Significant Disease Investigation Guide

Cattle & Sheep

AGRICULTURE VICTORIA

Biosecurity

You play a key role in the state's animal disease surveillance system. By reporting and investigating significant disease events you will help protect the livelihood of producers and the health of people, companion animals, livestock, and native animals.

This guide aims to help you decide when to initiate a significant disease investigation (SDI) and outlines the process you need to follow. Disease information relating to cattle and sheep has been arranged by syndrome for ease of use in the field.

A companion edition of this guide has been produced for equine disease. You can obtain a copy by contacting cvo.victoria@ecodev.vic.gov.au

This guide was produced with the help of the Department of Agriculture and Water Resources, the Government of Western Australia, the Northern Territory Government and the Queensland Government. Thanks to Agriculture Victoria staff who also provided pictures.

The Victorian Significant Disease Investigation Program

EMERGENCY ANIMAL DISEASE WATCH HOTLINE 1800 675 888

The Victorian Significant Disease Investigation (SDI) Program aims to boost Victoria's capacity for the early detection of emergency animal diseases in livestock and wildlife by increasing the participation of veterinary practitioners and subsidising the cost of investigating significant disease events.

Subsidies are available for the initial field investigation, including clinical evaluation and necropsy, laboratory testing and follow-up investigation of significant disease events in livestock and wildlife.

Eligible vets are those in private practice, zoos or wildlife parks. Subsidy details can be found on the Agriculture Victoria Significant Disease Investigation Program website page **agriculture.vic.gov.au/SDI**

To be considered a significant disease event and be eligible for the subsidies one or more of the following criteria must be met:

- An unusual or atypical manifestation of disease, including high morbidity, mortality and/or rate of spread; or

- An initial investigation fails to establish a diagnosis, including when veterinary treatment does not produce an expected response; or
- There are findings suggesting a possible effect on trade, public health, biodiversity or the viability of the farm, industry or region, excluding events where there is a genuine suspicion of an emergency animal disease.
- Where there is a genuine suspicion of an exotic or emergency animal disease, the department will lead the disease investigation and cover the cost of the investigation.

If you suspect an exotic or emergency animal disease, call the EAD Watch Hotline 1800 675 888.

Genuine suspicion of an EAD?

Immediately notify an Agriculture Victoria Animal Health or Veterinary Officer or contact the Emergency Animal Disease Watch Hotline if you suspect an exotic or emergency animal disease (EAD) or see the following with no apparent plausible explanation:

- sheep and cattle that have ulcers, erosions or blisters around the feet, muzzle, udder or mouth;
- sheep and cattle that are lame and drooling or salivating excessively;
- unusual nervous system signs in more than one animal;
- rapid spread of disease through a herd or flock;
- a disease event where multiple species are affected;
- a disease with sudden high mortality in any species.

In the case of a sudden unexplained death in cattle or sheep, test for anthrax.

Anthrax testing should be carried out on all sudden, unexplained deaths of cattle, sheep and other susceptible livestock. Field testing of cattle and sheep carcases can be carried out using a penside immunochromatographic test (ICT). Agriculture Victoria Animal Health and Welfare staff can provide training on the use of these test kits and can provide kits at no cost. ICT results are available in 15 minutes. Do not commence a necropsy examination until anthrax has been ruled out. Wear appropriate PPE if you suspect anthrax or any zoonotic disease.

Suspicion of zoonotic disease?

EMERGENCY ANIMAL DISEASE WATCH HOTLINE
1800 675 888

It is important to remember that some diseases have the potential to infect humans as well as animals.

- When investigating a disease outbreak, consider possible zoonotic diseases that could be responsible and take relevant precautions.
- Ensure all people in contact with the animals also take appropriate safety precautions.

Zoonotic disease differentials for syndromes seen in cattle:

Syndrome	Disease	Modes of transmission	Precautions at the property
Gastrointestinal	Colibacillosis	Ingestion of faecal contaminated material, food and water	Wear PPE for examination of animals. Avoid ingestion of faecal material and faecal contaminated food and water.
	Salmonellosis	Ingestion of faecal contaminated material, food and water	Wear PPE for examination of animals. Avoid ingestion of faecal material and faecal contaminated food and water.
	Campylobacteriosis	Ingestion of faecal contaminated material, food and water	Wear PPE for examination of animals Avoid ingestion of faecal material and faecal contaminated food and water.
Neurological	Bovine spongiform encephalopathy	Ingestion of material from infected animal	Remove suspect animals from food chain. Wear PPE for necropsy, caution with handling nervous tissue.
	Rabies	In saliva via bites/scratches	Extreme care. If bitten, euthanase and test animal - wear PPE for necropsy, caution with handling nervous tissue. Seek post exposure treatment.
	Listeriosis	Direct contact with infected animal tissue	Wear PPE for examination of animals.

