Risk Assessment: *Mycoplasma bovis* and Human Health

29 August 2017

Summary

Mycoplasma bovis is considered a very low risk to human health based on evidence to date.

Literature Review

In preparation for this risk assessment a literature review was conducted using the following terms:

- *Mycoplasma bovis* infection in humans
- Human cases of Mycoplasma bovis infection
- *Mycoplasma* cross-species
- *Mycoplasma* infection in immune compromised humans
- *Mycoplasma* infection in humans.

General information regarding *M. bovis* and its risk and impact in humans was gathered from websites belonging to the CDC, ECDC, webMD, and eMedicine. Only three peer-reviewed journal articles were found, all of which are referenced in footnotes below.

Hazard

Mycoplasma bovis, a very small bacterium lacking a cell wall, causes a range of illnesses in cattle. The organism is endemic in herds across the globe, though it was not known to be present in NZ until the recent detections in South Canterbury. The organism is spread through close contact (generally through milkers' hands or milking equipment) and may be infectious via the airborne route. Animals can be infectious without being symptomatic.

Level of Risk

Mycoplasmas are found ubiquitously throughout the animal kingdom. Given their small genome and dependence for pre formed nutrients, it is assumed that most

mycoplasma species are extremely host specific. However, some species including *M. bovis* have a broader host range and are known to pass between sheep, goats and cattle[1].

Humans are the primary host for a number of mycoplasma species, including *Mycoplasma pneumonia, Mycoplasma hominis* and *Mycoplasma genitalium.* It was believed that human mycoplasma flora were restricted to those for which humans are the primary host. However, there have been reports of animal mycoplasmas being isolated from humans, in most cases in immune compromised humans. [1]

M. bovis is not known to regularly infect humans and is not known to be a food safety risk. However, testing for zoonotic *Mycoplasma* infections is not commonly performed and the potential for sub-clinical infections in humans cannot be quantified using current data.

M. bovis is highly adapted to cattle but occasional isolations have been made in buffaloes, small ruminants and in two reported cases humans[1], both of which responded to tetracycline treatment. In the first case described in the literature, *M. bovis* was isolated from the throat of a woman who had developed bronchopneumonia after heavy exposure to cow manure (Madoff et al., 1979).[2] The disease ameliorated following tetracycline therapy with the development of antibodies to *M. pneumoniae* but not *M. bovis* during convalescence. The development of antibodies to *M. pneumonia* and patient's symptoms were consistent with *M. pneumoniae* rather than *M. bovis* as the primary aetiological agent.[3] The lack of confirmed route of exposure, development of antibodies against *M. bovis*, or reports of other cases indicate that there is not a significant risk of human infection with the organism. Details for the second case are extremely scant, consisting of a mention that it responded to tetracycline with no further details[4]

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[1] Pitcher DG, Nicholas RA; *Mycoplasma host specificity: fact or fiction?* Vet J. 2005 Nov;170(3):300-6.

[2] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC275384/pdf/jcm00191-0085.pdf
[3] https://www.researchgate.net/profile/Robin_Nicholas/publication/10897281_Mycoplasma_bovis_Disease_diagnosis_and_control/links/551910530cf2d70ee27b7df1/Mycoplasma-bovis-Disease-diagnosis-and-control.pdf
[4] Pitcher DG, Nicholas RA; *Mycoplasma host specificity: fact or fiction?* Vet J. 2005 Nov;170(3):302.

Immune compromise can raise the risk of infection with organisms not normally seen as pathogenic, and infection with *M. bovis* in immune compromised humans cannot be ruled out.