animalhealth AUSTRALIA

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Lamb feedlot

Producer post mortem guide

Disclaimer

This tool has been developed as a basic hands-on guide to help producers gather valuable information about lamb deaths on-farm. It is not intended to replace the role of veterinarians or pathology laboratories in providing a clinical diagnosis. The diseases described are not an exhaustive list of the conditions that can occur in feedlots therefore the information in this book should not be used to replace veterinary care, rather as a guide to aid diagnosis when veterinary care in unavailable.

Contents

Introduction

Purpose of this tool

The Australian sheep industry is dedicated to best practice management, animal welfare and husbandry. Sheep and lamb producers are passionate about improving lamb survival and ensuring they run highly professional, sustainable and productive businesses. This lamb feedlot disease investigation tool provides a hands on tool to optimise lamb survival when feeding concentrates in containment (lot feeding). The tool outlines a basic step-by-step process of carrying out on-farm postmortem exams (PMs) of lambs and highlights the important observations to take note of for certain diseases. You can use the tool and accompanying resource sheets to analyse the results of the PM, draw likely conclusions about the cause of lamb death and assess the management changes that will optimise lamb survival rates.

The practice of lot feeding lambs inherently occurs after lambs are weaned from their dams, which is a known period of stress in lambs. Furthermore, dietary changes, potential transport and mixing of lambs of different age groups and origins, as is often the case when lot feeding, exacerbates this stress. Under these circumstances, certain infectious agents which may be present in healthy animals may cause disease in these stressed lot fed lambs.

Nutrient intake is the primary driver of lamb growth rate and feed efficiency, consequently, any cause of reduced intake threatens to considerably decrease production and profitability. Many common diseases in lamb feedlots initially result in decreased intake and frequently result in removal of lambs and mortality. Surveys of lamb feedlot operators have identified acidosis and shy feeding as the major contributors to production loss; however, without accurate diagnostics many producers are possibly crediting unknown deaths to common causes.

Introduction

When should I use the tool?

Understanding the limiting factors of any farm enterprise provides the information necessary to help optimise productivity and profitability. This tool will allow you to better understand the key factors impacting lamb survival in your feedlot and enable you to take effective steps to minimise deaths and maximise growth rates. A PM can be done up to 36 hours after death in cold conditions and 12–24 hours in warm or hot conditions. On first inspection the reasons for death can appear obvious (for example predation, however it is not always the primary cause of death). It is worth carrying out a full PM because the primary (actual) cause of death is often not visible externally.

How to use this tool

Follow the instructions in **Step 1** to carry out a post mortem exam. Use the recording sheet provided concurrently. While going through the stages of **Step 1**, if you come to a diagnosis, continue on to **Step 2: The management implications**. An example recording sheet is provided at the back of the book to show you how to fill in the recording sheet to come up with a diagnosis.

Seeking further advice

This tool has been developed as a basic hands-on guide to help producers gather valuable information about lamb deaths. It is not intended to replace the role of veterinarians or pathology laboratories in Could can be difficult to conclusively diagnose without a pathology test. Where a cause of death is still unclear following the PM, and deaths are still occurring, contact your veterinary practitioner or state department of primary industries veterinary officer. Most states have programs where the cost of diagnostic testing may be covered by the state department if a significant disease is suspected. Consult your veterinary practitioner or state department of primary industries veterinary officer for further advice.

Storage and handling

If the cause of death is unclear following the PM process, take any suspect lambs (or organs) to your vet for further analysis. Wherever possible whole dead lambs are preferred to avoid any risk of contamination to organs, which can make an accurate diagnosis difficult.

To maintain the integrity of any samples (including whole lambs) and to prevent any further degradation:

- place the samples in a double layer of plastic bags
- store the samples in a refrigerator or an esky on ice)*
- deliver the lamb or organ within 12 hours of collection.*

NOTE: Some infectious sheep diseases are transmissible to humans.

ALWAYS wear protective clothing when handling dead lambs and their organs.

NEVER conduct a PM on lambs that have unclotted blood oozing from any orifice, have an absence of rigor mortis or there is a history of anthrax on the property.