Zoonotic disease differentials for syndromes seen in cattle:

Syndrome	Disease	Modes of transmission	Precautions at the property
Reproductive	Bovine brucellosis	Direct contact / ingestion of animal products	Wear PPE for examination of animals. Avoid ingestion of contaminated material.
	Leptospirosis	Urine, reproductive fluids	Avoid splashing or inhaling body fluids, wear PPE.
	Listeriosis	Direct contact with infected placenta/foetus, ingestion of infected animal products	Wear PPE for examination of animals. Avoid ingestion of contaminated material.
	Q Fever	Inhalation of aerosols from infected animals particularly placenta and fluids, and contaminated dust. Direct contact through open wounds.	Wear appropriate PPE (particularly if not immune).
Respiratory signs	Bovine tuberculosis	Direct transmission by ingestion, inhalation and instillation	Remove suspect animals from food chain. Wear PPE for necropsy.
Skin lesions	Ringworm	Direct contact with infected skin	Wear gloves to examine animals. Wash hands and equipment.
	Pseudocowpox	Direct contact with infected cattle	Wear gloves to examine animals. Wash hands and equipment.
Sudden death	Anthrax	Direct contact with infected fluids and tissues	Wear PPE for examination of animals, avoid contamination from discharges and avoid opening carcass.

Zoonotic disease differentials for syndromes seen in sheep:

Syndrome	Disease	Modes of transmission	Precautions at the property
Neurological	Scrapie	Ingestion of neural tissue from an infected animal.	Remove from food chain. Do render as blood and bone meal. Wear PPE for examination of animals.
	Listeriosis	Ingestion of infected brain	Remove from food chain. Wear PPE for the examination of animals.
	Hydatids	People – ingestion of tapeworm eggs (infected dog likicking face)	Personal hygiene about farm dogs
Reproductive (abortion)	Consider all cases potentially due to a zoonotic agent	Ingestion, inhalation, across mucous membreanes. Mosquio bites (Rift Valley Fever)	Wear PPE including P2 masks and goggles
Reproductive (mastitis and orchitis)	*Brucella melitensis*	Ingestion, inhalation, across mucous membranes	Wear PPE including P2 masks and goggles. Consume only pasteurised sheep and milk products.
Respiratory	Tuberculosis (exotic)	Ingestion, inhalation, across mucous membranes	Remove from food chain. Wear PPE for examination of animals.
Skin lesions	Dermatophilosis	Skin contact with wet, contaminated fleeces	Wear PPE for the examination of animals
	Orf (scabby mouth)	Skin contact	Wear PPE for the examination of animals
Sudden death	Anthrax	Direct contact with infected fluids and tissues	Wear PPE for the examination of animals, avoid contamination from discharges and avoid opening carcass.

What should be collected in the field?

To complete the Record of Disease Event form (RODE) and laboratory submission form you will need to gather these details.

- Species. Is more than one species affected?
- Number of deaths , number sick, number at risk, number examined.
- Age, condition score, sex.
- History and predisposing factors.
  - When did the outbreak begin?
  - What is the recovery time?
  - What vaccinations and treatments have the animals had?
  - Recent livestock introductions?

  Consider possible sources of introduction/spread. Grazing / feeding history, pasture/feed type and weed species (if suspect plant toxicity).
- Clinical history and signs.
- Primary syndrome.
- Lesions and necropsy findings.
- Owner and property details including the Property Identification Code.
- RODE forms are available at www.agriculture.vic.gov.au/sdi

Photographs

- Sick and dead animals.
- Lesions / pathology.

Samples

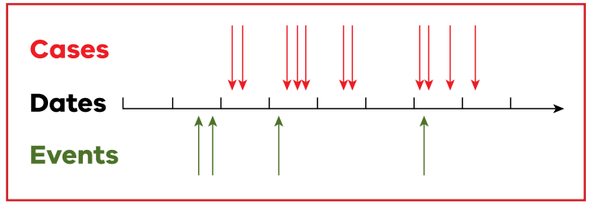
- From affected and healthy animals.
- Perform a necropsy.
- Check the sample collection guide.
- Describe lesions and take measurements.
- Be aware of zoonoses – collect samples carefully and wear appropriate PPE.

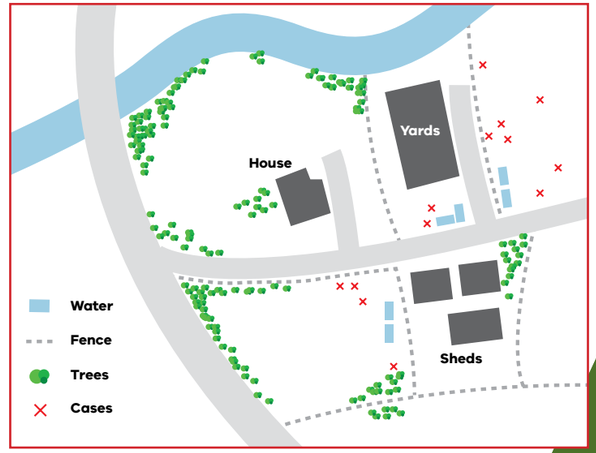
Timeline

- Sequence dates of disease cases and note clusters.
  - Find the first case – what happened before it?
  - Note other events that happened on the property within the timeline.
  - What's different when cases don't occur?

