventive ring-vaccination scenarios, although with the highest number of depopulated farms,
 - preventive vaccination of the most susceptible species in high-risk transmission areas was the best option to minimise the outbreaks' number and duration,
 - during outbreaks in such areas, emergency protective vaccination in a 3-km radius was more effective than 1- and 10-km radius.
 - Vaccine efficacy should be monitored and complement other surveillance and preventive efforts

- Three vaccination strategies (emergency suppressive, emergency protective and preventive) with their final foreseen outcome (freedom from disease, rapid eradication or minimising losses) and risk factors were characterised, resulting in different vaccination scenarios.
- Three scenarios applied emergency protective vaccination, and considered ring vaccination of all poultry species within a 1-km, 3-km and 10-km radius, respectively, of infected poultry farms.
- The last scenario applied preventive vaccination, and considered vaccination of only targeted poultry species with higher susceptibility and/or spreading potential, which were expected to contribute the most to secondary virus transmission

Drawbacks of vaccination

The main drawbacks that could hamper the success of a vaccination programme were

- insufficient intrinsic efficacy of the vaccine to fully protect vaccinated birds and prevent new outbreaks,
- host-specific factors (including external factors that adversely affect the host's immune system, such as immunosuppressive diseases) leading to extrinsic vaccine failure due to hampered immune response of vaccinated birds,
- inadequate vaccine coverage within farms and/or regions which could prevent the achievement of sufficient herd immunity to stop virus circulation and
- inefficient surveillance that may lead to the inability to detect field virus in vaccinated flocks, resulting in clinically silent circulation of HPAIV

Questions or comments?

