Bovine tuberculosis in Northern Ireland: factors associated with time from post-outbreak test to subsequent breakdown

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Introduction

Despite the implementation of a comprehensive eradication scheme since 1959 bovine tuberculosis (bTB) remains endemic in Northern Ireland. In particular, there is a lack of information as to why herds which have been pronounced clear of TB following a breakdown experience a relapse. The aim of this study was to identify factors associated with time from a negative post-outbreak test to subsequent herd breakdown

Methodology

We used TB herd data from northern Ireland's central database - Animal Public Health and Information System (APHIS). Study units were all cattle herds which completed a post-outbreak bTB test in 2002 and 2003. Exclusion criteria included being a herd with a chronic infection, traced infection or contiguous to a bTB infected herd. Data were analysed using the log-rank test, Kaplan-Meier curves and a Cox proportional hazards model, with 5% significance levels used throughout..

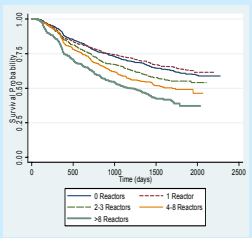
Results

3377 herds completed a post-outbreak test in 2002 and 2003, of which 1402 (42%) experienced a subsequent breakdown. Median time from negative post-outbreak test to subsequent breakdown was 582 days (IQR 336 – 1002,) contrasting with 1679 days (IQR 1506 – 1884) in non-breakdown herds.

TB history (herd having a TB incident in the previous two years) was not significantly associated with time to subsequent herd breakdown (p-value = 0.064). Kaplan-Meier curves for the different risk factors are presented below.

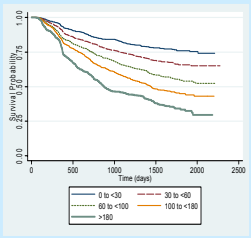
Number Of Reactors

At the disclosure test



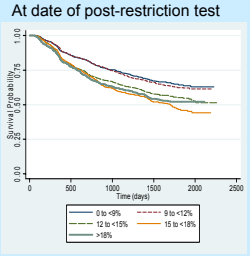
Herd Size

At the disclosure test



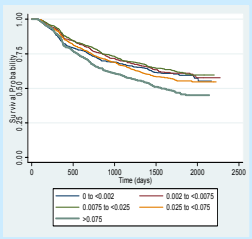
Local Prevalence

At date of post-restriction test



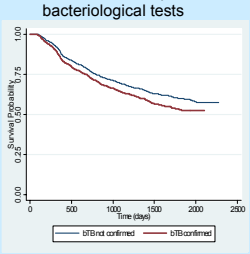
Purchase Intensity

Number purchased per day post derestriction



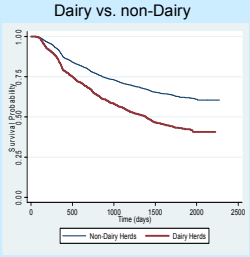
TB Confirmation

Visible lesions in skin reactors or positive histological/ bacteriological tests



Herd Type

Dairy vs. non-Dairy



Multivariable Cox proportional hazards model

The variables were further analysed in a multivariable Cox proportional hazards model. This resulted in both confirmation and history being excluded from the final model.

Conclusion

- Breakdown severity, local bTB prevalence, herd size and herd type are associated with time to subsequent breakdown.
- Above a certain level the purchase of animals appears to be an additional risk (>27 animals per year).
- Consistent with other studies this work shows bTB confirmation not being predicative of a future herd breakdown[1].
- bTB history was not a risk factor for future herd breakdown (at variance with previous studies[1,2]). This may be as a result of the exclusion criteria used.

References

1. Olea-Popelka, F.J., White, P.W., Collins, J.D., O'Keefe, J., Kelton, D.F., Martin, S.W., 2004. P.V.M, 63, 163-172.
2. Carrique-Mas, J.J., Medley, G.F., Green, L.E., 2008. P.V.M, 84, 85-93.

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