Details of the location

- Take GPS coordinates if possible.
- Address and PIC.
- Physical factors.
  - Infrastructure
  - Geography
  - Soil
  - Vegetation
  - Water sources
- Photos of layout and significant features.
- Spatial mud map of where cases occurred.
  - Identify clusters of cases.
  - Overlay geography and infrastructure.





Good blood collection

Please collect two of the following blood samples from each of 10 animals (five affected, five clinically normal):
2 x clotted bloods
2 x EDTA bloods

Careful handling of blood samples gives the best chance for thorough investigation and accurate diagnosis.

- Make sure you select the correct sample tube for the required tests
- Fill blood tubes
- Avoid haemolysis:
  - remove needle before transferring blood from a syringe to a tube
  - leave clot tubes standing upright to clot
  - mix anticoagulant tubes gently
  - allow tubes to cool in esky before placing on an ice block, don't freeze
  - don't allow tubes to overheat

Tube type	Description		Tests
Serum separation and clot activator Allows the clot to form so serum can be analysed	Gold and red tops or plain glass with red top		Serology Antibody and antigen tests Clinical biochemistry
EDTA Contains anticoagulant and used for complete blood counts	Purple tops		Haematology Haemoparasite Virus isolation Polymerase chain reaction
Lithium heparin Contains anticoagulant	Green tops		Clinical biochemistry Virus isolation

Good tissue sample collection

Careful collection of tissue gives the best chance for thorough investigation and accurate diagnosis

Ensure samples are representative of lesions
- sample the interface with normal tissue
- areas of different colour or consistency
- consider multiple sections for large lesions

Take fresh and fixed tissue samples

Fixed tissue
- use 10 times the volume of 10% buffered formalin as tissue
- can be drained before transportation (allow at least 24 hours for tissues to fix) - add a few millilitres of formalin to moisten tissue and seal well

Fresh tissue
- place in individual sterile containers and chill in esky/fridge.

Organ	Sample Size	Don't forget
Liver and spleen	10mm cube (fresh)	Multiple samples of normal tissue and pathology
Kidney	20mm long x 8mm wide (fixed)	Cortex, medulla, pelvis and stones
Heart	50mm cube (fresh liver and kidney for toxicology)	Left and right ventricles, atrium, septum, valves
Lung		Cranio-ventral and dorso-caudal areas
Lymph nodes	Whole lymph node (half fresh and half fixed)	Label container to identify which lymph node

Additional sample collection guide for syndromes seen in cattle

	Blood			Faeces & Urine	Priority tissue samples	Other samples
	Clotted	EDTA	Smear			
Ill thrift	✔	✔	✔	✔	Liver, kidney, heart, lung, spleen, GIT, lymph nodes	Any lesions
Neurological	✔	✔	✔		Brain, spinal cord, liver, kidney, heart, skeletal muscle	Rumen and intestinal contents, cerebrospinal fluid, aqueous humour, any lesions. Fresh kidney (50g) if suspect lead poisoning
Oral Lesions	✔	✔	✔		Vesicular fluid, epithelium from vesicles, oral, nasal, vesicular and tonsillar swabs in VTM or saline	Spleen, liver, lung, GIT, lymph nodes, any lesions
Reproductive	✔	✔			Aborted / stillborn foetus and placenta, Pericardial and intrathoracic fluid from foetus	
Respiratory Signs	✔	✔	✔		Lung, trachea, bronchial lymph nodes, pleural fluid, any lesions	Oral and nasal swabs in VTM (Viral and Transport Media) Bacto swab of lesions in TM (Transport Media)
Skin lesions	✔	✔	✔		Skin lesion, skin scrapings, pustular lesion swab in VTM, external parasites (70% alcohol)	Liver, kidney, any lesions
Sudden death (perform anthrax ICT prior to opening carcass. Do NOT perform necropsy if the anthrax ICT is positive)	✔	✔	✔	✔	Brain, liver, kidney, heart, skeletal muscle, lymph nodes, any lesions	Fluid from body cavities, bone marrow, aqueous humour, any suspect toxins

