

Response to questions posted on 13 Dec 2010

Original Article

[The Duration of the Effects of Repeated Widespread Badger Culling on Cattle Tuberculosis Following the Cessation of Culling](#)

Response to questions posted on 13 Dec 2010

Posted by **ChristlDonnelly** on **14 Dec 2010** at **16:59 GMT**

Dear Mr Major,

You wrote: "I see that there are noticeable differences between culling benefits in the culling area at the end of months 30 and 36 after one year after culling ceased. This can be seen by comparing values in Table 1 reported in February (this report) and Table 1 reported in July in the posting by Prof Donnelly titled "Analysis of further data (to 2 July 2010)". What is the reason for this?"

Our paper, published in February, only included data up to July 2009. This meant that the estimate for 31 to 36 month post-trial only consisted of 3.9 triplet-years of data (see Table 1). Full data are accrued over 5 triplet-years (i.e. 10 triplets x 6 months each = 5 triplet-years). The full data for this time interval (all 5 triplet-years) were available in the analysis of data available as of January 2010 (published as a comment in May 2010). You will note there was very little change between the estimate published in May 2010 and the estimate published in July 2010 (based on data up to July 2010). These later estimates, based on the full data, are more reliable than that published in February, based on incomplete data. To reduce such potential confusion in future, we have scheduled our next analysis to be based on data up to March 2011, rather than January 2011.

Regarding the paper published in February 2010, you wrote: "The best fitting straight line through the points in Table 1 of this report gives a 10% reduction in culling benefit every 6 months. However a 14.3% reduction was reported. How was this 14.3% calculated?"

The 14.3% was calculated by estimating a linear trend in the estimates on a log scale, using weighted least squares regression so that less precise estimates receive less weight. The 14.3% figure does not itself represent a reduction in cattle TB incidence; it is instead a measure of the estimated impact of badger culling on cattle TB incidence is changing. It might be easier for us to illustrate with the fitted values.

Time period Estimate Fitted value
(post-trial)

Months 1-6	-52.7%	-54.2%
Months 7-12	-41.1%	-47.7%
Months 13-18	-49.4%	-40.2%
Months 19-24	-27.8%	-31.7%

Months 25-30 -35.0% -21.9%

Months 31-36 9.9% -10.8%

You wrote: "According to the best fitting straight line in data reported in July, the reduction in culling benefit every 6 months after culling ceased is 4%. Are there any plans to report a lower figure which reflects cattle incidence in the 12 months leading up to July 2010? As far as I am aware the last figure reported is 14.3%."

A similar analysis was performed on the data up to July 2010, again estimating a linear trend in the estimates on a log scale. The equivalent figure was 7.0%; in other words the benefit of culling was going away less quickly. Again, it might be easier for us to illustrate with the fitted values.

Time period Estimate Fitted value
(post-trial)

Months 1-6 -52.2% -47.8%

Months 7-12 -40.5% -44.1%

Months 13-18 -49.1% -40.2%

Months 19-24 -27.2% -36.0%

Months 25-30 -30.3% -31.6%

Months 31-36 -8.4% -26.8%

Months 37-42 -31.4% -21.7%

Months 43-48 -25.0% -16.2%

Other trends might, of course, be fitted to the estimates. In any case, it is clear that the benefits of culling have diminished during the post-trial period.

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No competing interests declared.

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RE: Response to questions posted on 13 Dec 2010

Clarity replied to **ChristlDonnelly** on **19 Dec 2010** at **18:56 GMT**

Thank you for providing fitted values. However I am afraid I still do not understand what the 14.3% figure in Reference 1 represents.

Although the following may be wrong, I think the culling effect values which are shown plotted in Reference 1 represent a difference between two proportions expressed as a percentage. I

think they are the difference between the proportion of herds with a confirmed breakdown in the culling area and the proportion seen in a control area where no culling took place. These values represent the culling effect over 6 month periods after one year after culling ceased.

The following values in the column headed "Actual" were published in February 2010 in Reference 1.

Months | Actual | Fitted | Decline from previous 6 months

1-6 -52.7% -54.2% -

7-12 -41.1% -47.7% 6.5%

13-18 -49.4% -40.2% 7.5%

19-24 -27.8% -31.7% 8.5%

25-30 -35.0% -21.9% 9.8%

31-36 9.9% -10.8% 11.1%

I would say that the last 6-monthly decline in the culling effect according to these fitted values up to month 36 was 11.1%.

The 14.3% figure appears to be associated with the above actual values against which you have shown fitted values (derived by log-linear regression) up to month 36. Reference 1 defines this 14.3% figure to be the decline in beneficial effect with each six-month interval. However I do not know how it is derived from the fitted values.

Obviously I am trying to understand the method here and I appreciate that the actual values were based on incomplete data at the time of publication.

I apologise if I am being very slow to pick this up.

REFERENCE

1. "The Duration of the Effects of Repeated Widespread Badger Culling on Cattle Tuberculosis Following the Cessation of Culling" published 10Feb2010.

No competing interests declared.

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RE: RE: Response to questions posted on 13 Dec 2010

[Clarity](#) replied to [Clarity](#) on 19 Dec 2010 at 21:29 GMT

The following illustrates one area where I may be going wrong.

I am taking the culling effect to be

$(\text{survey area prop} - \text{culled area prop}) / (\text{survey area prop}) \times 100\%$

where

survey area prop = proportion of herds which had a confirmed breakdown in the 6 month period in the survey only areas

culled area prop = as above but in the culled areas.

This is what I meant in my previous post where I said "difference between two proportions expressed as a percentage".

No competing interests declared.

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