A message from the chief executive of TBfree New Zealand

William McCook

WELCOME to our final feature on the work of TBfree New Zealand, which includes some answers to a range of commonly asked questions.

Previously, we have explained the two main approaches taken to fight bovine tuberculosis. The first is disease control, which affects every single cattle and deer herd owner in New Zealand. More than 75,000 herds are included in a national programme that involves:

- Testing for tuberculosis
- The slaughter of animals suspected of being infected
- Movement control of animals in high risk areas or of herds with confirmed or suspected tuberculosis infection.

The other is vector control, where wild animals, particularly possums, which are known to be responsible for carrying and spreading the disease, are targeted.

As well as disease and vector control we are also responsible for ensuring farmers comply with the rules and regulations around testing, identification and movement of their animals. Strong farmer support for the scheme results in good compliance, however, should serious breaches occur, TBfree New Zealand will follow up with legal action.

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We also track disease sources, manage post mortem testing, monitor and survey possum populations and work with other agencies to see where our work can have wider benefit.

Bovine tuberculosis is a serious disease which poses a risk to our livestock exports, regional and national economies and even human health.

I personally hope the information provided in our features has clarified what we do – and in the process put vector control using 1080 into context.

As I have said previously, we are proud of what we have achieved for New Zealand and it is no coincidence that the TBfree programme in this country is regarded as a world leader.

Our features set out to provide the West Coast community with more detailed information about our work. Farmer and landowner support for what we do is vital, but wider community understanding is no less important to us.

William McCook
Chief Executive
TBfree New Zealand

Responding to some of the frequently asked questions

WHY have you put all this effort into providing a series of features about TBfree New Zealand?

The independent survey of West Coast residents and landowners conducted at the end of last year confirmed that the community wanted to know more, and also that further clarification was needed around a number of issues and concerns raised by Coasters during the survey.

How do we know if a possum control operation has been successful?

The benefits of possum control can be measured by indicators including a reduction in the number of cattle or deer tuberculosis reactors or infected herds or the re-growth of forest canopy species previously eaten by possums. It can take several years before the true success of an operation is known because there is often a time lag between the reduction in possum numbers and the response in the tuberculosis or conservation indicators.

Possum population densities can also be measured to give an indication of the likely success of an operation. This is usually expressed as either the relative number of possums remaining, or the percentage kill, calculated by the "Residual Trap Catch Index" (RTCI). This looks at the number of possums remaining after an operation by monitoring how many are caught in specially laid traps.

Why don't you use more ground control methods and trappers for possum control?

Ground control is the main form of vector control on the West Coast and around New Zealand. However, the cover, speed and level of control that can be achieved by hand is limited.

For example, the biggest aerial operation on the West Coast last year at Karamea covered 44,485 ha in four days. In order to match the effectiveness of aerial operations using ground control methods, traps would need to be set on a 100 metre x 100 metre grid across the entire control area. For an operation like Karamea, this means traps would have needed to be placed at more than 50,000 points over extremely rugged country and then be checked daily.

Vector control contractors are highly skilled in what they do and are required to have a specific set of qualifications. It would be impractical and even dangerous to send hordes of people out into dense bush without an understanding of an operation's goal, the terrain it covers and the regulations and safety measures that must be adhered to when working, often alone, handling toxins and traps.

Also, for effective bovine tuberculosis control the performance targets required are far greater than trappers are generally able to achieve. The numbers of possums and other vectors need to be kept low and control needs to be evenly spread so there are no remaining pockets of animals harbouring the disease.

Is the impact of bovine tuberculosis on our export trade overstated?

New Zealand trades its primary export products within a highly competitive global market. Unlike other countries, a significant proportion (about 18%) of our GDP relies on the primary sector.

Many of our competitors for this market have negligible levels of bovine tuberculosis, or none at all.

New Zealand's distance from its main trading markets, particularly Europe, means we are vulnerable on a number of fronts. Having serious bovine tuberculosis issues could damage our reputation as a producer of high quality, safe products.

The bovine tuberculosis situation in the UK at the moment is a good example of what happens when the disease is out of control. Some countries have recently boycotted imports of livestock from the UK and the high numbers of infected cattle being slaughtered has hit farmers hard. A dramatic increase in the number of cases of bovine tuberculosis in species other than cattle has also been recorded, posing a potential risk to human health.

If 1080 breaks down more slowly in cold temperatures, how can you say it breaks down in West Coast water, which tends to be very cold?

Testing of some 2,000 samples following aerial operations since 1990 has proved that 1080 is reduced to undetectable and harmless amounts by dilution in water.

Cold temperatures do not affect the rate of dilution.

Dilution occurs rapidly, regardless of the temperature of water.

If 1080 is so successful why do we continue to have drops on the West Coast?

The difficulty with the West Coast is the sheer size of the forested area and the nature of the terrain. There are simply not enough funds to do possum control over the whole area, so operations tend to focus on priority areas and the creation of buffer zones to push possums away from bush pasture margins where domestic cattle and deer herds are at the highest risk.

