

Original citation:

Hamilton, L., Evans, N., Allcock, J. (2019) "I don't go to Meetings": understanding farmer perspectives on bovine TB and biosecurity training, Veterinary Record, Published Online First: 07 January 2019.

<http://dx.doi.org/10.1136/vr.104995>

Permanent WRaP URL:

<http://eprints.worc.ac.uk/7516/>

Copyright and reuse:

The Worcester Research and Publications (WRaP) makes this work available open access under the following conditions. Copyright © and all moral rights to the version of the paper presented here belong to the individual author(s) and/or other copyright owners. To the extent reasonable and practicable the material made available in WRaP has been checked for eligibility before being made available.

Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.

Publisher's statement:

This article has been accepted for publication in Veterinary Record, 2019 following peer review, and the Version of Record can be accessed online at <http://dx.doi.org/10.1136/vr.104995> - please refer to any applicable terms of use of the publisher.

A note on versions:

The version presented here may differ from the published version or, version of record, if you wish to cite this item you are advised to consult the publisher's version. **In this case, please note that the title of the article given in the author's accepted manuscript differs from that of the version of record.** Please see the 'permanent WRaP URL' above for details on accessing the published version and note that access may require a subscription.

For more information, please contact wrapteam@worc.ac.uk

Title: Why Don't Farmers go to Meetings on Biosecurity? Understanding farmer perspectives on Bovine TB and Training

Keywords:

knowledge transfer

Bovine tuberculosis

meetings

Biosecurity

qualitative research methods

Wordcount: 1950

Corresponding author is Dr Lindsay Hamilton,

Keele University,

Keele,

Staffordshire ST5 5BG

Direct Telephone: 07540 100034

Switchboard: 01782 732000

Email: l.hamilton@keele.ac.uk

Fax: no fax machine exists at Keele University

Other Authors:

Professor Nick Evans, Centre for Rural Research, Institute of Science and the Environment,
Worcester University, St Johns Campus, Worcester.

Telephone: 01905 855187

Mr James Allcock, BVM&S Cert.CHP MRCVS XL Farmcare UK Limited, Diamond Way, Stone
Staffordshire ST15 0SD.

Telephone: 0800 6125289

Why Don't Farmers go to Meetings on Biosecurity? Understanding farmer perspectives on Bovine TB and Training

Abstract

In 2016, the veterinary service company, XL Farmcare UK Ltd, was awarded a Defra contract to manage a series of on-farm demonstration workshops to raise biosecurity awareness. The workshops provided free training for cattle farmers in England on the practical measures that they could take to limit the threat of bovine tuberculosis (bTB). Despite communicating these events to farmers, the number who subsequently attended them was low and the company decided to conduct research to explain this. Farmers were interviewed at agricultural shows, their comments analysed and the frequency of words in use were measured to produce a set of common themes. This theme analysis provides an illustrative rather than representative picture of farmer opinions but holds significant explanatory value for understanding the apparent lack of engagement with biosecurity training. Broad-ranging farmer perspectives can be understood through a 'typology' of feelings about bTB, particularly expressions of blame, loss, confusion, ignorance, resignation and fear. The cumulative effect of this negativity explains why so many farmers disengaged from training provision; a finding with relevance and value for the way training providers plan future communication methods in relation to biosecurity risk mitigation.

Keywords: knowledge transfer, bovine tuberculosis, meetings, biosecurity, qualitative research methods

Introduction

Bovine tuberculosis (bTB) is caused by a slow-growing bacterium, *Mycobacterium bovis*. Today it is rarely the cause of clinical disease in cattle yet can threaten human health (Robinson, 2018). In the middle of the 19th century, it was a major cause of human mortality in the UK. State intervention through the Bacillus Calmette-Guérin (BCG) mass child immunisation programme from the 1950s to 2005 was instrumental in lowering the disease reservoir in the population and, alongside this, public health controls in the food sector reduced the risk by instituting meat hygiene inspection and surveillance of the disease (Cassidy, 2015). The pasteurisation of milk by commercial dairies further helped to eradicate bTB from the human food chain (Robinson, 2015 and 2017a). Nevertheless, today, it is one of the five most prevalent infectious diseases of cattle in the UK alongside Bovine Viral Diarrhoea (BVD), Leptospirosis, Infectious Bovine Rhinotracheitis (IBR) and Johne's disease. In the developing world, bTB remains a significant threat to human health and the WHO (2018) state that as a leading infectious cause of adult mortality in the world, it is responsible for 1.5 - 2 million deaths annually.

