



HM Government

Human Animal Infections and Risk Surveillance (HAIRS) group

Qualitative assessment of the risk that cats infected with *Mycobacterium bovis* present to human health



About the Human Animal Infections and Risk Surveillance group

The joint Human Animal Infections and Risk Surveillance (HAIRS) group is a cross-government group, chaired by the PHE Department of Gastrointestinal, Emerging and Zoonotic Infections. The group acts as a forum to identify and discuss infections with potential for interspecies transfer (particularly zoonotic infections).

Members include representatives from Public Health England, Department for the Environment, Food and Rural Affairs, Department of Health, Animal Health Veterinary Laboratories Agency, Food Standards Agency, Public Health Wales, Welsh Government, Health Protection Scotland, Scottish Government, Public Health Agency of Northern Ireland and the Department of Agriculture and Rural Development Northern Ireland.

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Summary

The risk of cat-to-human transmission of *Mycobacterium bovis* (*M. bovis*) has never been formally assessed. In response to the first incident of cat-to-human transmission of *M. bovis* infection in England, a review of the literature was completed to estimate the risk that *M. bovis* infected cats present to human health.

Assessment of risk: Very low risk of transmission of *M. bovis* from cats to humans.

What is the epidemiology of *M. bovis* in cats in Great Britain?

Prior to the implementation of pasteurisation of milk and bovine tuberculosis (bTB) eradication efforts in the national cattle herd, *M. bovis* disease in cats was more frequently reported than it is today. In the seven years (2006-2012) since *M. bovis* infection in pet animals became notifiable to the Animal Health and Veterinary Laboratories Agency (AHVLA), fewer than 30 cats have been confirmed with *M. bovis* each year in Great Britain (GB) (see Defra). However, this is considered to be an underestimation of the true number of feline cases of *M. bovis* in GB.

Cases of *M. bovis* infections in cats are generally restricted to bTB endemic areas (Gunn-Moore *et al.*, 2011(a); Smith *et al.*, 2009) where both infected cattle and wildlife have the potential to introduce *M. bovis* into cat populations. Domestic cats are therefore believed to act as “spillover” or “sentinel” hosts of *M. bovis* in the local cattle and/or wildlife populations.

Most diagnosed feline *M. bovis* infections begin as tuberculous skin lesions, ie non-healing sores or bite wounds on different parts of their bodies. These wounds are thought to be acquired during hunting or territory defence from feline and non-feline animals. It is possible that cats could also be infected through the consumption of *M. bovis* infected rodents. Primary infections, whether cutaneous, respiratory or gastrointestinal, can become systemic and lead to weight loss, anorexia, dyspnoea and coughing and may be fatal (Gunn-More & Shaw, 1997; Gunn-Moore *et al.*, 2011(a)).

The majority of reported *M. bovis* cases in cats are sporadic, although multiple cases in single households and small clusters have been known to occur (N. Smith, AHVLA; Monies *et al.*, 2000). Spatially or temporally linked clusters, outside household linked cases, are an unusual occurrence. However, between December 2012 and March 2013, seven confirmed and two suspected cases of *M. bovis* disease in domesticated cats were identified in Southern England. The nine cats belonged to nine separate households, and six of the nine resided within 250 metres of each other. *M. bovis* isolates from the seven confirmed feline cases matched a distinct *M. bovis* strain, first detected in this area in cattle in 2008.

All cats presented with severe systemic infection including discharging lymph nodes and pulmonary signs. Some also had non-healing or discharging infected wounds, or had a recent history of bites.

What evidence of cat-to-human transmission of *M. bovis* exists?

In response to the unusual size and severity of the cluster of feline *M. bovis* cases in 2013 (described above) it was recommended that TB screening should be offered to all household members and others who had close contact with the infected cats. At the initial screening three of 24 people tested positive for latent TB infection (LTBI). No active disease was detected at that time.

