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Relational Distance, Neoliberalism and the Regulation of Animal Health

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Abstract

Using quantitative and qualitative data, this paper contributes to debates on the uneven geographies of neoliberal animal disease regulation. Specifically, the paper analyses the impacts of neoliberal reforms to animal disease regulation in Great Britain. Focussing on the case of bovine tuberculosis (bTB), the paper analyses how changes to 'relational distance' in animal disease regulation have led to closer relationships between regulators (veterinarians) and regulatees (farmers) which in turn has led to a departure from standardised disease regulation to approaches that emphasise greater flexibility and judgement. The paper presents quantitative analysis of bTB testing data revealing the gradual erosion of government control of bTB regulation and significant variations in disease diagnosis between vets in the private and public sectors. Drawing on interviews with senior veterinarians in Government and veterinary organisations, the paper shows how these regulatory structures evolved and came to be accepted despite their limitations. The paper concludes by considering how relational distance contributes to an understanding of the nature of disease and its implications for the wider regulation of animal disease.

1 Introduction

Neoliberal approaches to managing animal disease revolve around attempts to harmonise biosecurity practices across global space. In this deterritorialisation of agri-economic space, disease is standardised by disease management practices, risk assessments, and other metrological regimes that are designed and relied upon to patrol the boundaries of disease-free countries and ensure continued free trade between them (Braun, 2007). In practice, however, the harmonisation of biosecurity practices is invariably uneven: national economic interests may deflect international economic concerns requiring biosecurity solutions to be reworked at local scales (Higgins and Dibden, 2011; Higgins et al., 2012; Mather and Marshall, 2011; Maye et al., 2012). Instead, biosecurity standards are given a local character as they emerge 'out of complex articulations between actors in multiple locations' (Higgins and Lerner, 2010: 10) to make global rules workable across different agricultural spaces.

This paper contributes to these understandings of the uneven geography of biosecurity regulations, practices and procedures. The paper draws on the concept of 'relational distance' (Black, 1976) to analyse the effects of changes to the governance and regulation of animal disease in Great Britain. Relational distance refers to the cultural and institutional proximity between regulators and regulatees. Reforms to Government regulation in Great Britain have seen attempts to lengthen this distance to ensure stricter and more objective approaches. Despite significant changes to the organisation of the governance of animal disease in Great Britain there have been few attempts to analyse their effects upon the way animal disease is regulated in practice, or their wider implications for the governance of animal disease (Enticott et al., 2011).

The focus for the paper is on the reorganisation of the regulatory landscape for one animal disease – bovine tuberculosis (bTB) – and analyses how changes to this landscape have come about and contributed to tensions between different disease management and surveillance practices amongst private and public sector veterinarians. The paper begins by defining the concept of relational distance and describing how it is reflected in changing patterns of Government regulation. After outlining the background to bTB in Great Britain, the paper draws on qualitative and quantitative data to suggest that the relational distance of veterinary regulation affects practices of disease surveillance and the nature of disease itself. The paper shows how these practices have evolved from a mixture of necessity and the mutual interests of the Government and the veterinary profession. The paper argues that whilst this mixture contributes to different ways of understanding and diagnosing disease, it simultaneously holds it together, making changes to the system extremely difficult, leading to

an implicit accommodation of difference and an uneven geography of animal disease regulation.

2 Regulation, Relational Distance and Neoliberalism

A key focus of regulatory studies has been to determine what constitutes effective regulation: how is it possible for regulators to ensure regulatees comply with the law? Here, the first challenge is to determine what constitutes regulatory compliance: as regulatory studies point out, compliance does not simply mean obeying regulations. For Lipsky (1980), regulations and compliance are given meaning by the social context of regulators and those they are regulating. Thus, it is through exposure to and coping with varying contexts that regulators come to enact multiple versions of public policy on an on-going basis. What counts as compliance is therefore a matter of interpretation, whilst attempts to enforce compliance may take the form of various different strategies, some more legalistic or formal than others.

Different strategies of regulation are witnessed across different areas of economic activity. In reviewing safety in coal mines, Braithwaite (1985) considers the differences between regulatory strategies of persuasion and punishment employed by mine inspectors. Persuasion may arise as a necessary strategy for inspectors living in the same small communities as those they regulate. In studies of environmental health regulation, Hutter (1988) distinguishes between 'insistent' (i.e. formal) and 'negotiated' (i.e. persuasive) strategies of regulation. Hutter shows that Environmental Health Officers in rural local authorities are more likely to adopt a negotiated approach due to the close relationships between business owners and local politicians. In studies of farm pollution, Lowe et al. (1997) show how pollution inspectors base their style of enforcement on their judgements of farmers' social characteristics and an ability to do business with them. In short, these studies highlight how regulation and compliance is constituted in practice and is dependent upon social and environmental contexts.

The effect of situational and contextual factors upon regulation practices is captured within Black's (1976) extensive analysis of the laws of law. Black (p.3-4) argues that 'law is a quantitative variable. It increases and decreases, and one setting has more than another...law varies in time and space'. These geographical variations in the quantity of law exist at a local scale between legal settings, and at regional and national scales. There are also different styles in applying law: one person is punished, another is given sympathy, whilst for others there are no consequences. For Black, all these variations in the style and

quantity of law are explained by the relationship between law and aspects of social life, specifically factors such as stratification, morphology, culture, organisation, and social control. Of specific relevance to regulation studies are the effects of morphology. Black (1976: p.37) refers to morphology as 'the horizontal aspect of social life – the distribution of people in relation to one another, including their division of labour, networks of interaction, intimacy and integration'. Here, Black develops the concept of relational distance to explain variations in law. Relational distance describes the extent to which people (e.g. regulators and regulatees) participate in one another's lives, i.e. their intimacy. Relational distance can be measured by identifying 'the scope, frequency and length of interaction between people, the age of their relationship, and the nature and number of links between them in a social network' (Black, 1976: p.41). The greater the relational distance – the further apart people are culturally, institutionally or physically – the more likely it is that regulators will adopt legalistic or enforcement-oriented approaches to regulation. The closer it is, the more likely it is for informal and negotiated strategies to be employed. In support, Black points to evidence that people with close relational distance ('intimates') are less likely to call the police about crimes committed against each other and when they do, the police are less likely to view their complaints as crimes or make an arrest (Black 1970, 1971). The relational distance between the law and citizens also predicts regulation: 'the closer the relationship between an official and an offender, the less law...a policeman is more lenient toward someone close to him - a relative, friend, neighbour or fellow policeman' (Black, 1976: p. 44; see also Hagan, 1966). By contrast, relational distance widens 'as people crowd together in time and space with practically everyone a stranger to everyone else' (Black, 1976: p.45). As urbanisation increases, so too does the application of formal law.

