

## Arboviral Threats to UK Livestock and National Resources to Research Them

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## Targeted Future Planning

- Defra's Evidence Investment Strategy (EIS)
  - "How do we [...] understand the combined effects and impacts of a changing climate, and changes in international movement of animals, disease vectors, animal products and people on the incursion and transmission dynamics of infectious diseases of animals and plants?" (section 56)
  - "We see a need to shift the focus of our work on exotic animal diseases, to better reflect the current risks and allow room to explore new and emerging threats" (section 70)

<http://www.defra.gov.uk/evidence/science/how/documents/eis-100126.pdf>

- Targeted investment in bluetongue virus research saved the UK £500 million, together with 10,000 jobs

[PM Gordon Brown, Romanes Lecture Oxford 27<sup>th</sup> February 2009]



## Project Summary

- Project
  - Arthropod-borne viral diseases of livestock: risk to the UK (SE4107)
- Funding
  - Department for Environment, Food and Rural Affairs (Defra), UK Government
- Research Aim
  - A large number of vector-borne viruses cause disease in livestock. How should we prioritise them and how prepared are we for them?



## Project Objectives

1. Identify arthropod-borne viral threats to UK livestock
2. Quantify the relative risk and impact from arthropod-borne viral livestock diseases
3. Produce a national capability inventory
4. Conduct a gap analysis for both potential data and capacity gaps

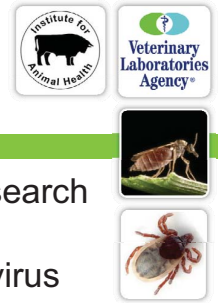


# UK Livestock Industries



- Aim to estimate of risk and impact for:
  - Horses and seven key UK livestock industries
    - Cattle
    - Pigs
    - Sheep
    - Goats
    - Farmed deer
    - Poultry (chickens, geese, ducks & turkeys)
    - Game (pheasants, grouse, partridge & guinea fowl)

# Identification and Quantification of Risk



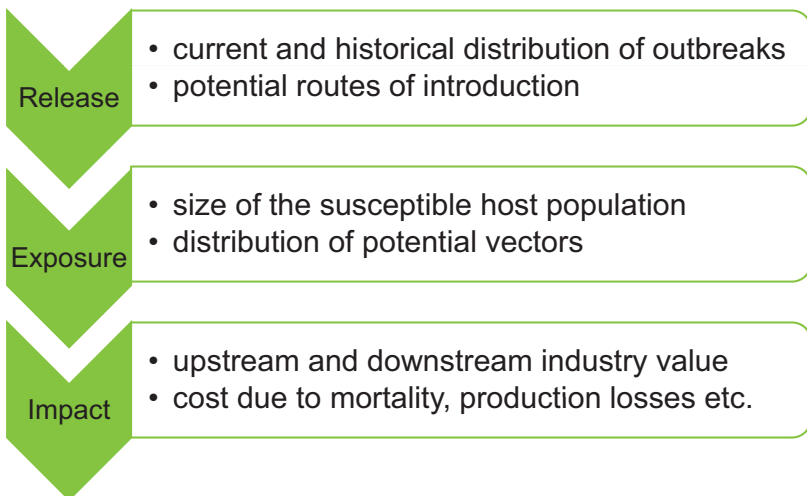
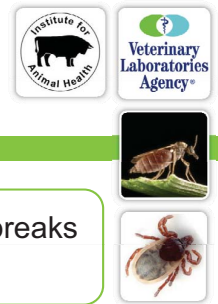
- Identify hazards based on a standardised search of published literature
- Currently lists 175 strains/serotypes of 71 virus species
  - Either biologically or mechanically transmitted via arthropods
  - Experimental or field evidence for transmission
  - Associated with clinical or sub-clinical disease in livestock and/or horses
- Additional virus species may be added to the hazard list based on expert recommendations when suitably supported by published literature

# National Capacity



- Interactive questionnaire to collect information on
  1. Virus expertise
  2. Vector expertise
  3. Facilities for working with arthropod-borne viruses
  4. Membership of policy groups, sector panels or expert groups
  5. Vaccine production and development
  6. Diagnostic services
- Sent to 112 organisations with relevant research/work programmes
  - including universities, research institutes, government agencies, research trusts and commercial companies

# Establishing Risk Criteria



# Release



- Wide variation in outbreak distribution
  1. Not present in Europe
  2. Present in southern/eastern Europe
  3. Present in northern/western Europe
  4. Present in the UK
- Potential introduction routes are difficult to accurately quantify as by their nature are rare events
  - Introduction to the UK via
    - Infected vectors
      - Air transport
      - Sea transport
      - Wind
    - Infected hosts
      - Live animal imports
      - Migratory Birds
    - Infected products of animal origin

