FACULTY OF HEALTH AND MEDICAL SCIENCES

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Coxiella burnetii antibody levels in Danish dairy cattle: Prevalence, incidence and recovery

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INTRODUCTION

➢ **OBJETIVE :**The objective was to estimate prevalence, incidence and recovery for *C. burnetii* antibody positivity in Danish dairy cattle

➢*Coxiella burnetii* is an obligate intracellular pathogen and zoonotic bacterium.

➢No literature on detailed *C. burnetii* antibody level across ages from calf to adult animals.

➢No literature on incidence and recovery for *C. burnetii* antibody.

➢ There is much literature about prevalence of dairy herd level *C. burnetii* antibody positivity; E.g. in Denmark 59% (Agger et al., 2010), in The Netherlands more than 50% (Muskens et al., 2011) and in Canada 67% (Lang, 1988).

➢There is some information about prevalence of *C. burnetii* antibody positivity at the animal level; E.g. in The Netherlands 16% (Muskens et al., 2011) and in Northern Ireland 10% (McCaughey et al., 2010).

CONCLUSIONS

➢Prevalence varied from medium in calves to null in young and in heifers and high among parity groups.

➢Age groups and herd status have a significant impact on prevalence and incidence.

➢Holstein has a higher recovery rate compared with other breeds.

➢Calves have maternal antibodies that disappear during the following two age periods (young and heifer). The antibody level was high in adult dairy cattle.

MATERIALS AND METHODS

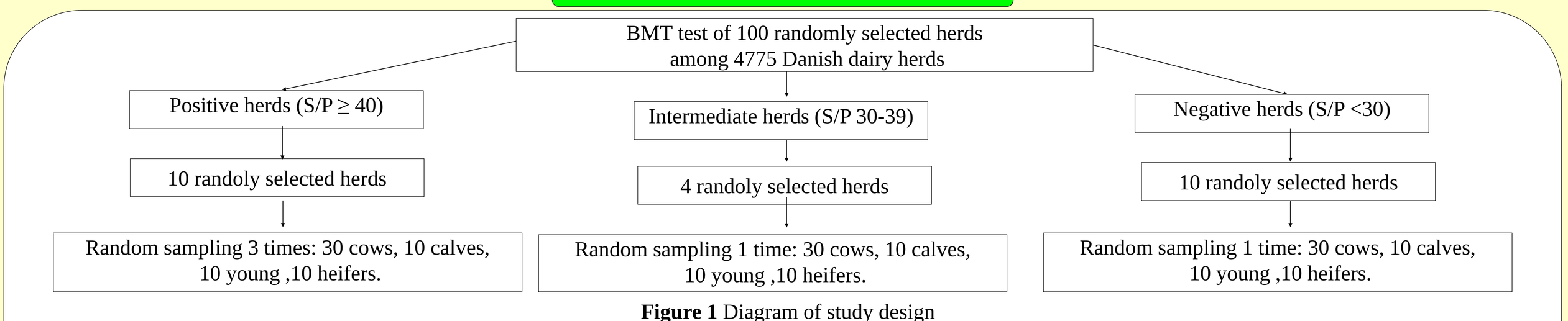

Figure 1 Diagram of study design

➢ 2113 blood samples from 1278 randomly selected animals in 24 herds were collected at T1=August-October 2008 , T2 = January-February 2009 and T3 = April-June 2009.

➢Blood samples were tested by CHEKIT Q-Fever Antibody ELISA Test Kit (IDEXX) and results were expressed as : $S/P\,value = \frac{OD\,Sample - OD\,negativecontrol}{OD\,positivecontrol - OD\,negativecontrol} X100$

➢Estimation of prevalence, incidence and recovery was done using a Hidden Markov Model. Multivariable analyses were performed including evaluation of a random effect of herds.

