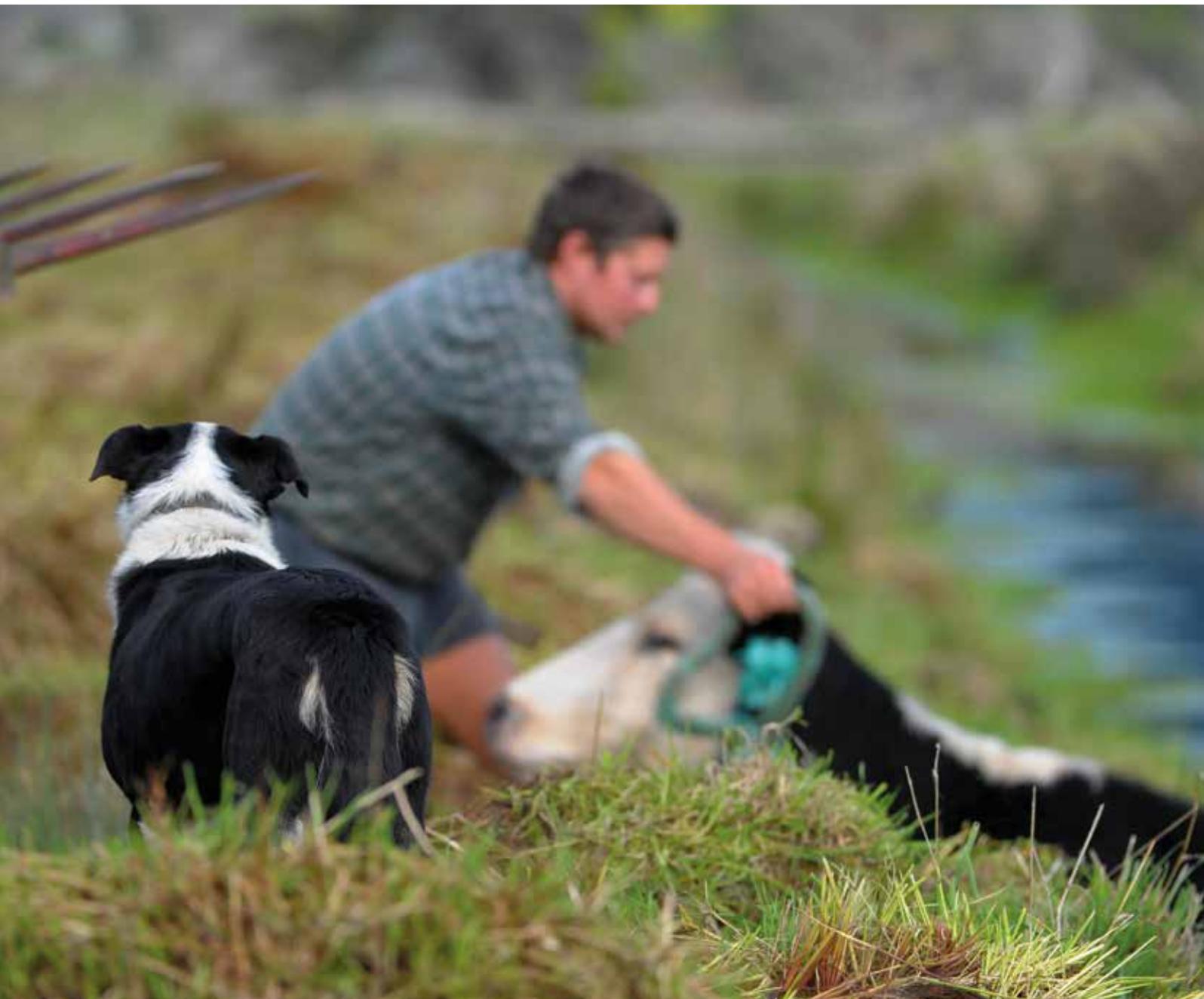


Prevention and Control of Leptospirosis

AUGUST 2015



This good practice guide provides practical suggestions for managing and preventing leptospirosis, an infectious occupational zoonotic disease.

It is aimed at people working in close contact with animals, anyone visiting rural/farming areas, and health professionals.

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- > NZPork
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This guide was adapted from an existing Department of Labour publication: *Guidelines for the control of occupationally acquired Leptospirosis (2001)*.

PREVENTION AND CONTROL OF LEPTOSPIROSIS KEY POINTS:

Leptospirosis is easy to catch from an infected animal and its environment

Protect yourself, your family and staff by vaccinating your animals, controlling rodents, practising good personal hygiene, using protective equipment, and seeking help early if you feel unwell

A robust animal vaccination programme is critical to break the cycle of infection, which includes understanding farm management risk factors

Animal vaccination guidelines have been recently updated

Cases of leptospirosis should be reported to WorkSafe New Zealand

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01/

**WHAT IS
LEPTOSPIROSIS?**

Leptospirosis is an infectious disease transmitted from animals to humans (a zoonosis) and from animal to animal by infected urine. Infection can occur through breaks in the skin or through the mucous membranes of the eyes, nose or mouth.

Infection occurs worldwide in almost all warm-blooded mammals, including farm, domestic and feral animals.

Leptospirosis is caused by spiral-shaped bacteria known as leptospire that multiply in the kidneys of animals and are shed in the urine. Reproductive tissues can also be infected.

Antibiotics used correctly and sensibly, can be used to treat shedding animals; however, leptospirosis can be very difficult to eliminate from a population, and control measures should focus on animal vaccination and minimising exposure.

Different animals contract different serovars (strains), and can be primary (maintenance) hosts or secondary (accidental) hosts. Serovars identified so far in New Zealand are Hardjo, Pomona, Tarassovi, Ballum, Copenhageni, and Balcanica.

Different serovars are found at different herd-level frequency (eg Hardjo is greater than Pomona in sheep, cattle and deer). But within a herd, the frequency can be the same for each. Also, serovars can persist without a primary (maintenance) host.

Leptospirosis is also known as swamp fever, mud fever, field fever, swineherd's disease, and cane-cutter fever. More severe cases are known as Weil's disease or haemorrhagic jaundice.



02/

**HOW DO
HUMANS CATCH
LEPTOSPIROSIS?**

Leptospirosis is easy to catch from an infected animal, but it is rarely transmitted from person to person.

People can catch leptospirosis when they are exposed to the urine of infected animals. Infection generally enters through cuts and cracks in the skin, eg through bare hands or feet, or through the mucous membranes of the eyes, nose or mouth.

Cuts, sores and grazes on the skin increase risk of infection, as does licking your lips and eating or smoking before washing and drying your hands.

You don't have to come into direct contact with urine or infected tissue of an infected animal. Even a splash or fine spray of urine, or indirect contact with urine-contaminated water (eg water used to clean down a cowshed or stockyard) can spread a large number of leptospires.

Contaminated rivers and lakes may also be a source of infection. The use of urine-contaminated animal manure when gardening is another potential source. In New Zealand farming systems, flood water, and water-logged paddocks and waterways, are a particular risk.

Infected and shedding animals may show no clinical signs of infection.

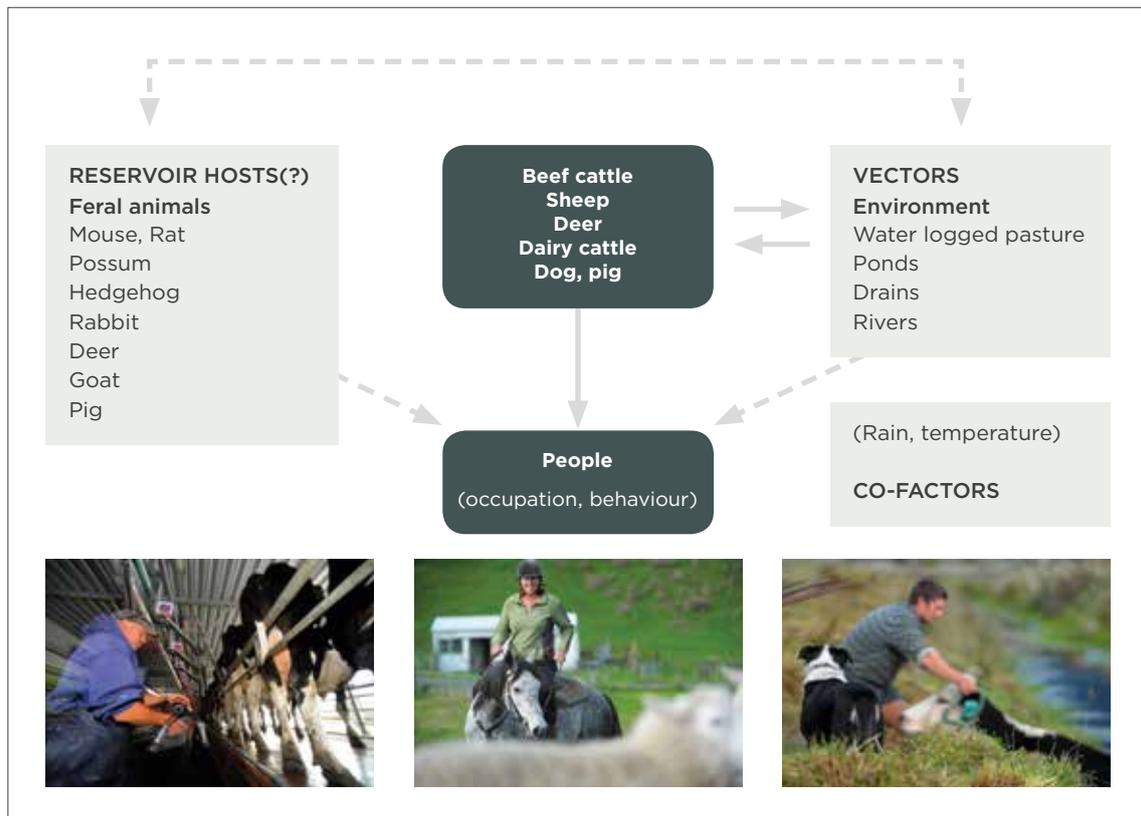


Figure 1: Ecological model of leptospirosis in New Zealand¹

¹ Heuer, C., Benschop, J., Stringer, L., Collins-Emerson, J., Sanhueza, J., Wilson, P. (2012). *Leptospirosis in New Zealand: best practice recommendations for the use of vaccines to prevent human exposure*. Massey University, Institute of Veterinary, Animal and Biomedical Sciences.

03/

WHO IS AT RISK?

Leptospirosis is a particular risk to people working in close contact with animals or animal products, especially in wet environments.

Leptospirosis remains the most common occupational infectious disease in New Zealand. It is more frequent in New Zealand animals and people than in many European countries².

Occupations with increased risk of infection are those involving animals or animal products, like:

- > farm workers
- > veterinarians
- > meat workers.

or those involving frequently contaminated environments, like:

- > sewer workers
- > coal miners
- > plumbers
- > fishing industry workers.

Those at highest risk are:

- > farmers (particularly sheep, beef, deer and dairy farmers) and their families (including children)
- > any other people living on the farm
- > farm workers, including relief milkers and casual labourers
- > people working in the farm garden
- > service workers on the farm, eg stock truck drivers, artificial insemination (AI) technicians, and anyone else handling animals

- > others working on and around the farm, eg drain layers
- > meat inspectors, meat processing workers, and service workers to the meat sector
- > forestry workers
- > veterinarians, both on-farm and in a meat plant.

In 2013, 59 cases of leptospirosis were notified in New Zealand, all confirmed by laboratory testing – a significant decrease from the 108 cases notified in 2012. However, the actual number of cases is thought to be about 16-56 times higher than notified number, probably because a large number of cases are undiagnosed, as leptospirosis starts as a severe, general illness that may be mistaken by patients and doctors for the flu³.

Of the 59 notified cases, 56 cases recorded occupation, with 40 of those people working in high-risk occupations for leptospirosis exposure – 22 (52%) in the meat processing industry and 18 (43%) as farmers or farm workers.

Of the 19 cases that didn't report a high-risk occupation (or no occupation was recorded) two (5%) cases involved an occupation requiring direct contact with animals, being veterinary science and possum trapping (one case each).

² "Leptospirosis Widespread, says researchers". Marlborough Express. Retrieved March 2015. www.stuff.co.nz/marlborough-express/news/10411674/Leptospirosis-widespread-say-researchers.

³ Heuer, C., et al. (2012). *Leptospirosis in New Zealand: best practice recommendations for the use of vaccines to prevent human exposure*. Massey University, Institute of Veterinary, Animal and Biomedical Sciences.

Other cases reported the following risk factors:

- > animal/outdoor exposure (13 cases)
- > contact with lakes, rivers and streams (3 cases)
- > overseas travel during the incubation period (1 case).

Two cases reported more than one risk factor⁴.

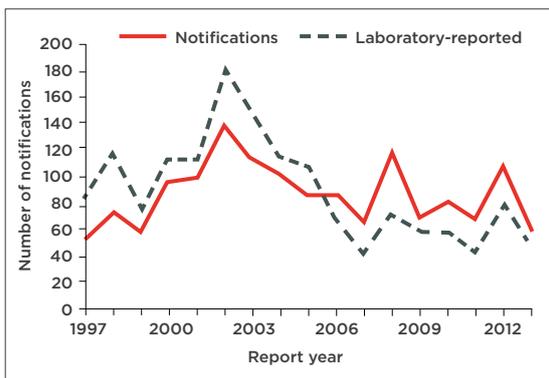


Figure 2: The number of notified and ESR laboratory-reported cases of leptospirosis per year, between 1997 and 2013⁵

⁴ Institute of Environmental Science & Research Ltd (ESR). Notifiable and other diseases in New Zealand: 2013 Annual Report. Porirua, New Zealand.

⁵ Institute of Environmental Science & Research Ltd (ESR). Notifiable and other diseases in New Zealand: 2013 Annual Report. Porirua, New Zealand.

04/

HOW DOES LEPTOSPIROSIS AFFECT HUMANS?

IN THIS SECTION:

4.1 Symptoms

People can be mildly or severely affected by leptospirosis, and may be asymptomatic (show no symptoms at all).

It is possible to have been exposed to infection without feeling any symptoms at all, for example, about 80% of all infections observed in abattoir (slaughterhouse) workers weren't associated with any signs of illness.

A mild form of the disease is often 'self-limiting', causing only minor flu-like symptoms, although tests will show there has been infection if there are antibodies in the blood.

A severe form of the disease can come on rapidly, and result in severe illness. Patients have mentioned 'crashing' or collapsing, being unable to see or move, or remember anything before waking up in hospital.

Death from leptospirosis infection is rare. Internationally, the overall fatality rate is approximately 1-5%, but varies with the form of the disease, health status and age of the infected person.

4.1 SYMPTOMS

Initial symptoms of infection include:

- > feeling tired
- > severe and persistent headaches
- > high temperature and chills/sweating
- > muscle pain (myalgia), particularly in the lower back and calves
- > abdominal pain
- > nausea and/or vomiting
- > diarrhoea
- > loss of appetite
- > conjunctivitis (inflammation of the eye)
- > sore throat and/or cough
- > sensitivity to light (photophobia)
- > vision problems.

Subsequent symptoms may include:

- > skin rash
- > breathing problems
- > chest pain.

Symptoms of severe disease may include:

- > jaundice (yellow eyes or skin from liver damage)
- > renal failure
- > haemorrhage
- > encephalitis and meningitis (inflammation of the brain and spinal cord)
- > pneumonitis (inflammation of lung tissue)
- > haemodynamic collapse (collapse of the cardiovascular system)
- > miscarriage.

Severe cases can result in permanent complications, most commonly kidney (renal) failure. Some patients suffer long-lasting, recurring symptoms, such as depression or muscle pains, and may have repeat hospital admissions over a period of years. In some cases, uveitis (inflammation of the eye) develops up to 18 months after the original acute infection.

Most people who are severely affected find it physically impossible to return to work within two months. Most do return to work, but it can be at least a year before they regain the energy they had before becoming ill.

Anyone who experiences symptoms, or suspects they have been exposed, needs to see a doctor within 24 hours to get tested and start antibiotic treatment. They need to tell the doctor that leptospirosis may be the cause of their illness, as some doctors may not be familiar with the symptoms, particularly those in cities⁶.

⁶ "Leptospirosis Widespread, says researchers". Marlborough Express. Retrieved March 2015. www.stuff.co.nz/marlborough-express/news/10411674/Leptospirosis-widespread-say-researchers.

05/

REPORTING/ NOTIFICATION

IN THIS SECTION:

- 5.1 Duties under the HSE Act 1992
- 5.2 Reporting to WorkSafe NZ
- 5.3 Public health follow-up

Leptospirosis is a notifiable disease under the Health Act 1956, and regarded as a significant hazard under the Health and Safety in Employment (HSE) Act 1992.