In environmental regulation, Braithwaite's (1985) study of mining regulation highlights how relational distance influences the regulatory strategies available to inspectors. Persuasive strategies are common when mine inspectors can nurture rapport by visiting the same mine several times a year and can return to check that suggestions have been followed. Where there is a high turnover in inspectors and infrequent visits, a persuasive strategy is unlikely to command much respect from management. The influence of relational distance on regulatory strategies is not confined to coal mines: Grabosky and Braithwaite (1986) show how relational distance influences regulatory strategies in 96 business regulation agencies across Australia. Covering agencies responsible for regulating corporate affairs, environmental protection, food standards, medicine, occupational health and safety, transport safety, discrimination and fraud, they distinguish four ways in which relational distance affects regulatory practices. Firstly, regulatory agencies that only dealt with a small number of companies were less likely to resort to legal sanctions. None of the nine agencies

that regulated fewer than 50 different organisations sought legal sanctions, whilst the 50 agencies that dealt with over 1000 different companies frequently resorted to a legal approach. Secondly, regulators that only dealt with companies drawn from a single industry were less likely to adopt a formal legal approach than those who dealt with many. For single industry regulators the median number of legal cases was 2.5 compared to 10.5 for diverse industry regulators. Thirdly, regulators who had frequent contact with the same firms were significantly less likely to use legal sanctions than those with no on-going relationship. Finally, where regulatory agencies had a large proportion of staff drawn from the industries they regulate, they tended to prosecute offences less frequently. In addition, Grabosky and Braithwaite (1986) show that the size of the company being regulated also had a significant impact on the type of regulatory strategy used. One interpretation is that larger organisations exert more power over regulators to prevent legal sanctions, thereby undermining the significance of relational distance. Whilst this remains a possibility, Grabosky and Braithwaite (1986) argue that it is difficult to disentangle these two explanations: lack of prosecutions, they argue, may be because regulators who regularly meet with organisations they are regulating are more able to persuade them to comply with rules. Similarly, Marsden et al (2000) show how organisational size leads to different regulatory strategies in the food sector. They argue that trading standards officers prosecute large national companies because, compared to small businesses, they are expected to know the rules and have effective self-regulation strategies in place. Thus, regulators often adopt persuasive strategies with small companies, but when large national companies make small errors, legal sanctions are more likely to follow.

One limitation of Grabosky and Braithwaite's (1986) research is that conviction rates rather than all prosecutions are used to assess relational distance. Moreover, as Hood et al (1999) point out, resorting to prosecution is not always open to some regulators, particularly those operating within Government. Instead, in examining the regulatory behaviour of Government regulators (such as auditors, fire, police and education inspectorates) Hood et al. (1999: 61) develop an 'index of formality' which takes into account regulators' attitudes towards regulatees as well as the degree of formalised rule-bound regulation. Their analysis provides further support for the role of relational distance. The degree of formal regulation was explained well by shared experiences (such as previously working in the regulated organisation) and familiarity (in terms of the frequency of contact between regulators and regulatees). However, there was no relationship between formal regulation and the number of regulatees, whilst there was only a moderate relationship between the diversity of regulated organisations and formal regulation. Nevertheless, Hood et al (1999, p.65) conclude that 'relational distance often seems important in shaping the way regulation in

Government works', meaning that the regulator-regulatee relationship should be a key factor in the institutional design of Government regulation.

In fact, since the late 1980s, reconfiguring relational distance has been a key element of neoliberal reforms to Government regulation. The concept and tools of neoliberalism are frequently hard to define, being far from monolithic or a uniform set of practices (Hodge and Adams, 2012; Maye et al., 2012). Instead they are better characterised as a vast number of "local trajectories, contingent forms and hybrid assemblages" of capitalist logic (Peck et al., 2010: p.96). However, three strategies of neoliberal rule that have redrawn the relational distance of Government regulation can be discerned. Firstly, in attempting to transform the efficiency of public services, there has been an ever greater reliance on a range of performance management, indicators and targets (Henkel, 1991). These techniques of audit have the capacity to 'govern from a distance' (Barry, 2001) and claim objectivity and neutrality (Humphrey, 2001, 2002) by distancing regulators from regulatees. For services like education and social services, it is argued that these changes to relational distance have seen an epistemological shift in the nature of regulation. Where regulators were reliant on professional expertise and judgement, new adversarial forms of regulation and managerialism have taken their place with the aim of identifying default (Day and Klein, 1990; Kogan and Maden, 1999).

Secondly, the creation of new regulatory agencies has facilitated a redrawing of relational distance. The process of 'agencification' removed civil servants from Government and placed them in new delivery agencies where they could deliver policy free from bureaucratic hurdles and adopt business management techniques usually found in the private sector (Efficiency Unit, 1988; Self, 1993). In doing so, the relational distance between regulators and the regulated was lengthened in an effort to ensure a less variable approach to regulation. For example, the establishment of the Meat Hygiene Service (MHS) in 1995 centralised arrangements for inspecting fresh meat plants to protect against the risks of animal disease (principally Bovine Spongiform Encephalopathy [BSE]). The creation of the MHS addressed concerns that local authorities were not enforcing BSE regulations because of close relational distance between local politicians and local businesses (Eves, 2006).

Thirdly, whilst neoliberal regimes have sought to deregulate (so called 'roll-back' neoliberalism), 'roll-out' neoliberalism suggests that industry becomes the architect of new strategies of regulation (Peck and Tickell, 2002). In the governance of animal disease, this has meant that industry translates consumer desires into 'checklists of acceptable farming practices' that can be audited by regulators (Haggerty et al., 2009: p.768). On the one hand, roll-out neoliberalism can lead to close relational distance as industry come to determine

regulatory standards. On the other, exposing regulation to market forces can also lead to an increase in relational distance. For example, in Great Britain, slaughterhouse inspection is contracted-out to a small number of private companies who procure vets to conduct the work from specialist recruitment agencies. This work has become particularly popular amongst foreign trained vets (Lowe, 2009). Thanks to the use of short-term contracts, the employment of overseas veterinarians and the comparative social isolation of these vets from the rest of the veterinary profession and local businesses, relational distance for this system of regulation can be high.

However, the impact of these strategies upon the regulatory practices of animal disease as a result of changes to relational distance has not been fully researched. There is limited evidence to suggest that neoliberal regulatory structures have contributed to the redefinition of what constitutes veterinary regulation, how it is done and who should do it (Enticott et al., 2011). In other policy areas, research has suggested that despite the apparent scientific and objective nature of new regulatory practices, inspectors are forced to adopt negotiating positions, rely on intuition and judgement, and make trade-offs in order for their judgements to be accepted (Downe and Martin, 2007). In other words, the consequence of re-organising the relational distance between regulator and regulatee by no means leads to a straightforward switch from informal and negotiated regulation to that which is formalised and standardised. Rather, these organisational shifts may lead to a subtle accommodation of different styles of regulation, shaped by the day-to-day demands of completing regulatory work, and in doing so raise questions over the nature of the object of regulation and the expertise required to identify it. The remainder of this paper explores the extent to which changes to the relational distance of animal disease regulation have impacted upon the very diagnosis of animal disease.