NEVER place lambs or organs in a refrigerator or esky used for storing food for human consumption

Step 1: Carrying out a post mortem examination

This post mortem guide should be used to conduct basic lamb post mortems on your property when veterinary assistance is not available.

The following section outlines a step-by-step process to carrying out a PM. With practice you will be able to carry out a PM in about 10 minutes and will start to become familiar with the tell-tale signs that indicate potential causes of death. Working with a fresh carcase is best — depending on conditions, a PM can be done up to 36 hours after death in cold conditions and 6–24 hours in warm or hot conditions. Handle the carcase with care to maintain its condition.

It is important to carry out the full postmortem to be able to draw accurate conclusions about the likely cause of death — even if you suspect you have identified it part way through the process. Many diseases can occur as a result of other diseases and conditions and so understanding the full picture will be important for management implications.

NOTE: Some infectious sheep diseases are transmissible to humans.

ALWAYS wear protective clothing when handling dead lambs and their organs.

NEVER conduct a post mortem on lambs that have unclotted blood oozing from any orifice, have an absence of rigor mortis or there is a history of anthrax on the property.

NEVER place lambs or organs in a refrigerator or esky used for storing food for human consumption.

Common changes after death

These are some changes that occur after death and are not necessarily a sign of the cause of death:

- vaginal/rectal prolapse due to gas distension from gut contents
- dark red lungs on down side where lamb died
- bloated carcase
- froth coming out of nostrils or mouth.

Record your observations

It is critical to record your observations as you work your way through the PM. Accurate and clear records will prove invaluable if you cannot easily determine the cause of death and need to seek further support from your vet. A recording sheet has been provided with the Lamb post mortem tool. When you have completed the PM and filled in the Recording sheet and have a likely diagnosis, continue to **Step 2: The management implications** for the sections for the condition(s) most likely to be implicated based on your post mortem exam.

Step 1: Carrying out a post mortem examination

Equipment required:

- ☐ sharp knife (~15cm blade, 1/4 curve to straight)
- ☐ sharpening steel
- ☐ gardening loppers
- ☐ sharp scissors
- ☐ urine test strips that measure pH and glucose (can be purchased from pharmacies)
- ☐ bucket or jug of clean water
- ☐ disinfectant
- ☐ rubber gloves and apron (cutproof gloves are a good idea)
- ☐ recording sheet and pencil
- ☐ clean, dry container or bag to store organ samples if required for submission to your veterinarian.

Before starting the PM, fill in the recording sheet with the date, the pen ID and name of PM conductor.

Tick any applicable boxes as you go through the post mortem exam. At the end, if you have not found a diagnosis, tally your 'yes' ticks (as in the example on the back page and see if there is one condition that is more likely than the others and if so, proceed to **Step 2: Management implications**.

History (signs observed before lamb death):

	no	yes
Is the space allocation in the pen less than 2.1m^2/lamb?	☐	☐
Did lambs get put on their full ration in less than seven days?	☐	☐
Is the mob bigger than 350 lambs in a pen?	☐	☐
Did the lambs enter the feedlot at under 35kg?	☐	☐
Has there been bad weather or any extreme weather changes in the last 24 hours?	☐	☐
Has there been water pooling in pens?	☐	☐

	no	yes
Did the lambs receive two vaccines, four weeks apart of either '3 in 1', '5 in 1', '6 in 1' or '7 in 1' before feedlot entry?	☐	☐
	☐ unsure	
Were the lambs vaccinated with any of the above on feedlot entry?	☐	☐
	☐ unsure	

If you answered no or unsure to either of the above two questions record a tick in the box 'Incomplete/ unknown '3 in 1' or '5 in 1' vaccination status'

Step 1: Carrying out a post mortem examination

	no	yes
Was the lamb lying down (recumbent) before death?	☐	☐
Was the lamb not eating (anorexic) before death?	☐	☐
Was the lamb dull before death (i.e. unable to stand or move, head pressing or segregated from the rest of the lambs)?	☐	☐
Was the lamb star gazing (standing or sitting with its head tilted up to the sky)?	☐	☐
Was the lamb blind before death (getting stuck in fence or knocking into feeder etc.)?	☐	☐
Was the lamb walking in a circle (circling) before death?	☐	☐
Was the lamb lame when walking (like a cat on a hot tin roof)?	☐	☐

	no	yes
Was the lamb's penis twitching?	☐	☐
Was the lamb straining to urinate?	☐	☐
Did the lamb have a bloated belly (abdominal distension)?	☐	☐
Was the lamb found with froth coming out of its mouth?	☐	☐

