

# FMD

## Taking the Decision to Vaccinate



'FMDV Vaccine to Live' Seminar

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Moredun Research Institute

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# Why consider vaccination?

EU directive on control of foot-and-mouth disease (2003/85/EC) states:

*‘That the competent authority shall, immediately upon confirmation of the first outbreak of foot-and-mouth disease prepare all arrangements necessary for emergency vaccination in an area of at least the size of the surveillance zone.’*

# Preparedness

- IAH-Pirbright able to identify the virus strain within 6 hours of receipt.
- Contracts to produce up to 2.5m doses of strain-specific vaccine
- Available within 4 days from the UK vaccine bank.
- Contracts with Genus Plc, to start vaccine deployment within 5 days.

# Epidemiological modelling

- Exodis-FMD™ model forms part of Govt's quantitative modelling standing capacity.
- Can be used to:
  - Predict the shape and size of an FMD outbreak (farms infected, farms culled, animals culled, animals vaccinated etc) in both space and time
  - Test different control strategies
  - Estimate the resources required
- Outputs can be fed into Economic Consequences Model

# Economic Consequences Model

- Uses outputs from Exodis model
- Values each of the physical aspects of the outbreak to estimate total cost
- Vaccination generally increases total outbreak cost except in very large outbreaks
- In larger outbreaks, vaccination substantially reduces IPs & animals culled
- Vaccination more likely to reduce total cost if:
  - High livestock density
  - High virus infectivity
  - Cull delays
  - Tracing effectiveness low

# What gets taken into consideration?

- Decision to vaccinate taken at Ministerial level.
- Not just a simple yes or no
- Need to decide and consider:
  - When
  - Where
  - Which species
  - What controls and requirements will be required
  - Industry, consumer and political perception

# When to vaccinate?

- Must be deployed at the right time:
  - Generally 4 days after vaccination there are good levels of protection in animals which rises to very good levels after 7 days.
- **Too soon:**
  - as yet undetected disease could appear beyond the vaccination zone, seriously jeopardising the disease control policy and meaning vaccine would have been wasted.
  - IPs could appear in an area where vaccination would have a bigger impact than where originally deployed.
- **Too late:**
  - the spread of disease would have been such that vaccinating would have little or no impact on disease control.
- NB: While ideally a vaccination campaign might take place against a backdrop of a clear epidemiological picture, this is not necessarily possible in the early stages of an outbreak when disease information may be incomplete.

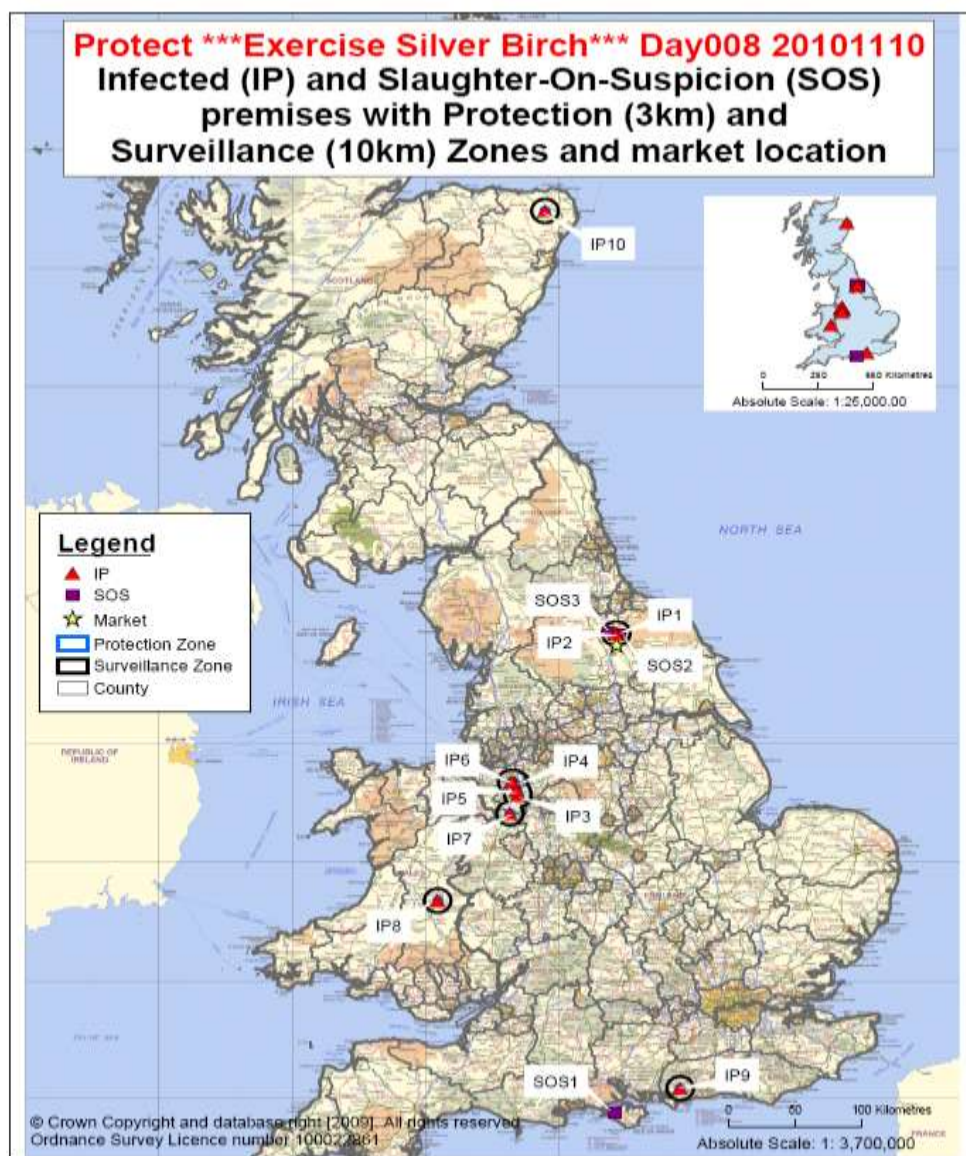
# Where to vaccinate?

