



Bovine Tuberculosis (Bovine TB)

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Key facts

To better understand public health terms included in this Disease Tool (e.g. What is a case definition? or What is an infectious agent?), consult our page on Key concepts in epidemiology.

Importance

Bovine Tuberculosis (TB) is a chronic zoonotic bacterial disease caused by ***Mycobacterium bovis***, which primarily affects cattle but can also infect other animals, including humans. ***Mycobacterium bovis*** is a sub-specie of the ***Mycobacterium tuberculosis*** complex, the bacterium responsible for human TB, but it is more common in animals. The disease can spread to humans through the consumption of unpasteurized dairy products, direct contact with infected animals, or inhalation of aerosolized bacteria. The disease poses a significant public health concern, especially in regions. Bovine TB in humans causes similar symptoms to TB caused by ***Mycobacterium tuberculosis***, including persistent cough, fever, night sweats, weight loss, and chest pain. However, the disease may also present in non-typical forms which affects areas such as the lymph nodes, gastrointestinal tract, or bones

Case definition

A **case definition** is a set of uniform criteria used to define a disease for public health surveillance. It enables public health officials to classify and count cases consistently.

*The following are standard case definitions to allow national health authorities to interpret data in an international context. However, during an outbreak case definitions may be adapted to the local context and the Red Cross Red Crescent should use those agreed/established by national health authorities. NB: Consider that during community-based surveillance, **volunteers** should use broad (simplified) case definitions (referred to as community case definitions) to recognize most or all possible cases, provide relevant risk communication and appropriate actions and encourage them to seek care. Other actors such as **healthcare workers or investigators** studying the cause of a disease, on the other hand, can use more specific case definitions that may require laboratory confirmation.*

Suspected case: Any individual experiencing TB-related symptoms. The most common symptom is a productive cough of more than two weeks, which may be accompanied by other respiratory symptoms (e.g. shortness of breath, chest pains) and/or constitutional symptoms (e.g. weight loss, fever).

Confirmed case: A patient with *Mycobacterium spp* identified from a clinical specimen, either by culture or by a more modern method:

<https://www.hpsc.ie/a-z/vaccinepreventable/tuberculosis/tb/casedefinition/>

Alert / epidemic threshold

An **alert threshold** is the pre-defined number of alerts that suggest the beginning of a possible disease outbreak and therefore warrant immediate notification.

Epidemic thresholds are the minimum number of cases indicating the beginning of a particular disease's outbreak.

It depends on various factors. Communities with bovine TB endemicity and poor healthcare facilities may have a lower epidemic threshold due to higher case incidences.

Additionally, socioeconomic conditions, living standards, and the effectiveness of TB control programs can influence the threshold, as improved healthcare infrastructure and robust prevention strategies can help contain and reduce the spread of TB, raising the epidemic threshold. Understanding these variations is crucial for public health experts in designing targeted interventions and implementing effective control measures.

In any case, it is important to note that TB has been considered a global public health emergency since 1993, when the WHO labelled it as such. Consequently, the global health community must be in constant alert concerning this deadly disease irrespective of regional discrepancies

Risk factors

- People who work with animals (farmers, veterinarians, livestock breeders) or animal products such as wool, hides or hair (butchers, weavers).
- People who eat raw or undercooked meat from infected animals.
- Close contact with an infectious person with bovine TB disease
- People returning from areas with high rates of bovine TB

Attack rate (AR)

The **attack rate** is the risk of getting a disease during a specific time period (such as during an outbreak).

Generally low and depends on the type of exposure. However, attack rates will vary from one outbreak to another. In case of an outbreak, consult the latest information provided by health authorities.

Groups at increased risk of severe illness (most vulnerable)

- People living with HIV
- Babies and young children under the age of 5
- Elderly individuals
- People with chronic conditions such as diabetes or kidney disease
- Cancer patients undergoing chemotherapy
- Organ transplant recipients

Infectious agent

Infectious agents are bacteria, viruses, fungi, prions and parasites. A disease caused by an infectious agent or its toxic products is defined as an infectious disease.

Mycobacterium bovis (bacterium).

Reservoir / host

A **reservoir of infection** is a living organism or material in or on which an infectious agent lives and/or usually multiplies. Reservoirs include humans, animals and the environment.

A **susceptible host** is a person at risk of being infected. The level of susceptibility depends on age, sex, ethnicity and genetic factors, specific immunity also depends on other factors that affect an individual's ability to resist infection or to limit its ability to cause infection.

A **zoonotic disease** or **zoonosis** is an infectious disease that has jumped from a non-human animal to humans.

Zoonotic disease: Cattle. Animals typically become infected when they come in contact with respiratory secretions of an infected cattle. Humans can also become infected by eating meat and dairy products from infected cattle.