Since the screening was undertaken, two clinical cases of *M. bovis* infection have been detected in human contacts of an infected cat. One case is a previously diagnosed LTBI while the other refused screening at the time of the incident. Molecular typing has determined that both individuals are infected with the same distinct *M. bovis* strain as observed in the cats. Since this development, TB screening has been re-offered to all human contacts of infected cats who previously refused testing (15 people). Only one person accepted screening (test negative) however at the time of screening being re-offered, all other contacts were reported to be well and not displaying any symptoms indicative of TB.

The potential for cat-to-human transmission of *M. bovis* has always been recognised, however this is the first recorded incident of cat-to-human transmission of *M. bovis*. While a common source of infection or human-to-cat transmission of infection cannot be conclusively excluded at this time, the timeline of symptom progression and the lack of any other significant risk factors makes these modes of transmission highly unlikely.

Prior to this incident the risk of cat-to-human transmission of *M. bovis* was regarded as negligible. For this reason, normal public health practice following the notification of a feline case of *M. bovis* infection generally entailed informing and advising all household contacts of the cat. TB screening was most likely to be offered only to those identified as being at risk or already symptomatic. It is, therefore, possible that other incidents of transmission of *M. bovis* from cats to humans may have occurred unobserved in GB, as the majority of immunocompetent people who get infected with *M. bovis* do not develop active TB disease, but may develop LTBI. Without clinical disease and subsequent culture, speciation and molecular typing, identification of the source of infection is not possible.

However, as it is estimated that between 8% and 15% of newly infected human TB cases develop active disease within two years of primary infection (Diel *et al.*, 2011), more active *M. bovis* disease would be expected to be observed, particularly in people who are immunocompromised, young or old, if transmission of *M. bovis* from cats to humans was a significant emerging issue. Only 30-35 human cases of *M. bovis* are

diagnosed each year in the UK, and follow up of cases has found the majority acquired their infection overseas or had other risk factors (PHE). Therefore, there is currently no evidence to suggest that transmission of *M. bovis* from cat to human is anything other than a rare event.

Public health implications of *M. bovis* infection in cats

Upon confirmation (or assumption) of *M. bovis* infection in a cat, the owners should be advised of the public health risks associated with the diagnosis. The most likely routes of transmission would be via aerosols from infected cats with pulmonary signs (ie coughing), from a contaminated environment or via ingestion following handling of discharges from tuberculous lesions.

The choice to treat or euthanise cats with confirmed *M. bovis* is a decision for the owner in consultation with their vet. However, treatment of cats with *M. bovis* presents a potentially significant public health risk for persons in contact with the animal. These risks include: the continued shedding/excretion of *M. bovis* bacilli during early treatment stages; the difficulty ensuring that owners administer appropriate treatment doses for the required duration; the potential emergence of resistant strains of both *M. bovis* and other bacterial species; the ability of cats to appear apparently healthy while still infected; and the possibility of relapse following treatment. Therefore, for public health reasons the most sensible course of action for a cat with confirmed *M. bovis* is euthanasia rather than treatment.

In summary, the absence of reports of confirmed cat-to-human transmission of *M. bovis* prior to this incident previously led public health practitioners to consider the risk of transmission as negligible. The detection of two clinical cases associated with cat-to-human transmission identified in this cat cluster investigation means that cat-to-human transmission can no longer be viewed as a theoretical risk. However, the lack of previously reported cases even though *M. bovis* infection in domestic cats in the UK is a known, but sporadic, occurrence means that the risk of transmission to humans is considered to be **very low**. Based on this assessment, the precautionary principle suggests that household and other close contacts of cats with confirmed *M. bovis* infection should be assessed and receive public health advice to minimise the human health risk.

Recommendations

- enhanced liaison should continue between Public Health England and animal health colleagues to ensure that appropriate guidance and assistance on the investigation of *M. bovis* cases in cats is provided to veterinary and public health personnel
- public health investigations of cases of *M. bovis* infection in cats should include a risk assessment of those in close contact
- Public Health England should ensure that all newly diagnosed human *M. bovis* cases are assessed for animal contacts, to specifically include companion animals

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