Leptospirosis cases should be reported to WorkSafe New Zealand.

5.1 DUTIES UNDER THE HSE ACT 1992

Employers are required to keep a record of:

- > every accident that harmed or may have harmed an employee at work or a place of work managed by the employer
- > every occurrence of serious harm to an employee at work, or resulting from any hazard an employee was exposed to at work.

Self-employed people and principals have a responsibility under the Act to keep a register of accidents and serious or potential harm or exposure to hazards in the workplace.

A person may have overlapping duties under the Act, eg a self-employed farmer overseeing other workers in their workplace, who is also the principal in a contract.

5.2 REPORTING TO WORKSAFE NZ

Any confirmed or suspected cases of leptospirosis, or evidence of exposure, eg antibodies measured in blood tests or a positive PCR urine or blood test, should be reported as a Notifiable Occupational Disease (NOD).

The Notifiable Occupational Disease System (NODS) is a voluntary system that anyone can use to tell WorkSafe NZ about cases where employee health may have been affected by a situation at work⁷.

It is important to make a NODS notification to protect employee health and help build a true picture of the risk and rate of the disease.

A NODS notification form and further information can be found at:

www.business.govt.nz/worksafe/notifications-forms/nods

Once a NODS notification has been made, WorkSafe NZ:

- > will assign the case to a health and safety inspector
- > may conduct an initial personal health assessment.

If a personal health assessment links ill health to a workplace activity, the inspector may investigate the workplace. This investigation will:

- > inform the employer that a workplace activity may have caused harm
- > ensure employees receive medical screening and treatment if required
- > take steps to ensure that no other person is harmed in the future.

NOTIFICATION BY MEDICAL PRACTITIONERS

Because leptospirosis is listed as a notifiable infectious disease under the Health Act 1956, medical practitioners must notify any suspected cases to the medical officer of health of the local public health service. Notification must not wait until infection is confirmed.

⁷ Health and Safety in Employment Act 1992, Part 4, s 25.

Any medical practitioner who doesn't report leptospirosis as a notifiable disease is not meeting their duty under the Health Act.

If patients are exposed to leptospirosis through their work, they should be asked to sign a NODS form to be sent to WorkSafe NZ. These patients are eligible for ACC cover. For each claimant, a form must be completed by the medical practitioner, employer and claimant⁸.

5.3 PUBLIC HEALTH FOLLOW-UP

The medical officer of health, or selected officer, investigates each case of leptospirosis. This includes following up on the case to find out how the patient may have become infected, and providing advice to prevent future infection to others exposed to the same environment.



⁸ ACC. (2014). *Leptospirosis in New Zealand: an overview of clinical best practice*. ACC Review 54. Retrieved December 2014 from: www.acc.co.nz.

06/

**FIRST AID
TREATMENT**

Treatment for leptospirosis has the most chance of success if it begins as soon as exposure to infection is known or suspected.

It is important to display first aid advice in work areas, provide a first aid kit, and follow first aid procedures. A readily available supply of clean water is important when exposure is known or suspected.

Look after your health. As soon as there is exposure to urine or infection is suspected:

- > dry off the urine splash straight away (leptospire tend to dry out easily), then wash the area
- > wash out fresh or old cuts and grazes with water and disinfectant, and dry well
- > flush out your mouth and eyes, and any exposed skin, with lots of running water
- > wash your hands and face well:
 - taking particular care with facial hair
 - using soap and water, and drying thoroughly
- > record in the incident register
- > tell a supervisor.

See a doctor within 24 hours of suspected exposure or if flu-like symptoms develop, to get a blood sample and antibiotic treatment. Tell the doctor that leptospirosis may be the cause of your illness – some doctors may not be familiar with the symptoms.

Treatment options will depend on the severity and duration of the symptoms. There is no firm evidence about how effective antibiotic treatment is⁹; however, there is agreement that early antibiotic treatment (with doxycycline or amoxicillin) should be given if infection is strongly suspected¹⁰.

The blood sample MUST be taken before medication is taken, and a subsequent sample may be needed 3-4 weeks later. All patients with severe infection or signs of meningitis should be sent to hospital immediately.

⁹ Brett-Major D.M., Coldren R. (2012). Antibiotics for leptospirosis. Cochrane Review; cited in *Leptospirosis in New Zealand: an overview of clinical best practice. ACC Review 54*. Retrieved December 2014 from: www.acc.co.nz.

¹⁰ Day, N. (2014). Treatment and prevention of leptospirosis. Topic 5524 version 7.0; cited in *Leptospirosis in New Zealand: an overview of clinical best practice. ACC Review 54*. Retrieved December 2014 from: www.acc.co.nz.

07/

INFORMATION FOR MEDICAL PROVIDERS

IN THIS SECTION:

- 7.1 Diagnostic tests
- 7.2 Antibiotics

Medical providers (general medical practitioners) should look out for leptospirosis, especially in patients who present with flu-like symptoms and work with farm animals or in the meat processing industry.

Patients should be treated as quickly as possible if leptospirosis is suspected. A multiple approach is needed to control and diagnose leptospirosis.

Medical providers should:

- > test for:
 - antibodies - using the microscopic agglutination (MAT) test
 - Leptospiral DNA - using the polymerase chain reaction (PCR) test
- > prescribe a course of appropriate antibiotics
- > monitor patients for signs of complication, eg renal failure
- > use the correct notification procedures for occupational diseases, ie notify suspected cases to the medical officer of health of the local public health service - this should not wait until infection is confirmed.
- > ensure that patients know the risks and prevention strategies, including:
 - immunisation of animals, ie:
 - livestock owners should consult with a veterinarian regarding an animal vaccination programme
 - those working with livestock should insist that owners consult with a veterinarian (as above)
 - being cautious with all animal urine exposure, including dogs, rodents and wildlife

- avoiding urine splashes or contact with potentially contaminated water by:
 - covering open cuts and scratches (preferably with water-proof bandages)
 - washing hands frequently
 - wearing protective clothing
- using personal protective equipment (PPE), eg face protection, aprons, waterproof footwear (gumboots)
- avoiding work in high risk areas if you have open wounds or eczema, are pregnant or trying to become pregnant.

7.1 DIAGNOSTIC TESTS

A Massey University study (2012) found that no single test meets all diagnostic needs, and that different tests are more suitable for various sample types and stages of the disease¹¹.

For a definite diagnosis, culture, molecular biology (eg PCR) or serological (eg MAT) testing, are needed.

Consistent clinical symptoms and a titre (antibody concentration) of say 800 or more, which is not uncommon, indicates infection. A rise or fall in titre levels is usually proof of infection, but infection can still be present without a rise or fall (eg a recent observation in sheep showed that infection didn't increase MAT titres, yet the animal was infected).

¹¹ Collins-Emerson, J. (2013). The vagaries of diagnostic testing. *VetScrip, NZVA*, p. 27-28.

Samples taken early in the illness may not identify infection. Two samples are needed at least three weeks apart to get a definite result. The first test must be carried out on the day of the initial consultation, before treatment.

The **Immunoglobulin M (IgM)** test:

- > identifies infection within the first weeks of illness
- > can be useful if MAT and PCR tests aren't readily available or when treatment before a firm diagnosis may benefit the patient.

The **IgM ELISA** test:

- > is likely to test positive before the MAT test in the early stage of infection, as it measures a different immunoglobulin (antibody)
- > should be the chosen test for a quick and early diagnosis of infection and disease (the acute stage, approximately seven days after symptoms begin) – it is however a less specific test and should be followed up with another test for confirmation
- > is easy to do, safe, inexpensive, and reduces risk for laboratory staff.

The **microscopic agglutination (MAT)** test:

- > diagnoses leptospirosis and gives a rough idea of the serovars present at population level (a collection of living serovars)
- > isn't exact (ie won't identify the infecting serovar in an individual case of leptospirosis)
- > can indicate active or recent infection, or past exposure, depending on the level of antibodies in the blood
- > will usually give a negative result in the first seven days of illness (the acute stage)
- > can be hazardous to laboratory staff.

The **polymerase chain reaction (PCR)** test:

- > can be used with blood or urine samples
- > will show that leptospirosis is present in blood in the early stages of infection (ie after leptospirosis has been circulating in the blood for 24 hours), but with a narrow timeframe for testing with confidence
- > may then start to detect *Leptospira* in urine approximately a week into the illness
- > won't identify the infecting serovar
- > is the most sensitive of the available diagnostic tests; however, timing is vital for the best diagnosis, ie a negative result doesn't necessarily mean a negative diagnosis, and a second sample should be taken if the initial sample tests negative (using another type of test)
- > is being used more often and can diagnose the disease earlier than the standard two-test regime (MAT); however, it is more expensive¹².

7.2 ANTIBIOTICS

Early antibiotic treatment may get rid of leptospires quickly, which will decrease the level of antibody response, making it harder to detect infection through testing.

There is limited evidence about the effectiveness of antibiotic treatment; however, antibiotics should be given (within the first seven days of symptom onset) if infection is suspected¹³.

Intravenous antibiotics may be needed for people with more severe symptoms.

¹² NZFarmer.co.nz (2014). *What you need to know about lepto*. Retrieved December 2014 from: www.stuff.co.nz/business/farming/discovery/63298403/What-you-need-to-know-about-lepto.

¹³ Day, N. (2014). *Treatment and prevention of leptospirosis*. Topic 5524 version 7.0; cited in *Leptospirosis in New Zealand: an overview of clinical best practice*. ACC Review 54. Retrieved December 2014 from: www.acc.co.nz.



08/

PREVENTION

IN THIS SECTION:

- 8.1 Eliminate
- 8.2 Isolate
- 8.3 Minimise

Leptospirosis is difficult to eliminate; therefore, minimisation is the best option for managing risk. The hazard will still exist, but exposure is minimised through appropriate controls, including a robust and recognised vaccination programme, awareness, hygiene, PPE and monitoring procedures.

Farmers should talk to a veterinarian about managing animal health and preventing infection on their farms.

8.1 ELIMINATE

Elimination involves removing a hazard from the workplace. In some closed-herd housed situations (ie closed to outside introduction of new animals) with all pests controlled, it may be possible to eliminate leptospirosis through vaccination of animals, rodent control, management, and disinfection of living quarters, supported by testing (particularly on pig farms).

A robust vaccination programme is essential; however, because leptospirosis is very difficult to eliminate in an open environment, other management methods should be used.

Where elimination is impracticable, then:

8.2 ISOLATE

Isolation involves separating the hazard or hazardous work from employees. Isolation itself won't be practical for leptospirosis, but may be part of a risk management plan, together with rodent/wildlife control and vaccination.

Recommendations:

- > Always ask for a vaccination certificate when buying or trading stock.
- > Keep animals isolated until at least 10 days after the second vaccination dose (a veterinarian can advise).

- > Have a stock movement control policy to protect livestock from infection/spreading disease.
- > Consider environmental controls, eg specify safe water sources as part of a grazing contract (reticulated water).

Where isolation is impracticable, then:

8.3 MINIMISE

Minimisation is probably the best option for managing the risk of leptospirosis. The risk will still exist but exposure is minimised through appropriate controls, like awareness, hygiene, PPE, monitoring procedures, and vaccination.

AWARENESS

- > Ensure employees are aware of the cause and symptoms of leptospirosis, and ways of reducing risk. Use a poster checklist in the cowshed or a similar place to remind employees about risks, protection and first aid for exposure.
- > Use a similar system to make sure anyone else who will be in close contact with animals is aware of the risks.
- > Run an induction programme for new and casual employees, including a leptospirosis briefing.
- > Ensure people involved in seasonal work, eg lambing, drenching, shearing, tailing and dagging, are aware that they may be at risk of infection.

- > Display control/clean-up information procedures if major splashes occur.
- > Ensure the vaccination status of animals is known and clearly documented.
- > Keep children away from potential sources of infection.

HYGIENE

Personal hygiene is good additional protection.

- > Wash hands regularly, using water, soap, and disinfectant.
- > Use disposable towels only.
- > Don't scrub hands harshly as it may cause breaks in the skin.
- > Always wash your hands after using the toilet or handling animals, and before eating, drinking, smoking, or taking a break. Wash your face if you have facial hair.
- > Do not touch your eyes, nose or mouth before washing your hands.
- > Cover cuts, scratches, blisters and skin breaks with waterproof, sterilising coverings, and change coverings regularly.
- > Ensure deeper wounds are fully healed before doing close work like shearing or crutching.
- > Do not smoke, drink or eat when handling livestock, as this can introduce bacteria into the mouth. Keep coffee mugs away from the work area.
- > Wash your clothes after handling stock.
- > Keep toilets and hand-washing facilities clean.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

The aim of PPE is to prevent urine, contaminated water and fluids from getting through cuts in the skin or the mucous membranes of the eyes, nose or mouth.

Provide and maintain PPE, and demonstrate how it should be worn. PPE may include:

- > goggles
- > face shields that protect the eyes, nose and mouth, particularly during activities that pose a risk of urine splash on the face, eg milking
- > milking sleeves, and clean aprons and gumboots in the milking shed
- > plastic aprons and gloves when assisting with animal birth, handling afterbirth and aborted fetuses, and kidneys or bladder (gloves are particularly important when scanning animals for pregnancy using rectal probes, as this requires holding the animal's tail which is often contaminated with urine)
- > solid and sealed footwear so water doesn't get in from the top – wet boots and gloves should be changed before water softens the skin and allows bacteria in.

PPE should be waterproof and clean. If working in wet conditions or assisting with lambing, extra PPE may be needed, eg overalls; sturdy, closed-toe, waterproof footwear; gloves for urine-soaked wool. PPE alone cannot be relied on for protection.

FURTHER CONTROLS

- > Good overall animal health can reduce the effects of infection or reinfection. There are still leptospirosis outbreaks in healthy flocks/herds, but unhealthy animals will be more severely affected than healthy animals, and take longer to recover.
- > Control rodents and possums, keeping them away from stored food and other crops – don't use rodent-contaminated feed.
- > Prevent livestock having access to open water sources like valley dams, rivers, or ponds – keep animals away from pasture with water-logged areas after heavy rains or floods.

- > Manage effluent disposal by containing it in properly built ponds or pits.
- > Try not to put stock straight onto pasture where effluent has been sprayed, unless you are sure the effluent comes from a 'clean' herd.
- > **If possible**, allow pastures to dry before grazing.

MONITORING

Monitor and record any instances or potential instances of leptospirosis exposure. Monitor your health and if you experience flu-like symptoms for more than a couple of days, suspect leptospirosis and see your doctor.

Do this if you feel ill, even if you don't think you have been exposed. Tell the doctor that leptospirosis may be a cause of your symptoms.

09/

BREAKING THE CYCLE OF INFECTION IN ANIMALS

IN THIS SECTION:

- 9.1 Animal vaccination**
- 9.2 Financial considerations**

To break the cycle of infection, a robust vaccination programme is essential. It should be ongoing, with an annual booster vaccination, and be part of a wider protective plan.

9.1 ANIMAL VACCINATION

An animal vaccination programme is essential to break the cycle of infection. Have a comprehensive vaccination programme, ideally as part of a wider control and quality assurance programme. Include farm dogs, especially if they are rat-catchers.

Vaccination is a protection, not a cure. It will reduce the risk of infection to very low levels, and may eliminate infection altogether in closed-herd/housed situations. Full immunity takes several weeks to develop and requires two vaccine doses. Immunity will last for a variable period of time and annual re-vaccinations (at least) are recommended.

ESSENTIAL FEATURES OF A VACCINATION PROGRAMME

> **Timing:** Vaccinate before the leptospirosis challenge is greater, usually before the wet season (April-May). Leptospirosis will spread at all times, but outbreaks are greater in wet conditions, particularly with the risk from floods, cyclones, and up-stream contamination from other animals. Veterinarians can advise on a robust vaccination programme for local conditions.

Young animals must have completed a full vaccination course (sensitiser and booster) by the age of 3-6 months, before exposure to infection. In most farming situations this means before Christmas.