How disease is spread (modes of transmission)

Categorisation of **modes of transmission** varies from one agency to another. In addition, some infectious agents can be transmitted by more than one mode. A list of modes of transmission can be found in the key concepts to serve as guidance to better understand the diseases included in this website.

People get infected with bovine TB via:

- **Direct Contact with Infected Humans and Animals:** The most common route of transmission is through close contact with infected cattle and humans. *Mycobacterium bovis* is shed in respiratory secretions, saliva, urine, faeces, and milk of infected animals. In close quarters, the infection can spread via aerosol.
- **Vehicle-borne transmission:** Humans and other animals can also become infected by consuming meat, milk, and water contaminated with the bacteria. The bacteria can survive in the environment, especially in damp, cool conditions.

Incubation period

This time from when infection occurs to the onset of symptoms is called the **incubation period**. It is a range of days and it can be different for each disease.

A few months to several years

Period of infectiousness

Period of infectiousness is the time interval during which an infected person can transmit the infection to other susceptible persons.

Humans can spread the disease to one another, especially if the infected person has an active TB

Clinical signs and symptoms

Symptoms will include:

- Prolonged cough
- Chest pain
- Coughing up blood or sputum (phlegm)
- Weakness or fatigue

- Weight loss
- Fever
- Night Sweats
- Loss of appetite
- Chills

Other diseases with similar clinical signs and symptoms

Influenza, COVID-19, lung cancer, fungal infections, Sarcoidosis, Chronic Obstructive Pulmonary Disease (COPD), Community acquired pneumonia among others.

Diagnosis

- Isolation of *Mycobacterium tuberculosis* complex (excluding *Mycobacterium bovis*-BCG) from a clinical specimen
- Detection of *Mycobacterium tuberculosis* complex nucleic acid in a clinical specimen AND positive microscopy for acid-fast bacilli or equivalent fluorescent staining bacilli on light microscopy
- Microscopy for acid-fast bacilli or equivalent fluorescent staining bacilli on light microscopy
- Histological appearance of granulomata.

Vaccine or treatment

Please refer to the appropriate local or international guidelines for clinical management. All clinical management including the administration of a treatment or vaccine should be conducted by a health professional.

- The treatment can take 4, 6, or 9 months depending on the programme.
- It usually involves a 4-drug regimen, with some of the most common TB drugs being:
 - Isoniazid
 - Rifampin
 - Rifabutin
 - Rifapentine
 - Pyrazinamide
 - Ethambutol

Immunity

There are two types of immunity:

- **Active immunity** results when exposure to an agent triggers the immune system to produce antibodies to that disease.
- **Passive immunity** is provided when a person is given antibodies to a disease rather than producing them through his or her own immune system.

To confer immunity, the Bacillus Calmette-Guérin (BCG) vaccine (which is attenuated *Mycobacterium bovis*) has been in use for a long time to prevent severe forms of tuberculosis in children but its effectiveness has not been proven for routine use in cattle.

Which interventions are most effective for prevention and control?

The following is a list of activities considered for Red Cross Red Crescent volunteers to take part in. It is not an exhaustive list of all prevention and control activities for the specific disease.

- Communicate risks about the disease or epidemic, not only to share information on prevention and mitigation measures, but also to encourage informed decision-making, positive behaviour change and maintenance of trust in the Red Cross Red Crescent response. This includes the identification of rumours and misinformation around disease—frequent during health emergencies—to manage them appropriately. Volunteers should use the most context-appropriate communication techniques (ranging from social media to face-to-face interactions).
- Community education and engagement activities to encourage the adoption of protective behaviours including:
 - Pasteurization of dairy products.
 - Use of protective equipment by those working with suspected infected animals
 - Quarantine of herds where tuberculosis has occurred (limiting contact between sick and healthy animals; preventing sick animals from reaching the market).
 - Safe slaughtering practices, including improved supervision of slaughter and meat inspection.
- Social mobilization to support human vaccination in endemic areas, where possible. This includes extensive Information, Education and Communication (IEC) activities on the benefits of the vaccine and vaccination schedules

Epidemic characteristics and RCRC

indicators and targets

The first table below includes data that should be gathered from health authorities and relevant non-governmental actors to understand the progress and characteristics of the epidemic in the specific country and area of intervention. The second table includes a list of suggested indicators that can be used for monitoring and evaluating Red Cross Red Crescent activities; wording of indicators may be adapted to specific contexts. Target values for a specific indicator can vary widely from one context to another and therefore managers should define them based on the specific population, area of intervention and programmatic capacity. Exceptionally, some indicators in this website may include target values when these are globally agreed as a standard; e.g. 80 per cent of individuals who slept under an insecticide-treated net (ITN) the previous night—the normative World Health Organization benchmark for universal coverage with ITNs.