3 The Regulation of Animal Health: A case study of bovine tuberculosis

Animal diseases over which the British Government exercise regulatory responsibility are defined by the World Organisation for Animal Health and incorporated within European Union (EU) directives on international trade. Known as statutory notifiable diseases, outbreaks of these diseases must be brought under control or have on-going eradication plans if exports of animals or animal products are to continue. An example of an endemic notifiable disease that has been subject to on-going Government-led eradication efforts is bovine Tuberculosis (bTB), a zoonotic bacterial infection that can be passed between animals and humans. The disease is commonly found in cattle and wildlife, specifically badgers, and was first recognised as an animal and public health problem at the end of the

Nineteenth Century. Although public health concerns are now minimal (Health Protection Agency., 2006), bTB is frequently described as the most challenging and complicated animal disease in Great Britain (Defra, 2013). Whilst eradication of the disease in cattle was virtually achieved in the 1960s (MAFF, 1965), from the 1970s, cases began to rise steadily (Krebs et al., 1997). In 2012, over 37000 cattle were slaughtered due to bTB infection (Defra, 2013). The disease is concentrated in the west and south-west of England and west Wales. Managing the disease is made complicated by the involvement of badgers as a disease vector. As an iconic and culturally significant animal in Great Britain, badgers are protected by law and Government-led badger culling strategies have been disrupted by public protest (Enticott, 2001). Scientific studies have found only limited support for the effectiveness of badger culling (Independent Scientific Group (ISG). 2007).

In this complicated policy environment, and without a useable cattle vaccine, the Department for Environment, Food and Rural Affairs (Defra) has relied upon routine cattle surveillance conducted by vets to identify and manage the disease. Cattle in areas with high disease prevalence are tested on an annual basis using the Single Intradermal Cervical Comparative Test, or 'skin test' for short (de la Rua-Domenech et al., 2006). Diagnosis of at least one animal with bTB (known as a reactor) leads to those cattle being slaughtered and the whole herd being placed under movement restrictions, meaning the farmer cannot move cattle on or off the farm for any purpose (such as trade). Positive herds are retested every two months until the whole herd has passed two consecutive tests when trading regulations are lifted.

The scale of the problem means that bTB is the most pressing animal disease problem for Defra, costing the taxpayer £100m a year and has resulted in a vast regulatory landscape involving agencies and actors from both public and private sectors (Defra, 2013). When it comes to bTB testing, tests may be conducted by vets working for the Animal Health and Veterinary Laboratories Agency (AHVLA¹). The growth of the disease in recent years has meant that vets in private practices have also been asked to conduct disease surveillance, usually of their own clients' herds. This mix of public and private regulation provides an ideal opportunity to examine the effect of relational distance on the regulation of animal disease.

Data were collected as part of a mixed-methods project investigating veterinarians' approaches to bTB testing. The project involved ethnographic participant observation of vets in two private practices and a regional office of the AHVLA over 5 months focussing on the day to day practice of veterinary regulation and the relationship between organisational culture and bTB testing practices. Fieldwork took place in 2008-9. Following its completion, interviews with 19 Government veterinarians (in AHVLA and Defra), representatives of veterinary organisations (the Royal College of Veterinary Surgeons and British Veterinary

Association) and academic vets were conducted on the subject of veterinary regulation. These data were triangulated with findings from the ethnographic fieldwork. Data from bTB tests were also analysed to look for differences in the diagnosis of bTB between private and Government vets. These data were extracted from the AHVLA's Vetnet database for three counties in England and Wales. The counties (Devon, Gloucestershire and Dyfed) were chosen because they have high levels of bTB incidence. The dataset contains details of the type of bTB test, the number of cattle tested, the number of reactors and who completed the test. In total, data were provided for 89567 bTB tests conducted between 2004-9. Most tests were routine surveillance tests (61025) with the remainder on herds already with bTB (known as short interval tests). The vast majority of tests were performed by private vets (83899).

4 The effect of changing regulatory regimes on animal health

This section explores changes to the regulation of bTB. It begins by considering the extent to which private sector vets have become involved in animal disease regulation and their impact upon disease diagnosis. Secondly, the section examines the reasons why private vets have become a cornerstone of bTB regulation despite concerns about their suitability to act as impartial regulators.

4.1 Changing patterns of veterinary regulation

The veterinary profession has long referred to its public good function in regulating animal disease to justify why private vets should receive Government funding (Anon., 1966; Woods, 2007). Testing for bTB represents a key part of its public good commitment but in reality data suggest that this contribution has only come relatively recently. Figures 1 and 2 show this quite clearly. Both figures reveal the changing distribution of veterinary regulation over ten years in England between the private and public sectors. The sudden drop in 2001 was a result of the suspension of bTB testing during the outbreak of Foot and Mouth Disease in 2001. Overall however, the pattern is one of increasing testing by the private sector, particularly from 2002 onwards. In fact, the actual number of bTB tests conducted by Government vets is unchanged from 2006 when compared to 1996 despite a worsening of the overall levels of disease.

[insert figures 1 and 2 here]

These changes are even more remarkable at a local level. Figure 2 shows the distribution of short interval tests in the county of Devon, a county with long standing higher than average levels of bTB. Short interval tests occur every 60 days on a herd that has been diagnosed with bTB. It is important that these are conducted to high standards to ensure that the herd is cleared of infection: as a former Chief Veterinary Officer (CVO) said in an interview: “the short interval tests have got to be done absolutely following the protocols”. In 1996 it was extremely rare for any short interval tests to be handed over to vets in private practice. Despite a worsening disease picture, this remained the case until 2000 when only a small proportion of short interval tests were completed by the private sector. However, three years later, private vets were completing more short interval tests than Government vets. Moreover, from 2003 the number of short interval tests completed by Government vets went into decline despite rapidly rising levels of disease. In fact, by 2006 the numbers of tests conducted by Government vets was lower than it was in 2002 by which time levels of disease had risen considerably.

During this time, the training requirements for bTB testing also changed. To qualify for bTB testing, vets traditionally attended a two day training course organised by the State Veterinary Service (SVS) dealing with the theoretical and practical aspects of training. However, as demand for testing increased, so did the need to train more vets so that they could complete the test, and just as the ability of the SVS to complete tests was limited, so was its time to train vets. The arrangements therefore changed according to regional demands. In those areas with high levels of bTB, the theoretical part of the training remained with the SVS, whilst the practical element was handed over to the private sector. In effect, veterinary practices became responsible for training their own staff in how to complete a bTB test. The rationale for this shift was described by one Divisional Veterinary Manager (DVM) in the following way:

“And of course we’re screaming at people to get tests done we can’t be a barrier to appointment. Putting off perfectly good people. So you know, that’s the way we ran it”.