- > **Length of time:** A vaccination programme must be ongoing, with annual boosters for adult stock.
- > **Thoroughness:** The programme should cover all stock types that will graze the same pasture, and all circumstances, including how stock is grazed off-farm. Also, unless all pests that may carry leptospirosis (eg rats, possums) are controlled, stock can be re-infected.
- > **Animal health:** Vaccination will be most effective if animals are in good health.
- > **Completing the course of treatment:** Effective vaccination is usually a two-dose process. The first sensitising dose must be followed by a second protective dose. It is recommended that vaccination is administered by a veterinarian; however, there is an Operating Plan approved under the Agricultural Compounds and Veterinary Medicines (ACVM) Act that allows individuals (non-veterinarians) to administer the vaccine¹⁴.
 Either way, a vaccination programme must be monitored by the veterinarian who prescribes the vaccine. Veterinarians can provide a certificate of vaccination for audit and quality assurance. Incorrect vaccination wastes money and creates a false sense of security.
- > **Protocol for new and introduced stock:** Verify vaccination status. If not vaccinated, isolate and test for infection. Implement a robust vaccination programme (working with a veterinarian).

¹⁴ Ministry for Primary Industries. (2013). *Efficacy of Veterinary Vaccines: ACVM Registration Standard and Guideline*. [Issued under the Agricultural Compounds and Veterinary Medicines Act 1997]. Wellington: New Zealand Government.

If a herd is 'closed', ie vaccinated and protected against mixing with other stock and pests like rats and possums, this should be shown on a vaccination certificate, which should accompany the herd if it is moved.

Although a farm may be closed to introduction of livestock, it may not be closed to introduction of leptospires, that is, if livestock are in a watershed on farms not vaccinated, there is a chance that leptospirosis will eventually track onto the farm. It can also be re-introduced by floods or river water from infected farms upstream.

Note: Organic farmers can be assured that properly administered vaccination against leptospirosis will not affect their official certification¹⁵.

TESTING FOR INFECTION

Testing shouldn't influence the decision to vaccinate. The decision should be made on the need to protect people and animals, and upon the risk factors present on the farm. Choosing other options of control because a test is negative won't be as effective as vaccination.

This means most animals on most farms should be under a vaccination programme. A negative herd/flock that gets infected is a GREATER risk to both animals and people because there is no herd immunity. This means more disease and more shedding.

As with humans, a MAT or PCR test can be used. Samples can be taken by veterinarians. Animals that have been exposed and show a high level of antibody in blood samples, or leptospirosis is seen in their kidneys or other tissues, are likely to be infected. A PCR of urine shows whether an animal is currently shedding *Leptospira*; however, even if tests show the presence of antibodies, it can be difficult to determine whether the animal:

- > is currently infected with leptospirosis
- > has been infected in the past (and is perhaps now protected by vaccination)
- > is a non-shedding carrier.

ANTIBIOTICS

Antibiotics can be used to treat animals suffering obvious health effects from leptospirosis, although often, as in the case of abortions, the cause of the problem is not realised until it is too late to prevent the loss. However, an individual infected animal may be the warning sign of an outbreak that can be controlled or prevented with antibiotics.

Antibiotics (like streptomycin) can also be used to treat shedding animals. Although this will stop the shedding, it won't stop the animals being prone to reinfection.

DISINFECTION

Leptospires can be temporarily 'cleaned out', ie destroyed with disinfectants or bleach. This may be a suitable way to clean some animal living areas, but may only be effective for hours or days if there is a risk of reinfection, eg from unvaccinated animals. Of course, pasture cannot be disinfected.

9.2 FINANCIAL CONSIDERATIONS

There is no definite answer to the question of whether or not leptospirosis vaccination is financially worthwhile. Farmers should work with their veterinarian to undertake a risk analysis, to help them decide whether to vaccinate or not. This is particularly so when working with sheep, beef or deer.

New Zealand doesn't have an available vaccine for leptospirosis infection in humans, so preventing infection in humans involves controlling infection in animals. There are

¹⁵ Ministry of Agriculture and Forestry (MAF). (2011). *Technical rules for organic production*. MAF Standard OP3, Appendix Two, Version 7.1. Wellington: MAF Information Bureau.

no publicly funded control programmes, so producers must cover the costs.

It is difficult to place an economic value on the risk of human disease. Vaccination is probably the most effective way of reducing risk of exposure for humans, and a financial evaluation of vaccination shows that it is economic on some farms. When making a decision about whether or not to vaccinate, farmers should have full knowledge of the disease, infection, and potential health effects¹⁶.

Factors to consider:

- > **Health effects (human illness and recuperation):** The cost of human illness can be huge – medical expenses, replacement labour, long-lasting or permanent illness and/or weakness. If a farmer or farm worker is laid up for a month or more, the cost of replacement labour and medical expenses will be great. Recent studies by Massey University have estimated that \$36 million dollars-worth of working hours are lost every year due to days off with leptospirosis, with 99 percent of that figure coming from the rural population¹⁷. Considering the cost of hospitalisation and intensive care, this estimate could well be four times as high.
- > **Production effects:** If a vaccination programme returned production gains that offset the cost of investment, farmers would be more likely to take on a programme. Under typical New Zealand weather conditions, clinical loss from leptospirosis is usually limited to sporadic young stock loss, and abortions. However, extreme floods in warm periods of the year can lead to increased death from outbreaks, as seen in the Manawatu region in February 2004. Research in deer has showed positive financial returns to vaccination in heavily infected herds, such as:

- higher weaning percentages in vaccinated vs. non-vaccinated adult hinds
- higher growth rates in vaccinated vs. non-vaccinated weaners
- reduction in perinatal (the period around childbirth – specifically five months before and one month after birth) and/or pre-weaning mortality.

There is also an effect of infection on growth rates in lambs and beef cattle, but the effect is:

- small
- not obvious in all herds and flocks
- usually not enough to make vaccination profitable in these species.

Vaccine expectations must be realistic – there are no guarantees. It's likely that whole-herd vaccination will reduce the incidence of disease and infection, yet long-term response will be affected by possible sources of re-infection (eg introducing infected and shedding stock, and contaminated waterways from neighbouring properties).

- > **Financial impact of an outbreak:** An economic evaluation shows vaccination to be cost-effective on some farms in regard to growth and production benefits, but it is impossible to make predictions for individual farms, as risk and incidence of infection is unpredictable¹⁸.

Studies in deer have found:

- positive financial returns on vaccination investment when incidence was approximately 20% or more
- an investment return on vaccination investment ranging from 700–1200% (reproduction and growth) in high infection rate situations.

¹⁶ Wilson, P., Heuer, C., Subharat, S., Ayanegui-Alcerreca, A., Collins-Emerson, J. (2009). Leptospirosis on deer farms: to vaccinate or not? *In: A Deer Course for Veterinarians. Proc. Deer Branch NZVA*, 26, 89-94.

¹⁷ NZFarmer.co.nz (2014). *Lepto cost could top \$130 million*. Retrieved December 2014 from: www.stuff.co.nz/business/farming/discovery/63711279/Leptospirosis-cost-could-top-130-million.

¹⁸ Wilson, P. et al. (2009). Leptospirosis on deer farms: to vaccinate or not? *In: A Deer Course for Veterinarians. Proc. Deer Branch NZVA*, 26, 89-94.

The financial loss due to poor performance in seemingly healthy animals can be several times higher than the cost of whole-herd vaccination, even in modestly exposed herds¹⁹.

- > **Whether long-term vaccination can be maintained:** The benefits of vaccination depend on the incidence of infection. Stopping a vaccination programme after a period of whole-herd vaccination will result in an increased risk of clinical disease, unless there's a guarantee of preventing future exposure²⁰.
- > **Epidemiology** (the study of how often diseases occur in different groups of people and why): Details of the epidemiology of leptospirosis are available at: www.nzva.org.nz or www.leptospirosis.org.nz

All these factors should be considered when determining the risk of vaccinating or not, rather than just encouraging vaccination of all herds regardless.

¹⁹ Heuer, C., et al. (2012). *Leptospirosis in New Zealand: best practice recommendations for the use of vaccines to prevent human exposure*. Massey University, Institute of Veterinary, Animal and Biomedical Sciences.

²⁰ Wilson, P., et al. (2009). Leptospirosis on deer farms: to vaccinate or not? *In: A Deer Course for Veterinarians. Proc. Deer Branch NZVA*, 26, 89-94.

10/

WORKING WITH DAIRY CATTLE

IN THIS SECTION:

- 10.1 Infection risks and symptoms**
- 10.2 Vaccination**
- 10.3 Managing the risks**

Infection in dairy cattle can result in mild to severe health, reproduction, and production effects, but may be asymptomatic (ie show no symptoms). A robust vaccination programme and hazard management is vital for minimising risk.

Dairy cattle numbers are steadily increasing and now exceed beef cattle numbers. Cattle bred in the dairy industry contribute to around 50% of New Zealand's beef production, including Friesian bulls, dairy-cross beef cattle, and surplus dairy cows.

More dairy cattle, especially young stock, are being grazed off-farm, and are at risk of infection because of it. They are often grazed on dry-stock (sheep or beef) farms, and as a result are in contact with unvaccinated animals or animals with unknown vaccination status, as few sheep and beef farmers vaccinate their animals.

Milking is the highest risk activity because of the risk of urine splash on the milker; however, the actual risk comes from the production system used, ie pit or rotary milking systems have a higher risk than robot/automatic milking systems where there is minimal contact with the cows.

10.1 INFECTION RISKS AND SYMPTOMS

Cattle are primary hosts of the Hardjo serovar which causes only minor health effects.

They are secondary hosts of Pomona which can cause severe illness, including:

- > mastitis (inflammation of breast tissue) and loss of milk production
- > abortion storms
- > death, especially in calves.



Cattle may be particularly vulnerable to Pomona when there are unvaccinated pigs on the dairy farm, and are more likely to be cross-infected with Hardjo or Pomona from sheep through farm management practices like rotational grazing of different stock. Introduced animals like dairy heifers or a new stud bull may bring infection if not previously vaccinated.

Cattle appear to be secondary hosts for Copenhageni, carried by rats, which has the most health impact on calves. On occasion, they have been infected with Balcanica (from possums) or Ballum (from mice) but these don't usually persist within the herd.

Acute leptospirosis occurs mainly in calves. Clinical signs may include:

- > fever
- > anorexia (loss of appetite)
- > conjunctivitis.

And in more severe cases, where infections can be fatal:

- > jaundice
- > hemoglobinuria (high concentrations of haemoglobin in the urine, commonly known as "redwater")
- > hemolytic anaemia (destruction and removal of red blood cells)
- > hepatitis
- > signs of meningitis (eg incoordination, salivation, muscle stiffness).

In adult cattle, early signs like fever, lethargy and anorexia may be absent, or brief and mild. The first signs of illness in many cases are:

- > abortion
- > stillbirth

- > weak calves and increased neonatal death
- > sudden decrease in milk production (returning to normal after a few days)
- > jaundice (in severe cases).

Cows infected for the first time during pregnancy may experience reproductive losses (early foetal loss and/or abortion). Some aborting cows may develop mild to severe secondary bacterial infections of the uterus, limiting later pregnancies.

10.2 VACCINATION

Almost all cases of human leptospirosis originate from unvaccinated stock. About 90% of dairy farmers vaccinate their breeding stocks, mainly to protect themselves and farm workers from infection. Farmers should work with their veterinarian to carry out a risk analysis, and then decide whether to vaccinate or not.

Shedding is almost zero when calves are vaccinated before three months old and less likely on farms where calves are first vaccinated before six months old²¹. Vaccinated herds may keep shedding if vaccination isn't carried out regularly or is left too late; therefore, a long-term vaccination plan should be considered.

Bobby calves don't need to be vaccinated; however, all other dairy cattle should be vaccinated according to veterinary advice.

Vaccination is a long-term strategy - it will take time for an infected herd first starting on a vaccination programme to reduce or eliminate the risk, and stopping vaccination will result in herds that are MORE susceptible to infection and outbreaks.

²¹ Heuer, C., et al. (2012). *Leptospirosis in New Zealand: best practice recommendations for the use of vaccines to prevent human exposure*. Massey University, Institute of Veterinary, Animal and Biomedical Sciences.

RECOMMENDATIONS

CALVES

Vaccinating pregnant cows will boost maternal protection, providing calves with up to 12 weeks maternal immunity, as long as they receive enough colostrum (antibodies and minerals from the mother before milk production) in their first six hours of life.

However, a large proportion of calves don't actually receive enough colostrum. Calves are most at risk:

- > when maternal protection runs out
- > when maternal protection wasn't received due to insufficient or too-late colostrum intake
- > if the mother's antibody level is low²².

Previously, calf vaccination was often delayed until around six-months-old, due to:

- > a belief that calves weren't at great risk of infection before six-months-old
- > doubt about the effectiveness of vaccination in very young calves (ie concerns about interaction between the vaccine and maternal antibodies).

However, recently published evidence shows that calves are at risk of infection well before six-months-old, and that maternal antibodies may not reduce vaccine effectiveness. Therefore, the latest age that calves should complete their first vaccination course is three months, before they have a chance to become infected²³.



It's best to complete a course of two vaccinations (with 4-6 weeks between injections), which would usually be 18 weeks after the start of seasonal calving/lambing.

Consider vaccinating calves in two mobs - artificial insemination (AI) (early born) and bull-mated tail-end for beef (late born), to ensure every animal is vaccinated young, and prior to exposure.

If calves are to be moved off the property, consult a veterinarian about the need for early vaccination.

ADULT CATTLE

Vaccinate adult dairy cattle annually. To ensure protection against urinary shedding, don't delay the annual vaccination period beyond 12-13 months. Include all cattle, including:

- > bulls brought on to the farm
- > any stock to be grazed off the property
- > breeding and replacement stock
- > growers kept at home or sold to beef finishing farms.

Assume that all bought-in stock is unvaccinated, unless accompanied by a current veterinary vaccination certificate. If there is uncertainty, vaccinate all purchased stock twice (cows, breeding bulls) starting at least six weeks before entering the property. Where this isn't possible, keep new stock on a separate run-off that won't be grazed by resident stock for at least 12 weeks, or on an area of the farm from which run-off water will not contaminate other pastures and therefore re-expose existing stock.

Vaccinate all young replacement stock before they leave the property for rearing.

There are currently nine vaccines registered for use in cattle in New Zealand. See appendix one for a list of registered vaccines. Consult a veterinarian for advice.

²² Heuer, C., et al. (2012). *Leptospirosis in New Zealand: best practice recommendations for the use of vaccines to prevent human exposure*. Massey University, Institute of Veterinary, Animal and Biomedical Sciences.

²³ Heuer, C., et al. (2012). *Leptospirosis in New Zealand: best practice recommendations for the use of vaccines to prevent human exposure*. Massey University, Institute of Veterinary, Animal and Biomedical Sciences.

Further information is available from veterinarians or from the Leptosure quality assurance programme (Leptosure – A Risk Management Programme for Leptospirosis on Dairy Farm): www.leptosure.co.nz.

This is a New Zealand Veterinary Association quality assurance programme administered by veterinarians.

10.3 MANAGING THE RISKS

AWARENESS

- > Clearly display information that leptospirosis may be a risk. Make sure new workers and anyone else who will be in close contact with animals, are aware of the risks.
- > Watch for abnormalities or warning signs of infection (eg red-water or a high number of abortions) and get a veterinary diagnosis.

HYGIENE

- > Wash with disinfectant after milking.
- > Refer to Prevention section (page 22) for further information.

PPE

- > Wear appropriate PPE where possible, eg when loading cattle for transport, handling animals, and carrying out husbandry procedures, and artificial insemination (AI). This may include overalls; sturdy, closed-toe, water-proof footwear; gloves; face protection; and milking sleeves, aprons and gumboots in the milking shed.
- > Change gloves or boots immediately if they split or leak.

FIRST AID

- > Have a supply of clean water readily available.
- > Refer to First Aid Treatment section for further information (page 17).

FURTHER CONTROLS

- > If pigs are kept on the farm, make sure they are vaccinated and keep them and their effluent separately contained and not accessible to cattle. If they are not vaccinated prior to arrival, then treat with antibiotic and vaccinate on arrival.
- > Make sure all introduced animals have a current veterinary certificate of vaccination. If not certain, then isolate, medicate and vaccinate.
- > Keep up with vaccinations for stock sent to run-off or rearing properties, eg dairy heifers for grazing.
- > When assisting with calving, be risk aware and practice good hygiene, eg wash hands, use gloves and aprons.
- > Keep areas around milking sheds well maintained to prevent stagnant water settling.
- > Hose down all milking facilities and yards after each use.
- > Take extra care when using high-pressure wash-down, ie don't breath in water spray, wear a mask and direct spray away from people.
- > Provide stock with reticulated water from a low risk source (eg rainwater).
- > Fence or keep stock away from effluent ponds, sumps and waterways.
- > If possible, avoid spraying pastures in the wet season with effluent stored in ponds.
- > **Where possible**, let pasture sprayed with effluent dry out before grazing.
- > Ensure effluent disposal tanks are properly sealed and drained.
- > Control rodents and possums, keeping them away from stored food and other crops – make sure no excess feed is left lying around, eg calf meal.