- **Experts will recommend**
  - Number, location and size of zones
  - Delivery strategy
    - Vaccination could be carried inside out; or, starting at the outside of the zone and working inwards.
    - Alternatively, the largest premises in terms of susceptible animals could be targeted first.
  - Exodis-FMD model (and other modelling) may help to this inform decision, as well explore as the resource available to deploy vaccine.
- **Taking into account**
  - Geographical spread
  - Rate of transmission
  - Density of susceptible livestock, etc

# What to vaccinate?

- Information on the types of animals at premises will be crucial.
- Concentrations of cattle, pigs or sheep must be taken into account.
- Proportion of population to receive vaccine will depend on population density.
- Experts will consider which species to vaccinate, especially if in high densities.
- Modelling can be used to look at which scenario for vaccination might be useful eg which species

# Exercise Silver Birch



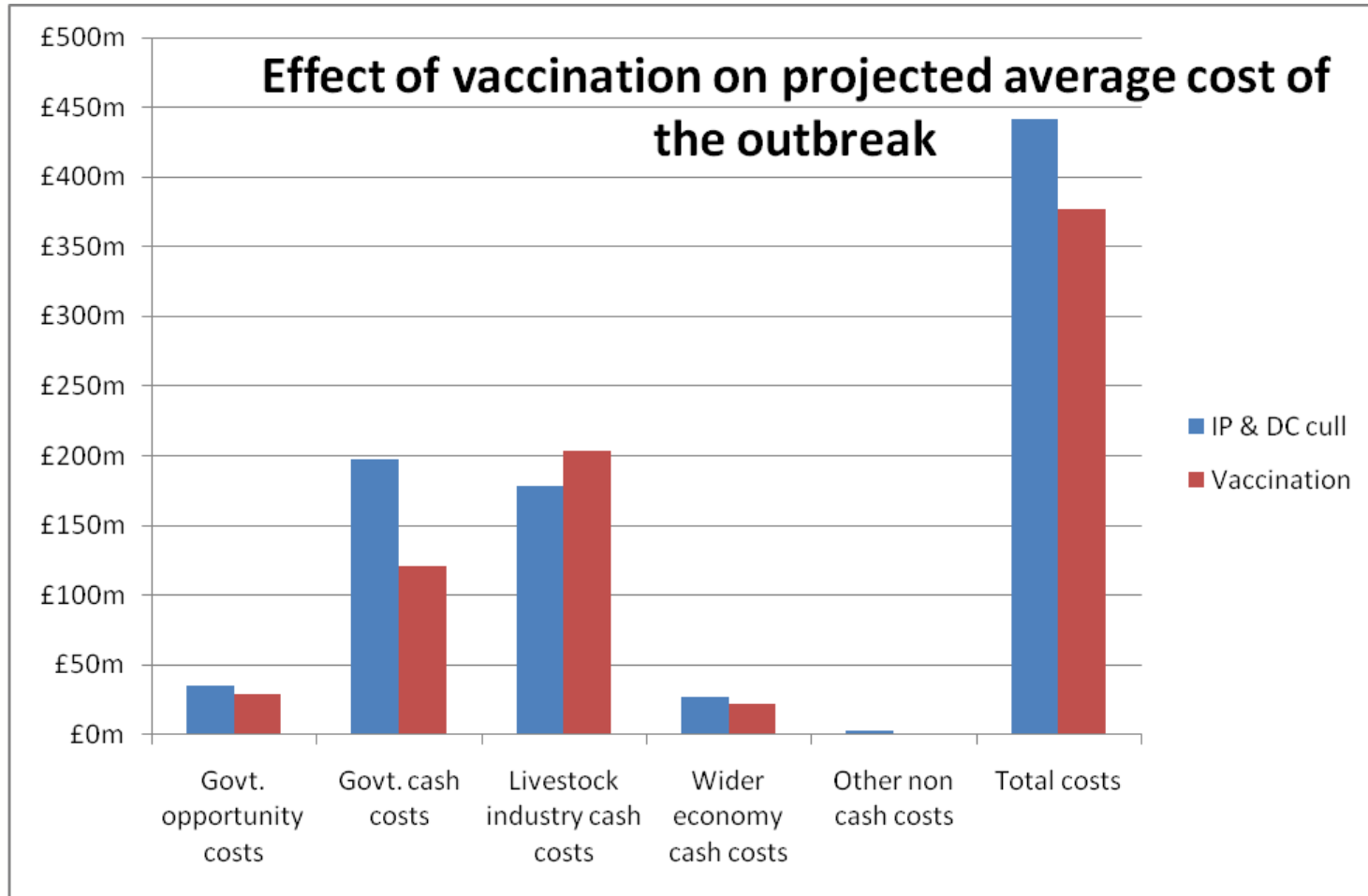
CREATOR: NDCC, Defra

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# Exercise Silver Birch: Output from ECM



# Conclusions from Silver Birch

- Vaccination reduces expected outbreak cost
  - loss of value of vaccinated animals could alter this (small increase in average outbreak cost)
- Longer export ban is a less important factor (vaccination shortens the outbreak)
- Vaccination would substantially reduce the expected (average) number of animals culled and the number of farms with culls
- Benefits of vaccination realised in larger outbreaks (like an insurance policy)