Why did this shift occur? Shifts to neoliberal styles of regulation are often marked by the establishment of new organisations. The story is more complicated in the governance animal disease. One of the results of the 2001 Foot and Mouth Disease outbreak in Great Britain was to expose the SVS as ill-prepared to respond to a national disaster (see Wilkinson et al., 2010). In the aftermath, the SVS was stripped from Defra and created as an agency in 2005 with the responsibility of managing animal disease. Whilst this type of agencification is often associated with the introduction of new managerial processes – such as contracting-out

services through competitive tendering to enhance efficiency – it seems these changes to the organisation of bTB testing were already occurring. Interviews with senior vets suggest that the process was gradual and borne out of necessity. Government vets suggested that there was never a moment when a decision was made to switch to the private sector. Rather, as one former DVM stated, “we started to push all the testing out because that was the easier way of doing the work”. Similarly, a former CVO responded when shown figure 2:

“it’s a question of resource...it comes back to the fact that it’s a question of who’s available to do these tests...if it’s just a straight huge increase in [the] number of outbreaks, you’ve got to use whatever resource you’ve got”.

These changes in veterinary regulation are hard to make sense of when compared to the same senior vets’ concerns about the role of private vets. In interviews, senior Government vets believed that the quality of bTB testing by private vets was of poor quality, that their failure to follow the testing procedures was compromising disease management and that the increasing role of private veterinarians was not having a positive effect on the management of the disease. Reactions to figure 2 from senior vets in Defra and AHVLA captured these concerns:

“for 10 years [we have] been saying we are unhappy with this. We’ve been making clear that we see it as a real risk to see more and more priority tests passing out to the private practice”

“the reason why this is worrying is because I don’t believe that these people reliably test each individual animal to the same standard as [Government vets] and this is an individual animal test this isn’t a herd test”²

Others commented that the mind-set and expertise of private vets was completely different to that of vets working directly for Government which affected their interpretation of test results, particularly in marginal cases:

“[Private vets’] philosophy is ‘my job is to look after my client, minimise the impact on my client. Make sure he gets the best deal, and all the rest of it’. Whereas the Government vet, because we have Duty Vets, they can go out and do that case, they can take out the technicians to support them...they’ve got the training to do epidemiology and we’re beginning to train more and more of them in epidemiology. They’ve got the time to do it...Where I think private vets have an important role is in prevention. So once you’ve got the outbreak confirmed I don’t, I wouldn’t want private vets having a lot of involvement” [former CVO]

These comments do not simply reflect concerns over private vets' expertise, but an increasing divide in the nature of veterinary expertise between the public and private sectors. Just as Government vets were concerned about the skills and knowledge of private vets, so too did private vets voice their criticisms of the expertise of Government vets. In interviews with private vets, Government vets were criticised for being too distant from the problem; for not being able to appreciate the realities of 'real' veterinary or farm work; imposing rules for their own sake rather than for good veterinary reasons; and accused of crossing T's and dotting I's for their own sake. Certainly, their image of what counted as a competent vet was not consistent with the type of desk-bound work that private vets assumed Government vets to be mainly involved with. Thus, as more and more tests were handed over to private vets, so the boundary of bTB expertise shifted towards them, allowing them to question the competency of Government vets and their policies.

Government vets' concerns about private vets' bTB testing practices also reflect this deepening divide in types of veterinary expertise and their respective knowledge bases, and were confirmed during the ethnographic phase of the research. The ethnographic analysis associated with the project showed that vets in private practice developed their own regulatory practices to cope with the demands of the volume and difficulties of bTB testing. This usually involved bending or ignoring elements of the testing protocol to suit different farm conditions and disease situations. Whilst the knowledge of which corners to cut was a product of shared practice cultures, it was also developed through their close contact with farmers. As vets already knew many of the farmers they tested as clients, this close relational distance allowed a negotiation over the result of tests; the application of veterinary judgement to interpret positive tests; and farmers requesting that only the vets they 'could do business with' test their herd. Private vets were particularly confused about who was responsible for the safety of a test and unless a farm was obviously dangerous stated that they were unlikely to tell the farmer how they should be handling their animals for the purposes of the test (for more details see: Enticott, 2012). The close relational distance between private vets and farmers ensured that the practice and expertise required of bTB testing was co-produced and locally variable. Such variations of the testing protocol were not found amongst Government vets working for AHVLA. Instead, their whole organisational environment was framed by procedures, regulations and conforming to rules. These vets routinely spoke of the need to follow procedures in order to manage the disease properly. It was rare for them to visit the same farm twice or have had previous contact with the farmer. Many of these vets were young, working on short term contracts, from abroad and did not know any of the farmers they were regulating. In these circumstances, relational distance was high and conformity to the bTB testing protocol unsurprising.

In fact analysis of bTB testing data provides confirmation that close relational distance impacts upon the diagnosis of bTB. One way of comparing the relative performance of Government and private vets is by comparing the number of diseased animals they find with the number of animals tested. The figure of reactors per 1000 (RpT) cattle tested is often calculated to express disease incidence, but can also be used to measure detection rates by vets. Table 1 shows significant differences exist between vets working for the private sector and those working directly for the Government. For the three high bTB incidence counties analysed (Dyfed, Devon and Gloucestershire), Government vets found on average 14 more reactors per 1000 animals tested, and 19 more during short interval tests. This pattern is repeated across five years of bTB testing and was most pronounced during short interval tests. Calculation of odds ratios provide further confirmation of the differences between private and Government vets. For all types of bTB test, Government vets were more than twice as likely to diagnose bTB infected herds (Odds Ratio: 2.388 Confidence Interval: 2.251 – 2.532). Odds ratios were lower, but still statistically significant when short interval and routine tests were examined separately. Regression analysis indicated that RpT was not influenced by herd size. It is possible that other factors may explain these variations. For example, Government vets may be more likely to test problem herds (for example, herd owners that refuse to test) that are likely to harbour reactors. Overall, however, the results indicate that Government vets find more reactors because they apply a stricter interpretation of the testing procedure. Where test results are marginal, Government vets appear more likely to condemn them, whilst private vets are more likely to give cattle a chance or take into account contextual factors in their diagnosis (see Enticott, 2012).

