Survey reveals bovine TB in a fifth of roadkill badgers in Cheshire

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The first study to test for bovine tuberculosis in badgers on the edge of the cattle TB epidemic in England, has shown that one in five badgers tested positive for the disease.

The pilot survey was carried out on road-killed badgers collected in Cheshire in 2014 through a local stakeholder TB Group that included farmers, wildlife groups and vets. Scientists from the Universities of Nottingham, Liverpool and Lancaster tested the carcasses for the bacteria that cause bovine TB, Mycobacterium bovis (M.bovis), and found that around 20 percent were infected.

Furthermore, the strain of M.bovis found in Cheshire badgers (SB0129 or genotype 25) was the same as that found in cattle in the same area. The results of the study have been published today, Thursday 6th December 2018, in *Scientific Reports*.

Although there have been several published studies of bovine TB (bTB) in badgers in the South West of England, where the infection is endemic in both cattle and badgers, this is the first study of infection in badgers on the expanding edge of the cattle epidemic. Previous studies in Cheshire, from between 10 and 30 years ago when bovine infection was rare in the area, found only a few infected badgers in the south-east of the county.

However, while these findings strongly suggest that both badgers and cattle were part of the same geographically expanding epidemic in Cheshire, the direction of any cross-species transmission and the drivers of this expansion cannot be determined from this study.

Roadkill badgers – clues to epidemic?

Professor Malcolm Bennett from the University's School of Veterinary Medicine and Science, said: "As emphasised by the recent independent review led by Professor Sir Charles Godfray, the role of badgers in the geographic expansion of the bTB epidemic in England is not at all clear, and there is huge controversy surrounding the use of culling badgers to control the disease. While there is general agreement that in endemic areas the disease can be transmitted among and between cattle and badgers, the role of badgers in the expansion of the epidemic has not been studied.The epidemic could expand through cattle-to-cattle or badger-to-badger transmission, or a combination of the two with cross-species transmission.

"Determining whether or not badgers on the edge of the cattle epidemic have TB is the first step in unpicking this tangle of cause and effect, and examining badgers that had already been killed on the roads seemed the obvious way to collect the evidence for this pilot study."

An important aspect of this study was that it arose from, and relied on, a variety stakeholders in Cheshire. It came about through the Cheshire TB Eradication Group, which brings together farmers, vets, wildlife groups and others to discuss bTB in

the county and provide all those involved with the latest information and advice on how to stop the disease's spread. The study was designed by the Group, and members collected the carcasses of road-killed badgers, which were then analysed through a collaboration between the Universities of Liverpool, Nottingham and Lancaster.

At the time of planning the project, bTB in cattle in much of Cheshire was regarded as sporadic and it was intended that the study investigate bTB in badgers ahead of the epidemic front. In the event, 2014 saw large increase in recorded bTB outbreaks in Cheshire herds, over a wider area than in previous years, and data from TB surveillance in cattle in Cheshire in 2014 were therefore included in this study for comparison with the findings in badgers through a collaboration with APHA both regionally and at Weybridge.

A more recent and larger study of infection rates in roadkill badgers in six counties on the edge of the cattle epidemic, core-funded by DEFRA and using much the same approach, is expected to publish its results early next year.

A historical picture of bovine TB

Bovine tuberculosis (bTB) in cattle in Great Britain is concentrated in South West England and South Wales, but has been gradually spreading northwards in England. Until recently, there were only sporadic outbreaks of bTB in cattle in Cheshire, in northwest England, one of the more important centres of the British dairy industry. Previous surveys of road killed badgers in Cheshire found very few to be infected.

Although bTB can infect people, testing catlle and the pasteurisation of milk means that the importance of bTB in cattle nowadays is largely through its effects on trade and, therefore, the economic and social cost of its control. The epidemiology and control of bTB in cattle is complicated in the UK and the Republic of Ireland, and increasingly in other European countries, by infection in badgers, which appear to be able to maintain the infection and transmit it to cattle.

DEFRA's control strategy for bTB in England applies diferent testing and control approaches to different regions based on risk. The High Risk Area (HRA) has a relatively high herd prevalence, while the Low Risk Area (LRA) does not. Testing and control measures are particularly strict in the counties in between – the Edge Area (EA) which includes Cheshire – in an attempt to prevent further expansion of the epidemic in cattle.

On the basis of both epidemiological investigations and strain typing of M. bovis, previous cattle outbreaks in Cheshire were thought to be largely the result of the importation of cattle from endemic areas further south. Since around 2010, more frequent outbreaks have been reported in herds, particularly in south eastern Cheshire, which by 2013 was on the northernmost edge of the endemic ('High Risk) region. This persistence led to the suggestion that badgers might be involved.

More information: Elsa Sandoval Barron et al. A study of tuberculosis in road traffic-killed badgers on the edge of the British bovine TB epidemic area, *Scientific Reports* (2018). DOI: 10.1038/s41598-018-35652-5

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