Research on bTB has grown significantly over the last decade, not only in the veterinary sciences (Robinson, 2017b) but also in policy studies (Grant, 2009), history and politics (Cassidy, 2015), geography (for example, Enticott and Wilkinson, 2013; Naylor and Courtney, 2014) and rural economics (for example, Butler et al., 2010). This work has served to focus interest in, and awareness of, the costs, risks and effects of the disease. In reflection of such attention, the Secretary of State's (2014) foreword in *A Strategy for Achieving Officially Bovine Tuberculosis Free status for England* described bTB as 'the most pressing animal health problem in the UK' (p.6). Both the incidence and prevalence of bTB in England have continued to increase since such anxiety was expressed. There is a general consensus and persistent call from farming groups that 'something must be done' (see for example, Ulster Farmers Union (UFU), 2018), even if there is much conjecture about the actions that will most effectively bring a resolution to the problem (Enticott and Wilkinson, 2013). The purpose of this article is to examine one strand of disease control policy – farmer training – with the intention of contributing new

insights to understanding why many farmers do not appear enthusiastic to engage with organised learning about bTB biosecurity.

Training as strategy of disease control

A central objective in the Government's strategy of working towards the eradication of bTB in England has been deepening the knowledge and awareness of the biosecurity measures that can help animal keepers to reduce the risk of disease breakdown (Brennan and Christley, 2013). Hence, policy-makers and decision-makers (including APHA/Defra) regard the improvement of communication of any advice and guidance available for farmers on biosecurity as a key tool to help control bTB. This strategy cuts across all the geographically defined risk areas of England (high; edge; low) and Wales, where differing descriptors of geographic incidence have been identified. While biosecurity advice and guidance have been prioritised by state agencies, they have also identified the benefits of professional veterinary involvement from the private sector. Funding has been made available to incentivise commercial firms to tender for training and education contracts (see, for example, the recent instigation of the bTB farm advisory service which can be seen at <https://www.gov.uk/government/news/new-bovine-tb-service-launched-for-farmers-in-england>).

As part of this strategy, in early 2016, a private veterinary service company, XL Farmcare UK Ltd., was awarded a Defra contract to manage a series of on-farm demonstration events to raise biosecurity awareness by providing training for cattle farmers in England. The specific focus was on the practical steps that farmers could take to limit the threat of bTB through better implementation of biosecurity measures. Intensive efforts were made to publicise and promote the meetings amongst farmers. This included: contacting every veterinary practice carrying out bTB surveillance on cattle farms in England and requesting they raise awareness of (and promote) the meetings to their clients; advertising meetings through livestock shows and markets and the National Farmers Union (NFU) monthly newsletters and email communications. Yet, despite these efforts, it proved extremely difficult to raise interest among farmers and the events themselves were relatively poorly attended. The cost of attending was unlikely to be a significant reason for this because the events were free, with food and drinks

provided. It appeared to the organisers that bTB was an unattractive topic for the target audience of farmers as well as for the veterinary teams who engaged regularly with them because the response rate for both groups was low.

As a result of the disappointing attendance at the training events, XL Farmcare UK Ltd. decided to undertake a targeted social science research project, reported here, in an attempt to clarify this and to test the assertion that biosecurity in relation to bTB appeared to be an uninviting topic. The research explored the variety of factors that influenced farmer decision-making when they came to choose whether or not to attend biosecurity training events, with the intention that this could inform future actions for influencing this positively. The research was designed to address one central question: *why do farmers seem disengaged from gaining knowledge about the deployment of existing disease security strategies through training sessions?* The main focus here was on the uptake of training in relation to bTB.