Additional sample collection guide for syndromes seen in sheep

	Blood			Faeces & Urine	Priority tissue samples	Other samples
	Clotted	EDTA	Smear			
Ill thrift	✔	✔	✔	✔	Liver, kidney, heart, lung, spleen, GIT, lymph nodes	Any lesions
Neurological	✔	✔	✔		Brain, spinal cord, liver, kidney, heart, skeletal muscle	Rumen and intestinal contents, cerebrospinal fluid, aqueous humour, any lesions. Fresh kidney (50g) if suspect lead poisoning
Oral Lesions	✔	✔	✔		Vesicular fluid, epithelium from vesicles, oral, nasal, vesicular and tonsillar swabs in VTM or saline	Spleen, liver, lung, GIT, lymph nodes, any lesions
Reproductive	✔	✔			Aborted / stillborn foetus and placenta, vaginal mucous or cervical mucous from cow, preputial wash from bull Pericardial and intrathoracic fluid from foetus	
Respiratory Signs	✔	✔	✔		Lung, trachea, bronchial lymph nodes, pleural fluid, any lesions	Oral and nasal swabs in VTM Bacto swab of lesions in TM
Skin lesions	✔	✔	✔		Skin lesion, skin scrapings, pustular lesion swab in VTM, external parasites (70% alcohol)	Liver, kidney, any lesions
Sudden death (perform ICT prior to opening carcass. Do NOT perform necropsy if the ICT is positive)	✔	✔	✔	✔	Brain, liver, kidney, heart, skeletal muscle, lymph nodes, any lesions	Fluid from body cavities, bone marrow, aqueous humour, any suspect toxins

Differential diagnosis for syndromes seen in cattle (not a complete list of diseases)

	Exotic	Endemic	Lab will undertake
Ill thrift	• Surra • Haemorrhagic septicaemia • Jembrana • Tick fever (babesiosis and anaplasmosis) (exotic to Victoria)	• Bovine Viral Diarrhea Virus (BVDV-1) / Mucosal Disease • Johne's disease • Intestinal worms and Coccidiosis • Liver Fluke • Theileriosis • Acute Bovine Liver Disease • Blue Green Algae • Trace mineral deficiency • Chronic plant toxicity	Surra - CATT, ELISA, PCR
Gastrointestinal	• Rinderpest	• Mucosal disease (BVDV) • Bovine Malignant Catarrh • Salmonellosis • Yersiniosis • Johne's disease • Intestinal worms and Coccidiosis	
Neurological	• Bovine Spongiform Encephalopathy • Rabies • Heartwater	• Botulism • Bovine Herpesvirus (BHV- 5) • Toxicity - Chemical / plant • Polioencephalomalacia • Metabolic – Grass Tetany, Ketosis, Hypocalcaemia • Neoplasm	BSE - Histology
Oral Lesions	• Foot and Mouth Disease • Vesicular stomatitis • Bluetongue • Jembrana	• Mucosal disease (BVDV-1) • Bovine Malignant Catarrh • Bovine papular stomatitis • Actinobacillosis and actinomycoses • Non-infectious causes such as trauma	FMD – ELISA & PCR VS – VNT, virus isolation (referral)

Differential diagnosis for syndromes seen in cattle (not a complete list of diseases)

	Exotic	Endemic	Lab will undertake
Reproductive	• Bovine brucellosis • Bovine Viral Diarrhoea Virus (BVDV-2) • Infectious pustular vulvovaginitis • Bovine Herpesvirus, exotic serotype • Rift Valley fever	• Vibriosis • Trichomoniasis • Bovine Viral Diarrhoea Virus (BVDV-1) • Leptospirosis • Arboviruses – Akabane, Bovine Ephemeral Fever	Brucellosis – RBT, CFT, PCR, Culture
Respiratory signs	• Contagious Bovine Pleuropneumonia • Bovine tuberculosis • Bluetongue • Bovine Herpesvirus, exotic serotypes • Meliodosis	• Bovine Respiratory Disease • Infectious Bovine Rhinotracheitis (BHV-1.2b) • Pneumonia • Bovine Ephemeral Fever • Lung worm	CBPP – Histology, PCR, Culture TB – Histology, PCR, Culture
Skin lesions	• Lumpy skin disease • Bluetongue • Aujeszky's • Surra • Screw Worm Fly • Haemorrhagic septicaemia • Irritation from cattle tick or buffalo fly	• Acute Bovine Liver Disease • Bovine Herpes Virus (BHV-2) • Bovine papillomavirus (Warts) • Photosensitisation • Ringworm • Mange (*Chorioptes bovis* or *Demodex bovis*) • Enzootic Bovine Leucosis	LSD – Histology, EM microscope
Sudden death	• Haemorrhagic Septicaemia • Rinderpest • Foot and Mouth Disease (young calves) • Tick fever (babesiosis and anaplasmosis) • Bluetongue	• Anthrax • Toxicity – Chemical / plant • Clostridial diseases – Enterotoxaemia, Tetanus, Black Leg, Black disease • Mucosal disease (BVDV) • Theileriosis • Acute Bovine Liver Disease • Bovine Malignant Catarrh • Botulism • Metabolic diseases • Blue Green Algae poisoning • Lightning strike	HS – PCR, Culture