ANIMAL STATUS DECLARATION (ASD) FORM

The purpose of the animal status declaration (ASD) is to transfer key information about an animal, or group of animals, to the next person in charge of the animals, and ultimately to the processor.

The Animal Status Declaration (ASD) form applies to cattle, and must be completed by the person in charge of the animals for:

- > all cattle sent for processing (except bobby calves as these are covered by a seasonal declaration) – the industry will only accept this one standardised form
- > the movement of all cattle from one property or saleyard to another (property or saleyard), or to a property where there is a different person in charge, even for calves less than 30 days old.

For cattle, the ASD must physically accompany the animals being moved. If an ASD form is not supplied and received, the animals must be either held separately till an ASD is supplied or returned to the supplier²⁴.

A copy of the ASD form is attached as Appendix two.

²⁴ Ministry of Primary Industries (2007). Animal Products Act 1999: Information Pamphlet. Retrieved 18 March 2015 from: www.foodsafety.govt.nz/elibrary/industry/Animal_Status-Outlines_Purpose.pdf.

11/

WORKING WITH BEEF CATTLE

IN THIS SECTION:

- 11.1 Infection risks and symptoms**
- 11.2 Vaccination**
- 11.3 Managing the risks**

Infection in beef cattle can result in mild to severe health, reproduction, and production effects, but may be asymptomatic (ie show no symptoms). A robust vaccination programme and hazard management is vital for minimising risks.

11.1 INFECTION RISKS AND SYMPTOMS

Risk of infection will increase with further beef, sheep, and deer cross-grazing, and contact with other animals (especially those with unknown vaccination status). New farming approaches (eg TechnoGrazing™) and more intensive and efficient use of pasture that increases animal contact will also increase risk.

Cattle are primary hosts of the Hardjo serovar, which causes only minor health effects. They are secondary hosts of Pomona, which can cause severe illness, including abortion storms and death.

Cattle may be particularly vulnerable to Pomona when there are unvaccinated pigs on the farm, and are more likely to be cross-infected with Hardjo or Pomona from sheep through farm management practices like rotational grazing of different stock. Introduced animals like dairy heifers or a new stud bull may bring infection if not previously vaccinated.

Cattle appear to be secondary hosts for Copenhageni, carried by rats, which has the most health impact on calves. On occasion, they have been infected with Balcanica (from possums) or Ballum (from mice) but these don't usually persist within the herd.

Acute leptospirosis occurs mainly in calves. Clinical signs may include:

- > fever
- > anorexia (loss of appetite)
- > conjunctivitis

And in more severe cases, where infections can be fatal:

- > jaundice
- > hemoglobinuria (high concentrations of haemoglobin in the urine)
- > hemolytic anaemia (destruction and removal of red blood cells)
- > signs of meningitis (eg incoordination, salivation, muscle rigidity).

In adult cattle, early signs like fever, lethargy, and anorexia may be absent, or brief and mild. The first signs of illness in many cases are:

- > abortion
- > stillbirth
- > weak calves and increased neonatal death
- > sudden absent or decreased milk production (returning to normal after a few days)
- > jaundice (in severe cases).

Cows infected for the first time during pregnancy may experience reproductive losses. Some aborting cows may develop secondary bacterial infection of the uterus.

11.2 VACCINATION

It is estimated that 10% of beef herds in New Zealand are vaccinated, yet, apart from milking, beef farmers are likely to be exposed to the same risks as dairy farmers when handling animals²⁵.

²⁵ Benschop, J., Heuer, C., Jaros, P., Collins-Emerson, J., Midwinter, A., Wilson, P. (2009). Sero-prevalence in workers at a New Zealand slaughterhouse. *The New Zealand Medical Journal*. 122(1307), 39-47.

Shedding is less likely on farms where calves are first vaccinated before six months old, and almost zero when vaccinated before three months old²⁶. Vaccinated herds may keep shedding if vaccination isn't carried out regularly or left too late; therefore, a robust long-term vaccination plan should be considered. Farmers should work with their veterinarian to carry out a risk analysis, and then decide whether to vaccinate or not.

Vaccination is a long-term strategy – it will take time for an infected herd first starting on a vaccination programme to reduce or eliminate the risk, and stopping vaccination will result in herds that are MORE susceptible to infection and outbreaks.

RECOMMENDATIONS

- > Make sure all introduced animals eg bought-in livestock, other livestock grazed on the property, have a current veterinary certificate of vaccination. If not certain, then isolate, medicate and vaccinate.
- > Unvaccinated pig populations are commonly infected with leptospirosis and are a risk to humans and livestock; however, there is no reason why livestock farms can't have pigs as long as all controls are in place, eg:
 - buying pigs from accredited leptospirosis-free sources
 - antibiotic treatment of pigs, followed by isolation and vaccination
 - a vaccination programme for cattle.

CALVES

Vaccinating pregnant cows will boost maternal protection, providing calves with up to 12 weeks maternal immunity, as long as they receive enough colostrum (antibodies and minerals from the mother before milk production) in their first six hours of life. Calves are most at risk when this maternal protection runs out.

Previously, calf vaccination was often delayed until around six-months-old, due to:

- > a belief that calves weren't at great risk of infection before six-months-old
- > doubt about the effectiveness of vaccination in very young calves (ie concerns about interaction between the vaccine and maternal antibodies).

However, recently published evidence shows that calves are at risk of infection well before six-months-old, and that maternal antibodies may not reduce vaccine effectiveness.

Therefore, the latest age that calves should complete their first vaccination course is 3-6 months, before they have a chance to become infected. It's best to complete a course of two vaccinations (with 4-6 weeks between injections), which would usually be 18 weeks after the start of seasonal calving.

If calves are to be moved off the property, consult a veterinarian about the need for early vaccination.

ADULT CATTLE

Vaccinate adult beef cattle annually. It may be worthwhile giving cows their annual booster vaccine shortly after they have given birth, as it will reduce maternal antibody and make the vaccine more effective. To ensure protection against urinary shedding, do not extend the annual vaccination period beyond 12-13 months. Include all cattle, including:

- > bulls brought on to the farm
- > any stock to be grazed off the property
- > breeding and replacement stock
- > growers kept at home or sold to beef finishing farms.

There are currently nine vaccines registered for use in cattle in New Zealand. See appendix one for a list of registered vaccines. Consult a veterinarian for advice.

²⁶ Heuer, C., et al. (2012). *Leptospirosis in New Zealand: best practice recommendations for the use of vaccines to prevent human exposure*. Massey University, Institute of Veterinary, Animal and Biomedical Sciences.

Further information is available from veterinarians or from the Leptosure quality assurance programme (Leptosure – A Risk Management Programme for Leptospirosis on Dairy Farm): www.leptosure.co.nz.

This is a New Zealand Veterinary Association quality assurance programme administered by veterinarians.

11.3 MANAGING THE RISKS

AWARENESS

- > Clearly display information that leptospirosis may be a risk. Make sure new workers and anyone else who will be in close contact with animals, are aware of the risks.
- > Watch for abnormalities or warning signs of infection (eg mastitis or a high numbers of abortions) and get a veterinary diagnosis.

PPE

- > Wear appropriate, clean PPE, especially for artificial insemination (AI) and calving. This may include overalls; sturdy, closed-toe, water-proof footwear; gloves; and face protection.
- > Change gloves or boots immediately if they split or leak.

HYGIENE

Refer to Prevention section (page 22).

FIRST AID

- > Have a supply of clean water readily available.
- > Refer to First Aid Treatment section for further information (page 17).

FURTHER CONTROLS

- > When assisting with calving, be risk aware and practice good hygiene, eg wash hands, use gloves and aprons.
- > Control rodents and possums, keeping them away from stored food and other crops – make sure no excess feed is left lying around, eg calf meal.

ANIMAL STATUS DECLARATION (ASD) FORM

The purpose of the animal status declaration (ASD) is to transfer key information about an animal, or group of animals, to the next person in charge of the animals, and ultimately to the processor.

The Animal Status Declaration (ASD) form applies to cattle, and must be completed by the person in charge of the animals for:

- > all cattle sent for processing (except bobby calves as these are covered by a seasonal declaration) – the industry will only accept this one standardized form
- > the movement of all cattle from one property or saleyard to another (property or saleyard), or to a property where there is a different person in charge, even calves less than 30 days old.

For cattle, the ASD must physically accompany the animals being moved. If an ASD form is not supplied and received, the animals must be either held separately till an ASD is supplied or returned to the supplier²⁷.

A copy of the ASD form is attached as Appendix two.

²⁷ Ministry of Primary Industries (2007). *Animal Products Act 1999 Information Pamphlet*. Retrieved 18 March 2015 from: www.foodsafety.govt.nz/elibrary/industry/Animal_Status-Outlines_Purpose.pdf.

12/

WORKING WITH PIGS

IN THIS SECTION:

- 12.1 Commercial piggeries with a Quality Assurance (QA) programme**
- 12.2 Non-commercial/backyard piggeries**
- 12.3 Infection risks and symptoms (unvaccinated pigs or unknown vaccination status)**
- 12.4 Vaccination**
- 12.5 Managing the risks**

The commercial pig industry is very aware of leptospirosis, and intends to maintain leptospirosis-free herds; however, this is not the case for non-commercial pig farmers or hobby farmers (backyard piggeries).

Pigs in poor conditions (eg Unhygienic, rodent-infested and over-crowded housing) or poor health are at particular risk of leptospirosis, and are more likely to be seriously ill if they are infected.

Hazard management is vital for minimising risks.

12.1 COMMERCIAL PIGGERIES WITH A QUALITY ASSURANCE (QA) PROGRAMME

Commercial pig farms are mainly free of leptospirosis – more so than any other part of the livestock industry.

The commercial pig industry is a great example of leptospirosis control. They have worked with veterinarians to develop a practical leptospirosis QA control programme, which is in place to keep most commercial piggeries leptospirosis-free.

12.2 NON-COMMERCIAL/BACKYARD PIGGERIES

Although leptospirosis is well controlled in commercial piggeries, infection status of pigs owned by non-commercial pig farmers or hobby farmers is unknown, as is the risk of human exposure. Leptospirosis should be assumed to be widespread until research shows otherwise.



Pigs in small farming situations are seen as an accepted 'small-farmer's' project, either as a hobby or a way of making extra money. They are:

- > a great way to use an oversupply of produce, garden waste, household food scraps and commercial food by-products
- > a great way to clear weeds
- > a source of nutritious meat
- > a provider of valuable organic fertiliser.

Pig owners (even small-scale ones) have a responsibility to meet the standards that the commercial pig industry works hard to maintain, ie:

- > good animal welfare standards
- > good animal husbandry practices
- > sustainable farming methods
- > maintaining strict biosecurity practices.

Further information regarding small scale pig farming can be found on the NZPork website: www.nzpork.co.nz/pork-production/small-scale-farming

HOME-KILL

Home-kill is slaughtering and butchering farmed animals for eating or use. It isn't subject to the same regulatory controls that apply to meat purchased from a supermarket or butcher, and so it is eaten at your own risk. It is illegal to trade or sell home-kill meat²⁸.

If you eat or use home-kill, or provide slaughter or processing services for home-kill, you must comply with the Animal Products Act (APA) 1999.

Further information can be found on the MPI website at: www.foodsafety.govt.nz

12.3 INFECTION RISKS AND SYMPTOMS (UNVACCINATED PIGS OR UNKNOWN VACCINATION STATUS)

Two *Leptospira* serovars are known to infect New Zealand pigs: Pomana (a major cause of infection in pigs) and Tarassovi (a milder and less frequent serovar).

Unvaccinated pig populations are commonly infected with leptospirosis and are a risk to humans and livestock; however, there is no reason why livestock farms can't have pigs as long as all controls are in place, eg:

- > buying pigs from accredited leptospirosis-free sources
- > antibiotic treatment of pigs, followed by isolation and vaccination
- > a vaccination programme for cattle.

Pig-to-pig infection is very common in infected herds and can result from sniffing urine or through urine-contamination of cuts or abrasions on the skin. Pigs in neighbouring pens can be a source of infection, as infected urine can be carried from one pen to another by people working in the piggery. Infection may remain in grower-finisher herds, despite ongoing vaccination of the parent sows. Non-infected pigs may also become infected through feed and water contaminated by the urine of infected rodents or unvaccinated livestock.

Infected stock can infect any other stock, eg not just infected pigs to dairy, but infected dairy to pigs. To eliminate infected stock, it is important to reduce shedding through vaccination and medication, and separate clean stock from infected stock.

Infected pigs rarely develop typical signs of infection. The most common clinical signs are reproductive failure (eg infertility, sporadic abortion) or stillbirth and weak newborns.

²⁸ Ministry for Primary Industries. (2012) *Homekill*. Wellington: New Zealand Government.

Both Pomona and Tarassovi can cause abortion in unvaccinated sows (adult female pigs) and gilts (young female pigs), and piglets may be stillborn or die within a few days. There is little effect on growers and baconers.

12.4 VACCINATION

All pigs that come into contact with other livestock or livestock workers should be vaccinated. Farmers and households with 'backyard' pigs should vaccinate all pigs every six months.

When a herd is found to be infected, the approach is to eliminate it as soon as possible. Treatment is only applied when leptospirosis is confirmed. The main goal is to eliminate carriers from the sow herd, by reducing shedding (with vaccination/medication) and separating clean stock from infected stock.

Infection may continue in the grower-finisher herd despite ongoing vaccination of the parent sows.

Vaccination is a long-term strategy – it will take time for an infected herd first starting on a vaccination programme to reduce or eliminate the risk, and stopping vaccination will result in herds that are MORE susceptible to infection and outbreaks.

RECOMMENDATIONS

- > Treat introduced pigs of unknown vaccination status with antibiotics.
 - > Vaccinate with two doses, 4-6 weeks apart (first vaccination at the time of antibiotic treatment), and isolate for four weeks.
 - > Follow up with six-monthly boosters throughout their life.
 - > Vaccinate sow herds and maintain vaccinations to provide a disease-free source of young animals.
- > Vaccinate grower herds at or soon after weaning, and follow-up with annual testing (not vaccination), together with good management practices.
 - > Vaccinate breeding herds at least every six months to protect sows from abortion and ensure maternal antibodies are passed on to piglets when they suckle.
 - > Vaccinate boars as breeding stock.
 - > Vaccines used must be licensed for use in pigs.

With careful management, leptospirosis can be eliminated from the grower herd by vaccinating new pigs against the disease. This will take from nine months to two years to confirm.

See appendix one for a list of registered vaccines. Consult a veterinarian for advice.

12.5 MANAGING THE RISKS

AWARENESS

- > Clearly display information that leptospirosis may be a risk. Make sure new workers and anyone else who will be in close contact with animals, are aware of the risks.
- > Make sure visitors haven't had contact with pigs for at least 24 hours.
- > Make sure anyone with the flu doesn't come into contact with pigs.
- > Watch for abnormalities or warning signs of infection (eg a high number of abortions or stillbirths) and get a veterinary diagnosis.

PPE

- > Wear appropriate, clean PPE, particularly when working in wet conditions, eg waterproof clothing; overalls; sturdy, closed-toe, waterproof footwear; face protection, gloves.

HYGIENE

Refer to Prevention section (page 22).

FIRST AID

- > Have a supply of clean water readily available.
- > Refer to First Aid Treatment section for further information (page 17).

FURTHER CONTROLS

- > Take extra care when using high-pressure wash-down, ie don't breath in water spray, wear a mask, and direct spray away from people.
- > Because most pigs are housed, it is possible to break the cycle of leptospirosis infection by:
 - ensuring housing and drainage systems are designed to direct flow away from housing, to prevent contamination between pens
 - ensuring disposed effluent is well contained by covering transport channels or preventing pigs being exposed
 - vaccinating and continuing to vaccinate sow herds to provide a disease-free source of young animals.
- > In grower herds, establish if pigs are infected, then:
 - discuss a robust vaccination programme and antibiotic treatment with a veterinarian
 - take hygiene measures such as:
 - disinfecting pens
 - separating infected and uninfected growers and their effluent while the infected growers are farmed out (this can be achieved with empty pens, although some farms, eg those with open drains, may need the whole shed to be empty)

- control rodents and possums, keeping them away from stored food and other crops – make sure no excess feed is left lying around.
- > Know where new pigs have come from. Where possible, buy pigs from a veterinary-certified leptospirosis-free piggery.
- > Ensure that pigs exhibited at shows are vaccinated.

ANIMAL STATUS DECLARATION (ASD) FORM

Pork Industry New Zealand (NZPork), along with Ministry for Primary Industries (MPI), has put a set of rules into place for movement and trade of pigs under the Animal Status Declaration (ASD).

