The outcome of studies on Q fever; NL

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8 March ‘12, Hendrik-Jan Roest, on behalf of the Dutch Government
Content

- Short summary of Q fever in the Netherlands

- Per project
  - Objectives
  - Main conclusions

- Publications and reports
Introduction, summary of the human cases
Summary of the dairy goat cases


Q fever infected goat farms per year

Legend
- Q fever positive dairy goat and dairy sheep farms on bulk tank milk
- Belgium zone

Number of goats per area
- 20 to 44  (8)
- 10 to 20  (19)
- 6 to 10   (14)
- 4 to 6    (15)
- 2 to 4    (18)
- 0 to 2    (20)
Onset of the Dutch Q fever outbreak

Animals
- 2005
- Dairy goats/dairy sheep
- Southern part of NL
- In spring

Humans
- 2007
- Males, age around 50
- Southern part of NL
- In spring
Connecting humans and animals

On epidemiological findings
Connection humans and goats

Due to:
- Overlapping area
- Succession in time
- No other source identified

Response and research is focused on dairy goats
Project 1: Q fever in goats

Objectives:

- Implementation of cultivation of *Coxiella burnetii*
- Genotyping of *C. burnetii*
- Survival of *C. burnetii* in manure
- Infection routes of *C. burnetii* in goats, infection model
- Pathogenesis of *C. burnetii* in goats
Main conclusions:

- One genotype of *C. burnetii* was predominantly present in the Dutch dairy goat population
  - This genotype played probably key role
- *C. burnetii* will be killed at the composting temperature of goat manure
- The nasal inoculation route is more effective than the oral inoculation route of *C. burnetii* in goats
- Also with new born kids, *C. burnetii* can be excreted in Q fever infected goats
Project 2: Assessment of virulence of C. burnetii strains

Objectives:
- Is the Dutch C. burnetii strain more virulent and other strains?
Main conclusions:

- Strains with the same genotype showed differences in virulence
- Uncertainties in the inoculum about
  - Proportion live/dead
  - Proportion phase 1/phase 2
- Dutch strain might be more virulent
- Confirmation is needed
Project 3: Pathogenesis of Q fever in goats

Objectives:
- Additional study on pathogenesis and immunology of Q fever in goats
Main conclusions

- The trophoblast cells in the placenta are the target cells for *C. burnetii*
- Infected pregnant goats do not excrete *C. burnetii* prior to abortion or parturition
Project 4: Inventory on Q fever strains in cattle, mutton sheep, dogs and cats

Objectives:

- Which genotypes of *C. burnetii* are present in cattle, mutton sheep, dogs and cats?
- Could have these species played a role in the Dutch Q fever outbreak
Project 4: Inventory on Q fever strains in cattle, mutton sheep, dogs and cats

Main conclusions:
- Study still on-going
- In total 431 placentas collected
  - 24% of cattle placentas positive
  - 18% of sheep placentas positive
  - 7% of horse placentas positive
  - 7% of dog placentas positive
  - 0% of cat and goat placentas positive
Project 5: Effectiveness of vaccination

Objectives:
- To measure the effectiveness of the phase 1 *C. burnetii* vaccine used in the Netherlands under field conditions
Main conclusions:

- No abortions were observed
  - numbers were low
  - only a few farms with abortions
- Bulk Tank Milk ELISA results → increased positivity
- Bulk Tank Milk PCR results → decreased positivity
- PCR on vaginal swabs showed confusing results
  - Doubts about reliability
Project 6: Search for suitable means of disinfection

Objectives:
- What are suitable products for disinfection
- Do these products work in farm conditions/stables?
Main conclusions:

- In an experimental set up 3 decontamination products showed sufficient reduction of *C. burnetii* reference strain
- Results with a Dutch isolated were inconclusive
- Further research is on-going
Publications and reports  (more to come)

- **publications:**
  - Hendrik I.J. Roest et al. 2011. Molecular epidemiology of *Coxiella burnetii* from ruminants in the Dutch Q fever outbreak. Emerging Infectious Diseases volume 17, issue 4; 668-675

- **Reports:**
  - Piet Vellema, et al. 2010. Q fever vaccination in goats, a field study [in Dutch]. GD Deventer, CVI-Lelystad, project number 2080021, November 2010
Questions & Discussion

Hendrik-Jan Roest:

: +31 320 238026

: hendrikjan.roest@wur.nl

: www.cvi.wur.nl