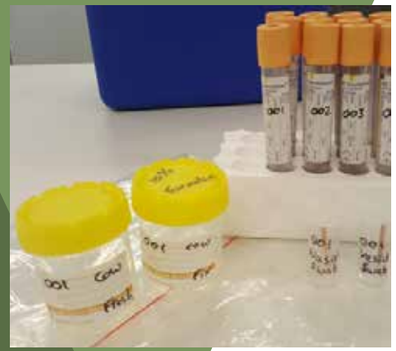
Differential diagnosis for syndromes seen in sheep (not a complete list of diseases)

	Exotic	Endemic	Lab will undertake
Ill thrift	• Maedi-Visna • Scrapie • Bluetongue (BTV) • Foot and Mouth disease	• Johne's disease • Intestinal Worms and Coccidiosis • Liver Fluke • Blue Green Algae • Trace mineral deficiency • Chronic plant toxicity • Malnutrtiion • Worms (Haemonchus or scour worms) • Paratuberculosis • Toxicities (eg pyrrolizidine alkaloidosis)	BTV serology and Polymerase Chain Reaction (PCR). FMD on cattle. Histology for scrapie and Maedi-Visna
Gastrointestinal	• Peste des Petits Ruminants (PPR) • Rift Valley Fever • Bluetongue Virus • Lamb dysentry	• Johne's disease • Toxicity (Plant / Chemical) • Scour worms • Salmonellosis • Yersiniosis • Coccidiosis	Virology for PPR, Rift Valley Fever and Bluetongue Virus.
Neurological	• Scrapie • Maedi-Visna	• Toxicity – Chemical / plant • Polioencephalomalacia • Metabolic • Listeriosis • Staggers diseases • Toxicological syndromes • Pregnancy toxaemia	Histology for Maedi-Visna and Scrapie
Oral Lesions	• Foot and Mouth disease • Bluetongue Virus • Peste des Petits Ruminants (PPR) • Rift Valley Fever (RVF)	• Traumatic lesions (eg grass seeds) • Renal failure	Virology for FMD, Bluetongue Virus, Peste des Petits Ruminants (PPR) and Rift Valley Fever (RVF).

Differential diagnosis for syndromes seen in sheep (not a complete list of diseases)

	Exotic	Endemic	Lab will undertake
Reproductive	• *Brucella melitensis* • Rift Valley Fever • Bluetongue Virus • Foot and Mouth disease	• *Brucella ovis* (rams) • Abortive agents (Camplyobacter, Listeria, Toxoplasma, etc) • Malnutrition	Bacterial culture for Brucella. virology for Rift Valley Fever, Bluetonge Virus and FMD.
Respiratory signs	• Maedi-Visna • Ovine Pulmonary Adenomatosis • Peste des Petits Ruminants	• Pneumonia • Lung worm (Dictyocaulis) • Nasal bot	Virology for Maedi-Visna, Ovine Pulmonary Adenomatosis, Peste des Petits Ruminants.
Skin and fleece lesions	• Scrapie • Sheep Pox • Sheep Scab	• Photosensitisation • Lice • Flystrike • Scabby mouth • Photosensitisation	Histology, Virology, Parasitology for these.
Sudden death	• Peste des Petits Ruminants • Rift Valley Fever • Bluetongue Virus • Foot and Mouth disease (lambs)	• Anthrax • Clostridial diseases – Enterotoxaemia, Tetanus, Black Leg, Black disease • Metabolic diseases • Blue Green Algae • Pulpy kidney • Tetanus • Other Clostridial diseases • Salmonellosis • Hypocalcaemia	Virology for Peste des Petits Ruminants, Rift Valley Fever, Bluetongue Virus, FMD.
Lameness	• Foot and Mouth disease • Bluetongue Virus	• Footrot • Benign footrot • Foot abscess	Virology for FMD and Bluetongue Virus

* There are subsidies available for TSE testing. Contact Agriculture Victoria.



Handling samples in the field

- Ensure samples are taken prior to giving treatments (where possible).
- Ensure enough samples are collected to represent the whole herd.
- Collect fresh and fixed samples first, then gut samples.
- Label samples as soon as you take them.
- Ensure labelling is clear and indelible. Record Property Identification Code (PIC), animal identification, date and vet on label.
- Tissue samples should be prepared as both fresh and fixed.
- Use plenty of 10% formalin to fix tissues.
- Fix for 24 hours then formalin can be drained off for transport. Add a few mL of formalin to the container, or wrap tissue in paper towel moistened with formalin, and place in leak proof container.
- Clean any surface contamination from tubes and containers.
- Place tubes/vials into zip-lock bags to keep them clean and contained together.
- Keep fresh samples cool while in the field with ice bricks.
- Don't leave samples standing in the sun while working.
- Use an esky and ice bricks to store samples in transit.