The purpose of the ASD is to transfer key information about an animal, or group or animals, to the next person in charge of the animals, and ultimately to the processor. There is a separate ASD for pigs, which must be completed by the person in charge of the animals for:

- > all pigs sent for processing – the industry will only accept this one standardised form
- > all pigs moving from commercial properties, whether for slaughter or other reasons.

An ASD form must also be supplied when pigs leave a property, and must accompany any pigs received. If a form is not supplied and received, the animals must be either held separately till an ASD is supplied, or returned to the supplier²⁹.

A copy of the ASD form for pigs is attached as Appendix three.

²⁹ Ministry of Primary Industries (2007). *Animal Products Act 1999 Information Pamphlet*. Retrieved 18 March 2015 from: www.foodsafety.govt.nz/elibrary/industry/Animal_Status-Outlines_Purpose.pdf.

13/

WORKING WITH SHEEP

IN THIS SECTION:

- 13.1 Infection risks and symptoms**
- 13.2 Vaccination**
- 13.3 Managing the risks**

Clinical leptospirosis in sheep occurs most frequently and severely in lambs and hoggets (one-year-old sheep). A robust vaccination programme and hazard management is vital for minimising risks.

13.1 INFECTION RISKS AND SYMPTOMS

Hardjo is the most common serovar in sheep, with more than 90% of flocks and more than 50% of sheep within a flock showing evidence of infection when tested.

Pomona is present in over 70% of sheep flocks and 14% of individual sheep. Sheep can be hosts for Pomona, which has caused occasional outbreaks of disease in adult sheep and severe disease in lambs, but they are most likely to be a maintenance population. Individual flocks can be infected by more than one serovar, but it is uncommon. Serovars like Copenhageni are thought to cause sporadic infections.

It is most likely that leptospirosis in sheep comes from other sheep, and the result of wet weather (floods) which encourages the survival and spread of leptospires³⁰. Cross-grazing studies show that cross-grazing is not a risk factor for infection in sheep³¹.

Symptoms of leptospirosis include:

- > fever
- > anorexia (loss of appetite)
- > jaundice
- > hemoglobinuria (red water from abnormally high concentrations of haemoglobin in the urine)
- > anaemia.



³⁰ Thornton, R. (1994). Leptospirosis in New Zealand sheep. *Surveillance* 21 (2)13-14.

³¹ Dreyfus, A. (2013). *Leptospirosis in humans and pastoral livestock in New Zealand*. Palmerston North: Massey University, Institute of Veterinary, Animal and Biomedical Sciences.

Adult symptoms (either with or without other clinical signs) include:

- > reproductive losses (abortion, stillbirth, weak lambs, infertility)
- > decreased milk production.

13.2 VACCINATION

Farmers should work with their veterinarian to carry out a risk analysis, and then decide whether to vaccinate or not.

RECOMMENDATIONS

- > Give two vaccination doses 4-6 weeks apart, before the season of high risk (autumn to early summer), with an annual single booster dose.
- > Vaccinate all breeding stock annually, preferably during pregnancy if it fits with management of the pregnant ewe flock. One month before lambing is recommended, to increase antibodies in colostrum for protecting new-born lambs against infection.
- > There are no recommendations for lamb vaccination; however, they should complete a full vaccination course (sensitiser and booster) by three months old.
- > Assume all purchased or transferred-in stock is unvaccinated. Vaccinate all purchased replacement and breeding stock at least six weeks before entering the property. If this isn't possible, keep new stock on a separate run-off that won't be grazed by the resident flock for at least 12 weeks.
- > Unvaccinated pig populations are commonly infected with leptospirosis and are a risk to humans and livestock; however, there is no reason why livestock farms can't have pigs as long as all controls are in place, eg:

- buying pigs from accredited leptospirosis-free sources
- antibiotic treatment of pigs, followed by isolation and vaccination
- a vaccination programme for livestock.

Vaccination is a long-term strategy – it will take time for an infected herd first starting on a vaccination programme to reduce or eliminate the risk, and stopping vaccination will result in herds that are MORE susceptible to infection and outbreaks.

There are two vaccines registered for use in sheep in New Zealand. The purpose, dosage and administration are the same as the recommendations for cattle.

See appendix one for a list of registered vaccines. Consult a veterinarian for advice.

13.3 MANAGING THE RISKS

AWARENESS

- > Clearly display information that leptospirosis may be a risk. Make sure new workers and anyone else who will be in close contact with animals, are aware of the risks.
- > Ensure people involved in seasonal handling of sheep are aware they are at higher risk of infection. High-risk tasks include:
 - tailing, docking, dagging, crutching
 - shearing
 - handling urine-soaked belly wool
 - loading for transport
 - washing down the woolshed
 - lambing (assisting with births or still births)
 - drenching
 - sheep dipping.

- > Watch for abnormalities or warning signs of infection, (eg a high number of abortions) and get a veterinary diagnosis.

Family members, including children, can also be at risk if they go barefoot or paddle in contaminated water.

PPE

- > Wear appropriate, clean PPE, particularly when working in wet conditions or assisting with lambing, eg overalls; sturdy, closed-toe, water-proof footwear; face protection; rubber gloves for urine-stained wool.
- > Change gloves or boots immediately if they split or leak.

HYGIENE

Refer to Prevention section (page 22).

FIRST AID

- > Have a supply of clean water readily available.
- > Refer to First Aid Treatment section for further information (page 17).

FURTHER CONTROLS

- > Control rodents and possums, keeping them away from stored food and other crops - make sure no excess feed is left lying around.

ANIMAL STATUS DECLARATION (ASD) FORM

The purpose of the Animal Status Declaration (ASD) is to transfer key information about an animal, or group or animals, to the next person in charge of the animals, and ultimately to the processor.

The ASD form applies to sheep, and must be completed by the person in charge of the animals for:

- > all sheep sent for processing - the industry will only accept this one standardised form
- > the movement of all sheep from one property or saleyard to another (property or saleyard), or property where there is a different person in charge.

For sheep, an ASD must physically accompany the animals being moved. If an ASD form is not supplied and received, the animals must be either held separately till an ASD is supplied, or returned to the supplier.

A copy of the ASD form is attached as Appendix two.

14/

WORKING WITH DEER

IN THIS SECTION:

- 14.1 Infection risks and symptoms**
- 14.2 Vaccination**
- 14.3 Managing the risks**

Leptospirosis infection in New Zealand farmed deer is common and can be a significant clinical and sub-clinical problem, resulting in animal loss and reduced reproductive performance and growth. Young deer are particularly at risk.

14.1 INFECTION RISKS AND SYMPTOMS

Deer are primary hosts for Hardjo, with infection shown to be in up to 77% of herds. They are secondary hosts for Pomona, with about one in six herds having evidence of infection at any one time. Other serovars are sporadically reported.

Both Pomona and Hardjo infection in deer may not be clinically obvious, but can have sub-clinical effects, including:

- > production losses:
 - reduced weaning percentages
 - reduced growth
- > lethargy
- > swollen kidneys and hematuria (red blood cells in urine).

Other signs of infection include:

- > jaundice
- > photo sensitisation
- > corneal opacity (disorder of the cornea)
- > anaemia.



Pomona infection can have severe clinical effects, including:

- > death of weaners (young deer)
- > sudden death.

Anyone who works close enough to deer to be splashed or sprayed with their urine or contaminated water are at high risk of infection, including:

- > people handling hinds, which commonly “dribble” urine onto their hind legs or flick it onto people with their tails
- > workers in wet yards, where deer often kick up water spray
- > people handling deer or assisting with artificial breeding, ultrasound scanning or fawning
- > people doing animal autopsies
- > truck drivers and others loading deer for transport
- > workers in a deer slaughter plant, including those handling pizzles.

The deer habit of wallowing is a likely way of spreading infection. There is also potential risk of infection from rat or mouse urine when handling hay or feed grains.

Family members, especially children, are at risk if they have contact with deer or where deer have been.

14.2 VACCINATION

The recommended vaccination programme for deer is similar to that for cattle. If vaccination is given before exposure, it should prevent infection and shedding. If infection is already present, vaccination has been shown to reduce shedding in urine by around 50% in the 10-12 months after vaccination.

In the early stages of an outbreak it would be worthwhile treating all deer that have been in

contact with infected animals. Antibiotics will probably stop animal shedding, which will limit the spread of infection in an outbreak.

Farmers should work with their veterinarian to carry out a risk analysis, and then decide whether to vaccinate or not.

Vaccination is a long-term strategy – it will take time for an infected herd first starting on a vaccination programme to reduce or eliminate the risk, and stopping vaccination will result in herds that are MORE susceptible to infection and outbreaks.

RECOMMENDATIONS

- > Vaccinate all young stock – fawns for meat or replacement – at three months old with a sensitiser and booster 4-6 weeks later.
- > Give all deer a sensitiser dose, followed by a booster vaccine 4-6 weeks later, before the season of high risk.
- > Give breeding stock and antler-producing stags an annual vaccine booster.
- > Avoid mixing young deer of unknown vaccination or infection status, until fully protected by vaccine.
- > Assume that all bought-in stock is unvaccinated, unless accompanied by a current veterinary vaccination certificate or ASD form³².
- > If uncertain, vaccinate all purchased stock twice, starting at least six weeks before entering the property. Where this isn't possible, keep new stock on a separate run-off that won't be grazed by resident stock for at least 12 weeks, or on an area of the farm from which run-off water won't contaminate other pastures and re-expose existing stock.
- > If cross-grazing, all classes of stock should be vaccinated.

³² Ministry of Primary Industries (2007). *Animal Products Act 1999 Information Pamphlet*. Retrieved 18 March 2015 from: www.foodsafety.govt.nz/elibrary/industry/Animal_Status-Outlines_Purpose.pdf.

- > Unvaccinated pig populations are commonly infected with leptospirosis and are a risk to humans and ruminant livestock; however, there is no reason why livestock farms can't have pigs as long as all controls are in place, eg:
 - buying pigs from accredited leptospirosis-free sources
 - antibiotic treatment of pigs, followed by isolation and vaccination
 - a vaccination programme for livestock.

There are currently three vaccines registered for use in deer in New Zealand. See appendix one for a list of registered vaccines. Consult a veterinarian for advice.

14.3 MANAGING THE RISKS

AWARENESS

- > Clearly display information that leptospirosis may be a risk in the work area. Make sure new workers and anyone else who will be in close contact with animals, are aware of the risks.
- > Watch for abnormalities or warning signs of infection (eg poor growth rates, sudden deaths, low weaning percentages) and get a veterinary diagnosis.

PPE

- > Wear clean appropriate PPE, particularly when working in wet conditions or closely with deer, eg overalls; sturdy, closed-toe, water-proof footwear; face protection; rubber gloves.
- > Change gloves or boots immediately if they split or leak.

HYGIENE

Refer to Prevention section (page 22).

FIRST AID

- > Have a supply of clean water readily available.
- > Refer to First Aid Treatment section for further information (page 17).

FURTHER CONTROLS

- > Provide reticulated water from a low risk source (eg rainwater).
- > Control rodents, pigs, wild deer, and possums. Keep them away from stored food and other crops – make sure no excess feed is left lying around.

ANIMAL STATUS DECLARATION (ASD) FORM

The purpose of the Animal Status Declaration (ASD) is to transfer key information about an animal, or group or animals, to the next person in charge of the animals, and ultimately to the processor.

The ASD form applies to deer, and must be completed by the person in charge of the animals for:

- > all deer sent for processing (even fawn when they are less than 30 days old) – the industry will only accept this one standardised form
- > the movement of all deer from one property or saleyard to another (property or saleyard), or property where there is a different person in charge – even fawns less than 30 days old.

For deer, the ASD must physically accompany the animals being moved³³. If an ASD form is not received, the animals must be either held separately till an ASD is supplied, or the animals must be returned to the supplier.

A copy of the ASD form is attached as Appendix two.

³³ Ministry of Primary Industries (2007). Animal Products Act 1999 Information Pamphlet. Retrieved 18 March 2015 from: www.foodsafety.govt.nz/elibrary/industry/Animal_Status-Outlines_Purpose.pdf.

15/

DOGS (AND OTHER PETS IN RURAL AREAS)

IN THIS SECTION:

- 15.1 Infection risks and symptoms**
- 15.2 Vaccination/treatment**
- 15.3 Managing the risks**

Leptospirosis is a complex disease in dogs. Infection is difficult to recognise, as clinical signs will vary, depending on the serovar³⁴. Some farm dogs will carry the disease and spread it without becoming unwell themselves.

Although infection in dogs is much less common than in livestock, infected dogs do pose a risk to humans and other animals.

15.1 INFECTION RISKS AND SYMPTOMS

Each year, a small number of dogs are diagnosed with leptospirosis in New Zealand. Breeds of dogs used on farms have a greater risk of exposure to Hardjo. Both smaller dog breeds and farm working breeds have the same risk of exposure to Copenhageni (the most common serovar)³⁵.

Infection in dogs can develop in any age, breed or gender of dog³⁶. Dogs aged 12 years or older do have less chance of infection compared to dogs aged less than six years old, perhaps because younger dogs are more likely to roam outside, which will increase exposure and chance of infection.

Most cases of infection are reported in the summer and early autumn. Symptoms can depend on the serovar type. Some serovars can cause severe liver and kidney disease in dogs, but it is less common these days.

Young dogs tend to be more severely affected by infection.

Dogs with rapid onset of symptoms following infection will have:

- > fever
- > depression
- > weakness
- > vomiting
- > muscle pain
- > pale gums.

Skin may have a jaundice (yellow) tint.

Most dogs don't have rapid onset of symptoms, but are chronically infected. The infection may be sub-clinical, ie no obvious symptoms. Severe illness can rapidly result in death with only a few signs, such as:

- > lethargy
- > muscle tenderness
- > shivering.

Dogs with more common infection will be:

- > off their food
- > lethargic
- > unwilling to move
- > vomiting
- > more thirsty.

³⁴ The vets: life for pets. (2010). Dogs: vaccinations. Retrieved December 2014 from www.thevets.net.nz/dogs/vaccinations.cfm.

³⁵ Harland, A., Cave, N., Jones, B., Benschop, J., Donald, J., Midwinter, A., Squires, R., Collins-Emerson, J. (2013). A serological study of leptospiral antibodies in dogs in New Zealand. *New Zealand Veterinary Journal*. 61(2), 98-106.

³⁶ The vets: life for pets. (2010). Dogs: vaccinations. Retrieved December 2014 from www.thevets.net.nz/dogs/vaccinations.cfm.

A detailed examination and blood test (by a veterinarian) will help diagnose leptospirosis. The sooner the disease is diagnosed and treated, the better the outcome. Diagnosis in dogs is complex, as it's hard to find the organism in tissue samples or urine. The most common laboratory test involves finding increasing antibody (protein) levels in the blood over a period of 2-4 weeks.

15.2 VACCINATION/TREATMENT

Leptospirosis isn't usually a disease included in routine vaccination for dogs, and unfortunately the vaccine registered for dogs doesn't include the most common type of *Leptospira*³⁷.

However, if dogs have regular access to areas where rats are likely to live, vaccination should be considered. Farmers should work with their veterinarian to carry out a risk analysis, then decide whether to vaccinate or not.

Treating infected dogs involves antibiotics and good supportive care. Supportive care includes intravenous fluids to support hydration and blood pressure. Aggressive treatment and supportive care in hospital may save some dogs, but unfortunately death isn't uncommon.

Cats are far less at risk, rarely becoming unwell. They seem to have natural resistance and therefore aren't vaccinated for leptospirosis.

RECOMMENDATIONS

Antibiotic treatment involves two phases.

Phase One is aimed at:

- > preventing *Leptospira* from reproducing
- > decreasing the chance of shedding
- > protecting the liver and kidneys from complications.

Usually, penicillin injections are given for about two weeks, followed by another antibiotic.

Phase two is aimed at removing any remaining *Leptospira* from the kidneys. Because several organs can be affected, regular blood tests should be taken during early stages of treatment.

Leptospiral vaccines for dogs only offer about 6-8 months protection. Dogs at high risk of infection should be vaccinated twice a year. Many veterinarians have begun to recommend leptospiral vaccination only for dogs at higher risk, because of:

- > the lack of cross-protection between serovars
- > the high incidence of reactions
- > the need for frequent vaccination.

However, vaccination is very effective if the recommended dose is followed. Puppies should be vaccinated at nine and 12 weeks old (if older than nine weeks at first vaccination, two vaccinations will still be needed). Adult dogs should be vaccinated one year after puppy vaccinations, with subsequent annual vaccinations. Lifelong annual boosters are needed to ensure the best possible protection.