Step 1: Carrying out a post mortem examination

Rule out anthrax

	no	yes
Is carcase in rigor mortis? (NB absence of rigor can be a sign of severe septicaemia e.g. anthrax or clostridia. However, it can be variable in onset, duration and severity and can be missed. Thus, absence of rigor may not be significant):	☐	☐
Bloody discharge from any orifice (NB bloody nasal discharge may be due to nasal congestion at death and rupture of vessels as a normal part of autolysis):	☐	☐
History of anthrax on property:	☐	☐
	☐ don't know/ not known	
Suspicion of anthrax (i.e. sudden death with no other explanation +- no rigor, bloody discharge, hx of anthrax on property:	☐	☐

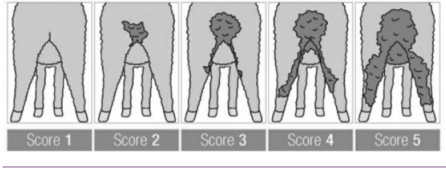
If 'yes' to above question. DO NOT PERFORM POST MORTEM.

Notify district veterinary officer (DVO) of suspect case of anthrax so that they may test for this disease which is contagious to humans.

CALL 1800 675 888

External observations

	no	yes
Is the body condition score low (≤2 out of 5)?	☐	☐
Is there crusty discharge at the nostrils?	☐	☐
Does the lamb have sunken eyes?	☐	☐
Does the lamb have a red line going around one or more hoof walls?	☐	☐
Does the lamb have a high dag score (≥3/5)?	☐	☐
Does the lamb have a rectal prolapse?	☐	☐



Internal observations:

1. Wear gloves.
2. Place lamb on its side with its left side facing down (as in photo below).

Step 1: Carrying out a post mortem examination

3. Cut under the front armpit and flay the joint backwards with a sharp knife. Keeping the knife away from the wool continue to flay the skin towards the back bone (below).

4. Make another cut under the flank and flay the back leg back at the hip joint.

5. Cut the muscle covering the belly to expose the abdominal cavity (be careful not to get sprayed with rumen contents by accidentally puncturing the rumen).

Step 1: Carrying out a post mortem examination

6. Using your gardening loppers, cut along the ribs parallel with the backbone (spine).

7. Again, using your loppers cut the sternum at the same distance that you made your rib cuts.

Step 1: Carrying out a post mortem examination

8. Flay the rib cage back so you have now exposed the chest cavity.

9. Take a photo at this stage before you disrupt any organs. This is called display stage.
10. Now you can examine the animal and record your internal observations.

Internal observations

	no	yes
If the lamb is a male is the penis swollen/ obstructed/reddened or is there any sandy material coming from the tip? Is the body condition score low (≤2 out of 5)?	☐	☐
Do you see swelling around the skin near the penis that looks yellow?	☐	☐
Can you smell or see urine within the abdomen? (that wasn't caused by your post mortem exam)?	☐	☐
Is the bladder ruptured?	☐	☐

If you answered yes to any or all of these questions, the lamb likely died of water belly. Continue to the water belly section on page 25.

	no	yes
If the bladder is full collect a urine sample. Is there glucose in the urine?	☐	☐

If you answered yes to the above, the lamb likely died of pulpy kidney. Continue to the pulpy kidney section on page 20.

Step 1: Carrying out a post mortem examination

If the lamb has been dead for less than two hours, you can examine the rumen and take a pH sample. After this the rumen pH starts to increase and the inner lining starts to slough and decompose which renders the test useless.

	no	yes
The rumen is the biggest of the four stomachs, it has what looks like a shaggy carpet (papillae) on its inside wall. Take a rumen pH sample by squeezing the rumen contents and dipping the test strip in the liquid. Follow your test strip instructions to read the pH. Is the rumen pH under 5?	☐	☐
Is the rumen full of undigested grain or concentrates with very little fibre?	☐	☐
Is the inner wall of the rumen reddened and sloughing off?	☐	☐

If you answered yes to the above questions the lamb likely died of acidosis. Continue to the acidosis section on page 21.

	no	yes
Does the lamb have blood flecked faeces?	☐	☐
Are the intestines reddened?	☐	☐

The lamb may have died of salmonella. Salmonella can transfer to people. Wear gloves when handling the carcase. Handle the body with care on disposal and wash hands thoroughly after examination. Go to page 29.