Ill thrift

Clinical signs

- Depressed animals.
- Weight loss or failure to gain weight.
- Emaciation.
- Sudden losses in production.
- Weakness.
- Lethargy.
- Cattle: oedema in lower parts of body.
- Cattle: swollen lymph nodes.
- Cattle: death.
- Tail in mob.
- Diarrhoea (possibly).
- Bottle jaw.
- Sheep: Fleece break.

Samples to collect

- Acute and convalescent blood samples for serology – collect in clot tubes and EDTA.
- Blood smears.
- Tissue samples of any lesions found.
- Tissue samples from dead animals – lymph nodes, liver, kidneys, heart, lung, spleen, GIT.
- Faeces.
- Urine.

Remember to ask

- How long have the animals been affected?
- What proportion of animals are affected?
- Are other species affected, what are they?
- Have any animals been introduced to the property?
- Have any animals been removed from the property?
- Have you had a problem with biting or blood-sucking insects?
- Drenching history.
- Any supplementary feeding?
- Any history of Johne's disease and is the flock/herd vaccinated?

Neurological signs

Clinical signs

- Behavioural changes.
- Unusual vocalisation.
- Unusual posture and gait.
- Puritis and self-trauma.
- Sheep: fleece derangement.
- Sheep: Fall over when moved.
- Weakness.
- Ataxia.
- Paralysis.
- Blindness.

Samples to collect

- Acute and convalescent blood samples for serology – collect in clot tubes and EDTA.
- Blood smears.
- Tissue samples of any lesions found.
- Tissue samples from dead animals – liver, kidneys, brain, spinal cord, heart, spleen.
- Aqueous humour.
- Smears of brain, vascular tissue and spleen.
- Fluid from body cavities.
- Rumen and intestinal contents.
- Faeces.
- Urine.
- Transmissable Spongiform Encephalopathies (sheep scrapie, cattle BSE) specific samples, up to two animals.

Remember to ask

- How long have the animals been affected?
- What proportion of animals are affected?
- Are other species affected, what are they?
- Have any animals been introduced to the property?
- Have any animals been removed from the property?
- Has there been any recent rainfall?
- Have animals had access to a rubbish dump?
- Has any new equipment or feed been brought onto the property?
- Sheep: What have they been grazing?

Oral lesions and vesicular diseases

Clinical signs

- Unwillingness to eat.
- Excess salivation.
- Depressed animals.
- Fever.
- Vesicles/erosions/ulcerations in the mouth.
- Check if animals also present with:
  - lameness
  - reluctance to move
  - similar lesions on the feet or the teats.

Samples to collect

- Vesicular fluid – from unruptured vesicles collect via a syringe or a swab and place in plain sterile tube.
- Nasal, oral and tonsillar swabs.
- Place swabs in 0.5ml of phosphate buffered saline or viral transport media.
- Epithelium from unruptured vesicles.
- Epithelial tags from freshly ruptured vesicles: 1–2 cm.
- Oropharyngeal fluid, collected with a probang, if this is available.
- Acute and convalescent blood samples for serology – collect in clot tubes and EDTA.
- Tissue samples from dead animals – lymph nodes, spleen.

Remember to ask

- How long have the animals been affected?
- What proportion of animals are affected?
- Are other species affected, what are they?
- Have any animals been introduced to the property?
- Have any animals been removed from the property?
- Has any new equipment or feed been brought onto the property?
- Have there been visitors to the property recently?
- Has anyone who has contact with the animals been overseas recently?
- What have they been grazing?

Reproductive signs

Clinical signs

- Low pregnancy/scanning rate.
- Low calving/lambing rate , low marking or weaning rates.
- Protracted lambing/calving.
- Abortion.
- Stillborn calves/lambs.
- Weak calves/lambs.
- Retained placentas.

Samples to collect

- Blood samples from live animals for serology – collect in clot tubes and EDTA.
- Swabs from placenta or foetus.
- Pericardial and thoracic fluid from aborted/stillborn foetuses.
- Swab of uterine discharge
  – place swabs in 0.5ml of phosphate buffered saline or viral transport media.
- Whole placenta or foetus chilled.
- Tissue samples from foetus– liver, kidneys, lung, brain, heart.
- Sheep: foetal abomasum.

Remember to ask

- Do you pregnancy test your herd/flock?
- What are your pregnancy testing, calving/lambing results?
- Have you noticed any aborted foetuses in the paddocks or yards?
- Have you noticed any deformed calves/lambs?
- Do you vaccinate for reproductive diseases?
- Sheep: Do you vaccinate for abortion in ewes?
- Sheep: When did you mate these ewes?
- Do you run heifers and cows and maiden ewes/ewes separately?
- Have you introduced new bulls/rams to the property and how have they been managed?
- Do you have significant problems with wild dogs?
- Sheep: Have you tested your rams for *Brucella ovis*, or are they all from accredited studs?
- Sheep: What has ewe nutritional status been like at mating and throughout pregnancy?