[Table 1]

Whilst these results indicate that relational distance does make a difference to the outcome of a bTB test, they might also indicate something more fundamental about the nature of disease itself. Recent biosecurity studies have argued that the fixed and standardised procedures to international biosecurity regulations may be less effective than looser forms of expertise which can accommodate difference (Hinchliffe, 2007). Mather and Marshall (2011), for example, show how uneven regulatory approaches facilitated the management of avian influenza in South Africa. Accepting an accommodation of difference – which in this case might refer to the different interpretations of bTB test results by private and Government vets – suggests too that there are multiple versions of disease, each enacted through different practices. As Law and Mol (2011) describe, ways of diagnosing disease enact specific disease ontologies: a version of disease that performs and is performed by a specific set of practices, materials, and expertise. Whilst Law and Mol describe how clinical, laboratory and epidemiological practices produce different versions of disease, the differences between

public and private veterinarians suggest that different versions of disease are enacted within the same practices. As Enticott (2012, p.85) argues: “multiple versions of disease do not depend on wildly different diagnostic techniques but on subtle variations in technique developed in relation to cows, vets, farmers and other actors...the balance between them is constantly shifting at different farms and for different animals”. By comparing public and private vets, these findings also show that the balancing out of different factors occurs in the context of the relational distance in which veterinary regulation is situated. Thus, versions of bTB are not just produced by different diagnostic methods, but by the relational distance inherent within the organisation of bTB testing.

4.2 Regulating or living with disease?

In the neoliberal governance of animal health, the acceptance of these kinds of difference is rarely an explicitly acceptable strategy. Nevertheless, the regulation of bTB suggests that they can at least be implicitly accepted in ways of managing disease. Why otherwise would the Government have continued to allow the increased use of private vets for bTB testing despite their concerns? One answer to this question is that a regulatory structure gradually emerged in which deviation from standardised procedures by private vets was inevitable because the approach to regulating disease allowed both Government and private vets to accrue wider benefits. In addition, the absence of external coercive pressures allowed the Government to implicitly accept these variations in practice, choosing instead to live with different versions of disease.

The regulatory structures that led to the variations between private and Government vets were largely supported by an absence of external coercive pressures. Firstly, despite an EU directive setting the standards for the bTB test and disease eradication across all member states, there was little pressure from the EU. Whilst the EU’s Food and Veterinary Office (FVO) had previously expressed concerns about the quality of bTB testing during an inspection in 2004 (DG SANCO., 2004), the fact that Defra received no EU financial assistance to help with their management of bTB meant, in the words of one vet within Defra, that they could effectively ignore them despite effectively legitimising an infraction of an EU directive:

“we’re actually breaking the law... I notice the EU are now contributing to the TB programme. The reason we didn’t ask them to up until recently was so we didn’t have them hassling us. So we got no EU funding. We could deal with TB control as

required, but we didn't have visits and aggravation [from the EU]... we weren't taking money off them then so we tell them to get stuffed".

Secondly, control over the regulatory policy vacillated between Defra and the various government agencies responsible for bTB. Whilst field staff in AHVLA complained about private vets making their job more difficult, interviews with Government vets suggested that ownership of the policy was confused with neither AHVLA nor Defra taking a lead. Discussions over reforms had stagnated, whilst staff resources and turnover in AHVLA meant that there few people with a clear understanding of the issues. Policy issues were therefore never satisfactorily dealt with:

"[policy is] almost like rugby balls that people don't want to hold and they give a hospital pass out to someone on the wing and just say 'well do what you can with it'"
[Defra vet]

Thirdly, there was little coercive pressure from the agricultural industry. Many farmers were already distrustful of the Government in relation to bTB (Enticott, 2008) and considered a good bTB test to be one that was completed as quickly as possible. Fourthly, there were no significant pressures from the veterinary profession itself. Until 2009, the Royal College of Veterinary Surgeons had not disciplined any vets for poor bTB testing, largely because no cases had been referred to their disciplinary committee. Moreover, in interviews veterinary organisations disagreed with Government vets over what constituted a poor quality test: whilst some of vets' transgressions of the bTB protocol were agreed to be of poor quality, other transgressions were seen as marginal and simply part of a veterinarians' expertise. Indeed, the Royal College of Veterinary Surgeons suggested that if testing guidelines were overly prescriptive and left no room for professional judgement then many vets could withdraw from bTB testing altogether (Defra, 2007).

In the absence of coercive pressures, a self-reinforcing system of regulation became embedded in which Government and private vets became mutually dependent upon each other. Reforming or challenging the system was therefore extremely difficult as benefits accrued to each party and different interests reinforced the importance of maintaining the system. Passing more bTB tests to private practices has provided a valuable source of income stream to many veterinary practices. For those in areas of high bTB incidence, income from bTB testing can often account for over 25% of practice income, and in some cases much higher. Income from testing has allowed some practices to rapidly expand: testing income is used to subsidise wages for additional veterinary staff. For example, in interviews practice partners suggested that in a practice of ten vets, the loss of bTB testing income could result in the loss of two vets who would be able to bring in extra income from

conducting other veterinary tasks paid for by farmers and small animal clients. More importantly, the additional vets would also contribute to the out of hours rota, allowing a reduction in time spent on call or working at weekends. Income from bTB testing therefore helps to improve vets' quality of life, whilst simultaneously contributing to the provision of veterinary services in rural areas. Without income from bTB testing, practice partners that were interviewed suggested that running the practice would be much harder and for some, it would be the cause of retirements and a further decline in the provision of farm animal veterinary services.

Similarly, amongst Government vets there was recognition of the wider negative consequences of attempting to change the regulatory system. Whilst one Government vet described the situation as being 'over a barrel', the lack of alternative capacity meant that they were unable to threaten the vets in private practices that they were going to withdraw their right to conduct bTB tests in order to improve testing quality. Despite the belief that abuses were widespread, suspensions were therefore rarely considered, and punishments limited to a 'professional chat' (Defra vet interview). The entrenchment of bTB testing within private veterinary practice meant that Government faced a dilemma: withdrawing bTB testing from private practices would not only compromise their ability to maintain animal disease surveillance for bTB, but also the wider provision of farm animal veterinary services. Senior vets in Defra therefore recognised their dilemma in the following way:

"you can't suddenly cause an almighty rift by taking TB testing away from [private vets] because these practices of 10 or a dozen people will reduce the staff by 50% [so unless] you were prepared to see large animal veterinary work just go to the wall and all you're interested in as a government or a society is to do cheap accurate TB testing, you would use cheap European vets...So, I don't think you can solve the quality of TB testing argument without looking at these much wider things...and what role government has in creating the environment that will allow large animal practice to thrive"

This dilemma therefore helps to account for the lack of change to the regulatory system. The benefits to each party had become such that the radical changes required to increase relational distance sat uneasily with the Government and the vets. In effect, by decreasing the relational distance between regulator and regulatee, the Government had not only encouraged the use of negotiated regulation based on veterinary judgement and deviation from the testing protocol, but they had also come to tacitly accept it. The Government's ability to conduct veterinary regulation depended on living with these uncertainties rather than accepting that regulation must proceed in a scientific rational fashion, just as much as

the vets had when it came to testing in practice. Thus, in the same way that roll-back neoliberalism has handed regulatory control to agricultural elites in other areas of policy (Haggerty et al., 2009), so the power to decide how bTB tests should be completed, and how the disease should be defined and enacted, was effectively passed from Government to private vets. In coming to rely on the private sector to deliver bTB testing, variations in procedure were inevitable, but importantly the system allowed the volume of testing required to be completed.