Method

The research used semi-structured interviews as the primary data collection method. Interviews were conducted at five agricultural shows at which the researchers had reserved trade stands (The Beef Expo, Stoneleigh Park May 2017; the Dairy Day, International Centre, Telford September 2017 and 2018; the Bath and West Show, May 2017 and the Beef Expo, Shrewsbury Auction, May 2018). While many farmers approached the stands with things to say already in mind, others did not initially seem especially keen to discuss bTB directly. In keeping with the semi-structured nature of the interviews, however, they were engaged in broad conversation about their farming experiences and the discussion moved on to the topic of bTB when a level of familiarity with one another had been attained. Interviews were not organised around scripted questions but were conversational in style, allowing for topics, ideas and expressed feelings to emerge naturalistically. In contrast to survey questionnaires, which have become more challenging for reasons that include data disclosure, the declining numbers of farmers and cost (see Griffiths and Evans, 2015), in this research project the findings were '[co-]produced through the social relations of the interview' (Baxter and Eyles, 1998, p.510) which was an important consideration when reflecting upon the resultant data.

[Figure 1 GOES HERE – anonymised photo of an interview at the Dairy Day, 2017]

Show stands were decorated with a range of images, such as a picture of a ‘cure for bovine tuberculosis’ [a packet of pills, intended to illustrate, ironically, that there are no simple answers to disease control] and a picture of a veterinary surgeon conducting a bTB skin test on a farm. Placards were displayed containing a range of questions about bTB, designed to stimulate interest from farmers. Examples were: ‘Do we need a new strategy on bovine tuberculosis?’; ‘What will be the impact of Brexit on TB?’. In advancing these visual cues and prompts, the aim was to provoke thoughts about a range of issues surrounding bTB and attract farmers towards the researchers. Despite some research design limitations, to which the article returns in the final discussion, the approach appeared highly successful for stimulating farmer interest in the project.

To enhance interpretive opportunities for data collection, the stands were also used to elicit written comments from farmers (Bergold and Thomas, 2012) and so all farmers who participated were asked either at the beginning or end of their interview to use sticky notes to write down their concerns about the risk of bTB, placing each comment into ‘high’, ‘low’ and ‘no risk’ sections of a large display board. This was a creative, participatory activity that they did without direct input from the researchers. Usually, each note contained only a few words, although some participants wrote significantly more. This process was valuable for starting conversations with visitors to the stand and directing respondents to think about biosecurity training. Responses to this exercise were photographed and added to the interview transcriptions that were written in situ. The data were then typed up and consolidated with the interview transcriptions.

[Figure 2 GOES HERE - photograph of the flip charts to be covered in post-its]

Using the stands in this way meant that the sampling was initially opportunistic because it was influenced by the readiness of individuals to approach the researchers to participate in the sticky note exercise or to have a conversation. Curiosity and the non-commercial nature of the exhibit encouraged a steady stream of visitors, all of whom were screened prior to recruitment into bTB discussion to ensure that they had awareness of the topic (McEachern et al, 2010) and

a form of membership to the farming community (as a business owner or employee). A minority of participants approached the stand in a small group or couple – and held a group conversation. The overwhelming majority were alone or, on arrival at the stand, engaged in one-to-one conversations with the researchers while their companions looked at displays on this or an adjacent stand. Participation was not only entirely voluntary, but enthusiastic and varied. In total, the researchers collected 50 interviews at agricultural shows in 2017 and 2018, representing just over 28 hours of material.

A smaller subset of follow-up interviews was conducted with participants who were eager to elaborate further on their responses by telephone and face-to-face between September 2017 and June 2018. Some expressed a desire to think further about their views and to pick up the conversations at a later date; others were rushing to other stands, seminars and events at the shows and wanted the opportunity to come back to the questions at a time to suit them. They willingly left their contact details with the researchers. Hence, the shows were useful in establishing these as voluntary contacts and creating a network of key ‘informants’ who gave more detail and depth than was possible at the show days themselves. The interview questions in this part of the research were designed to be as open as possible but followed the same line as those posed at the shows and so the range of possible answers was also broad. In total, there were ten follow-up interviews (four by telephone and six in person conducted with one researcher) comprising just over 12 hours of material.

