Defining the period of infectiousness in cattle naturally infected with foot-and-mouth disease virus.

B. M. Bankowski\textsuperscript{1}, R. Howey\textsuperscript{2}, N. Juleff\textsuperscript{1}, D. Gibson\textsuperscript{1}, C. Wright\textsuperscript{1}, S. J. Cox\textsuperscript{1}, P. V. Barnett\textsuperscript{1}, M. E.J. Woolhouse\textsuperscript{2}, B. Charleston\textsuperscript{1}

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\textsuperscript{1} Institute for Animal Health, Pirbright Laboratory, Ash Rd, Woking, Surrey, GU24 0NF, UK.
\textsuperscript{2} Epidemiology Group, Centre For Infectious Diseases, Ashworth Laboratories, Kings Buildings, Mains Road, University of Edinburgh, EH9 3JF, UK.
Conclusions

- Transmission occurred between inoculated to donor animals and the incubation period to the onset of clinical signs in the donor animals varied between 2 and 8 days post challenge.

- In our model system, FMDV infected cattle have been shown to be infectious from 42.35 hours to 86.80 hours.

- Presence of lesions in oral cavity, mouth, tongue and/or snout correlate with transmission occurrence and appear to be good indicators of infectiousness.

- Airborne transmission within pen was not evident between cattle, highlighting a lesser importance of this route epidemiologically.
Objectives of the study

- Broaden our understanding on the biology of FMDV transmission in cattle.
- Quantify variability in infectiousness at different time points and establish the peak of infectiousness.
- Pin-point predictors of infectiousness.
- Provide data to improve mathematical models of the disease.
To meet the objectives

- After initial pilot study, 4 experiments carried out (16-22 cattle each).
- Extensive collection of samples for bio-bank and subsequent analysis.
- Liaison with mathematical modellers to establish period of infectiousness.
Pattern of experiments 1, 2, 3 & 4

- Inoculates challenged donors and direct contact recipients.
- Indirect contact or Indirect contact companion animal (exp 3&4).

48 hrs: In contact for 24 hrs
2 days later
4 days later
6 days later
8 days later

Monitored for 14 days post-challenge.
Sampling and analysis

**Samples:**
- Collected daily in the first week and every other day in the second week.
- Serum, whole blood, nasal swabs and nasal fluid, probang/oropharyngeal fluid, air samples.

**Assays:**
- Virus isolation in bovine thyroid (BTY) primary cell culture
- RNA extraction, RT-QPCR
- Liquid Phase Blocking ELISA (LPBE)
Incubation period (any clinical signs) in donor animals

Days post challenge

VO75
VN89
VN90
VR57
VQ05
VR56
VO76
VQ06

day
0 1 2 3 4 5 6 7 8 9 10

Incubation period
Transmission events from donor animals

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- **Incubation period**: ■ – successful transmission, □- lack of transmission

**Days post challenge**: 0 1 2 3 4 5 6 7 8 9 10
Challenge and transmission events in relation to the first obvious lesion in a mouth, oral cavity, nose or tongue

- day of challenge,
- transmission event,
- lack of transmission

day clinical signs first observed
## Virus excretion over transmission experiments

Estimated release of airborne virus over 8hrs; * Cyclone sampler, ** Porton sampler

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* Cyclone sampler, ** Porton sampler
Future work

- Complete analysis of the collected samples from the pilot study involving vaccinated cattle – (see poster – D. Gibson et al., ).

- Perform further studies with vaccinated cattle at different time points, to establish when they become protected and inhibit/reduce transmission of disease to naïve animals.

- Provide further data for the mathematical modellers, to further clarify the window of infectiousness in cattle and effect of prophylactic intervention.
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  - David Paton and John Gloster
  - Animal technicians

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