As indicated above, these kinds of accommodations and living with difference are what allow rules, regulations and classifications to hold firm. Timmermans and Berg (1997) for instance show that it is only by bending medical standards, that it is possible to ensure they work in all locations. Waterton (2002; 2003) takes a similar view in describing the problems of measuring biodiversity faced by biologists in the field, but also suggests that the flexible nature of standards and classifications is legitimised by Government actors at national and intra-national scales who are indifferent to the precision of classifications and protocols. Dibden et al's (2011) analysis of biosecurity practices paint a similar picture: that global biosecurity regulations and standards are made to work thanks to local actors working to fit global rules to local contexts. For the regulation of bTB, something similar is afoot. Concerns over the quality of bTB testing reflect the ways in which practicing vets routinely bend the protocol in order for it to work in different contexts. Yet, these adaptations to the protocol are legitimised by the ways in which Government and the veterinary profession have organised the regulation of bTB. Ironically, the regulatory system for bTB has similarities to calls for these flexible systems to regulate and manage outbreaks of animal disease (Hinchliffe, 2007; Law, 2006), but not through deliberate choice. Rather, Government vets have criticised practicing vets, and more recently begun to issue guidance and instructions to vets to encourage them to test according to the regulations. However, the insistence that vets follow the protocol and failure to re-organise the regulatory system means that the testing regulations may be instead seen as a symbolic order in which the importance of instructions, rules and protocols reflect a desire to appear rational. As Clarke (1999) suggests, albeit in a different context, the plans, protocols and training advice associated with veterinary regulation can be interpreted as 'fantasy documents' produced by organisations to give an impression of control, when it is clear that control of the system in its current format is an illusory goal. This rhetoric allows individual vets to be blamed for failures whilst the systemic problems associated with the relational distance of animal health regulation can be hidden away. That any punishments are for individual vets rather than veterinary practices reveal a reluctance to engage with the different forms of bTB enacted through variable testing practices. Thus, the emphasis on plans and standards in animal disease regulation can

instead be seen as rhetorical devices directed at external audiences to reassure them of the efficiency of animal disease regulation.

5 Conclusion

This paper has examined the effects of changes to the governance of animal health and their impacts upon the regulation of bovine Tuberculosis. In particular, the paper has been concerned with analysing how changes to the relational distance of veterinary regulation have impacted upon the practice of veterinary regulation. Neoliberal biosecurity governance demands that diseases are standardised through standard operating procedures and metrological regimes. However, the changing governance of bTB challenges these understandings of disease and biosecurity. Rather, reforms to the way disease is regulated has led to changes in the relational distance between regulators and regulatees. Whilst other public policy reforms have sought to increase relational distance, the reverse has been true for bTB regulation where increasing numbers of private veterinarians have been involved in bTB testing.

The reduction of relational distance between regulators (vets) and regulatees (farmers) has had a number of effects. Firstly, it has led to a shifting balance in veterinary expertise in relation to bovine Tuberculosis. As Government vets have come to test proportionally fewer cattle – particularly cattle herds that are suffering from bTB – so vets in the private sector have gained greater competence and knowledge in bTB testing leading to divisions in what constitutes veterinary expertise between private and Government vets. Thus, as the volume of bTB testing has outstripped their colleagues in Government, so have private vets challenged the legitimacy and status of Government vets. Similarly, the increase in testing has allowed private vets to develop a field-level experiential knowledge-base to question and bend the testing protocol to fit local circumstances. Secondly, analysis of bTB testing data reveals that Government and private vets' disease detection rates are different. These differences are likely to be related to their different approaches to bTB testing. Thus, the changing distribution of veterinary regulation does not have neutral effect on the surveillance of animal disease. Thirdly, the paper shows that the organisation of bTB testing allows different versions of disease to be constructed which are tolerated by the mutual interests of Government, the veterinary profession and farmers which help secure a broader goal of animal disease surveillance and the provision of farm veterinary services. By providing benefits for all parties and with little external coercive pressures, this structure of veterinary regulation has become firmly embedded. Its organisation has therefore helped to create and

sustain cultures and boundaries of veterinary expertise in which the different organisations associated with the regulation of bTB are located.

These findings also have wider significance for the governance and regulation of animal health. Studies of the implementation of international biosecurity regulations have shown that variations are common as local actors seek local solutions for international problems (Dibden et al., 2011). Results in this paper show a similar trend but, for some, they might also be interpreted as questioning moves to open up biosecurity regulations to more flexible decision-making. If by encouraging the greater use of approaches to animal disease regulation that suppress disease incidence, then such an approach may be less than desirable. However, it is also possible to interpret these results as a way of opening up a broader debate and scrutiny over the nature of biosecurity practices, regulations and disease itself. What this paper has shown is that organising the regulation of animal health is no simple matter. The organisation of regulations has social and biological consequences: it is only by considering what these might be and their origins does it become possible to ask questions about what is, might be and might not be desirable in veterinary regulation. Relational distance therefore provides a mechanism by which to consider these effects: it allows researchers to highlight the issues and compromises that may need to be taken into account when regulating animal disease. Considering relational distance highlights that the nature of animal disease is not straightforward, but emerges through complex sets of relationships, in which accommodations of difference may be inevitable – whether they are intended or not. It may be that effective veterinary regulation requires more than specifying scientific standards and protocols, and instead requires an examination of the social effects of the structure of veterinary regulation, and agreement on what is and isn't acceptable, what can and cannot be accommodated (Hinchliffe, 2007; Law and Mol, 2011). Exploring relational distances therefore does more than describe a set of regulatory relationships: it opens up important questions about the nature of disease and the regulation of animal health that require public debate rather than closing down through narrow legalistic scientific definitions of animal disease. Asking questions, determining limits and assessing the social consequences of the regulation of animal disease is vital for the future of animal health.

¹ AHVLA is a Government agency responsible to Defra for the management of all statutory animal diseases in the Great Britain. The agency was initially created in 2005 when the State Veterinary Service (SVS) was removed from Defra's direct control. In 2007, the SVS was rebranded as Animal Health and in 2011 Animal Health was merged with the Veterinary Laboratories Agency to become the AHVLA. The term 'Government vet' is used to refer to vets working either for AHVLA or within Defra as advisors to policy makers.

² The skin test was initially used as a herd test, meaning any animal testing positive led to the destruction of the whole herd. Now, only cattle reacting to the skin test are slaughtered, hence the concern for good quality tests on every animal.