[Figure 3 GOES HERE – photograph of show stand visitor]

In evaluating the collated dataset, key words were highlighted and then these were grouped together to reveal a set of recurring themes or categories in relation to views about (or relevant to) the decision to attend bTB training events. Each sentence of interview material was read closely and interpreted by the researchers using ‘axial coding’ – a technique that can be used to pursue each category for relevance; in this case, attaching codes to the feelings expressed in the qualitative interviews and on the sticky notes written by interviewees (Strauss and Corbin, 1990). Working line by line, the researchers picked out any prominent expressions of feeling and, using what Strauss and Corbin describe as a ‘coding paradigm’, (1990: 89-90) were able to

relate the codes to one other along the category (or axis) being pursued via a combination of inductive and deductive thinking (Cope and Kurtz, 2016). Coding worked to aid the researchers to make sense of the large volumes of transcription to develop a theoretical interpretation ‘while still grounding it in the empirical reality reflected’ (Strauss and Corbin, 1990, p.89) by the dataset. Rather than acting as a means to profile individual respondents, it is a means to ensure that large and varied amounts of qualitative ‘data and interpretations are valid and reliable’ and to ‘break through the inevitable biases, prejudices, and stereotypical perspectives that researchers bring with them in their pre-designed research questions and foci’ (Strauss and Corbin (1990, p.1). Axial coding enabled the researchers to pick up on and work through the – initially overwhelming – range of underlying feelings, beliefs or emotions about bTB as well as training events which then formed the basis for the interpretation.

Findings

There was a prevailing sense among interviewees that bTB training was of no great interest to them. As one farmer phrased it, “I could go to meetings every single day of the week, but do I want to? Not really.” Almost all interviews revealed similar perspectives on training when it came to bTB and only one participant highlighted the importance of seeking professional advice in managing the risk of disease outbreak: ‘Choosing the right vet and getting the right advice for the farm is a risk’ (from post-it note) implying that obtaining the wrong adviser could damage their business. In contrast to earlier research (Brennan and Christley, 2013), in this study the role of Defra was not cited by any participant as a source of important biosecurity information.

After further questioning, fuller reasons were provided for the prevailing lack of interest in new training opportunities. The idea of learning new information was not off-putting in itself; it was the subject matter that provoked intensely negative feelings. This became apparent because only one respondent claimed not to have any concerns about bTB, writing in the post-it note activity that: ‘TB doesn’t bother me, I get on and don’t worry’. This was explained further in the in-depth follow-up interview:

“It’s not like we don’t care about TB... I’ve written here [points to the post-it note] that it doesn’t bother me but it’s more that we just get on with the work that needs to be

done, there's never a time when there is nothing to do. I choose to just get on with it. I keep positive."

Here the farmer qualified the written comment in the words they later chose, shifting emphasis from ambivalence to a demonstration of elective positivity which could only be maintained by limiting his interaction with bTB advisers, including those hosting meetings and on-farm training events:

"We spend a lot of time trying to think of new efficiencies and trying to make a genuine difference to animal health and productivity but we don't want to learn more about something we can't really do anything about."

It was sad to observe that some interviewees felt very embarrassed to reveal, and then only after typically at least ten minutes of conversation had elapsed, that their farm had suffered an outbreak of bTB, meaning that their operation has or had been put into restrictive measures.

"I understand that TB is a massive problem in a lot of areas. I am in Wales and it is killing me. I have been locked down for a long time now and it is breaking me financially. I have been looking at alternative ways of making money but I don't want to think about them. My sister has used her farm for a caravan site. But I hate to look at it. When I go over there I just hate to see the caravans and I can't bear to think of all those people roaming all over the place. The reason you go into farming is to have that isolated lifestyle, beautiful views and beautiful countryside, and you are out there just living in it and enjoying it. But if I have to diversify away from the suckler business, I am going to lose that and it worries me to death."

This farmer revealed a variety of strong feelings in the words chosen; 'breaking me' and 'worries me to death' with 'hate' of alternative income generators (tourism) and 'loss' (not only of money, but also a rural way of life and isolation). Another farmer stated:

"We have had movement restrictions that have crippled us. Your question [pointing at a placard reading 'do we need a new approach to TB policy?'] is a very good one and comes at

the right time. Until the Government change what they are doing to help us, and get a proper grip on do-gooders, we will never solve it.”

