The hidden burden of bovine Tuberculosis

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Up to 21% of herds clearing restrictions for bovine Tuberculosis (bTB) in Great Britain may be harbouring infection, according to a study published in *PLOS Computational Biology* this week. A cross-disciplinary group of experts in the Disease Dynamics Unit, University of Cambridge and the Animal Health and Veterinary Laboratories Agency has used mathematical models to provide the first empirical estimates of the efficiency of cattle-based controls for bovine tuberculosis (bTB). These models were developed to help policy-makers understand and control bTB as part of a project funded by Defra.

bTB was previously transmitted from cattle to people in untreated milk. However, stringent measures, including pasteurization, introduced by the British government in the 1930s have practically eliminated the risk to people. A rigorous policy reduced disease in herds to minimal levels in the 1960s, but the past 25 years have seen the disease return; around 26,000 cattle were slaughtered for bTB control in England in 2011 alone.

The models were constructed using data taken from infected herds detected through routine surveillance, either in the slaughterhouse, or through routine whole herd tests between 2003-2005.

"Around 38% of herds officially cleared of disease experience a recurrent incident within 24 months, suggesting that infection persists in herds," said lead author Dr Andrew Conlan. "We developed mathematical models, fitted carefully to extensive surveillance and testing data to estimate the efficiency of testing directly from epidemiological data rather than relying on expert opinion. Another

important result is that we estimate a high rate of re-introduction of infection into herds. This suggests that eliminating the hidden burden of infection alone will not be enough to reduce rates of recurrence."

The work focused on what happens within infected herds. These models cannot predict the extent to which hidden infection contributes to transmission between herds. The models also do not distinguish between the relative roles of the badger and cattle in the spread of bTB. Quantifying the persistence of infection at the herd level is an important first step to answering these questions and provides a basis for developing more complex national models of transmission.

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