Respiratory signs

Clinical signs

- Coughing.
- Rapid respiration.
- Nasal discharge
  – mucopurulent
  – frothy
  – bloody.
- Tail in mob.
- Respiratory distress.
- Conjunctivitis.
- Sudden death.

Samples to collect

- Nasal, oral and tonsillar swabs.
- Swabs from lesions.
- Acute and convalescent blood samples for serology.
- Collect in clot tubes and EDTA.
- Tissue samples of any lesions found.
- Tissue samples from dead animals – lymph nodes, liver, kidneys, pleural fluid, spleen.

Remember to ask

- How long have the animals been affected?
- What proportion of animals are affected?
- Are other species affected, what are they?
- Have any animals been introduced to the property?
- Have any animals been removed from the property?
- Have the animals been transported recently?
- Are there any wild/feral animals which could contact stock?
- Sheep: Have the animals been lot or confinement fed?
- Sheep: Have they been droved, yarded, transported or shorn recently?

Skin lesions

Clinical signs

- Depressed animals.
- Maggots in wounds or openings such as eyes.
- Cutaneous nodules – may become necrotic.
- Enlarged lymph nodes.
- Sheep: odour of flystrike.
- Oedema in limbs and ventral parts of body.
- Scratching, biting, rubbing and itching.
- Loss of hair/wool.
- Sheep: fleece derangement.
- Scabs.

Samples to collect

- Acute and convalescent blood samples for serology
  – collect in clot tubes and EDTA.
- Nasal, oral and tonsillar swabs.
- Place swabs in 0.5ml of phosphate buffered saline or viral transport media.
- Skin scrapings at site of lesions and adjacent tissue.
- Crusts, scabs and swabs from lesions.
- Any external parasites found (in 70% alcohol).
- Fresh and fixed tissue samples from dead animals - lymph nodes, kidney, liver, spleen.

Remember to ask

- How long have the animals been affected?
- What proportion of animals are affected?
- Are other species affected, what are they?
- Have any animals been introduced to the property?
- Have any animals been removed from the property?
- Has any new equipment been in contact with the animals?
- Do you have problems with biting insects?
- Sheep: What fly control measures do you use?
- Sheep: Do you have a problem with straying sheep?
- Sheep: Have you bought sheep in the past 12 months?

Sudden death

Clinical signs

- Single or multiple animals found dead.
- Death not preceded by obvious signs of disease.
- Animals dying in rapid succession.

Samples to collect

- Perform anthrax ICT before conducting necropsy.
- Blood samples from live affected and normal animals for serology, collect in clot tubes and EDTA.
- Swabs from any lesions found.
- Swab of any bloody discharge from any orifice.
- Tissue samples of any lesions found.
- Tissue samples from dead animals – lymph nodes, liver, kidneys, lung, brain, bone marrow, spleen.
- Fluid from body cavities.
- Faeces.
- Urine.

Remember to ask

- What have weather conditions been like lately?
- How long have the animals been dying?
- What proportion of animals have died?
- Are other species affected, what are they?
- Have any animals been introduced to the property?
- Have any animals been removed from the property?
- Has any new equipment or feed been brought on to the property?
- Has anyone travelled overseas recently? To where?
- Any property or locality history of anthrax?

In the case of a sudden unexplained death in cattle or sheep, test for anthrax.

Anthrax testing should be carried out on all sudden, unexplained deaths of cattle, sheep and other anthrax susceptible livestock. Field testing of cattle and sheep carcases can be carried out using a penside immunochromatographic test (ICT). Agriculture Victoria Animal Health and Welfare staff can provide training on the use of the test kits and can provide kits at no cost. ICT results are available in 15 minutes.

Gastrointestinal disease

Clinical signs

- Scouring, diarrhoea, dags.
- Weight loss.
- Depression.
- Production loss.
- Deaths.

Samples to collect

- Faecal samples: individual from sick, and bulk (10+) from stock.
- Blood samples from live affected and normal animals in EDTA and clot tubes.
- Tissue samples (fresh and fixed) from any lesions seen at necropsy.
- Tissue samples (fresh and fixed) from along the GI tract: rumen, abomasum, proximal duodenum, jejunum, ileum, caecum, colon.
- Gut contents.
- Fluid from body cavities.

Remember to ask

- Drenching history?
- How long have the stock been on the property?
- What proportion of the stock are affected (just this mob, or others)?
- Are any other species affected?
- What are they grazing or being fed?

Lameness in sheep

Clinical signs

- Lameness.
- Weight loss.
- Tail in mob.

Samples to collect

- Examine feet.
- Swabs from lesions in interdigital space or underrun hoof.
- Scabs if present.
- Blood samples from normal and affected animals in EDTA and clotted tubes.