This farmer pointed a finger of blame towards ‘do-gooders’ outside the farming community, a sentiment corroborated by a number of post-it note comments by other participants, for example:

‘I am concerned about offcomers (outsiders) who purchase land and are nothing to do with farming community – they inflate land prices unfairly’;

‘Outsiders having their say at the cost of farming community members’.

The data revealed overlaps between views of bTB, biosecurity practises more generally, and opinions about the actions available to producers (including training). These could not be neatly disaggregated with simple causal links drawn between their ideas and the motivation for engagement in training events. Using the coding method on the transcribed data, however, a typology of common expressions was developed to help clarify the main feelings from the wide-ranging and often, highly personal, comments.

- Figure 4 GOES HERE: Piechart showing the typology of feelings towards bovine TB coded from the interview material and post-it notes

Many farmers held more than one feeling about bTB and sometimes even expressed apparently contradictory/paradoxical views (such as the need for ‘better’ science coupled with the suspicion of scientific expertise). This was taken into account during the coding process by measuring the frequency that particular feelings emerged (for example, in counting ‘blame’ and ‘fear’ which often, understandably, appeared together as complimentary). Nonetheless, this is notable for indicating that farmers can hold different and competing ideas about bTB concurrently, making straightforward responses from interviewees, and indeed professional advisers, difficult. The range of opinions also made it difficult to discern simple reasons for disengagement from training; this was a multi-factorial issue with several potential causes. The

typology of feelings simplified matters by using coding to provide a matrix for understanding the underlying sentiments expressed during the interviews.

The highest proportion of respondents exhibited a prevalent feeling of blame (26% of the collective dataset material). Blame was directed towards other farmers, policy-makers, ‘do-gooders’ (mainly in respect of rural incomers, wildlife conservation and animal welfare agencies) and consumers. As one respondent phrased it:

“[Some farmers] feel they are above the law or that the law doesn’t apply to them. They expect the benefits of working in the food production industry [but it] worries me that they see themselves as superior to other food producers who toe the line on a vast range of quality control and legal structures. That, to me, is a major reason why we won’t solve disease breakdowns.”

In another interview, blame was extended to charitable and animal welfare organisations as a source of disease:

Researcher LH: “What’s wrong with the [name of animal welfare charity]?”

Farmer: “They get badgers from high risk areas, capture them and release them in clean areas. Why they think that taking a dirty badger from a dirty sett and releasing it somewhere clean is helpful, I don’t know. It is well known that they do this and you find there are a lot of breakdowns near the sides of motorways as a result. They are transferring disease to us and think they are doing a good job for the countryside, for the animals. They are not.”

Worries that were specifically about financial and livestock loss were expressed in the next largest proportion of the interview and post-it note material (21%). For example, on one post-it note was written ‘In the aftermath of culls and disposals is a loss of genetic progeny, carefully managed over generations in some cases’. Another emotively stated, ‘Raw emotion of loss of livestock to any disease, particularly to TB’. Along with worries about loss, confusion emerged on occasions, as this post-it note showed:

‘Agricultural policy on the environment is extremely complex, so too are the various schemes that run. How can we access this confusing information?’

In the interview which followed, the farmer explained more about the source of his confusion:

Researcher NE: “You have written here [on the post-it] about the complexity of policy, and how confusing it can be, what do you mean by that?”

Farmer: “There are numerous blockages to practical change. To give you an example that I know about; why do we have a situation where we cannot develop the vaccine for widespread use in the high-risk areas...or even in all areas? The science is probably all there I think but what are the reasons for this not being rolled out and implemented to make a real impact? I find that a very confusing situation because where does the responsibility lie for making practical science work on the farm? If the knowledge is there, then who is holding it back and why?”

Ignorance was expressed as a lack of knowledge (rather than uncertainty about why the *right* knowledge or the *right* policy hadn’t been applied, as was common in the case of confusion) as the following post-it highlighted:

‘Lack of knowledge is one of the biggest risks as you cannot avoid making mistakes if you don’t know what you don’t know’.