Most commercial vaccines provide protection against two serovars (Copenhageni and Canicola). Although those vaccines have reduced the rate of disease, other serovars are becoming more common³⁸. Vaccine will reduce the severity of the disease, but it will not prevent some dogs from continuing to carry leptospirosis.

Leptospirosis is a potentially serious disease, and all pet owners should consult with a veterinarian to decide whether vaccination is necessary for their pet. See appendix one for a list of registered vaccines.

³⁷ Orr, M. (2010). *Leptospirosis*. Retrieved December 2014 from: www.lifestyleblock.co.nz/lifestyle-file/livestock-a-pets/the-basics/item/903-leptospirosis.html.

³⁸ The vets: life for pets. (2010). *Dogs: vaccinations*. Retrieved December 2014 from www.thevets.net.nz/dogs/vaccinations.cfm.

Vaccination is a long-term strategy – it will take time for an infected herd first starting on a vaccination programme to reduce or eliminate the risk, and stopping vaccination will result in herds that are MORE susceptible to infection and outbreaks.

15.3 MANAGING THE RISKS

CONTROLS

- > Take care when handling dogs.
- > Avoid contact with dog urine – dogs that seem well can still shed *Leptospira* in their urine for many months after treatment.
- > Keep kennels clean.
- > Control rodents and possums. Keep them away from stored food and other crops – make sure no excess feed is left lying around.



16/

MEAT PROCESSING WORKERS

IN THIS SECTION:

16.1 Infection risks

16.2 Managing the risks

All animals processed for meat (abattoir and home-kill) in New Zealand – cattle, pigs, sheep, goats and deer – can potentially pass on the bacteria.

16.1 INFECTION RISKS

Anyone working in and around a meat plant (including maintenance workers and other visitors) or slaughtering animals at home may be at risk, in particular:

- > all slaughter-floor workers, especially those stunning/pelting or removing abdominal insides
- > meat inspectors who check kidneys and other offal for abnormalities
- > offal workers and butchers
- > veterinarians.

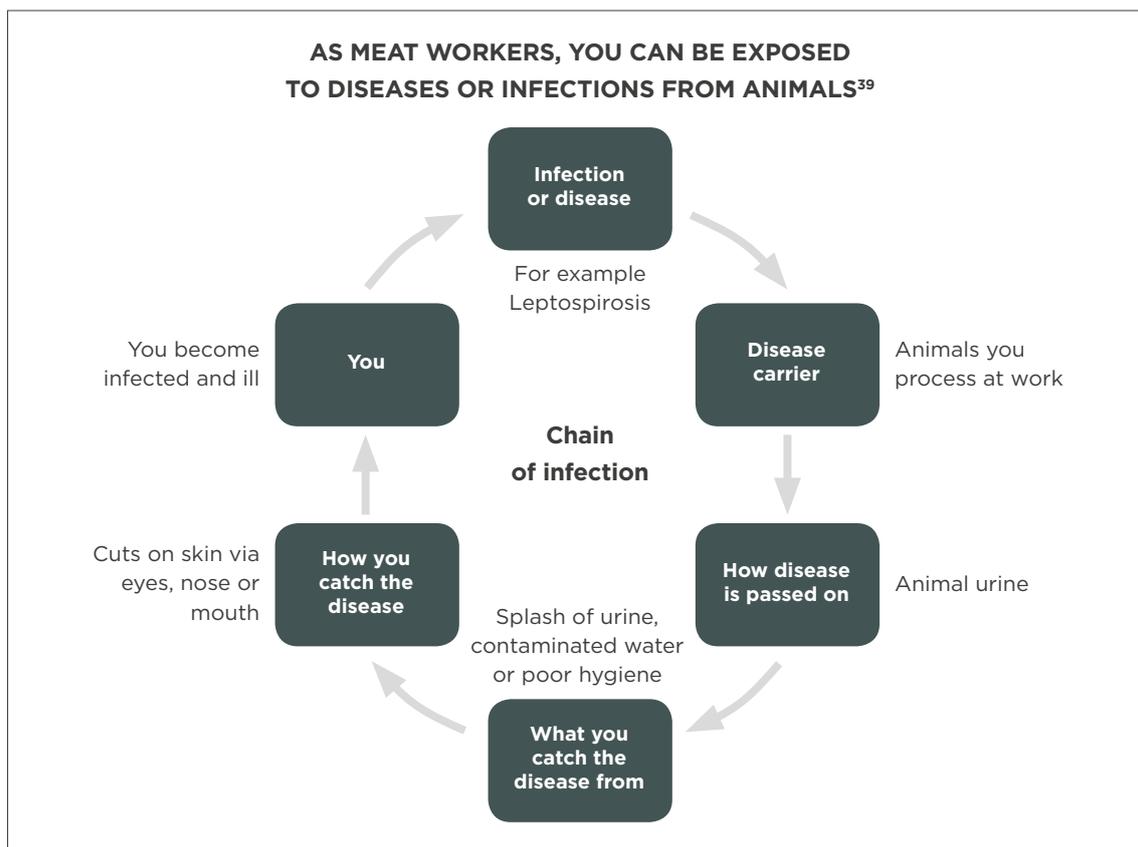


Figure 3: Infection risk for meat workers

³⁹ ACC. (n.d.). Common illnesses in the meat industry. Retrieved December 2014 from: www.acc.co.nz/PRD_EXT_CSMP/groups/external_ip/documents/publications_promotion/pi00213.pdf.

Meat workers are most at risk when:

- > moving stock into stunning boxes
- > stunning and pelting
- > hosing down yards or other areas
- > tumbling pig carcasses
- > they're at the beginning of the chain when the fleece is still on
- > gutting and taking out the bladder
- > working with kidneys
- > handling wool, hides or pelts.

Many factors increase the risk of exposure to infected urine, including:

- > high-speed, high-volume work
- > skin cuts, common for people working with knives
- > animals with full bladders (S22(1)(b)(ii) of the Animal Welfare Act 1999 requires that water is made available to animals being transported – some plants use pizzle clips to control this hazard)
- > people working below the carcass on the beef slaughter floor.

16.2 MANAGING THE RISKS

AWARENESS

- > Clearly display information that leptospirosis may be a risk in the work area, eg posters or checklists. Make sure new workers and anyone else who will be in close contact with animals, are aware of the risks.
- > Many meat workers also work with animals outside the home, or do their own home-kill, without the level of controls that processing plants have. Ensure that workers are aware of the risks.

PPE

- > Workers should treat all animals as if they are infected and wear full protection in high-risk areas.
- > Wear clean appropriate PPE, eg overalls; aprons; sturdy, waterproof footwear; eye or face protection; hats; gloves (the rate of leptospirosis in the meat industry has fallen since double-gloving was introduced)⁴⁰.
- > Change gloves or boots immediately if they split or leak.
- > PPE effectiveness can depend on:
 - the size of animal being processed
 - the temperature of the plant, eg a meat processing plant may cause face protection gear to fog up; therefore, a full-face mask won't be effective and goggles should be used
 - the physical work the processor undertakes, eg a beef slaughterman undertakes a range of tasks that present various risks, and will therefore require different PPE.
- > Offal room workers should wear face protection gear, as the risk of infection is higher when handling organs. Double-gloving is recommended.

⁴⁰ Meat Industry Association (consultation feedback, Month 2014) believes that the rate of leptospirosis has fallen since double-gloving was introduced).

HYGIENE

- > Wash hands regularly.
- > Wash other areas regularly, eg door handles.
- > Refer to Prevention section for further information (page 22).

FIRST AID

- > Have a supply of clean water readily available.
- > Refer to First Aid Treatment section for further information (page 17).

FURTHER CONTROLS

- > Keep knives sharp so they cut better.
- > Take care when using high pressure wash-down, ie Don't breath in water spray and wear a mask. Direct spray away from people.
- > Take extra precautions if there is a greater risk of urine splash, such as pizzle closers; chutes to avoid splashing; perspex shields/ protective screens to cover gut contents being worked on.
- > Use tags or dyes to identify carcasses that have been splashed with urine, so that workers further down the chain can easily identify them.
- > Monitor the slaughter floor temperature, ie outside temperature, ventilation, air flow, proximity to chillers etc.

17/

TRANSPORT AND SALE YARD WORKERS

IN THIS SECTION:

17.1 Infection risks

17.2 Managing the risks

Transport and sale yard workers are at risk of infection through regular exposure to animal urine during their everyday activities.

17.1 INFECTION RISKS

Transport workers/stock truck drivers are at risk when:

- > loading or unloading stock
- > checking the truck during transit stops
- > emptying or cleaning effluent tanks
- > hosing down the truck
- > working underneath the truck where contaminated water may collect, eg in the wheel housing
- > changing a tyre.

Sale yard workers are at risk of infection when:

- > handling stock in the yards
- > working in or walking past auction sorting pens
- > cleaning the area with a high-pressure hose
- > handling contaminated wooden railings
- > walking in wet or muddy areas in bare feet or jandals.

17.2 MANAGING THE RISKS

AWARENESS

- > Clearly display information that leptospirosis may be a risk, eg posters or checklists. Make sure new workers and anyone else who will be in close contact with animals, are aware of the risks.
- > Always be aware of what's going on around you. Look out for and avoid situations where you might be splashed with urine or urine-contaminated water.

PPE

- > Wear clean appropriate PPE, eg overalls; sturdy, waterproof footwear.

- > Wear face protection if you are working with unsettled animals.
- > Wear gloves where permitted and if you have split or grazed skin.
- > Change gloves or boots immediately if they split or leak.
- > Remove PPE if contaminated and store well away from where people eat.
- > Make sure whoever cleans PPE is aware of potential contamination.

HYGIENE

Refer to Prevention section (page 22).

FIRST AID

- > Have a supply of clean water readily available.
- > Refer to First Aid Treatment section for further information (page 17).

FURTHER CONTROLS

- > Regularly check effluent levels in transporter tanks, to avoid overflows and roadside spillage during transport.
- > Keep the ramp and other surfaces clean. Wash down affected areas as soon as possible.
- > Take care when using high pressure wash-down, ie Don't breath in water spray and wear a mask. Direct spray away from people.
- > Do not transport infected animals.
- > Ensure any sick or injured animals are inspected by a veterinarian before unloading.
- > Extra process precautions may be needed if there is a greater risk of urine splash.
- > Where possible, avoid waterways when moving stock.

18/

APPENDICES

IN THIS SECTION:

- 18.1 Appendix One: List of veterinary medicines
- 18.2 Appendix Two: ASD form
- 18.3 Appendix Three: ASD form for pigs
- 18.4 Further information and support
- 18.5 Terms and definitions
- 18.6 Bibliography

18.1 APPENDIX ONE: LIST OF VETERINARY MEDICINES⁴¹

28 August 2014			
<u>List of Veterinary Medicines</u>			
Reg Number & Trade Name			
Reg Number	Product Class & Formulation type	Status	Registrant
A001948	LEPTAVOID 2 vaccine	ACVM Registered Aqueous liquid (solution o	Schering-Plough Animal Health
	vaccine	LEPTOSPIRA BORGPETERSENII SEROVAR HARI	Active
	vaccine	LEPTOSPIRA INTERROGANS SEROVAR POMON.	Active
	Subcutaneous		
	Cattle	Leptospirosis	
	Deer	Leptospirosis	
	Sheep	Leptospirosis	
	Swine	Leptospirosis	
A003734	Leptoshield vaccine	ACVM Registered Aqueous liquid (solution o	Zoetis New Zealand Limited
	vaccine	LEPTOSPIRA BORGPETERSENII SEROVAR HARI	Active
	vaccine	LEPTOSPIRA INTERROGANS SEROVAR POMON.	Active
	Subcutaneous		
	Calves	Leptospirosis	
	Cattle	Leptospirosis	
	Deer	Leptospirosis	
	Goats	Leptospirosis	
	Sheep	Leptospirosis	
A003876	LEPTAVOID 3 vaccine	ACVM Registered Aqueous liquid (solution o	Schering-Plough Animal Health
	vaccine	LEPTOSPIRA INTERROGANS SEROVAR ICTERO	Active
	0.00 vaccine	LEPTOSPIRA INTERROGANS SEROVAR POMON.	Active
	vaccine	Leptospira interrogans serovar Hardjo	Active
	Subcutaneous		
	Cattle	Leptospirosis	
	Deer	Leptospirosis	
A006462	Lepto-Eryvac vaccine	ACVM Registered Aqueous liquid (solution o	Zoetis New Zealand Limited
	vaccine	ERYSIPELOTHRIX RHUSIOPATHIAE (INACTIVA	Active
	vaccine	LEPTOSPIRA INTERROGANS SEROVAR POMON.	Active
	vaccine	LEPTOSPIRA INTERROGANS SEROVAR TARASS	Active
	Subcutaneous		
	Swine	Erysipelas	
		Leptospirosis	
A006499	CATTLEVAX vaccine	ACVM Registered Aqueous liquid (solution o	Schering-Plough Animal Health
	0.00 vaccine	CLOSTRIDIUM CHAUVOEI TOXOID/CELLS	Active
	0.00 vaccine	CLOSTRIDIUM NOVYI TYPE B TOXOID/CELLS	Active
	0.00 vaccine	CLOSTRIDIUM PERFRINGENS TYPE D TOXOID	Active
	0.00 vaccine	CLOSTRIDIUM SEPTICUM TOXOID	Active
	0.00 vaccine	CLOSTRIDIUM TETANI TOXOID	Active
	0.00 vaccine	LEPTOSPIRA BORGPETERSENII SEROVAR HARI	Active
	0.00 vaccine	LEPTOSPIRA INTERROGANS SEROVAR POMON.	Active
	Subcutaneous		
	Cattle	Black Disease	
		Blackleg	
		Leptospirosis	
		Malignant Oedema	
		Pulpy Kidney	
		Tetanus	
A006526	LEPTOGUARD vaccine	ACVM Registered Aqueous liquid (solution o	Zoetis New Zealand Limited

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⁴¹ Provided by Ministry for Primary Industries. *List of veterinary medicines*. Received December 2014.

28 August 2014

List of Veterinary Medicines

Reg Number & Trade Name

	Product Class & Formulation type	Status	Registrant
	vaccine Subcutaneous; Intramuscular Dogs	LEPTOSPIRA INTERROGANS SEROVAR ICTERO	Active
		Leptospirosis	
A006935	ULTRAVAC 7 IN 1 vaccine	ACVM Registered Aqueous liquid (solution o	Zoetis New Zealand Limited
	vaccine	CLOSTRIDIUM CHAUVOEI TOXOID/CELLS	Active
	vaccine	CLOSTRIDIUM NOVYI TYPE B TOXOID/CELLS	Active
	vaccine	CLOSTRIDIUM PERFRINGENS TYPE D TOXOID	Active
	vaccine	CLOSTRIDIUM SEPTICUM TOXOID	Active
	vaccine	CLOSTRIDIUM TETANI TOXOID	Active
	vaccine	LEPTOSPIRA BORGPETERSENII SEROVAR HARI	Active
	vaccine	LEPTOSPIRA INTERROGANS SEROVAR POMON.	Active
	Subcutaneous Calves		Black Disease Blackleg Leptospirosis Malignant Oedema Pulpy Kidney Tetanus
	Cattle		Black Disease Blackleg Leptospirosis Malignant Oedema Pulpy Kidney Tetanus
	Sheep		Black Disease Blackleg Leptospirosis Malignant Oedema Pulpy Kidney Tetanus
A007426	Leptosield 3 vaccine	ACVM Registered Aqueous liquid (solution o	Zoetis New Zealand Limited
	vaccine	LEPTOSPIRA BORGPETERSENII SEROVAR HARI	Active
	vaccine	LEPTOSPIRA INTERROGANS SEROVAR COPENHAGEN	Active
	vaccine	LEPTOSPIRA INTERROGANS SEROVAR POMON.	Active
	Subcutaneous Cattle		Leptospirosis
A007832	NOBIVAC LEPTO 1 vaccine	ACVM Registered Aqueous liquid (solution o	Schering-Plough Animal Health
	vaccine	LEPTOSPIRA INTERROGANS SEROVAR ICTERO	Active
	Subcutaneous Dogs		Leptospirosis
A007943	PROTECH C2i vaccine	ACVM Registered Aqueous liquid (solution o	Zoetis New Zealand Limited
	0.01 g/litre vaccine	AMPHOTERICIN B	Active
	0.50 g/litre vaccine	CORONAVIRUS (INACTIVATED)	Active
	0.50 g/litre vaccine	GENTAMICIN	Active
	0.50 g/litre vaccine	LEPTOSPIRA INTERROGANS SEROVAR ICTERO	Active
	Subcutaneous; Intramuscular Dogs		Coronavirus Leptospirosis
A008314	Lepto 3-Way	ACVM Registered	Virbac New Zealand Ltd