# Exposure



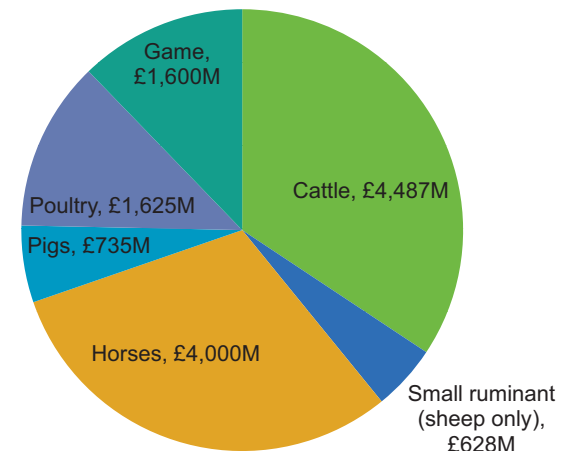
- Proportion of host population susceptible
  - Species affected
    1. Sub-clinical transmissible infection
    2. Clinically affected
- Vector distribution within the UK
  1. No competent vectors present
  2. Suspected vectors present
  3. Confirmed vectors present

# Impact

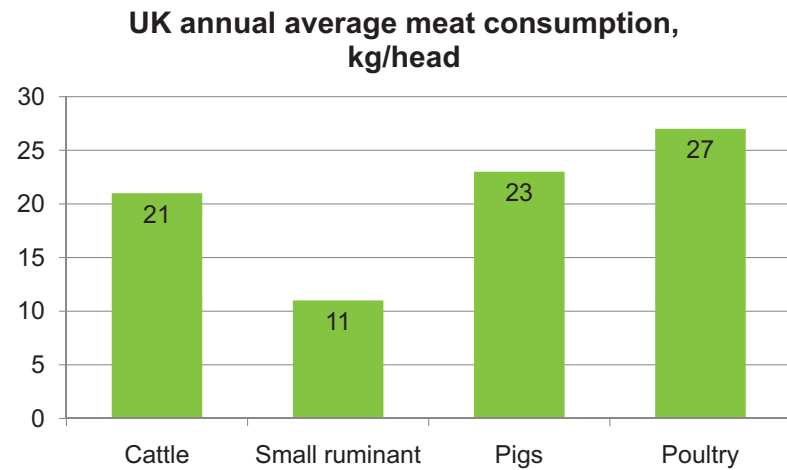


- Direct and indirect economic impact
  - Upstream and downstream value of the industry
  - Cost of mortality
    - Replacement stock
      - Adult livestock/horses
      - Youngstock
  - Cost of morbidity
    - Milk yields
    - Abortions
    - Weight loss
    - Other
    - Veterinary costs
  - Potential for control

# UK Livestock Industry Value

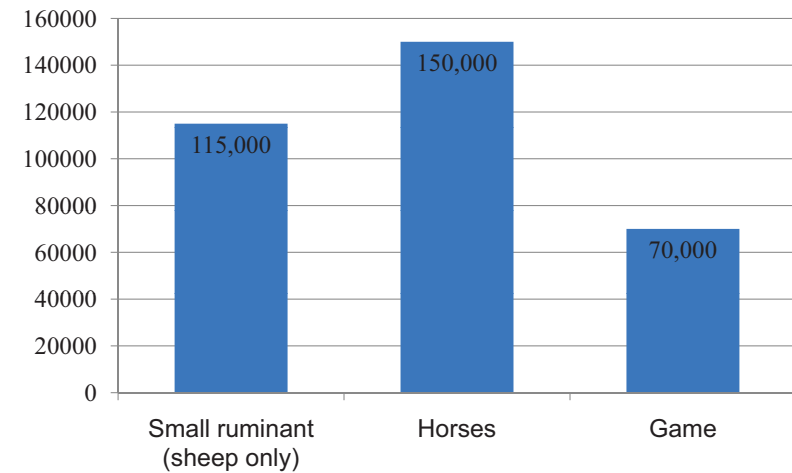


# Food Security



[Source: EuroStat ([epp.eurostat.ec.europa.eu](http://epp.eurostat.ec.europa.eu))]

# Jobs Supported



[Source: EuroStat ([epp.eurostat.ec.europa.eu](http://epp.eurostat.ec.europa.eu))]

# Acknowledgements



Anthony Wilson and Philip Mellor



Tony Fooks and Nick Johnson

Group updates: <http://www.iah.ac.uk/research/MB-VBD/>  
 SE4107 project updates: <http://www.iah.ac.uk/research/Defra/SE4107/>

To register your interest in this project please email [iah.vbd@bbsrc.ac.uk](mailto:iah.vbd@bbsrc.ac.uk)

**Thank you for your attention**  
**Any Questions?**



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