Fear was expressed by farmers when they described being ‘worried to death’ by the prospect of disease breakdowns, movement restrictions, falling incomes and livestock losses. Where farmers had experienced a bTB breakdown, the fear often related to long-term sustainability and income streams whereas those who had not experienced a breakdown were usually expressing concern about the prospect of one.

The cumulative effect of so much breadth of negativity was a dominant and pervasive feeling of resignation and fatalism (Robinson, 2017b); something which appeared to pose an obstacle to adopting positive action plans or seeking out new knowledge and practical skills at training events and meetings. It was not merely a lack of technical or scientific innovation which

appeared to support this sense of disengagement because many stressed the social and political complications of the disease. As this farmer stated, “TB is one of those intractable political problems” implying that “it will never be solved in my lifetime.” Likewise, another farmer stressed the enormity of the problems faced by describing bTB as “entirely unmanageable” with “no realistic prospect of solving it, either through policy or other interventions that the vets suggest [which is] why I don’t go to meetings on it.” Such a feeling of concern was serving to drive a very different view of veterinary practitioners amongst farmers than would normally be the case in other disease situations. Vets were not seen as practical solution-providers in that they held no ‘magic bullet’ for addressing the multiple factors that farmers felt were outside their control and explains why they featured so little in the interviews. It may also explain the lack of enthusiasm for veterinary-led training.

Implications, Discussion and Conclusion

The findings here broadly support Naylor and Courtney’s (2014) contention that farmers exhibit different attitudes and levels of resilience, attributing their concerns to a range of sources and issues. The contribution of this set of findings is different, however, in that the thematic analysis provided a framework for thinking about the *types* of feeling that were exhibited about bTB rather than their range. While the principle objective of the research was to elicit opinions on the training provision that had been promoted by XL Farmcare Ltd., the study revealed a wide range of different concerns about bTB, a variety of responses to questions on the factors that influence on-farm behaviour and practices, and widely varying perceptions of the relative risks of outbreak and the sorts of impact that were most troubling. These diverse opinions prompted the researchers to think more deeply about the issue of training as an indicator for a host of wider concerns and worries among the cattle farming population. The variety of opinion made it difficult to draw simple conclusions about attendance at training events.

It was difficult to begin conversations with targeted questions about training because farmers viewed this as only a part of the much bigger problem of disease control in general. This breadth of opinion provided the rationale for the typology of feelings which makes clear the depth and range of feeling on what has become a highly politicised rather than a purely

economic issue (Robinson, 2017a and b). A majority of the farmers that offered their opinions and thoughts in this study demonstrated significant awareness of the complexities of bTB surveillance and control through their hands-on, practical knowledge and – other than those who claimed to be concerned about what they *didn't know* – were swift to point out how they might manage the situation differently. Their confusion – and often cynicism – related to the ways that powerful agencies (such as policy-makers, charitable bodies, 'offcomers') appeared to disregard the views of farming practitioners at the grassroots level. Hence, most farmers interviewed here felt utterly powerless and in an 'intractable' position as they faced up to the scale of the problem. This prompted a sense of despair that 'paralysed' them and made new learning unappealing and, seemingly, pointless.

Despite a majority of those interviewed in this study having some confidence in their existing knowledge and understanding of the issue, they perceived that their decision-making power was limited because the incidence and prevalence of the disease was inextricably linked to political, social and economic factors outside their sphere of control. This left farmers somewhat resistant to making plans/ taking actions because, to them, these did little to resolve any of – what they regarded as – the large-scale structural issues that, if resolved, could make disease eradication a possibility. For farmers, the difficult situation implied a need to tackle the presence of disease among wildlife species, rein in the power of 'do-gooders' and activists, as well as having their voices heard in setting the policies of those in power. The range and depth of negativity about their potential to solve this multi-factorial problem – to exhibit meaningful influence in dealing with policy decision makers and those outside the farming community – was the central factor in determining whether they would attend a meeting, workshop or training event on bTB. They did not see veterinary surgeons as agents of change and rarely mentioned them in connection to their opinions (for a good discussion of this see, for example, K. Pritchard, W. Wapenaar, M. L. Brennan 2015).

