

Effect of control measures on within-herd transmission of *Coxiella burnetii* in Dutch dairy goats

A modelling approach

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Goal

- Evaluation of effects of control measures and identification of the best option(s).
 - Tool: combining literature data and expert knowledge into a computer model.
- Assist policy makers in selecting control measures.

Within-herd transmission model

- The “default” model describes:
 - How a naive goat herd responds to a Cb introduction (short term).
 - How the endemic situation will look like (long term).
- Model output shows likely effect of each control measure separately or combined.
- Rank (combinations) of control measures on effectivity.

Possible control measures

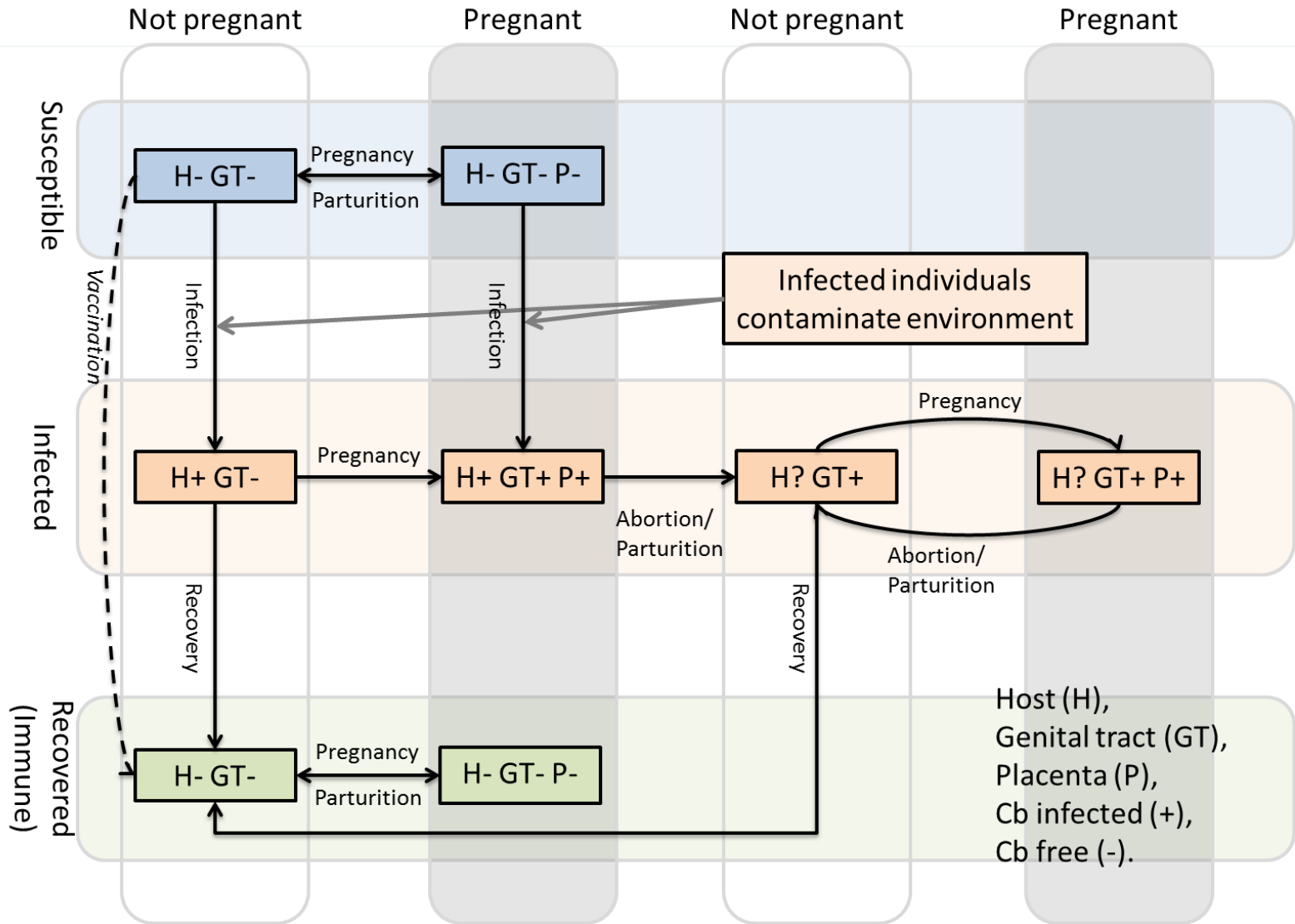
- Vaccination of all goats
- Prolonged lactation (fewer births per year)
- Longer separation of young from herd
- Culling of pregnant does
- Higher/lower frequency of dung removal from stable
- Dung heap treatment



