

FAQs on Bovine TB

1. What is Bovine TB?

Bovine Tuberculosis (bTB) is a highly infectious disease of cattle caused by a bacterium called *Mycobacterium bovis* (*M. bovis*). *M. bovis* can cause disease in other domestic or wild animals and in humans.

Cattle can become infected by:

- Breathing air contaminated by infected animals;
- Consuming contaminated food or water;
- Moving infected animals into a previously clear herd;
- Contact with other infected animals, such as across fences or at shared watering points;
- Sharing machinery (cattle trailers, muck/slurry spreaders) or facilities (cattle crushes) between farms; and
- Using dirty lorries to transport animals.

Getting rid of bTB involves identifying which cattle are infected and removing them so that they cannot spread infection further. There are different types of tests to detect whether cattle are infected with bTB.

How is Bovine TB detected?

Skin test

The 'skin test' for bTB is called the single intradermal comparative tuberculin test or SICCT. It works by detecting the animal's immune response to the bTB bacteria. Vets conduct this test by injecting cattle with small amounts of TB bacteria called Tuberculin. This test can detect infected animals whether or not the damage caused by the bacteria is visible at post-mortem.

Blood test

The gamma interferon blood test for bTB (also known as the GIF test) also works by detecting the animal's immune response to bTB. A blood sample is taken and analysed in a laboratory. The advantage of the GIF test is that it can detect infected animals earlier than the skin test.

Post Mortem

When reactors are sent for slaughter, they get a post-mortem inspection by vets as part of the food safety system. A selection of their glands (also known as lymph nodes) are cut into with a knife and inspected by eye. If the vet sees any damage of the sort caused by bTB, this is recorded and the animal is said to have visible lesions. In other words, the disease has developed so far that the damage caused by the bacteria was large enough to be seen by the naked eye.

In most cases, however, infected animals detected by the skin test or GIF test have not yet reached the stage where the damage can be seen by eye. These animals are said to have no visible lesions (NVL) but they are still considered to be infected.

Laboratory Test

In some cases, the glands (or lymph nodes) may be sent to a laboratory for further study to see if the *M. bovis* bacteria can be grown and identified. If tissue damage caused by bTB is seen under a microscope, or if the bacteria can be grown, then there is no doubt that the animal was infected with bTB.

How soon can TB in cattle be detected after infection occurs?

There is currently no test that can reliably detect bTB in cattle in the first days and weeks after they get infected. The test that can detect infected animals earliest is the GIF test. At this early stage of infection, it is rare for disease to have progressed so far that visible lesions can be seen at post-mortem.

The skin test can detect infected animals a little later than the GIF test, but still at a relatively early stage of infection (weeks to a couple of months). At this stage, it is common for a minority of those cattle to have visible lesions at post-mortem.

2. Why do I have to do a round test every year?

The annual round test is critical to eradicating TB from cattle. Each herd in Ireland must be tested at least once per year, to detect any spread of disease and to provide evidence that TB-free herds are still free. If a herd does not have its annual herd test, it is no longer able to be regarded as TB-free and so will be restricted from trading.

3. How does the TB skin test work?

The bovine TB (bTB) Skin Test

This is the most widely used test in Ireland. It is also called the single intradermal comparative tuberculin test (SICTT). It has been used successfully in bTB eradication in many countries.

How does it work?

On the day of the test the vet records the identity of the animal, measures the thickness of the skin in two places on the animal's neck, and then injects a small amount of bovine tuberculin in one area and avian tuberculin in the other. Tuberculin is a small amount of purified protein from the TB bacteria. Cattle that are infected with bTB will develop an increased thickness in the skin where the bovine tuberculin was injected. This can range from a few millimetres to a very noticeable swelling. The avian tuberculin is used to distinguish between other bTB-like bacteria, which the animal may have been exposed to, and genuine bTB bacteria. Three days later, the vet again records the identity of the animal, measures the skin thickness at the same sites on the neck, and compares the readings with those taken on the first day.