Step 1: Carrying out a post mortem examination

Continue onto the chest cavity if you do not already have a diagnosis.

	no	yes
Did the lungs stick to the ribs when you removed the rib cage (=pleurisy)?	☐	☐
Are the lungs meaty especially along the bottom edge?	☐	☐
Does a piece of what felt like meaty lung sink in water?	☐	☐
Is there pus when you make bread loaf like slices through the lungs?	☐	☐

If you answered yes to any of the above questions and the lungs look abnormal in over 60% of the lung tissue, then the lamb likely died from pneumonia, go to the pneumonia section on page 23.

Finally examine the heart sac.

	no	yes
When you cut into the heart sac does it have straw coloured fluid with clots in it	☐	☐

If you answered yes to the above the lamb may have died of pulpy kidney. Go to the pulpy kidney section page 20.

If you have not reached a diagnosis by now tally up the boxes you ticked yes for (if any) and see if there is one condition that is more likely than the others and if so, proceed to **Step 2: Management implications.**

If you still do not have a diagnosis, consider contacting your veterinarian for advice especially if more deaths occur. Not all conditions can be diagnosed on post mortem examination and further testing may be necessary.

Step 2: Management implications

Pulpy kidney

What is it?

- Pulpy kidney or Enterotoxaemia is a blood poisoning of sheep caused by the bacteria Clostridium perfringens and the liberation of its fatal type D toxins.
- Sheep acquire the organism early in life via ingestion.
- The organism multiplies slowly under normal conditions and toxin levels do not build up in this instance. However sudden changes in diet, particularly an increased plane of nutrition (as may often be the case with entry into feedlots), results in fermentable carbohydrate entering the small intestine, providing a substrate in which the organism may readily multiply.
- This often occurs when lambs entering feedlots have not been adequately adapted to grains or concentrated rations.

Can I treat it?

No. Unfortunately there is no effective treatment, but the good news is that there is a vaccine!

What should I do next?

Prevention is key:

- Introduce concentrates slowly to a lamb's diet over a period of 21 days.
- Ensure correct vaccination on entry to feedlot with at least a '3 in 1' vaccine.
- Teach new staff how to properly administer the vaccine.
- If vaccination status is unknown prior to feedlot entry, ensure lambs are revaccinated four weeks later after initial dose.
- Lambs need two vaccines (usually one at marking and one at weaning) to prevent against pulpy kidney disease.
  - » If they only receive one vaccine in this time period, they will have incomplete immunity and so a second vaccine a month after the initial dose is necessary.
  - » If this time period has already passed (i.e. it is over a month since their first dose) restart vaccine course ensuring one vaccine is given as per label instruction and then the booster dose is given four weeks later.

Acidosis

What is it?

A fermentation disorder in the rumen characterised by a lower than normal ruminal pH (≤ 5.0). The condition has long been a major issue when introducing ruminants to grain/concentrate-based diets, as they to adapt to converting the highly soluble carbohydrates to useable energy sources.

If a sheep's diet is changed to highly soluble carbohydrates (such as grains) too suddenly, (increasing grain feeding by more than 25g/head/day over a period shorter than 21 days), there is insufficient time for lactic acid utilising rumen microbes to proliferate, causing ruminal fluid pH to reduce which will lead to acidosis.

Can I treat it?

Yes. But this may be difficult in a feedlot setting.

- Remove affected animals from grain.
- Provide ad lib access to hay/silage.
- Nil access to water for 24 hours.
- Will have to reintroduce grain/concentrates slowly starting at 25g/head/day over a period of at least 21 days.