Model components

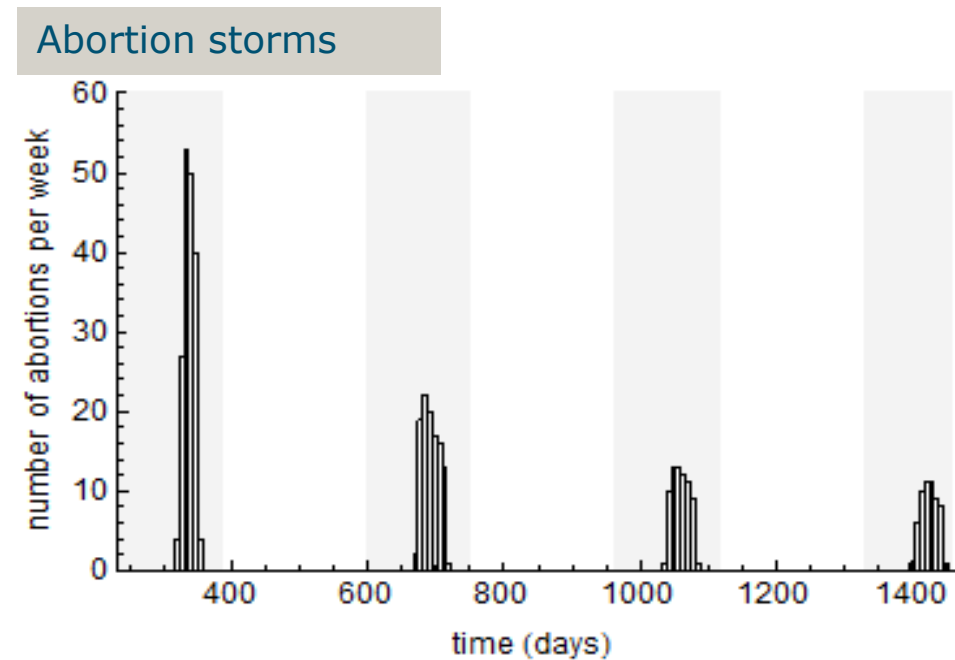
- Farming practise and goat demography
 - Duration of separation of young and adults, Frequency and moment of dung removal from stable, Dung heap treatment.
 - Replacement rate of goats -> life expectancy 3 to 4 years.
- Routes of Cb emission
 - Birth products, Urine and feces
- Routes of Cb exposure
 - Dust from environment in the stable
- Biology and pathology of Cb
 - See next slide

Biology and pathology



Model output of control strategies

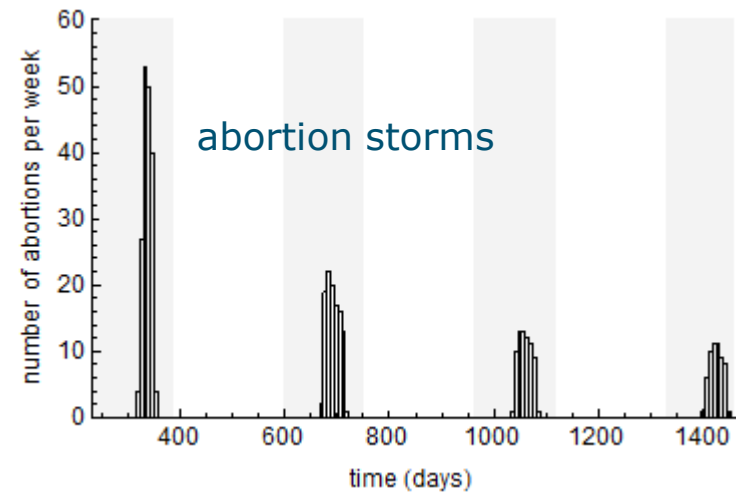
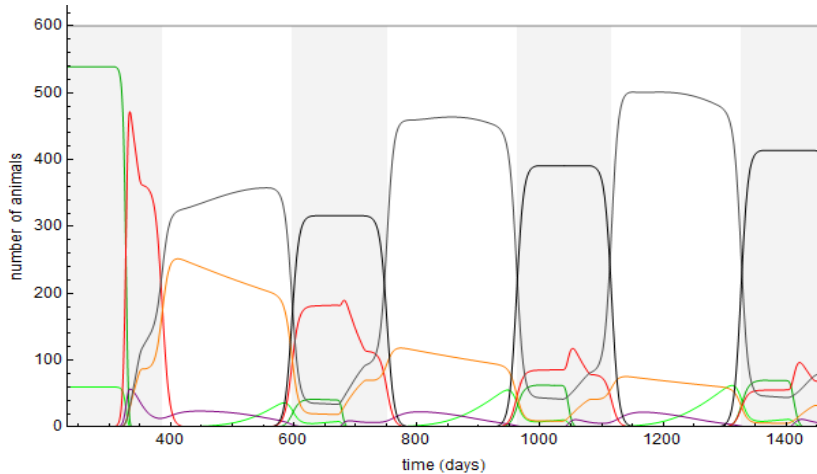
- After introduction: endemic situation or extinction.
- Different control strategies will lead to changes in:
 - the number of abortions per month, susceptible-, infected-, pregnant- and immune animals,
 - the environmental Cb load in stable and Cb load in the dung heap.



Example: effect of prolonged lactation

Default: no control measures

90% is pregnant



Control measure: prolonged lactation

45% is pregnant