6. References

- Anon., 1966. The Future of the Veterinary Profession. *Veterinary Record* 78 (17), 591 - 596.
- Barry, A., 2001. *Political Machines*. Athlone Press, London.
- Black, D., 1976. *The Behaviour of Law*. Academic Press, New York.
- Braithwaite, J., 1985. *To Punish or Persuade: Enforcement of Coal Mine Safety*. State University of New York Press, Albany, NY.
- Braun, B., 2007. Biopolitics and the molecularization of life. *Cultural Geographies* 14 (1), 6-28.
- Clarke, L., 1999. *Mission Impossible: using fantasy documents to tame disaster*. University of Chicago Press, Chicago.
- Day, P., Klein, R., 1990. *Inspecting the Inspectorates Joseph Rowntree Memorial Trust*, York.
- de la Rúa-Domenech, R., Goodchild, A.T., Vordermeier, H.M., Hewinson, R.G., Christiansen, K.H., Clifton-Hadley, R.S., 2006. Ante mortem diagnosis of tuberculosis in cattle: A review of the tuberculin tests, [gamma]-interferon assay and other ancillary diagnostic techniques. *Research in Veterinary Science* 81 (2), 190-210.
- Defra, 2007. Update on implementing the recommendations of the Comer report on the Tuberculin testing instructions, London.
- Defra, 2013. Draft Strategy for Achieving "Officially Bovine Tuberculosis-Free" Status for England. Defra, London.
- DG SANCO., 2004. Final report of a mission carried out in the United Kingdom from 17 to 26 November in order to evaluate the Bovine Tuberculosis eradication programme, in: Office, F.a.V. (Ed.). European Commission, Brussels.
- Dibden, J., Higgins, V., Cocklin, C., 2011. Harmonizing the governance of farming risks: the regulation and contestation of agricultural biosecurity and biotechnology in Australia. *Australian Geographer* 42 (2), 105-122.
- Downe, J., Martin, S., 2007. Inspecting for improvement? Emerging patterns of public service regulation in the UK. *Environment and Planning C: Government and Policy* 25 (3), 410-422.
- Efficiency Unit, 1988. *Improving Management in Government: the Next Steps*. HMSO, London.
- Enticott, G., 2001. Calculating nature: The case of badgers, bovine tuberculosis and cattle. *Journal of Rural Studies* 17 (2), 149-164.

Enticott, G., 2008. The ecological paradox: Social and natural consequences of the geographies of animal health promotion. *Transactions of the Institute of British Geographers* 33 (4), 433-446.

Enticott, G., 2012. The local universality of veterinary expertise and the geography of animal disease. *Transactions of the Institute of British Geographers* 37 (1), 75-88.

Enticott, G., Donaldson, A., Lowe, P., Power, M., Proctor, A., Wilkinson, K., 2011. The changing role of veterinary expertise in the food chain. *Philosophical Transactions of the Royal Society B: Biological Sciences* 366 (1573), 1955-1965.

Eves, D., 2006. *Review of the Animal Health and Welfare Delivery Landscape*. Defra, London.

Grabosky, P., Braithwaite, J., 1986. *Of Manners Gentle. Enforcement Strategies of Australian Business Regulatory Agencies*. Oxford University Press, Oxford.

Hagan, W.T., 1966. *Indian Police and Judges: Experiments in Acculturation and Control*. Yale University Press, New Haven.

Haggerty, J., Campbell, H., Morris, C., 2009. Keeping the stress off the sheep? Agricultural intensification, neoliberalism, and 'good' farming in New Zealand. *Geoforum* 40 (5), 767-777.

Health Protection Agency., 2006. *Focus on Tuberculosis: Annual surveillance report 2006 - England, Wales and Northern Ireland*. Health Protection Agency, London.

Henkel, M., 1991. The New "Evaluative State". *Public Administration* 69 (1), 121-136.

Higgins, V., Dibden, J., 2011. Biosecurity, trade liberalisation, and the (anti)politics of risk analysis: the Australia - New Zealand apples dispute. *Environment and Planning A* 43 (2), 393-409.

Higgins, V., Dibden, J., Cocklin, C., 2012. Market instruments and the neoliberalisation of land management in rural Australia. *Geoforum* 43 (3), 377-386.

Higgins, V., Larner, W., 2010. Standards and standardization as a social scientific problem, in: Higgins, V., Larner, W. (Eds.), *Calculating the social: standards and the reconfiguration of governing*. Palgrave, Basingstoke, pp. 1-17.

Hinchliffe, S., 2007. *Geographies of Nature*. Sage, London.

Hodge, I.D., Adams, W.M., 2012. Neoliberalisation, rural land trusts and institutional blending. *Geoforum* 43 (3), 472-482.

Hood, C., Scott, C., James, O., Jones, G., Travers, T., 1999. *Regulation inside government waste watchers, quality police, and sleaze-busters*. Oxford University Press, New York.

Humphrey, J.C., 2001. Bewitched or Bewildered? 'Facts' and 'Values' in Audit Commission Texts. *Local Government Studies* 27 (2), 19-43.

Humphrey, J.C., 2002. A scientific approach to politics? On the trail of the Audit Commission. *Critical Perspectives on Accounting* 13 (1), 39-62.

Hutter, B.M., 1988. *The reasonable arm of the law? the law enforcement procedures of environmental health officers*. Clarendon, Oxford.

Independent Scientific Group (ISG). 2007. *Bovine Tuberculosis: The Scientific Evidence*. Defra, London.

Kogan, M., Maden, M., 1999. An evaluation of the evaluators: the OFSTED system of school inspection, in: Cullingford, C., Daniels, S. (Eds.), *An Inspector Calls – OFSTED and its Effect on School Standards*. Kogan Page, London.

Krebs, J., Clutton-Brock, T., Morrison, I., Young, D., Donnelly, C., 1997. *Bovine Tuberculosis in Cattle and Badgers*. Ministry of Agriculture, Fisheries and Food, London.

Law, J., 2006. Disaster in agriculture: Or foot and mouth mobilities. *Environment and Planning A* 38 (2), 227-239.

Law, J., Mol, A., 2011. Veterinary Realities: What is Foot and Mouth Disease? *Sociologia Ruralis* 51 (1), 1-16.

Lipsky, M., 1980. *Street-level bureaucracy dilemmas of the individual in public services*. Russell Sage Foundation, New York.

Lowe, P., 2009. *Unlocking Potential: A Report on Veterinary Expertise in Food Animal Production*. Defra, London.

Lowe, P., Clark, J., Seymour, S., Ward, N., 1997. *Moralizing the environment countryside change, farming and pollution*. UCL Press, London.

MAFF, 1965. *Animal Health A Centenary 1865-1965*. HMSO, London.

Marsden, T., Flynn, A., Harrison, M., 2000. *Consuming interests the social provision of food choice*. UCL, London.

Mather, C., Marshall, A., 2011. Living with disease? Biosecurity and avian influenza in ostriches. *Agriculture and Human Values* 28 (2), 153-165.

