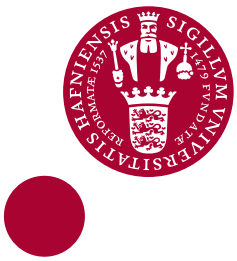

Coxiella burnetii antibodies in cow milk

association with cow and herd level factors

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Coxiella burnetii antibodies in cow milk : association with cow and herd level factors

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BACKGROUND

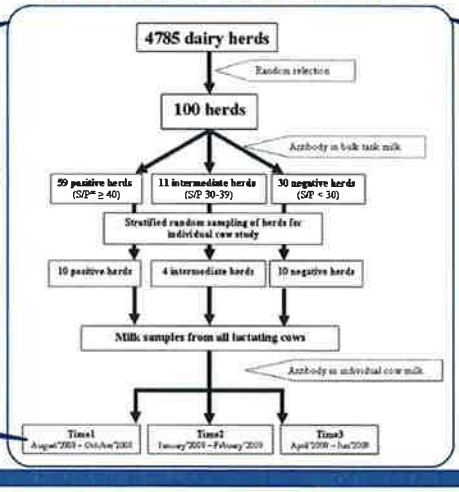
- High prevalence of *Coxiella burnetii* exposure has been reported in humans and cattle in Denmark
- A study in 2008 based on bulk tank milk samples (BTM) from 100 randomly selected dairy herds also reported an increased prevalence compared to previous years
- Animal level prevalence and risk factors associated with the infection have not yet been studied

OBJECTIVE

To identify association of the level of *C. burnetii* antibodies in individual milk samples with cow and herd level factors in Danish dairy cows

MATERIALS AND METHODS

- A cross sectional study with follow up included:
  - 24 Danish dairy cattle herds
  - 3116 lactating cows
- 5829 milk samples at three time points
- Milk samples were tested with ELISA and results determined as S/P values
- Milk samples with S/P ≥ 40 were considered positive



- Cow level information from
  - Danish cattle database
- Herd level information from
  - Questionnaire interview of the farmers

Statistical Analyses

- Estimation of Association
  - Logistic regression with random effects
- Prevalence estimation

RESULTS

Estimation of association

Cow level factors

	Odds ratio [OR] (95% CI)		Odds ratio (95% CI)
Breed		**Fat content (%)**	
Danish Holstein	3.21 (2.17 – 4.74)		0.88 (0.79 – 0.98)
Other (pooled breed)	2.92 (1.86 – 4.58)		*(OR for per unit increases in fat content)*
Jersey	1		
Parity		**Protein content (%)**	
≥ 4	1.40 (1.11 – 1.77)		1.43 (1.22 – 1.69)
3	1.27 (1.02 – 1.58)		*(OR for per unit increases in protein content)*
2	1.08 (0.90 – 1.29)		
1	1		
Milk yield (Kg)		**Season**	
	0.98 (0.97 – 0.99)	Summer	1.55 (1.31 – 1.82)
	(OR for per kg increases in milk yield)	Winter	1.27 (1.08 – 1.50)
		Autumn	1

Herd level factors

Herd size		**Type of stable**	
	1.75 (1.03 – 3.00)	Loose housing	4.22 (1.08 – 16.57)
	(OR for per 50 cows increases in herd)	Tie stall	1
Quarantine practice		**Hygienic precautions by veterinarian**	
No	3.75 (1.19 – 11.86)	No	8.91 (2.00 – 22.23)
Yes	1	Yes	1

Prevalence estimation

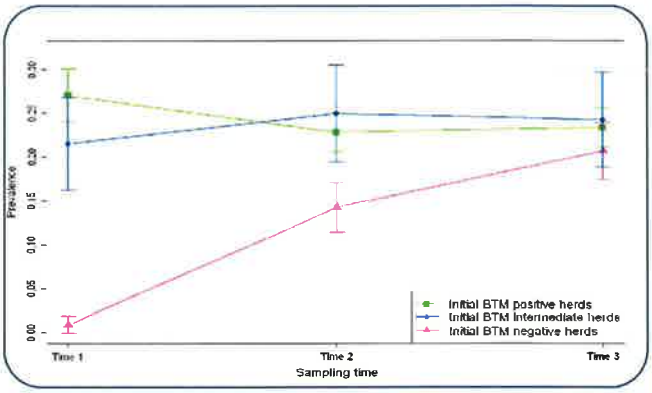


Figure: Cow prevalence of *Coxiella burnetii* antibody positivity at three time points in three strata of initially bulk tank milk antibody positive, negative and intermediate herds

- Prevalence in different strata varies significantly in first and second sampling time but not in third sampling time
- Significant increases in prevalence among different sampling times is only seen in initially BTM negative herds

CONCLUSIONS

- Level of *C. burnetii* antibodies in cow milk samples is significantly associated with:
  - Cow level factors – breed, parity, milk yield, milk protein contents and milk fat contents
  - Herd level factors – herd size, stable type, quarantine of newly purchased animal and hygienic precaution taken by the veterinarian before entering the stable
  - Season
- Infection with *C. burnetii* in dairy cattle herds lasts long (at least 11 months) and BTM antibody status of herds may change over time

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