Estimating the population impact of four pathogens on abortion rates in beef cattle using a matched case-control design

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Reproductive loss from conception to weaning in pastoral beef breeding herds in New Zealand was estimated to be 10%. This study attempted to quantify foetal loss attributable to four highly endemic pathogens, *Neospora caninum* (Nc), bovine viral diarrhoea virus (BVD), *Leptospira borgpetersenii* serovar Hardjo (Lh) and *Leptospira interrogans* serovar *Pomona* (Lp). In a matched case-control study, heifers/cows that aborted (cases) or calved normally (controls) were sampled from the same herd. Serum antibodies to Nc and BVD were detected by ELISA, and to Lh and Lp by the microscopic agglutination test. Multivariable, conditional logistic regression was used to generate adjusted odds ratios (aOR) for pregnancy loss at various titre cutoffs. The fraction of cases in the population (PAF) attributable to an increased titre was estimated using the proportions of exposed cases and the aOR. Between 2 and 12 aborting cows (cases) were identified and sampled in each of 45 herds. At least 1 and up to 20 controls per case were sampled in each herd. Based on 379 cases and 435 controls, significant aORs were found for Nc (aOR=3.6), Lh (aOR=1.9), Lp (aOR=11.1), and marginally significant for BVD (aOR=2.0). The PAF (95% confidence interval) for Nc was 3.0% (0.8-5.4%), for Lh was 4.9% (0.6-9.0%), for Lp was 4.2% (1.5-6.8%) and for BVD was 3.4% (0.1-6.6%). A possible bias by misclassification of a case will be discussed. If present, such a bias was regarded as being independent of the classification of exposure, thus potentially causing an underestimate of the true effect. We conclude that at least 14% abortions in the population could be prevented by controlling for Nc , BVD, Lh and Lh in beef cattle herds.