Aerial operations using 1080 are highly successful in reducing possum numbers, but over time possums from untreated areas start to "leak" or migrate back into the clear areas. When this continues for a period of time, further control may be required to reduce numbers.

Why is it that possum numbers are still quoted at 70 million?

The 70 million figure is relatively unscientific, dates from the 1970s and is not a figure relied upon or used by the Animal Health Board which manages the National Bovine Tuberculosis Pest Management Strategy.

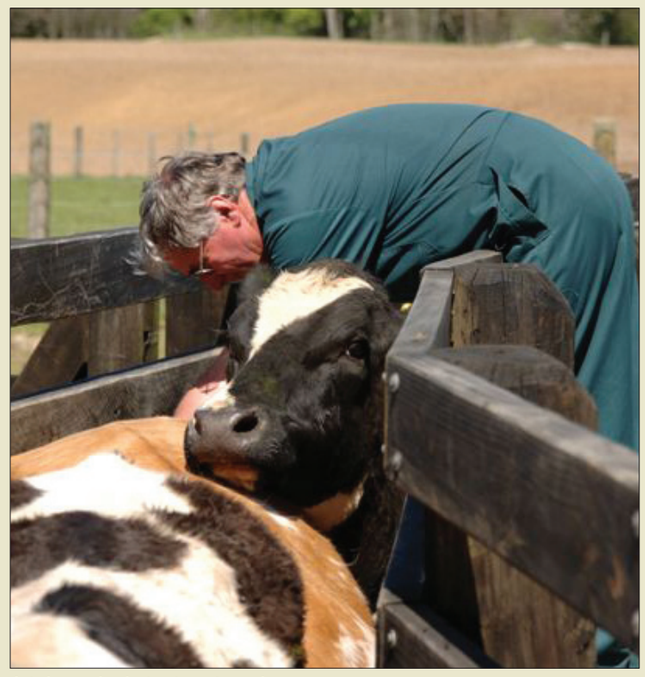
Where is the data to support the AHB's claims that 1080 is the only option available to solve the bovine tuberculosis issue?

The AHB has never claimed that 1080 is the only option available to solve the tuberculosis problem. Traps and a range of other toxins are used for bovine tuberculosis control but 1080 is highly effective and remains the only substance licensed for aerial application for this purpose in New Zealand.

Why do we use 1080 when other countries don't?

Several countries do use 1080 but not in the same way as New Zealand which, apart from bats, has no native mammals which would be susceptible to its use. However, 1080 is used in Australia to control foxes and as a rodenticide in Mexico, Japan and Israel. The United States has limited use of 1080 because of its effects on large native mammals, but it has been used to reduce coyote attacks on sheep.

No absolutes in testing for the disease



A tuberculosis tester at work

WHAT is true of human diseases also applies to diseases in animals. When using biological tests to diagnose diseases, there can never be absolutes.

The accuracy of the tuberculosis test can sometimes vary according to a number of factors, the most important of which are the state of the animal's immune system at the time of the test and the number, type and virulence of the bacteria with which it has come into contact.

False positive reactions to the test may be seen where animals have been exposed to a range of bacteria related to the bovine tuberculosis bacterium, *Mycobacterium bovis*. This includes bacteria responsible for avian TB, Johne's disease and skin tuberculosis, as well as bacteria that share common antigens with the M.bovis family, such as the organism that causes "lympho" (or "cheesy gland") in sheep.

On the West Coast where there are bacteria in the environment, as well as herds infected with Johne's disease, some cattle can falsely react to the TB skin test.

Nationally 99.98% of cattle that are not infected will test negative to the TB test. A very small percentage of animals can be misdiagnosed.

Test accuracy will decrease when animals are chronically stressed by such factors as poor nutrition, parasites, copper deficiency, late pregnancy or early lactation. These factors cause false negative reactions to the test, which means that infected animals can sometimes be missed.

TBfree New Zealand has worked to improve the accuracy of TB testing. Funds have been invested to develop technology and to refine procedures so tests are quickly turned around and are as specific and as accurate as possible. Additional (parallel) testing in cases of suspected infection is also used to further check the diagnosis.

Evidence of tuberculosis in possums on the West Coast

NEW ZEALAND has had compulsory TB testing of dairy cattle since 1965, and for beef animals since 1970. Tuberculosis control was originally done by testing all cattle frequently (at least annually) and any returning a positive TB test result were sent to slaughter. This programme eradicated bovine tuberculosis from most dairy herds in New Zealand by the early 1970s, except for the northern part of the West Coast. The failure to eradicate the disease from dairy herds in parts of the West Coast posed a major dilemma to the success of the then Department of Agriculture's TB control programme.

To tackle the problem, testing and shed hygiene measures were intensified. But despite all attempts to eradicate the disease and thousands of cattle being slaughtered, a high proportion of dairy herds in parts of the West Coast remained infected.

By this stage dairy farmers were suffering greatly. Large numbers of cattle were being killed and compensation barely covered the cost of transporting reactors to the slaughterhouse. Some farmers went out of business and the viability of the Buller Dairy Factory was affected.

