**Bovine Tuberculosis**

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### CONTROL / PREVENTION

In large parts of the developed world, policies regulating the control of bovine tuberculosis are aimed at complete eradication of the disease from its livestock populations as part of an integrated approach to food safety. These policies follow an expensive test-and-slaughter strategy for the control of bovine tuberculosis and significant successes have been achieved in many countries. On the other hand, the benefit and sustainability of such costly programmes have been increasingly questioned in the light of the rising economic burden and social impacts on and reduced acceptance by farmers. However, in general, with the exception of a few countries with a wildlife reservoir of *M. bovis* (see further below), the prevalence of bovine tuberculosis has reached very low levels, in most developed countries.

The situation is profoundly different in developing countries, which are unable to apply expensive test-and-slaughter schemes for the control of animal tuberculosis. Although in parts of the Latin American and Caribbean countries there has been significant progress in bovine tuberculosis control and infection rates under 1% have been reported for 30% of the region’s cattle, 70% of cattle are kept in areas where rates of infection are higher and where herd prevalences of up to 56% have been reported. On the African continent very few countries apply control measures ([http://www.oie.int/wahis](http://www.oie.int/wahis)).

Risk factors contributing to difficulties in controlling bovine tuberculosis in cattle across continents can have their origin at farm-level, e.g. cattle breed, age, behaviour, and nutrition of animals. However, host independent factors are considered more important in most cases and include, amongst others, production types and management practices as under circumstances of high population density and production stress, progression of disease is enhanced. Cattle movement, existence of a wildlife reservoir and possibly strain related differences are of additional significance. Tuberculosis in wildlife, in particular, can pose serious difficulties for bovine tuberculosis control and eradication. Particularly noteworthy is the case of the British Isles, where the Eurasian badger represents an important and well documented disease reservoir. In several industrialized countries that have adopted animal tuberculosis control programs and in which wildlife has been involved, control programmes were designed to exclusively benefit the livestock sector with less importance given to wildlife conservation or protection. This is mostly due to the fact that many of the wildlife maintenance host species, with the exception of badgers in the United Kingdom and Ireland, score a low priority on their national wildlife conservation listings and enjoy, at best, the status of valued, sought-after hunting trophies. In some cases these reservoir species are classified as alien or feral with well-documented examples being the brushtailed possums in New Zealand.
and feral water buffaloes in Australia leading to the implementation of radical disease eradication campaigns by culling programmes.

Bovine tuberculosis can be considered a re-emerging disease due to several factors, e.g. the wide host spectrum of *M. bovis*, the presence of wildlife reservoirs, the insidious nature of the disease allowing widespread distribution of *M. bovis* before clinical or post mortem findings become apparent. Preventive strategies and those aimed at early recognition of the infection are therefore considered more effective measures than trace-back and culling operations. Vaccination is a low cost and effective strategy for the prevention and reduction of infectious diseases in general worldwide and is likely to play an important role in the control of bovine tuberculosis in developing countries and those with a wildlife reservoir. Although to date no commercial vaccine is available for animals, considerable progress has been made in studying the protective efficacy of BCG (Bacillus Calmette Guerin) in reservoir hosts such as cattle, deer, badgers and brushtail possums. In African buffaloes, however, BCG did not induce significant levels of protection to challenge with *M. bovis*. For new vaccine development against both, bovine and human tuberculosis, prime-boost strategies involving combinations of BCG with a protein or DNA vaccine, to improve on BCG vaccination alone, have produced encouraging results recently.