What do the results mean?

In most situations, called “standard interpretation”, if there is an increased skin thickness where the bovine tuberculin was injected and this is over 4 mm greater than the increase in the skin thickness where the avian tuberculin was injected, the animal is identified as being infected with bTB.

In herds that are categorised as low risk of bTB, if the increase in skin thickness in the bovine site is between 1 and 4 mm greater than the avian reaction, the animal is regarded as “inconclusive”.

In animals or herds with a higher risk of bTB, any increase in the bovine site which is 1 mm or more greater than the avian site means the animal is identified as being infected with bTB. This is known as “severe interpretation” and is only used at the direction of the Regional Veterinary Office.

How effective is the test at detecting bTB?

The skin test can, on average, detect around 80% of bTB-infected cattle. In some cases, this figure can be higher, and in others it can be lower. There are several factors which can affect it:

- The skin test cannot detect very recently infected cattle, as their immune system has generally not had the time to respond to the bTB bacteria. Usually, around 4 to 6 weeks after infection must have passed before the test can work.
- The skin test can detect around 90% of cattle with bTB lesions. However, as the disease progresses, an infected animal’s immune system becomes damaged and the test becomes less likely to work.

Cattle which test positive to this test are over 99% likely to have bTB. Less than 1 in 5000 of them won’t have bTB.

4. Why is my herd on a contiguous testing programme?

When a herd has a TB outbreak which is classified as high risk, the area around the infected herd is at a much higher risk of further outbreaks. Herds neighbouring the infected herd will be put on a contiguous test programme. The purpose is to detect any new outbreaks in the area as early as possible, before they can spread further within the herds or to additional herds. The contiguous testing programme is a very effective in stopping the spread of TB in a high risk area.

5. My herd was recently derestricted – why do I have to do additional tests a few months later?

Herds which have high risk TB outbreaks are more likely to have a subsequent breakdown. Even when such a herd has two clear TB tests and is derestricted, the risk of more cattle becoming infected with TB in the following months is still much higher than in other herds. For this reason, high risk herds must have post-derestriction check tests between three and eight months after being derestricted. If you don’t want to carry out the test at three months, you can wait, but the herd will be restricted until the test is carried out so as to protect other herds from the risk.

6. My herd is scheduled for a gamma interferon TB blood test, why is that?

The gamma interferon test, sometimes referred to as the “GIF test” or “TB blood test”, is a way of testing whether cattle have been infected with TB by analysing a sample of blood. It is used in herds which have had a severe outbreak of TB, to detect additional infected cattle and help the herd go clear more quickly. The test can detect infected cattle earlier than the skin test and can be done earlier than the 60 days required before the next skin test can be done, so it is a very useful tool for detecting infected cattle and removing them before they can spread disease further within the herd.

7. How does the TB gamma interferon blood test work?

The Gamma Interferon Test

This is a blood test and is carried out in a laboratory. It is also known as the GIF test or IFN- γ test.

How does it work?

A blood sample is taken from the animal and brought to the laboratory. The blood sample is then stimulated with bovine tuberculin and avian tuberculin, which stimulate immune cells in the blood to produce a molecule called gamma interferon. The level of gamma interferon produced by the immune cells from each sample in response to the bovine or avian tuberculin is measured and a comparison is made between the two.

What do the results mean?

If more gamma interferon is produced by the immune cells in response to the bovine tuberculin than the avian tuberculin, it indicates that the animal is infected with bovine TB (bTB).

How effective is the test at detecting bTB?

The GIF test can detect more than 90% of cattle infected with bTB, so it can detect more bTB infected animals than the skin test. There are several factors which can affect it:

- The GIF test can detect an infected animal earlier than the skin test, so it is more effective at detecting new infections.
- There is a period of time immediately after an animal is first infected with bTB but before it has developed an immune response when the GIF test will be negative.
- As with the skin test, sometimes animals may have damaged immune systems that do not respond during the GIF test. This may cause them to test negative even though they have bTB.