Maye, D., Dibden, J., Higgins, V., Potter, C., 2012. Governing biosecurity in a neoliberal world: comparative perspectives from Australia and the United Kingdom. *Environment and Planning A* 44 (1), 150-168.

Peck, J., Theodore, N., Brenner, N., 2010. Postneoliberalism and its malcontents. *Antipode* 41 (S1), 94-116.

Peck, J., Tickell, A., 2002. Neoliberalizing Space. *Antipode* 34, 380-404.

Self, P., 1993. *Government by the Market? The Politics of Public Choice*. Macmillan, Basingstoke.

Timmermans, S., Berg, M., 1997. Standardization in Action: Achieving Local Universality through Medical Protocols. *Social Studies of Science* 27 (2), 273-305.

Waterton, C., 2002. From field to fantasy: Classifying nature, constructing Europe. *Social Studies of Science* 32 (2), 177-204.

Waterton, C., 2003. Performing the classification of nature. *The Sociological Review* 51, 111-129.

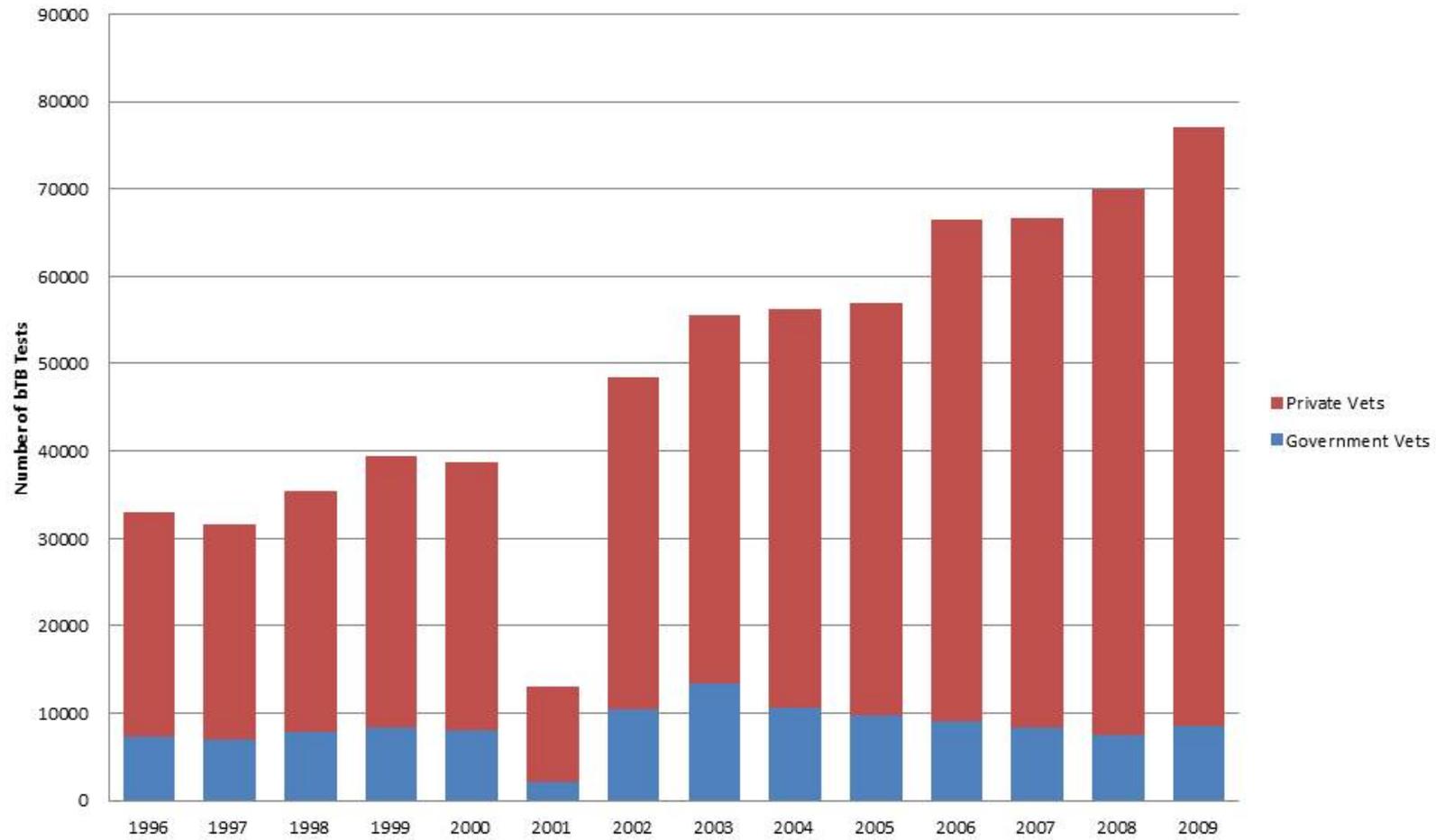
Wilkinson, K., Lowe, P., Donaldson, A., 2010. Beyond policy networks: Policy framing and the politics of expertise in the 2001 foot and mouth disease crisis. *Public Administration* 88 (2), 331-345.

Woods, A., 2007. The farm as clinic: veterinary expertise and the transformation of dairy farming, 1930-1950. *Studies in History and Philosophy of Science Part C* 38 (2), 462-487.

Table 1: Differences in Reactors per 1000 Cattle Tested (RpT) for Government and Private Sector Vets

| | County | Vet Sector | N Tests | Mean RpT | Significance level (p. value) |
|-----------------------------|--------|------------|---------|----------|----------------------------------|
| | | | | | |
| Routine tests | All | Private | 59793 | 4.578 | 0.000 |
| | | Government | 1232 | 18.606 | |
| Short Interval tests | All | Private | 24106 | 9.645 | 0.000 |
| | | Government | 4435 | 28.901 | |
| Routine tests | Devon | Private | 27947 | 4.870 | 0.013 |
| | | Government | 502 | 22.577 | |
| | Glos | Private | 7723 | 7.992 | 0.231 |
| | | Government | 391 | 12.018 | |
| | Dyfed | Private | 24123 | 3.147 | 0.000 |
| | | Government | 339 | 20.325 | |
| Short interval tests | Devon | Private | 13631 | 9.049 | 0.000 |
| | | Government | 1232 | 63.156 | |
| | Glos | Private | 3776 | 10.545 | 0.014 |
| | | Government | 934 | 14.918 | |
| | Dyfed | Private | 6699 | 10.347 | 0.000 |
| | | Government | 2269 | 16.057 | |

**Figure 1: Changing Patterns of Veterinary Regulation.
Tests for bTB in England and Wales, 1996-2009**



**Figure 2: Changing Patterns of Veterinary Regulation:
Short Interval Tests in Devon 1996 - 2009**