Epidemic characteristics and progression
Suspected cases per week (disaggregate by age, sex)
Confirmed cases per week (disaggregate by age, sex)
Case fatality rate
Indicators for Red Cross Red Crescent activities
<p>Number of volunteers trained on a specific topic (e.g. Epidemic Control for Volunteers (ECV); Community-based surveillance (CBS); WASH training; CBHFA training, etc.)</p> <p>Numerator: Number of volunteers trained Source of information: Training attendance sheets</p>
<p>Suspect cases detected by volunteers who were encouraged to seek healthcare and who arrived at a health facility</p> <p>Numerator: Bovine TB suspect cases detected by volunteers in a determined period preceding this survey (e.g. two weeks) for whom advice or treatment was sought from a health facility</p> <p>Denominator: Total number of people who are bovine tuberculosis suspect cases in the same period preceding the survey Source of information: Survey</p>
<p>Percentage of people recognizing the main risk factors, at least one transmission route and at least one measure for preventing it</p> <p>Numerator: Total number of people who recognized risk factors, at least one transmission route, and at least one measure for preventing it during the survey</p> <p>Denominator: Total number of people surveyed Source of information: Survey</p>

Indicators for Red Cross Red Crescent activities

Percentage of people who know the cause, symptoms, treatment or preventive measures

Numerator: Number of people who cite the cause, symptoms, treatment or preventive measures

Denominator: Number of people surveyed

See also:

- For Community Engagement and Accountability (CEA) indicators for activities accompanying ECV actions, please refer to: IFRC *CEA toolkit (Tool 7.1: Template CEA logframe, activities and indicators)*. Available at: <https://www.ifrc.org/document/cea-toolkit>
- For community-based surveillance guidance please see: IFRC, Norwegian Red Cross, Croix-Rouge de Belgique (2022), *Community Based Surveillance Resources*. Available at: www.cbsrc.org/resources.

Impact on other sectors

Sector	Link to the disease
WASH	Human-to-human transmission is rare and only reported for cutaneous anthrax. The main WASH activities concern environmental and animal hygiene before, during and after exposure to potentially infected livestock.
Food security	Bovine TB can be transmitted by contaminated meat and milk. Safe pre-slaughtering practice is an effective prevention measure.
Nutrition	Proper nutrition is essential for helping the body's ability to fight off the bacteria. People with poor nutrition have a higher risk of developing complications during treatment
Shelter and settlements (including household items)	People living in tightly knitted housing facilities are more likely to get the disease through aerosol as there would be poor ventilation. Also, people with poor housing facilities are also at a higher risk of contracting the disease.

Sector	Link to the disease
Psychosocial support and Mental health	Providing psychosocial support to individuals with Bovine TB and livestock farmers with infected cattle is crucial as it helps promote adherence to treatment, and improves overall health outcomes.
Sex and Gender	Bovine TB spreads through close contact with infected cattle or unpasteurized dairy. Women often handle daily care like milking and cleaning, while men are more involved in herding, trade, and slaughter—both with distinct exposure risks. Yet women are often excluded from animal health trainings. Gender-sensitive training and response efforts are essential for prevention, reduce exposure and strengthen disease control for all.
Education	Proper education empowers affected communities to combat the stigma associated with the disease thereby promoting support for affected individuals. It also helps in creating proper awareness about the disease.
Livelihoods	The disease leads to reduction in productivity in infected individuals as well as infected cattle. This can lead to a loss of income to the infected individual as well as the affected livestock farmer.

Resources :

- Balinda, I. G., Sugrue, D. D., & Ivers, L. C. (2019). More Than Malnutrition: A Review of the Relationship Between Food Insecurity and Tuberculosis. *Open forum infectious diseases, 6*(4), ofz102. <https://doi.org/10.1093/ofid/ofz102>
- Centers for Disease Control and Prevention (CDC); [About Bovine Tuberculosis in Humans](#) (2024)
- Health Protection Surveillance Centre; [Tuberculosis \(Mycobacterium tuberculosis complex\)](#) (2019)
- World Health Organization (WHO); [Roadmap for zoonotic tuberculosis](#) (2017)
- World Health Organization (WHO); [Definitions and reporting framework for tuberculosis](#) (2020)
- World Health Organization (WHO); [Tuberculosis](#) (2023)
- World Organisation for Animal Health (WOAH); [Bovine Tuberculosis](#). (2018)
- World Organisation for Animal Health (WOAH); [Bovine Tuberculosis](#) (n.d.)
- WHO, FAO & WOAH. [Roadmap for zoonotic tuberculosis](#). World Health Organization; (2017)