The level of bTB infection in the herd determines whether the GIF test will be used to look for further infected animals.

In a herd where bTB has been confirmed a GIF positive animal is very likely to be truly infected. In a herd where there is thought to be no bTB, a GIF positive animal is still likely to be infected but it is not as certain as in an infected herd. For this reason, the GIF test is not suitable to be used as a mass

screening test in all herds, in the way the skin test is used. Instead, it is used in herds where bTB is present and has spread within the group of cattle tested.

8. I've had an inconclusive – what will happen now?

You should strongly consider culling cattle that have an inconclusive TB skin test result. They're at a higher risk of having TB and can pose a serious threat to your other cattle. These animals are restricted to your herd for life and can only move out to slaughter or to a restricted feedlot for movement to slaughter. Many farmers choose to protect themselves and their cattle by culling these animals as soon as possible.

Cattle with an inconclusive TB skin test result must be subjected to follow-up investigations. You will be provided with three options from which to choose: A, B or C.

Option A

Option A allows you to retain the inconclusive reactor within the herd, but it will be subject to a blood test between 7 and 30 days after disclosure. If the animal has a positive TB blood test, it is then removed as a reactor. If the animal has a negative TB blood test, it will be subjected to a skin test 60 days after disclosure. Should the animal pass this test, the herd suspension is then lifted, and the animal will be blood tested on a six-monthly basis, which it must pass, otherwise it will be removed as a reactor.

Option B

Here the inconclusive animal is removed and slaughtered and both a post-mortem examination of the carcass and laboratory examination of tissue samples from the carcass is undertaken. Should this testing give a negative TB result, a result which may take up to 8 weeks to establish, the herd suspension is lifted. The consequence of a positive result is that the herd must pass two consecutive skin tests before suspension may be lifted. In the case of an inconclusive laboratory result then one herd skin test is required. The animal and herd level testing for TB described serves to establish the herd's freedom to trade.

Option C

The Inconclusive reactor is removed and slaughtered where only a gross post-mortem examination of the carcass is undertaken. Should no lesion be identified at post-mortem and the herd passes one skin test a minimum of 60 days after slaughter of the inconclusive reactor, the herd restriction can be lifted. The animal and herd level testing for TB described serves to establish the herd's freedom to trade.

9. I've had a reactor – what will happen now?

Keep the reactor separate from the other cattle in your herd. It is important to do everything you can to reduce the chances of TB spreading from the reactor to other cattle. It is important that you

do not administer any medicines, wormers, or anything else to the reactor as the withdrawal time may delay its removal.

The Department of Agriculture, Food and the Marine (DAFM) will send you a reactor pack in the post, which contains detailed instructions and advice on what to do.

DAFM officials will come out to visit your farm and inspect the reactors; they may take a blood sample from them for quality assurance purposes.

If there are several reactors, a DAFM veterinary inspector will come out to carry out an on-farm epidemiological investigation to try to establish how the cattle became infected and what can be done to protect your other cattle.

You will be asked to nominate a valuer to come out and calculate the price the reactor would have made if it had been sold on the open market.

When the valuation is agreed, DAFM officials will arrange to have the reactor removed and slaughtered.

After the reactor is removed, it is important to clean and disinfect any areas that may have been contaminated (for example buildings, pens, and other things). DAFM officials will advise you on the areas of your farm to focus on. Effective cleaning and disinfecting is critical to removing any TB bacteria and reducing the risk of more of your cattle being infected.

10. Why did my reactors not have lesions in the factory?

The tests for bovine TB (bTB) in cattle are very effective at detecting infected animals; yet when these cattle are sent for slaughter as reactors, only a minority will have visible lesions of bTB. This can cause some herd owners to wonder if the animals really had bTB at all.