Affected sheep that are obviously lethargic or have distended abdomens, runny faeces or are lame should be treated:

- Drench with bicarb solution at 1 gram bicarb/kg liveweight.
- Metacam subcutaneous injection (1ml/20kg).
- Oxytetracycline LA (1ml/10kg) to prevent secondary infections.

Sheep that are down or cannot travel:

- humanely euthanise.

Step 2: Management implications

It is possible that two to three weeks post acidosis event you will see cases of thiamine deficiency induced Polioencephalomalacia (PEM). Consult a veterinarian who can prescribe vitamin B1 (thiamine) injections or drenches.

What should I do next?

- Introduce concentrates to lambs slowly over a period of 21 days starting at 25g/head/day and increasing by this much daily. Have fibre present when doing so.
- Decrease stocking rate to 5m^2/lamb if it is higher than this.
- Ensure lambs are of a similar weight range when placing them in pens together.
- If there are lambs which are not eating or separating themselves from the rest of the mob, remove them and feed them separately if viable.
- Consider using buffers in your ration. Consult your nutritionist for further information.
- Ensure lambs have shade within their pens.

Pneumonia

What is it?

Also called ovine respiratory complex or summer pneumonia, the disease is usually multifactorial in nature and caused by a mix of environmental factors, animal factors and pathogen factors (bacteria and viruses).

Environmental factors include dust, adverse weather and over crowding.

Animal factors include inadequate nutrition and shy feeding, concurrent disease (acidosis, coccidiosis) and stress (transport, mixing with unfamiliar lambs).

Pathogen factors include primary pathogens (mycoplasma spp, lung worm, parainfluenza) and secondary pathogens (*M. haemolytica*, pseudomonas, Fusobacterium *necrophorum*).

Can I treat it?

- Potentially yes, but pneumonia cases are notoriously tricky to treat with antibiotics. Consult a veterinarian for further advice regarding your options.

A severe case of pneumonia is depicted above

What should I do next?

- Decrease stocking density to >5m^2/lamb.
- It is important to move animals slowly and quietly so as to not exacerbate the condition.
- Consider selling animals that are poor doers providing they are safe to load.
- Take a pooled faecal sample from the mob to see if there are high coccidia counts which may be exacerbating the condition.

Coccidiosis

What is it?

It is a protozoal (a type of parasitic) infection in sheep. Lambs four to six weeks old are most commonly affected but it can be seen in lambs up to six months of age, especially in feedlots. Clinical disease is often precipitated by a stressful event such as adverse weather, weaning or change of diet. You will need to send faecal samples to your preferred laboratory to confirm a diagnosis.

Can I treat it?

- Yes. Move sheep from the infected pen as soon as disease becomes apparent.
- Cease any further management activities for a few weeks to minimise stress.
- In severe cases, contact a veterinarian. Sulphadimidine powder can be given as a prescription made into an oral drench.

What should I do next?

- Introduce animals to concentrate slowly over a period of at least three weeks and include hay in the ration.
- Try to keep animals in the social groups they came in (if this is not possible with boxed mobs etc. then place animals in pens that are of similar weights).
- Avoid stressful handling practices in the first three weeks on entry to the feedlot such as shearing, especially if using dogs to muster.

Water belly

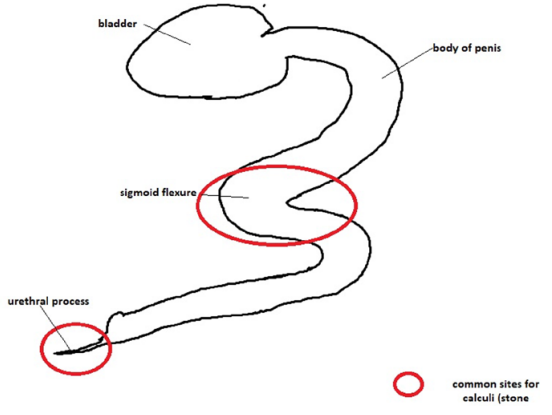
What is it?

Urolithiasis or water belly results from the obstruction of the urethra or ureter (rarely) of mostly male sheep by uroliths (urinary calculi). While uroliths are deemed to form equally in males and females, females are generally able to pass them without blockages, while blockages occur in wethers and rams as they have long, narrow and tortuous urethras as well as narrow urethral processes.

