Risk factors for *Salmonella* infection in Dutch dairy herds: differences between low, average and high prevalence areas

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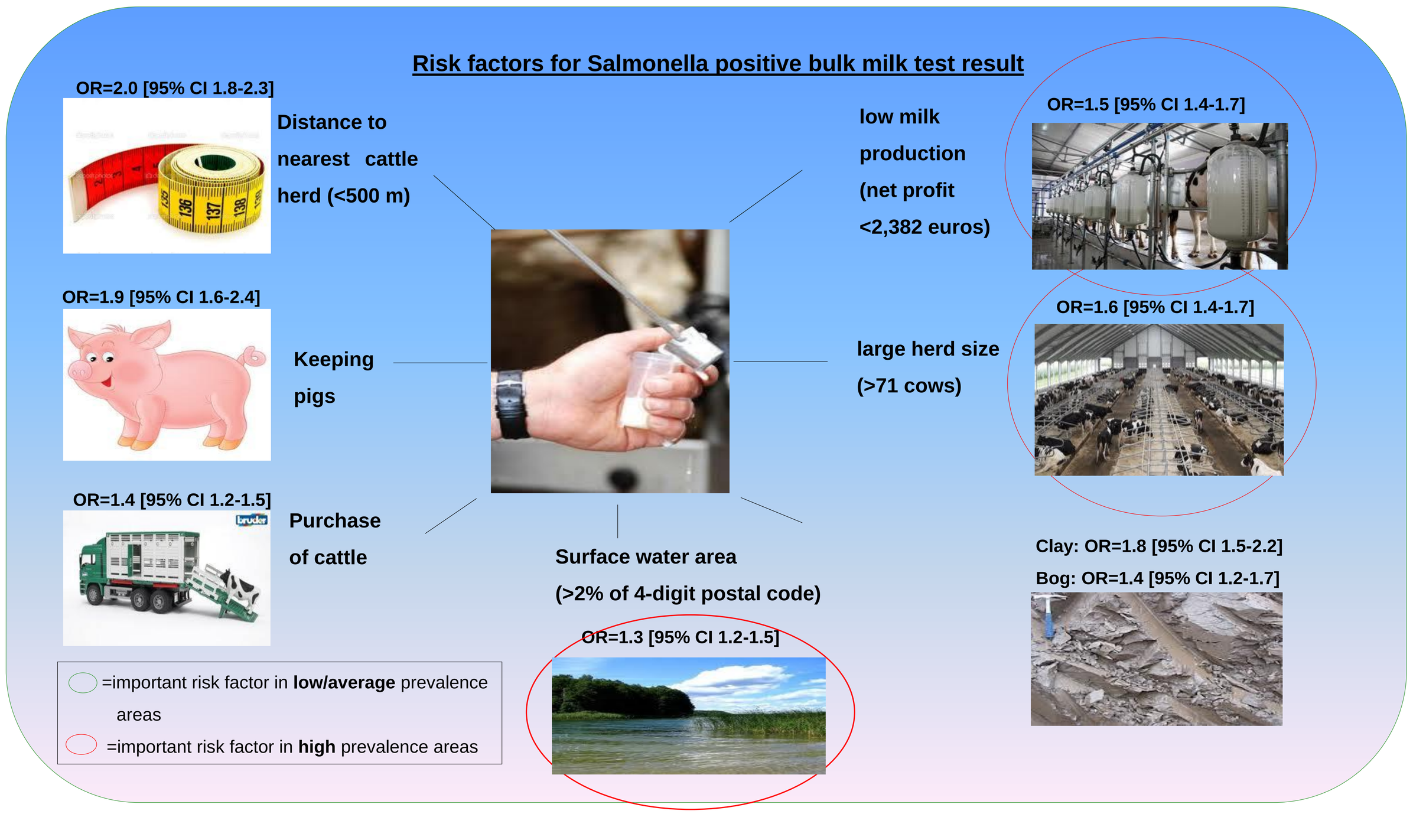
Introduction

Since 2008, bulk milk samples of all Dutch dairy herds are tested three times a year for antibodies against *Salmonella spp.* serogroups B and D. This programme aims to stimulate control of *Salmonella* infections among Dutch dairy cattle. The **goals** of this study were to determine 1) the apparent *Salmonella* prevalence in time 2) if *Salmonella* infections were clustered in space and 3) herd-level risk factors associated with a positive bulk milk test result.

Material & Methods

A multilevel logistic regression for *Salmonella* bulk milk result was carried out accounting for repeated measurements at the herd level. Season, trend in time and postal code areas were included as independent variables. Based on the results of this model, low (OR<1), average (OR=1) and high prevalence (OR>1) postal code areas were distinguished. Next, putative risk factors associated with a positive bulk milk test result were determined in a multilevel logistic regression with a random herd effect. In addition, subgroup analyses were performed for herds in low, average and high prevalence areas, respectively.



Results & Discussion

The results indicate a beneficial effect of the programme: the average moving annual *Salmonella* prevalence in Dutch dairy herds decreased from 11.5% in 2009 to 7.6% in 2011.

Variables that were positively associated with a positive bulk milk test result in the dataset for all herds were distance to the nearest cattle herd (< 500 meters), purchase of cattle, herd size (> 71 lactating cows), low milk production level (Net Profit < 2,382 euros), keeping pigs, soil types clay and bog and surface water area (> 2% per 4-digit postal code). Increase of herd size and grazing of lactating cows were not associated with a positive bulk milk test result.

The subgroup analyses showed that the risk factors differed between low, average en high prevalence areas. *Salmonella* infections persisted longer in high prevalence areas. This may be associated with the presence of more surface water and different management practices. In contrast, keeping pigs increased the risk of positive test results in low and average prevalence areas, but not in high prevalence areas. These differences have to be taken into account in prevention and control strategies in these areas.

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