It actually means that the disease has not yet developed to the stage where the damage caused by bTB is so large that it can be seen by the naked eye during post-mortem inspection.

If very few reactors in an outbreak have visible lesions, this can indicate that infection has been detected relatively early. If a majority of reactors in an outbreak have visible lesions, this is a sign that disease has been present for some time and more animals in the herd may have been infected.

11. How does TB detection at slaughter work?

All cattle slaughtered for human consumption in Ireland must undergo a post-mortem inspection carried out by a vet in the abattoir as part of the food safety system. This includes checking the animal for visible signs of bTB infection.

After each animal is slaughtered, a selection of its glands (also known as lymph nodes) are cut open with a knife and examined by eye by a vet. The lungs, the internal lining of the chest cavity and the abdominal organs are also inspected. If any damage, of the sort caused by bTB, is seen this is recorded and the animal is said to have suspect bTB lesions.

What is a bTB lesion?

A bTB lesion is an area of damage caused by the bTB bacteria (*M. bovis*) in the tissues of an infected animal. During the early stages of infection, the bacteria invade the animal's own cells, usually in the glands of the head, neck and lungs. Even using a microscope, it is very difficult to see them at this stage. As the infection progresses, the bacteria multiply and damage the tissue around them. This damage may be seen using a microscope. As the disease continues, the areas of damage get larger; eventually they reach a size where they can be seen by eye when the glands are cut open. In severe cases, these areas of damage (called lesions, or tubercles) can be found in the glands of the head, neck and lungs and in the rest of body as the animal gets sicker.

What do the results of the post-mortem mean?

When suspect bTB lesions are seen in an animal which was not thought to have been infected (it was not a skin test or blood test reactor), this means the animal may or may not have had bTB. There are some other diseases which can cause tissue damage that can sometimes look like bTB. For this reason, the suspect bTB lesions are sent to a laboratory for further testing. These laboratory tests can either confirm that bTB was indeed present, or rule out bTB and designate the animal as non-infected.

How effective is the post-mortem at detecting bTB?

Inspection at slaughter is not as successful at detecting bTB infection as the skin test programme. However, it is still a vital part of the bTB surveillance system and detects many infected herds each year. There are several factors which can affect it:

- Post-mortem inspection can only detect bTB if the disease is at a stage where the tissue damage caused by bTB is substantial and visible to the naked eye. Recently infected cattle will not be detected as the bTB bacteria are too small to be seen. The rate at which infected cattle develop bTB lesions varies.
- The more advanced the stage of bTB, the more likely it is that inspection at slaughter will detect it.
- Sometimes the immune system of an animal is damaged and post mortem testing is the only way to detect the disease.

Cattle which have bTB lesions detected at slaughter, where the lab confirms disease, always have bTB infection; in other words, the laboratory test is 100% accurate.

What are the average lesion detection rates?

- 30-40% of skin test reactors will have visible lesions at post-mortem inspection.
- 15% of Gamma Interferon reactors will have visible lesions at post-mortem inspection. (This figure relates to cattle, in herds with high risk breakdowns, which are in the same groups as cattle that were skin test reactors).
- Post-mortem inspection can detect bTB infection in 25% of infected herds that have not yet been detected through the skin test programme.

12. What is process for getting compensated for my reactors?

You must nominate a valuer of your choice from the panel of approved valuers. This person will visit your farm and calculate the price your reactors would have made if they had been sold on the open market. If you are not satisfied with the price, you may appeal the valuation and a second valuer will come out and go through the process again. If you still are not satisfied, you may appeal the case to an arbitration panel.

After the reactors are removed and slaughtered, the meat factory will pay you directly for the salvage cost for the animal. DAFM will pay the balance of any sum required to make up the agreed valuation price.