The findings explored here have showed that a plethora of feelings of negativity and powerlessness compromise a sense of personal responsibility which, in turn, provides further reasoning for the lack of training attendance and engagement. This knowledge is useful to

those designing new strategies for communicating with farmers about a range of complex or negatively perceived issues in general, as well as specifically to veterinary practices considering whether or not to offer meetings and events about biosecurity. This is because it indicates that where there is a high level of negativity or strong emotion about a particular topic, it can be difficult to stimulate positive action, including learning and innovation. In such cases, training events may prove less fruitful than other avenues of communication and knowledge exchange such as veterinary visits, tailored around personalised advice or the trial of new technical innovations (such as fencing or feeding technologies).

As Naylor and Courtney (2014, p.3) argue, for example, 'a farmer will be more easily persuaded about the best ways to avert the risk of a 'new' disease of which they have little or no knowledge'. The findings of this study extend this by showing that farmer/practitioner innovation with regard to bTB control is less of a priority than might be expected given the cost, stress and hassle that 'breakdowns' routinely generate (Butler, Lobley and Winter, 2010) and suggests that bTB has been present for so long that it is no longer considered a 'new' problem. 'Concern fatigue' has become encultured through repetition in the ways that UK farmers talk about TB control, prevention and eradication. The 'fatigue' is exacerbated by the multi-factorial nature of biosecurity which supports Brennan and Christley's (2013) finding that biosecurity practises are adopted with varying enthusiasm across a cross-section of producers. To counter this, new approaches to knowledge transfer and exchange are much needed to address the dominant feeling of 'paralysis' and hopelessness; one that is constituted by the various feelings that have been identified in this research.

Rather than reliance upon training as an end-of-pipeline process, for example, it may be more beneficial to increase farmer representation in policy meetings and 'thinktanks' at the start of strategic conversations (and to publicise this in the farming press) to visibly foster a collaborative approach and to target farmer fears that 'outsiders' have a greater voice in the way the countryside is managed (Enticott and Wilkinson, 2013). It is also possible that disease surveillance and eradication strategies used in other global regions might yield insights into how this may be managed in the UK (in the case of New Zealand, for example, see Livingstone et al,

2015). Future research is needed to explore such possibilities although it should be noted that, inevitably, as with all qualitative methods, there are some limitations which need to be openly acknowledged when considering extending the scope of this next phase of research.

In the research described here, for example, the design of the show stands could be expected to have discouraged approaches from those who had 'no opinion' on the subject matter. Future research using this technique needs to be designed with care to encourage as many respondents as possible which is important to guard against over-reliance upon a small sample of interview material. The fact that a small proportion of the participants that were interviewed for this project expressed an opinion of 'no worries' seems to suggest that the stands did not deter individuals with less strident views. Indeed, the research team regarded the open and sociable space of the exhibitions (and the simple, non-technical style of the questions) as important for ensuring that no-one felt pressured into answering questions. There was no requirement on participants to demonstrate expertise or to engage with difficult or emotionally troubling subjects because beyond some initial questions about training, interviews evolved naturalistically and themes developed in a conversational exchange. By conducting the research across beef and dairy farming populations, however, there is a possibility that the scope of the current findings do not shed sufficient light upon the specific factors impacting different industry sectors; something which future fieldwork needs to take into account. It must also be borne in mind that different populations of respondents may well exhibit a different spectrum and depth of opinions.

Overall, the purpose of qualitative work of the sort explored in this article is to be illustrative rather than 'representative', meaning that all opinions expressed are considered to hold value, no matter how contradictory, ill-informed or puzzling they may at first glance appear to the researcher. To continue such investigation, as well as to mitigate some of the caveats highlighted here, enlarging the dataset with more primary qualitative work is now necessary to expand the scope of the project and to follow-up on these initial findings. Next steps in research should therefore address two broader research questions: first of all, what factors influence current farmer decision-making on biosecurity practices? and, secondly, what strategies would

farmers like to see implemented to drive change towards a solution? The present research uncovered a range of reasons for disengagement from training and made clear the need for further research to excavate certain issues more deeply. We now need to consider what actions farmers said they had already considered and/or implemented, as well as their opinions about what other actors (vets, policy-makers) should be doing to help and support them in tackling bTB. By extending the current study towards these questions and issues, it is hoped that more comprehensive detail can be provided on the obstacles to change in relation to the eradication of this emotive, divisive and economically damaging disease.