Remember to ask

- Do you footbathe the stock?
- Have you bought in stock in the past 12 months?
- Do you have a problem with straying stock?
- Have your sheep had footrot before?
- Have you attempted to eradicate footrot in the past?
- Have you noticed increased insect activity after heavy rain?

Practising good biosecurity

Vehicles, clothing, footwear and equipment can all spread disease between properties

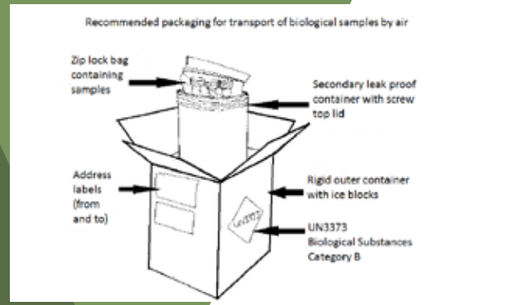
- Take cleaning equipment in your vehicle.
- If possible, leave your vehicle outside the property.
- Include a bucket, brush, disinfectant and bin bags. Common disinfectants such as chlorine based and Virkon are effective against most infectious agents.
- Put clean overalls on over your clothes before entry.
  - clean disposable or dedicated overalls.
  - clean gumboots.
- Wear disposable gloves to collect samples.
- Establish clean and dirty zones at the entrance to the property.
- Equipment, clothing and footwear that have been in contact with the dirty zone, must be cleaned or placed in bags when exiting the dirty zone.

EMERGENCY ANIMAL DISEASE WATCH HOTLINE
1800 675 888

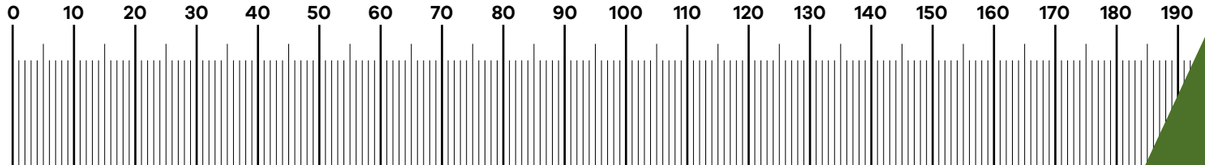
- Always clean before disinfecting. Mud and dirt can prevent disinfectants from being effective.
- Pay particular attention to footwear, hands and fingernails as well as equipment used on animals.
- Collect all waste and disposable equipment in a plastic bin bag.
- Remove overalls as you depart the property and place in a plastic bag.
- All mud and dirt should be cleaned from your boots, including the soles.
- Once cleaned the boots should be disinfected.
- Clean vehicle on exit from the property, paying particular attention to wheel arches and tyres.

If you suspect a notifiable disease call the EAD Watch Hotline for advice before leaving the property. Do not allow animals to be moved off the property. Leave disposable equipment securely on the property for later disposal post investigation.

Packaging samples for transport



- Refrigerate samples as soon as you return from the property.
- Do NOT freeze samples.
- List all samples taken on the submission form.
- Samples must be sent to the Veterinary Diagnostic Services AgriBio laboratory as soon as practical.
- Place all sample containers in zip-lock bags for transport.
- Place bags of samples in a rigid container (esky/cool box).
- Use absorbent material to line container in case of leaks.
- Pack all samples with ice blocks in the transport container.
- Do not pack with wet ice.
- Place laboratory submission form in a separate zip lock bag within the transport container.
- Seal the container with tape.
- If sending via courier, place the consignment note on top of the container.
- If samples are travelling by air, packing must comply with the dangerous goods regulations for
  – UN3373, Biological substances, Category B.



Submitting samples and reports

Veterinary Diagnostic Services
AgriBio Specimen reception
Main Loading Dock
5 Ring Rd
Latrobe University
Bundoora 3083

Phone: (03) 9032 7515
Fax: (03) 9032 7604
Email: vet.diagnostics@ecodev.vic.gov.au

Please contact your local Agriculture Victoria veterinary officer for further information

ATTWOOD	9217 4200	**ELLINBANK**	5624 2222	**SEYMOUR**	5735 4300
BAIRNSDALE	5152 0600	**GEELONG**	5226 4667	**SWAN HILL**	5033 1290
BALLARAT	5336 6856	**HAMILTON**	5573 0900	**TATURA**	5833 5222
BENALLA	5761 1611	**HORSHAM**	4344 3111	**WANGARATTA**	5722 7101
BENDIGO	5430 4444	**LEONGATHA**	5662 9900	**WARRNAMBOOL**	5561 9946
COLAC	5233 5504	**MAFFRA**	5147 0800	**WODONGA**	(02) 6043 7900
ECHUCA	5482 1922	**RUTHERGLEN**	(02) 6030 4500		

Information correct 2019.
Please check the Agriculture Victoria website for your current SDI contact

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