"...it became clear that possums are the main source of TB infection for cattle"

In 1970, the Department of Agriculture decided to take extreme measures to get rid of the disease. Testing frequency was increased to every three months and farmers were forced to comply. Every single cow was branded with paint and then tested repeatedly. Cows found without branding were immediately slaughtered. This saw an initial decrease in infection rates but that soon levelled off. It was clear that something else was going on and that a different approach was needed to find the infection source.

The Department began looking at other animals. Some sheep were found to be infected and upwards of 17,000 were culled to eliminate them as a possible source of infection. This made no impression on infection rates. During 1971 possums became the next target and it was at that point that tuberculosis-infected possums were found on most of the properties with infected herds.

While these investigations were going on, and despite ongoing testing of cattle, infection rates remained high.

In 1972, an intensive possum control programme was started. Within 18 months the infection rate had been knocked back by 75%. Within four years infection rates were down by 90%.

From this it became clear that possums are the main source of TB infection for cattle.

When funding for possum control was reduced by around 90% in the late 1970s, the rate of cattle herds found infected with bovine tuberculosis increased exponentially over a 14-year period. Infection rates only started declining again when increased funding for possum control was secured in 1994. The current situation in the UK is mirroring this, where badgers are believed to be the source of infection for cattle herds, but are not being controlled. As a consequence, infection rates are soaring.

Through effective possum control, infection rates have dropped dramatically both in farmed cattle and deer herds. Furthermore, it has significantly reduced infection levels in wild deer and pig populations.

New Zealand leads the world in vector control research and implementation. The results of the West Coast programme continue to be presented both here and abroad to demonstrate the relationship between vector control and the decline of bovine tuberculosis in cattle and deer herds.

A tuberculosis lesion on a cow's udder

Possum fur trade not a fix for tuberculosis

A RECENT entrepreneurial summit suggested that the possum fur trade could be revived by using funds for trapping, instead of toxins.

Unfortunately, this would not be effective for the control of bovine tuberculosis.

Trapping cannot achieve the performance standards required to ensure low, even densities of possums to control the disease effectively.

Maintaining low possum numbers for several years is also the key to fighting bovine tuberculosis.

Inevitably, hunters would rightly seek to maximise profit for energy expended. They are likely to focus on high possum density areas, avoiding those with fewer animals.

The logical tendency for hunters will also be to concentrate on spots with easy access, whereas TBfree New Zealand needs to ensure full coverage of control across land blocks, regardless of terrain or location.

While the objective of tuberculosis control, including aerial 1080 operations, is to achieve and sustain low, even possum populations, a lucrative fur trade industry would rely on keeping population numbers high.

Figures quoted at the summit suggested some $200 million is spent on poisoning possums, but the source of this statistic is unclear. TBfree New Zealand, through the Animal Health Board, spends around $55 million nationally on controlling vectors such as possums. Approximately $20m of that figure is used for trapping, monitoring and survey work.

A thriving possum fur trade could complement bovine tuberculosis control in New Zealand, but it could not replace the TBfree vector control programme.

Possum with tuberculosis lesions

Farmer deals with disease on his doorstep

BARRYTOWN dairy farmer Richard Reynolds is in full response mode after a couple of his cows tested positive for tuberculosis several months ago.

This is not good news given his 350-strong herd had been clear of the disease for more than 10 years and with the winter season coming up he says the consequences of having infected herd status are starting to be felt.

"Having infected herd status has affected our future plans. We have decided to graze our young stock at home this year because it is pretty hard to get grazing for them anywhere else with them coming out of an infected herd. This will impact on our milk production in the long-term.

"Even though I might want possum control for personal reasons, it is pretty obvious it benefits everyone"

"And our breeding plans are on hold as well because any young stock would be too hard to sell, and would be worth less anyway," he explained.

TBfree New Zealand is working with Richard and has put a recovery plan in place to clear his herd of infection. The first step has been to identify the source of the disease. The origins of all his new stock have been traced to determine whether any may have come from an infected herd.

In New Zealand there are several different strains of *Mycobacterium bovis* (the bacteria causing bovine tuberculosis). DNA testing is being done using tissue samples from the infected cows to indentify what strain of the disease they had. This may help with the location of the disease source. Surveys are also being undertaken in the area surrounding Richard's farm to check for the disease in wildlife.

Richard's cows are also under an intensive testing programme until tuberculosis tests come back clear.

So far the cows appear to have come from healthy herds. Although it is early days yet, Richard says his gut feeling is that infection has come from possums.

"Some areas were missed out with recent aerial control which couldn't be controlled as effectively by ground. Now we have been noticing an increase in possums around the place. It was a real shock to us all when a possum suspected of having tuberculosis was found close to the township recently.

"Even though I might want possum control for personal reasons, it is pretty obvious it benefits everyone. Our bush would be in a much worse state without it and with a sick possum found right at our doorstep we have just had a reminder of the risk tuberculosis can pose to human health," he said.

Christina Houston and Richard Reynolds with baby Iris