RESULTS

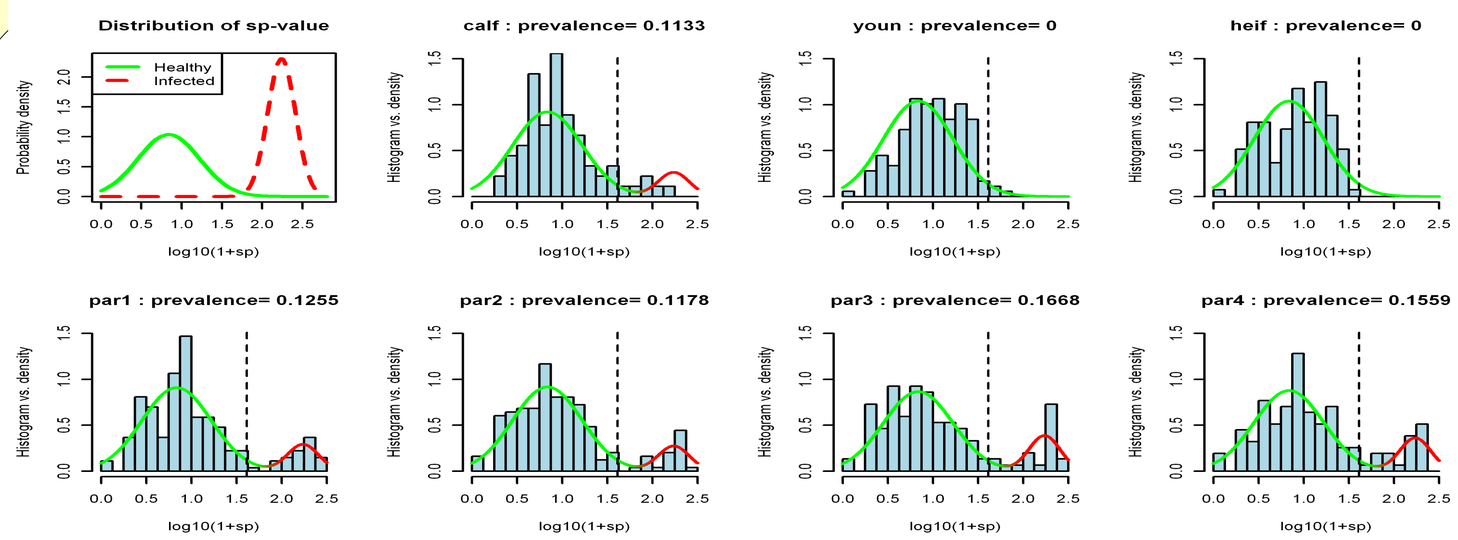

Figure 2 *Coxiella burnetii* antibody prevalence, all animals at T1

➢Prevalence varied from medium in calves to null in young animals and in heifers and high in parity groups at T1 (Figure 2).

➢Histograms indicate that the best discrimination between infected and not infected is at S/P=68, as compared to the recommended cut off at S/P= 40 (Figure 2).

➢Incidence was zero in all age groups of initially negative and intermediate herds. Incidence varied from lower in calves to null in young and in heifers and again high among parity groups of initially positive herds.

Table 1 Logistic regression result of association between, age groups, initial herd status and breed with prevalence ,incidence and recovery of *C. burnetii* antibody in cattle

Response	Effect	P-value
Prevalence	Age groups	<0.0001
	Initial herd status	0.0007
Incidence	Age groups	<0.0001
	Initial herd status	0.0009
Recovery	Breed	0.0001
	Age groups	<0.0001

➢The Holstein breed has higher frequency of recovery compared to other breeds ($p<0.0001$) Table 1.

➢Age groups and initial herd status have significant impact on prevalence and incidence for *C. burnetii* antibody positivity ($p<0.0009$) Table 1.

➢Recovery in Holsteins were 100% in calf, young and heifer. In parity groups1-4 recovery was 7%, 23.7%, 10.0% and 13.0% respectively.

DISCUSSION

➢It is likely that the young calves have maternal antibodies that disappear during the following two age groups (young and heifers). This result was supported by Mahmood et al. (2007) who detected the transfer of colostral *P. Multocida* antibodies to calves.

➢The prevalence increased with parity. McCaughey et al. (2010) found that the *C. burnetii* antibody level increased with age of the animals, which agree with this study result.

Note: Refered literature is available from the first autor via e-mail: ofm@life.ku.dk.