13. One of my cattle had a suspect lesion in the factory – what will happen now?

The suspect lesion will be sent to a lab to be tested for TB. Because the bacteria which causes TB (called *Mycobacterium bovis*) is a very slow-growing bacteria, it can take up to nine weeks for the test results to come through, although in some cases the test result comes back sooner.

Your herd will be restricted until the test result comes through. This is because, if it turns out that your animal did have TB, there may be more infected cattle in your herd and if you were to move them to another herd, this could spread TB further.

If the lab test results show that the suspect lesion was not caused by TB, your herd will be derestricted. If the results confirm that it is a case of TB, your herd will be restricted.

14. How can I reduce the risk of bovine TB to my cattle?

Bovine TB (bTB) is an infectious disease. You have the power to reduce the risk of bTB spreading to your cattle.

Infected cattle can appear healthy but they may already be spreading infection. It is essential that any infected cattle are identified and removed before they can spread disease further.

Preventing the introduction of bTB into your herd is crucial. This advice applies to every herd in the country.

The decisions you make affect the risk to your cattle of bTB. You can take steps to protect your herd from disease, and protect your family and yourself from the stress and financial difficulties of a bTB breakdown.

1. bTB testing

- i) High quality bTB testing reduces the threat to your herd. If an infected animal is present, it is better to have it identified and removed promptly. The longer infection is present, the more likely it is to spread to other cattle. This can make the

difference between having a small breakdown or a large scale, on-going, bTB problem.

- ii) Ensure good quality bTB testing facilities are available, especially a crush of appropriate size. Sufficient light and shelter are important.
- iii) Provide the vet with any assistance required in order to do the job well.
- iv) Each animal must be identified and have its skin thickness measured and recorded on both days in order for the test to be effective and protect your herd from undetected spread of disease.

2. Reduce the risk of infection being left behind

- i) Cull any cattle which ever tested inconclusive, even if they subsequently re-tested negative.
- ii) Consider culling any cattle which were in the herd during a previous bTB breakdown, particularly older cows and those that were part of previously infected groups.

3. Reduce the risk of introducing cattle which are infected

- i) Source cattle from herds which have not had a bTB breakdown in recent years.
- ii) Buy cattle with a recent bTB test date as they are less likely to be infected.
- iii) Isolate purchased animals and carry out a post-movement bTB test to protect the rest of your herd.
- iv) Maintain a closed herd if possible.

4. Reduce the risk from badgers

- i) If badger setts or latrines are present on grazing land, you should fence them off with electric fencing.
- ii) Do not feed cattle concentrates spread on the ground.
- iii) Feed cattle in raised troughs. Avoid spilling feed on the ground, as badgers may consume it and contaminate any leftovers.
- iv) Use raised drinking troughs
- v) Badger-proof farm buildings by covering the lower part of access gates to sheds so they can't get through.

5. Reduce the risk of contiguous spread

- i) Ensure boundary fences are well maintained.
- ii) Stop nose to nose contact with cattle from another herd.
- iii) Avoid mixing groups of cattle which are normally managed on separate land fragments.

6. Reduce your risk through biosecurity

Biosecurity is critical to protecting your cattle from a range of infectious diseases; if you take steps to improve biosecurity on your farm, you will reduce the risk of bTB and also of many other diseases.

- i) Ask yourself how can bTB be brought onto my farm? Through people, equipment or poor fencing? What steps have you taken to reduce this risk?

- ii) Clean and disinfect shared machinery after each use. Effective cleaning and disinfecting of any areas where bTB infected cattle were kept is essential and will reduce the risk of infecting other cattle. The bTB bacteria can survive in the environment for weeks and even months.

7. Breeding to reduce the risk of bTB

When you select bulls for breeding, choose ones that are genetically more resistant to bTB. The Irish Cattle Breeding Federation (ICBF) now provide a score of genetic resistance to bTB for bulls; farmers can use this to reduce the risk of bTB through selecting the right bull and increasing the level of genetic resistance in the herd.