References

Baxter, J. and Eyles, J. (1997) Evaluating qualitative research in social geography: establishing 'rigour' in interview analysis. *Transactions of the Institute of British Geographers* 22, 505-525.

Bergold, J. and Thomas, S. (2012). Participatory Research Methods: A Methodological Approach in Motion, [110 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 13 (1). Art. 30, <http://nbn-resolving.de/urn:nbn:de:0114-fqs1201302>. [Last accessed 18 May 2015]

Butler, A., Lobley, M. and Winter, M. (2010) *Economic Impact Assessment of Bovine Tuberculosis in the South West of England*. CRPR Research Paper No 30. Exeter University, Exeter, UK.

Cassidy, A. (2015). 'Big science' in the field: experimenting with badgers and bovine TB, 1995-2015. *History and Philosophy of the Life Sciences* 37, 305-325.

Cope, M. and Kurtz, H. (2016) Organizing, coding and analyzing qualitative data. In N.Clifford, M. Cope, T. Gillespie, & S. French (eds) *Key Methods in Geography* (3rd Edition), Chapter 36, pp.647-664. Sage.

Enticott, G., and Wilkinson, K. (2013). Biosecurity: Whose knowledge counts? In A. Dobson, K. Barker, & S. Taylor (eds.), *Biosecurity: The socio-politics of invasive species and infectious diseases* (Vol. 6). London: Routledge.

Grant, W. (2009) Intractable Policy Failure: The Case of Bovine TB and Badgers. *British Journal of Politics and International Relations* 11, 557-553.

Griffiths, R., and Evans, N. (2015) The Welsh Marches: resilient farmers? Exploring farmers' resilience to extreme weather events in the recent past. *AGER: Revista de estudios sobre despoblación y desarrollo rural: Journal of Depopulation and Rural Development Studies* 18, 161-189.

Livingstone, P., Hancox, N., Nugent, G., Mackereth, G., Hutchings, S. (2015) Development of the New Zealand strategy for local eradication of tuberculosis from wildlife and livestock. *New Zealand Veterinary Journal* 63, 1-30.

McEachern, M., Warnaby, G., Carrigan, M. and Szmigin, I. (2010) Thinking locally, acting locally? Conscious consumers and farmers markets, *Journal of Marketing Management*, 26 (5), 395:412, DOI:10.1080/02672570903512494

Naylor, R. and Courtney, P. (2014) Exploring the social context of risk perception and behaviour: farmers' response to bovine tuberculosis. *Geoforum* 57, 48-56.

Robinson, P. (2015) A history of bovine tuberculosis eradication policy in Northern Ireland. *Epidemiology and Infection* 143, 3182-3195.

Robinson (2017a) Framing bovine tuberculosis: a 'political ecology of health' approach to circulation of knowledge(s) about animal disease control. *Geographical Journal* 183, 285-294.

Robinson, P. (2017b) Farmers and bovine tuberculosis: Contextualising statutory disease control within everyday farming lives. *Journal of Rural Studies* 55, 168-180.

Robinson P. (2018) Performativity and a microbe: Exploring *Mycobacterium bovis* and the political ecologies of bovine tuberculosis. *BioSocieties*, online first pp.1-26.

Secretary of State (2014) 'Foreword'. *A strategy for achieving Officially Bovine Tuberculosis Free status for England*, UK Government, London UK

Strauss, A. and Corbin, J (1990) *Basics of Qualitative Research Techniques and Procedures for Developing Grounded Theory* Sage Publications: London

Ulster Farmers Union (2018) *Radical thinking required to eradicate bovine TB, says UFU.*

February 8th, available online at: <https://www.ufuni.org/news/radical-thinking-required-to-eradicate-bovine-tb-says-ufu> [last accessed 22/07/18].

World Health Organisation (2018) *Tuberculosis Control.*

http://www.who.int/trade/distance_learning/gpgh/gpgh3/en/index4.html [last accessed 19/7/18].