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List of Veterinary Medicines**Reg Number & Trade Name**

	Product Class & Formulation type	Status	Registrant
	vaccine	Aqueous liquid (solution o	
	vaccine	LEPTOSPIRA COPENHAGENI	Active
	vaccine	LEPTOSPIRA HARDJO	Active
	vaccine	LEPTOSPIRA POMONA	Active
	Subcutaneous		
	Cattle	Leptospirosis	
A009041	Suvaxyn PLE	ACVM Registered	Zoetis New Zealand Limited
	vaccine	Aqueous liquid (solution o	
	vaccine	ERYSIPELOTHRIX RHUSIOPATHIAE (INACTIVA	Active
	vaccine	LEPTOSPIRA INTERROGANS SEROVAR POMON.	Active
	vaccine	PORCINE PARVOVIRUS (INACTIVATED)	Active
	Intramuscular		
	Boars	Erysipelothrix	
		Leptospirosis	
		Parvovirus	
	Sows	Erysipelothrix	
		Leptospirosis	
		Parvovirus	
A009166	Lepto 2-Way	ACVM Registered	Virbac New Zealand Ltd
	vaccine	Aqueous liquid (solution o	
	vaccine	LEPTOSPIRA HARDJO	Active
	vaccine	LEPTOSPIRA POMONA	Active
	Intramuscular		
	Cattle	Leptospirosis	
	Subcutaneous		
	Cattle	Leptospirosis	
A010520	Canigen Li	ACVM Registered	Virbac New Zealand Ltd
	vaccine	Powder	
	vaccine	LEPTOSPIRA INTERROGANS SEROVAR ICTERO	Active
	Subcutaneous		
	Dogs	Leptospirosis	

18.2 APPENDIX TWO: ASD FORM⁴²

  								
<h2 style="background-color: black; color: white; padding: 5px; display: inline-block;">Animal Status Declaration</h2>								
<p>Declaration: I am the person in charge of these animals and I declare that I have read and understand the requirements for this ASD and that the information that follows is true and accurate.</p>								
<p>Signature <small>(person in charge)</small></p>				<p>Address animals moved from <small>(Rapid Number, Road and Town/District)</small></p>				<p>AHB herd no. or LIC MINDA code <small>(cattle and deer only)</small></p>
<p>Name <small>(person in charge)</small></p>								<p>NAIT no.</p>
<p>Owner/Trade name <small>(if different from person in charge)</small></p>				<p>Owner's postal address <small>(if different from above)</small></p>				<p>Phone</p>
								<p>Fax</p>
								<p>Email</p>
								<p>Date / /</p>
Stock type	Steer	Heifer	Cow	Bull	Lamb	Sheep	Deer	Other
Tallies								
<p>Description <small>(e.g. breed, age, ID, etc)</small></p>								
<p>Destination <small>(e.g. name and location of processor, saleyard or farm destination)</small></p>								
<p>1.0 Withholding periods – all animals <small>(see note 1 of the requirements)</small></p>								
<p>1.1 Are any of these animals within the withholding period of any treatment?</p>								<p style="text-align: center;">yes no</p>
<p>1.2 If Yes, state the product name, method of treatment and dates applied <small>(NB: these animals are NOT eligible for slaughter for human consumption until outside the withholding periods)</small></p>								
Product name			Method of treatment			Date used		
						/ /		
						/ /		
<p>2.0 Animal history – all animals <small>(see note 2 of the requirements)</small></p>								
<p>2.1 Were all of these animals born on your property?</p>								<p style="text-align: center;">yes no</p>
<p>2.2 Were any of these animals imported into New Zealand?</p>								<p style="text-align: center;">yes no</p>
<p>2.3 Are any of these animals from either a MPI surveillance listed property or under MPI movement control for residues or any purpose other than TB?</p>								<p style="text-align: center;">yes no</p>
<p>3.0 Animal feeding – cattle, sheep, lambs, goats, deer, alpacas, llamas <small>(see note 3 of the requirements)</small></p>								
<p>3.1 Have any of these animals been fed ruminant protein in their lifetime?</p>								<p style="text-align: center;">yes no</p>
<p>3.2 Have any of these animals been fed ANYTHING OTHER than milk or pasture (see description of 'Pasture fed') in their lifetime?</p>								<p style="text-align: center;">yes no</p>
<p>4.0 John's Disease vaccination – where applicable <small>(see note 4 of the requirements)</small></p>								
<p>4.1 Have any of these animals been vaccinated against John's disease in their lifetime?</p>								<p style="text-align: center;">yes no</p>
<p>5.0 HGP treatment – cattle <small>(see note 5 of the requirements)</small></p>								
<p>5.1 Have any of these cattle been treated with a hormonal growth promotant in their lifetime?</p>								<p style="text-align: center;">yes no</p>
<p>5.2 If Yes, how many of these cattle have been treated with a hormonal growth promotant in their lifetime?</p>								<p style="text-align: center;">Number</p>
<p>6.0 TB Declaration – cattle, deer <small>(see note 6 of the requirements)</small></p>								
<p>6.1 What is the TB status of these animals? Enter status and index number</p>					Status		Number	
<p>6.2 Have any of these animals been tested while under your management?</p>					yes		no	
<p>6.3 What is the date of the last TB test for these animals and was TB detected?</p>					Date / /		yes no	
<p>6.4 What is the date of the last TB test for the whole herd and was TB detected?</p>					Date / /		yes no	
<p>6.5 Is the herd under TB movement control? (If Yes, a permit is required unless going direct to slaughter)</p>					yes		no	
<p>6.6 Are these animals being moved from a property within a Movement Control Area?</p>					yes		no	
<p>6.7 If Yes, have these animals been tested within 60 days prior to this movement? <small>(The 60 day test is not required if the animals are going direct to slaughter)</small></p>					yes		no	
<p>6.8 Does the herd from which these animals are being moved include cattle or deer which have been introduced from a herd of lower TB status within the last three years?</p>					yes		no	
<p>I understand the obligations under the Animal Welfare Act of persons in charge of animals to ensure that their physical, health and behavioural needs are met in accordance with the minimum standards defined in Codes of Welfare under the Act</p>								
<p>7.0 Additional information <small>(see note 7 of the requirements)</small></p>								<p>HAVE YOU SIGNED THIS FORM AT THE TOP LEFT?</p>

May 2012

⁴² Ministry of Primary Industries. *Animal status declaration*. Retrieved 18 March 2015 from: www.mpi.govt.nz.

You must supply an ASD when animals are moved from your property and get one for all animals you receive.

Ministry for Primary Industries
Manatū Ahu Matua



Requirements for the Animal Status Declaration

Purpose of the Animal Status Declaration

Practices on the farm impact on the suitability of animals for processing and on animal products' eligibility for trade. The purpose of the Animal Status Declaration (ASD) is to transfer key information about an animal, or group of animals, to the next person in charge, or the processor. For the processor, the information on the ASD is vital for guiding ante-mortem and post-mortem examination, and for determining export eligibility and certification. The ASD also incorporates the TB questions required by the Animal Health Board under the Biosecurity National Bovine Tuberculosis Pest Management Strategy Order 1998.

Privacy Act Statement

The Privacy Act 1993 provides rights of access to, and correction of, personal information held in readily retrievable form. The information is held by the receiver of the ASD.

Who is to complete and sign the Animal Status Declaration?

The ASD is to be completed by a person in charge of the animals who has the knowledge and authority to answer all the applicable questions. The person in charge of the animals could be the owner, farm manager or saleyard operator, but does NOT include transport operators. However, transport operators are required to transfer the ASD accompanying the animals being moved.

Guidelines for completing the Animal Status Declaration

The ASD MUST be completed for all consignments of cattle (except bobby calves going to slaughter), buffalo, deer, sheep, lambs, goats, alpacas, llamas, horses, ostriches, and emus sent for processing.

In addition, the ASD MUST be completed for all-

- movements of sheep, lambs, goats, ostriches and emus sent from one property or saleyard to another property or saleyard where there is a different person in charge of the animals; and
- movements of cattle (including calves) and deer

Saleyard operators are to complete a new ASD or, where there is no change to the status of animals, the saleyard operator may use a clear photocopy of the ASD received with the animals. Where photocopies are used, the tallies must be altered to match the departing mobs and the ASD MUST be countersigned by the saleyard operator as being true and accurate and tally changes initialed. Alternatively, it is acceptable for the sales docket which accurately states the number of animals purchased to be attached to a copy of the incoming ASD. Where there is change to the status of animals at the saleyard, a new ASD must be completed.

Notes

The ASD is a mandated form under the Animal Products Act 1999. No additional commercial information is to be added to the form.

'NAIT no.' is the unique number which identifies the Person In Charge of Animals (PICA) with respect to their registered NAIT location. You will obtain a NAIT number when you register with NAIT on www.nait.co.nz. It is compulsory for all PICA of NAIT animals to have a NAIT number. The inclusion of your NAIT number on this form is recommended.

'AHT herd no. or LIC MINDA code (cattle and deer only) is the Animal Health Board herd number or MINDA participant code or CRV Ambreed code of the herd from which the cattle or deer are being moved.

The box **'Address animals moved from'** is the physical address of the property from which the animals are being moved. Please include the name of the road and if available, the Rapid Number.

Where the animals' description will not fit in the space provided, the additional information box (question 7.0) may be used. Then, if necessary, an additional piece of paper that is signed by the person in charge and attached to the ASD could be used.

The box **'Destination'** is to be completed to the best of your knowledge; for example provide the processor's company name and plant location, or the saleyard name and location, or address of the destination farm.

1. Withholding periods – all animals

You need only detail any treatments which remain within the withholding period. If you do not know the withholding period, the following defaults apply –

- 91 days (3 months) for cattle, deer, sheep, goats, alpacas, and llamas;
- 63 days for horses, ostriches and emus.

Calves for rearing: If the dam was within a meat withholding period at the time of birth of the calf, or if the calf has been fed milk from a dam within a milk withholding period of any animal treatment, or the calf itself has been treated, then enter details of the treatment in this section when the calf is within a withholding period.

Animals grazing in vineyards: There is a recommendation to withhold from slaughter or sale all animals used for leaf-plucking for at least 6 months from either the time of the last known spray or from when the animals were removed from the vines, whichever is earlier.

2. Animal history – all animals

Movement Control: the ASD question 2.3 must be ticked "Yes" when animals are under any movement control imposed by MPI.

3. Animal feeding

Under the Biosecurity (Ruminant Protein) Regulations 1999 it is an offence to feed ruminant protein in any form, composition or admixture to ruminants. Ruminant protein means protein derived from ruminant tissue including blood but excluding dairy product. Ruminant refers to cattle (including buffalo), calves, deer, sheep, lambs, goats, alpacas and llamas.

Pasture fed means that the animals have been raised under normal New Zealand farming conditions with year round access to grass (e.g. hay, silage, lucerne, feed crops or other grazed or conserved forages) and other supplementary feeds (including manufacturing feeds, provided that you have a statement from the manufacturer that the feed does not contain animal protein or animal fat, other than dairy). You must keep the manufacturers' declaration. Where animals have been fed on a feed pad or feedlot other than for short term periods (e.g. only as supplementary feed immediately prior to slaughter) then they would not be 'pasture fed' because of not having year-round access to grass.

If you do not know if an animal has been only 'pasture fed' you must tick the 'Yes' box.

4. Johne's Disease vaccination

The ASD must be ticked 'Yes' when any of the animals have been vaccinated with Johne's disease vaccination or you believe a previous owner may have vaccinated them.

5. Hormonal Growth Promotants (HGP)

HGPs may only be used under veterinary supervision. **If you do not know** whether the cattle have been treated with HGPs you must tick the 'Yes' box, and put 'Unknown' in the number box.

6. Bovine Tuberculosis (TB) Declaration

The TB status to be declared is the TB status currently assigned to the herd by the Animal Health Board, the agency responsible for implementing the TBfree New Zealand Programme.

Special movement conditions apply to herds with an Infected (I) status and to some herds with a Suspended (S) status. If you have received a legal notice restricting the movement of your herd, refer to the conditions contained within that notice prior to moving your stock.

If you move stock without a completed ASD or without the correct pre-movement test, you may be prosecuted and the stock may be redirected back to your property.

If you are uncertain how to complete this declaration or you do not know your herd's TB status or whether the herd is located within a Movement Control Area (risk area) contact **0800 482 4636** prior to moving stock.

7. Any further information

This box enables other important information to be given by the person completing the ASD, for example identifying that the animals are experimental animals.

Animal welfare

The Animal Welfare Act creates obligations to alleviate pain or distress of ill or injured animals. A veterinary declaration of fitness to transport is required for any ill or injured animals. Further information and Codes of Welfare are available at the MAF website (www.maf.govt.nz) by searching 'Animal Welfare'.

Records

The person in charge who completed and signed the ASD must keep a copy of the completed ASD for 1 year.

The person in charge who received the animals must keep the ASD received for the period that the animals are kept and then for an additional year.

Processing companies must keep the signed ASD (and any faxed changes) for 4 years from receipt.

Use of the ASD

- When it is provided, the signed ASD form must accompany the animals sent from the property. In the case of electronic transfer – the ASD must be present at the receiving property when the animals arrive.
- If animals arrive at a property without an accompanying ASD or the receipt of an electronic ASD, then the animals must be separated from all other stock and held until a completed and signed ASD is received OR the animals must be returned to the supplier.
- Scanned (and emailed), or faxed copies of any changes to the ASD are acceptable.

Warning

It is an offence under the Animal Products Act 1999 to falsify, alter or misrepresent any declaration required by this Act, with the intent to deceive or for the purposes of obtaining any material benefit or avoiding any material detriment.

It is an offence under the Biosecurity Act 1993 to: 1) Move cattle or deer aged 30 days or more unless accompanied by a completed TB declaration; 2) Move cattle or deer aged 90 days or more from a risk area to a place outside that risk area or within any risk area from its herd of origin or the place of establishment at which the animal is being kept to a place other than the place occupied by the owner or person in charge of the cattle or deer, unless it has undergone within 60 days prior to the date of movement, a negative test for bovine tuberculosis; 3) Make a declaration that is false or misleading.

It is an offence under the Biosecurity (Ruminant Protein) Regulations 1999 to allow ruminants to be fed ruminant protein.

It is an offence under the Biosecurity (Animal Identification Systems) Regulations 1999 to move cattle and deer over 30 days of age from the herd of origin or place where the animals are kept unless identified in accordance with these regulations.

18.3 APPENDIX THREE: ASD FORM FOR PIGS⁴³

Ministry for Primary Industries
Manatū Ahu Matua





Must be used from 01 December 2012

ANIMAL STATUS DECLARATION FOR PIGS

Farm Name & Physical Location:

Hook No/Agent: _____
Pen No: _____
FarmsOnLine No: _____
AgriBase No: _____

Pigs for Slaughter			Other Movements of Pigs		
	Number	Tattoo/Brand/Ear Tag		Number	Tattoo/Brand/Ear Tag
Suckling / spit pig			Weaners/stores		
Pork			Gilts		
Bacon or trim pork			Sows		
Choppers			Boars		
Other (specify)			Other (specify)		
RMP No. or Slaughterhouse (Name and Physical Address):			Supplied to (Name and Physical Address) :		

1.0 Withholding periods – all pigs (See note 1 of the requirements)

1.1 Are any of these pigs within the withholding period of any treatment? yes no

1.2 If **Yes**, state the product name, method of treatment, last date used and withholding period
(Note these pigs are NOT eligible for slaughter for human consumption until outside the withholding periods)

Product Name	Method of Treatment	Last Date Used	Withholding Period

2.0 Animal history – all pigs (See note 2 of the requirements)

2.1 Were all of these pigs born on your property? yes no

2.2 Are any of these pigs under MPI movement control? yes no

2.3 Are any of these pigs subject to a current surveillance notice for residues? yes no

3.0 Have any of these pigs ever been treated with PST in their lifetime? (See note 3) yes no

4.0 Meat and products containing meat

4.1 Have any of these pigs ever been fed **meat or food waste** in their lifetime? (See note 4, incl. 4.1 and 4.2) yes no

4.2 If Yes, was that feed correctly treated? (See note 4, including 4.2) yes no

5.0 Have any of these pigs been fed any porcine material in their lifetime? (See note 5) yes no

6.0 Have these pigs been managed in accordance with a leptospirosis control programme?(As defined in note 6) yes no

6.1 If No, has the breeding herd been vaccinated for leptospirosis in the last 6 months? (See note 6.1) _____ yes no

7.0 Have these pigs been managed on a PigCare™ accredited farm? (See note 7) yes no

8.0 Have these pigs been managed in accordance with any other quality assurance programme that has been independently audited? (See note 8) _____ yes no

Declaration: I am the person in charge of these pigs and I declare that I have read and understand the requirements of this ASD for Pigs and the information is true and accurate.

