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2. Merck Veterinary Manual <http://www.merckvetmanual.com/mvm/index.jsp?cfile=html/bc/204400>.
3. World Health Organization <http://www.who.int/topics/tuberculosis/en/>
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Key Facts

- In 1881 Robert Koch discovered the tubercle bacillus as the cause of tuberculosis, and in 1898 *M. bovis* was identified.
- Although the infection has been controlled in most developed countries, the complete elimination is complicated by persistent infection of wild animals such as badgers in the United Kingdom, white tailed deer in parts of the United States and brush-tail possum in New Zealand.
- Pasteurisation of milk from infected animals largely eliminated the spread of Bovine TB in people.
- The campaign to eliminate Bovine TB was a major incentive for the establishment and growth of veterinary services in many countries.
- Bovine TB remains a serious problem for animal and human health in many developing countries.

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Bovine Tuberculosis

What is Bovine Tuberculosis?

Bovine tuberculosis (TB) is a chronic disease of animals caused by a bacteria called *Mycobacterium bovis*, (*M.bovis*) which is closely related to the bacteria that cause human and avian tuberculosis. This disease can affect practically all mammals, causing a general state of illness, coughing and eventual death.

The name Tuberculosis comes from the nodules, called “tubercles”, which form in the lymph nodes of affected animals.

Until the 1920s when control measures began in developed countries, it was one of the major diseases of domestic animals throughout the world. Today TB remains an important disease of cattle, wild animals, and is a significant zoonosis (a disease of animals which can also infect humans).

TB is a disease listed in the World Organisation for Animal Health (OIE) *Terrestrial Animal Health Code*, 2011, (Article 1.2.3) and must be reported to the OIE (Chapter 1.1.2 – Notification of Diseases and Epidemiological Information).



Bovine Tuberculosis



Where is the Disease Found?

TB is found throughout the world. The disease is more prevalent in most of Africa, parts of Asia and of the Americas.

Many developed countries have reduced or eliminated bovine TB from their cattle population; however significant pockets of infection remain in wildlife in Canada, the United Kingdom, the United States and New Zealand.

Although cattle are considered to be the true hosts of *M. bovis*, the disease has been reported in many other domesticated and non-domesticated animals.

Isolations have been made from buffaloes, bison, sheep, goats, equines, camels, pigs, wild boars, deer, antelopes, dogs, cats, foxes, mink, badgers, ferrets, rats, primates, llamas, kudus, elands, tapirs, elks, elephants, sitatungas, oryxes, addaxes, rhinoceroses, possums, ground squirrels, otters, seals, hares, moles, raccoons, coyotes and several predatory felines including lions, tigers, leopards and lynx.

How is the disease transmitted and spread?

The disease is contagious and spread by contact with infected domestic and wild animals.

The usual route of infection is by inhaling infected droplets which are expelled from the lungs by coughing.

Calves and humans can also become infected by ingesting raw milk from infected cows.

Because the course of disease is slow, taking months or years to kill an infected animal, an animal can spread the disease to many other herd mates before it begins to manifest clinical signs. Therefore, movement of undetected infected domestic animals and contact with infected wild animals are the major ways of spreading the disease.

What is the public health risk?

Mycobacterium bovis is not the major cause of human tuberculosis, which is caused by *M. tuberculosis*, but humans are susceptible to bovine TB. Humans can be infected both by drinking raw milk from infected cattle, or by inhaling infective droplets. It is estimated in some countries that up to ten percent of human tuberculosis is due to Bovine TB.

What are the clinical signs?

TB usually has a prolonged course, and symptoms take months or years to appear. The usual clinical signs include:

- weakness,
- loss of appetite,
- weight-loss,
- fluctuating fever,
- intermittent hacking cough,
- diarrhea,
- large prominent lymph nodes.

However, the bacteria can also lie dormant in the host without causing disease.

How is the Disease Diagnosed?

The standard method for detection of TB is the tuberculin test, where a small amount of antigen is injected into the skin, and the immune reaction is measured.

Definitive diagnosis is made by growing the bacteria in the laboratory, a process that takes at least eight weeks. The guidelines for tuberculin manufacture and culture of *M. bovis* are detailed in the OIE *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals* (chapter 2.4.7, 2008).

What is being done to prevent or control this disease?

Prevention and control measures

The standard control measure applied to TB is test and slaughter.

Disease eradication programs consisting of post mortem meat inspection, intensive surveillance including on-farm visits, systematic individual testing of cattle and removal of infected and in-contact animals as well as movement controls have been very successful in reducing or eliminating the disease.

Post mortem meat inspection of animals looks for the tubercles in the lungs and lymph nodes (OIE *Terrestrial Animal Health Code*, Chapter 11.6.1).

Detecting these infected animals prevents unsafe meat from entering the food chain and allows veterinary services to trace-back to the herd of origin of the infected animal which can then be tested and eliminated if needed.

Pasteurisation of milk of infected animals to a temperature sufficient to kill the bacteria has prevented the spread of disease in humans.

Treatment of infected animals is rarely attempted because of the high cost, lengthy time and the larger goal of eliminating the disease.

Vaccination is practiced in human medicine, but it is not widely used as a preventive measure in animals: the efficacy of existing animal vaccines is variable and it interferes with testing to eliminate the disease. A number of new candidate vaccines are currently being tested.