Signature: _____ Contact Phone: (0) _____

Printed Name: _____ Contact Fax: (0) _____

Date: ____/____/____

Name of Transport Company: _____	Vehicle Registration No: _____
Driver's Name: _____	Trailer Registration No: _____
Driver's Signature: _____	Time Loaded: _____ AM / PM

Comments

Version 2. July 2012

⁴³ Ministry of Primary Industries. *Animal status declaration*. Retrieved 18 March 2015 from: www.mpi.govt.nz.

You must supply an ASD for Pigs when pigs leave your property and get one with all pigs you receive
REQUIREMENTS FOR THE ANIMAL STATUS DECLARATION (ASD) FOR PIGS

Purpose of the Animal Status Declaration (ASD) for Pigs

Practices on the farm impact on the suitability of animals for processing and on animal products' eligibility for trade. The purpose of the ASD for Pigs is to transfer key information about a pig, or group of pigs, to the next person in charge, or the processor. Information sought on the white sections of the declaration form is required to administer the Animal Products Act 1999. Information sought in the shaded sections of the declaration form is requested in accordance with support for an industry agreed declaration that was ratified by delegates at the New Zealand Pork Industry Board (NZPork) Annual General Meeting in July 2002. Provision of this information is voluntary for the New Zealand market but may be required for market access requirements either within NZ or overseas. This form replaces the ASD for Pigs used from 1 March 2006.

Privacy Act Statement

The Privacy Act 1993 provides rights of access to, and correction of, personal information held in readily retrievable form. The information is held by the receiver of the ASD for Pigs.

Who is to complete and sign the ASD for Pigs?

The ASD for Pigs is to be completed by a person in charge of the pigs who has the knowledge and authority to answer all the applicable questions. The person in charge of the pigs could be the owner, farm manager or saleyard operator; but does NOT include transport operators.

Transport operators are not to prepare ASD for Pigs themselves, but are required to transfer the ASD for Pigs when provided with the animals being moved.

Guidelines for Completing the ASD for Pigs

Under the Animal Products Act, the ASD for Pigs MUST be completed for all consignments of pigs sent for processing. In addition the ASD for Pigs MUST be completed for all movements of pigs sent from one property or saleyard to another property or saleyard where there is a different person in charge of the pigs.

Saleyard operators must also complete a new ASD for Pigs, or where there is no change to the status of pigs, the saleyard operator may use a clear photocopy of the ASD for Pigs received with the pigs. Where photocopies are used the tallies must be altered to match the departing mobs and the ASD for Pigs MUST be countersigned by the saleyard operator as being true and correct and tally changes initialled. Where use of a photocopy is not suitable a new ASD for Pigs must be completed by the saleyard operator. Where there is change to the status of pigs at the saleyard, a new ASD for Pigs must be completed.

The same requirements apply to the industry agreed component.

NOTES

Where the pigs' description will not fit in the space provided (e.g. the tattoo/brand/ear tag of pigs), if necessary, an additional piece of paper that is signed by the person in charge and attached to the ASD for Pigs could be used.

Compulsory Requirements

1 Treatments – all pigs

You need only detail any treatment which remains within the withholding period. If you do not know the withholding period, a **63 day withholding period must be applied**.

2 Animal history – all pigs

Movement control: Question 2.2 must be ticked 'yes' when pigs are under any movement control imposed by MPI.

Industry Agreed Requirements

Questions 3 to 8 refer to industry agreed voluntary declaration questions, but may be required for specific purposes. E.g. specific responses to Qs 4 and 8 are required for market access to Singapore. Questions 3 to 6 refer to the whole lifetime of the pigs and so if the pigs have not all been born on your property, you will need to refer to the ASD for Pigs provided by the previous person in charge.

3 PST (Porcine Somatotropin) is a veterinary medicine and must meet the prescribed meat-withholding period, which is 24 hours. Nevertheless, a declaration of use over the pigs' lifetime is sought in order to provide traceability. To answer 'no' to question 3, you must be sure that these pigs have never been treated with PST in their lifetime. All pigs, whether or not treated with PST, are eligible for slaughter.

4 Meat and products containing meat

Under the Biosecurity (Meat and Food Waste for Pigs) Regulations 2005, it is an offence to feed, or allow, cause or permit pigs to be fed, untreated meat or untreated food waste. 'Treated' means heated to 100° Celsius and maintained at that temperature for not less than one hour; or another standard approved by the Director-General of MPI and notified in the Gazette. Untreated meat means meat that has not been 'treated' as defined above. Untreated food waste means any feed that is or contains untreated meat, or may have come into contact with untreated meat. Meat does not include eggs, milk, or rendered material.

4.1 To answer 'no' to question 4.1, you must be sure that these pigs have never been fed any meat or food waste (as defined in note 4) in their lifetime. You are strongly advised to ask the supplier of any feed for a declaration of content.

4.2 To answer 'yes' to question 4.2, you must be able to demonstrate that meat or food waste fed to the pigs any time during their lifetime has been treated as required by the regulations. Unless you have treated the feed yourself you must obtain evidence of treatment from any supplier of any meat and/or food waste.

If you cannot declare that the pigs comply with the Biosecurity (Meat and Food Waste for Pigs) Regulations 2005, based on your answers to Q4.1 and 4.2, these pigs will not be accepted for marketing under the 100% New Zealand Pork label.

5 NZPork strongly recommends that pigs are not fed porcine material to enhance consumer perceptions of New Zealand grown pork. To answer 'no' you must be sure that no porcine material (other than through suckling) has been included in the feed of this consignment of pigs at any time.

6 Leptospirosis

A leptospirosis control programme requires vaccination of the breeding herd if present at least every 6 months, and certification of the grower herd as "free of leptospirosis" at least once every 12 months. Grower herd certification is based on the results of serological testing of a minimum of 10 grower pigs either within two weeks of slaughter or at slaughter using the MAT (Micro Agglutination Test) for *Leptospira pomona*. A registered veterinarian must interpret the results to determine the status of the grower herd. Equivalence to the above programme documented by a registered veterinarian is accepted.

6.1 If the pigs HAVE NOT been managed in a leptospirosis control programme, as defined above, has the breeding herd, if present, been vaccinated within the last 6 months? If you do not have a breeding herd, write in N/A (not applicable).

7 PigCare™ accredited farm

This question is included to enable supply requirements of commercial groups to be met. To answer "yes" the pigs must have been farmed on a PigCare™ accredited farm. For more information refer to NZPork.

8 This question is included to enable additional supply requirements, if any, of commercial groups to be met. Farms registered as eligible to export pork meat to e.g. Singapore, must write in **New Zealand PIB Export Assurance Programme**.

Records

Under the Animal Products Act, the person in charge who completed and signed the ASD for Pigs must keep a copy of the completed ASD for Pigs for 1 year. The person in charge who received the animals must keep the ASD for Pigs received for the period that the pigs are kept and then for an additional year. In order to prove compliance with the Fair Trading Act, it is recommended that copies of the completed ASD for Pigs be retained for 3 years and 9 months from the date that the pigs are supplied. Processing companies must keep the signed ASD for Pigs (and any faxed changes) for 4 years from receipt.

Use of the ASD for Pigs

When it is provided, the signed ASD for Pigs form must accompany the pigs sent from the property or be sent electronically, in which case, it must be at the receiving property when the pigs arrive. If pigs arrive at a property without an accompanying ASD for Pigs or the receipt of an electronic ASD for Pigs, then the pigs must be separated from all other pigs and held until a completed and signed ASD for Pigs is received; OR the pigs must be returned to the supplier. Faxed copies of any changed ASD for Pigs are acceptable.

Warnings

It is an offence under the Animal Products Act 1999 to falsify, alter or misrepresent any declaration required by this Act, (i.e. the white sections of this form) with the intent to deceive or for the purposes of obtaining any material benefit or avoiding any material detriment.

It is an offence under the Biosecurity Act 1993 to feed untreated meat or untreated food waste (see 4. above).

Giving a false or misleading declaration on both (white and shaded) sections of the declaration form could give rise to liability under the Fair Trading Act, including criminal liability, which can carry a fine of up to \$30,000 for individuals and up to \$100,000 for corporations.

Obtaining the ASD for Pigs forms

Forms can be ordered from NZPork by ringing 0800 697 675 (NZ PORK). Forms are provided free of charge to pork producers registered with NZPork. Other persons will be charged \$25 per book of 25 forms. Forms can be downloaded free of charge from MPI's website www.foodsafety.govt.nz or NZPork's website.

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18.4 FURTHER INFORMATION AND SUPPORT

The following contact details are correct at the time of publication. Readers should regularly check websites for up-to-date information.

ACCIDENT COMPENSATION CORPORATION (ACC)

ACC holds information, including publications, about leptospirosis illness, prevention and treatment, and information on working with livestock.

Website: www.acc.co.nz

DAIRY NZ

Dairy NZ holds information, including publications, about animal health and welfare, environment and effluent management.

Website: www.dairynz.co.nz

Phone: 0800 4 DAIRYNZ or 0800 4 3247969

Email: info@dairynz.co.nz

DAIRY NZ FARMER INFORMATION SERVICES

Link to Farmfacts: www.dairynz.co.nz

DEER INDUSTRY NEW ZEALAND

Deer Industry NZ holds information about the deer industry, including farm environment and deer management.

Website: www.deernz.org

Phone: 04 473 4500

Email: info@deernz.org

EFFLUENT CONTROL

See Dairy NZ for information on effluent management. Local authorities/councils should also have information available.

ENVIRONMENTAL SCIENCE AND RESEARCH (ESR)

ESR has public health information available about zoonotic diseases. Laboratory services provide screening and testing for common leptospirosis serovars found in New Zealand.

Website: www.esr.cri.nz

LEPTOSPIROSIS NZ

A website to inform the public about leptospirosis, developed by the Farmer Leptospirosis Action Group (FLAG), an initiative of Rural Women NZ and Massey University: www.leptospirosis.org.nz

MASSEY UNIVERSITY

Massey University is highly regarded in leptospirosis research. Publications and other information about risk, vaccination practices and more, are available on Massey's website.

Website: www.leptospirosis.org.nz

MEAT INDUSTRY ASSOCIATION OF NZ

The Meat Industry Association of NZ holds industry information about health and safety guidelines in the meat industry, including working environment, slaughter operations, yards and stock handling, and packing operations.

Link to Health and Safety Guidelines:

www.mia.co.nz

Website: www.mia.co.nz

MEDICAL PROVIDERS/GENERAL**MEDICAL PRACTITIONERS**

The Ministry of Health and Worksafe New Zealand hold information about medical care and recommendations in cases of leptospirosis.

MoH website: www.health.govt.nz

WorkSafe NZ website: www.worksafe.govt.nz

MINISTRY FOR PRIMARY INDUSTRIES (MPI)

MPI has agricultural information covering New Zealand's livestock industries – dairy, deer, sheep, beef and wool.

Website: www.mpi.govt.nz

NEW ZEALAND VETERINARY ASSOCIATION (NZVA)

NZVA has information, including publications, about animal health and welfare, and management of leptospirosis, including **Leptosure**, a national risk management programme.

Website: www.nzva.org.nz/

RISK MANAGEMENT PROGRAMME

Leptosure was developed by the New Zealand Veterinary Association (NZVA) and the Society of Dairy Cattle Veterinarians (DCV), as a quality assurance programme to reduce the risk of human leptospirosis infection on dairy farms.

This Leptosure programme is being expanded to include sheep, beef, cattle and deer.

Website: www.leptosure.co.nz

Phone: +64 4 471 0484

Email: leptosure@vets.org.nz

All veterinarians should be able to provide advice on vaccination.

NZPORK

NZPork has information regarding small scale pig farming, with links to other valuable resources.

Website: www.nzpork.co.nz

PERSONAL PROTECTIVE EQUIPMENT (PPE)

NZ Safety specialise in PPE, providing a wide range of equipment.

Website: www.nzsafty.co.nz

Worksafe New Zealand has information, including publications, available about use of personal protective clothing and equipment.

WORKSAFE NEW ZEALAND

WorkSafe NZ holds information, including publications, about leptospirosis. These include guidelines, factsheets, and notification information via NODS.

Website: www.worksafe.govt.nz

Phone: 0800 030 040

18.5 TERMS AND DEFINITIONS

TERM	DEFINITION
Closed-herd	<p>Means no cattle movement onto the farm, i.e. closed to outside introductions.</p> <p>You DON'T have a closed herd if you:</p> <ul style="list-style-type: none"> > buy in or borrow bulls > exhibit at shows > share cattle handling facilities for testing > directly return unsold cattle to your farm > have poor boundary fences > use common grazing or housing > cattle are transported by someone else or in someone else's vehicle.
Cross-graze	<p>Means the practice of grazing different species of livestock on the same pastures (either at the same time or one after the other).</p>
Diagnostic Test	<p>Means a test designed to determine whether a disease or evidence of infection is present, which aids in the making of a diagnosis.</p>
Eliminate	<p>Means to remove a hazard from the workplace.</p> <p>Significant hazards to employees to be eliminated if practicable.</p> <p>Where there is a significant hazard to employees at work, the employer shall take all practicable steps to eliminate it.</p> <p><i>HSE Act 1992, Part 2, S8</i></p>
Isolate	<p>Means to separate the hazard or hazardous work from employees.</p> <p>Significant hazards to employees to be isolated where elimination impracticable</p> <p>Where—</p> <p>(a) there is a significant hazard to employees at work; and</p> <p>(b) either—</p> <ul style="list-style-type: none"> (i) there are no practicable steps that may be taken to eliminate it; or (ii) all practicable steps to eliminate it have been taken, but it has not been eliminated,— the employer shall take all practicable steps to isolate it from the employees. <p><i>HSE Act 1992, Part 2, S9</i></p>
Minimise	<p>Means to lessen the chance of exposure to a hazard through appropriate controls.</p> <p>Significant hazards to employees to be minimised, and employees to be protected, where elimination and isolation impracticable</p> <p>(1) Where—</p> <ul style="list-style-type: none"> (a) there is a significant hazard to employees at work; and (b) either— <ul style="list-style-type: none"> (i) there are no practicable steps that may be taken to eliminate it; or (ii) all practicable steps to eliminate it have been taken, but it has not been eliminated; and (c) either— <ul style="list-style-type: none"> (i) there are no practicable steps that may be taken to isolate it from the employees; or (ii) all practicable steps to isolate it from the employees have been taken, but it has not been isolated,— <p>the employer shall take the steps set out in subsection (2).</p> <p><i>HSE Act 1992, Part 2, 10</i></p>

TERM	DEFINITION
Medical Provider	Means a medical practitioner who is, or is deemed to be, registered with the Medical Council of New Zealand continued by section 114(1)(a) of the Health Practitioners Competence Assurance Act 2003 as a practitioner of the profession of medicine. <i>HSE Act 1992, Part 1, S2</i>
Microscopic Agglutination Test (MAT)	A standard serologic test used to test for leptospirosis.
Notifiable Occupational Disease System (NODS)	A voluntary system that anyone can use to notify WorkSafe NZ of a health problem that may have been caused by work.
Occupational	Means relating to, or caused by, employment in a place or field of work.
Polymerase Chain Reaction (PCR)	A standard test used to test for leptospiral DNA.
Serious Harm	Means death, or harm of a kind or description declared by the Governor-General by Order in Council to be serious for the purposes of the HSE Act 1992. <i>HSE Act 1992, Part 1, S2</i>
Serology	Means a diagnostic blood test to detect the presence of antibodies.
Serovar	Means strain of leptospirosis infection.
Shedding	Means the expelling of bacteria from the body (via the respiratory tract, genital tract, and intestinal tract).
Significant Hazard	Means a hazard that is an actual or potential cause or source of— (a) serious harm; or (b) harm (being harm that is more than trivial) the severity of whose effects on any person depend (entirely or among other things) on the extent or frequency of the person's exposure to the hazard; or (c) harm that does not usually occur, or usually is not easily detectable, until a significant time after exposure to the hazard. <i>HSE Act 1992, Part 1, S2</i>
Symptoms	Means a change in a person's body that may be linked to a disease.
Titre	Means the concentration of antibodies developed by the body in response to an infection.
Zoonosis	Means a disease transmitted from animals to humans.

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