Diet plays an important role in water belly and when grain diets have a relatively high phosphorus (P) and low calcium (Ca) concentration urinary calculi can form.

Urinary P levels are very important in determining the presence of calculi.

Urinary P levels are increased by high dietary P levels and decreased by high dietary Ca levels and by the addition of 1% ammonium chloride. This is presumed to be due to ammonium chloride's effects on decreasing urine pH and increasing Ca in urine and urine volume.



The urinary tract of wethers includes a penis with an opening (urethra), that has two bends (the sigmoid flexure) as well as a narrow three centimetre long urethral process at the end. At these points, stones (calculi), comprised of salts, can block the penis.

Step 2: Management implications

Can I treat it?

- Potentially, providing the bladder or urethra has not burst (water belly), you may be able to cut the urethral process off to relieve a blockage. However, this is rarely successful in feedlot conditions and given the sigmoid flexure is often blocked too, this procedure may be futile.

What should I do next?

When formulating a pelleted feedlot ration for lambs, to minimise the risk of urolithiasis, the following points must be taken into consideration for the total ration fed (including both concentrate pellets and additional hay):

- The Ca:P ratio should be 2:1 or greater.
- The P level is recommended to be less than 0.6% i.e. 6mg/kg, as increased P levels have been shown to increase risk of uroliths even when the Ca:P ratio is 2:1. This is discussed further below.
- Add 1% salt to increase water consumption and urine output.
- Consider the addition of ammonium chloride at a maximum of 1%, although given the possible decrease in growth rates it is reasonable to reserve the inclusion of ammonium chloride until any problems are detected.
- Provide access to clean drinking water with low mineral content.

Shy feeders

What are they?

Shy feeders, also known as non-adapters, are animals which do not adapt to the feedlot environment and lose condition.

Can I treat them?

- You can remove shy feeders and place them in paddocks or in smaller mobs which may get them to start eating.
- There may be concurrent disease, so if you have a high shy feeder percentage (>5%) it is worth seeking veterinary advice to discern if this is the case.

What should I do next?

- Increase the grain/concentrate induction period beyond seven days.
- Utilise induction mob sizes of less than 350 head.
- Purchase lambs at a minimum entry weight of 35kgs.

Polioencephalomalacia (PEM)

What is it?

A condition that affects the brain of sheep due to a lack of vitamin B1 (thiamine). In a feedlot setting this is usually due to a high concentrate ration which has caused the rumen pH to drop below 5.5, allowing rumen microbes which kill thiamine producing microbes to proliferate in the rumen, thus causing a deficiency. Without thiamine, glucose (the energy source of the brain) cannot be transported to the brain which causes neurological signs including star gazing, blindness, circling and head pressing. If thiamine is not given quickly, animals will soon die.

Can I treat it?

- Yes. Yard affected mob as soon as possible and drench entire mob with 5ml of thiamine powder. You will need to have a bona fide relationship with a veterinarian in order to have this prescribed to you.
- Any animals showing clinical signs should be treated with injectable thiamine at a dose of 5ml into the muscle. If there is no improvement, this injection should be repeated in 12 hours. You should expect new cases to cease five to seven days after oral treatment with thiamine, but in the meantime, the vitamin B1 injection will be necessary for animals that appear to be affected.
- Provide a quality source of fibre (hay) to animals for the following two weeks and then slowly reintroduce grain.

What should I do next?

- Introduce concentrates to lambs slowly over a period of 21 days starting at 25g/head/day and increasing by this much daily. Have fibre present when doing so.
- Decrease stocking rate to $5m^2$/lamb if it is higher than this.
- Ensure lambs are of a similar weight range when placing them in pens together.
- If there are lambs which are not eating or separating themselves from the rest of the mob, remove them and feed them separately if viable.
- Consider using buffers in your ration. Consult your nutritionist for further information.
- Ensure lambs have shade within their pens.

Salmonellosis

What is it?

A potentially zoonotic (can transfer from animals to humans) bacterial infection of the intestines in sheep.

Can I treat it?

- Yes. Salmonella outbreaks should be treated in consultation with a veterinarian as you will need appropriate antibiotics.
- Destock the affected pen and wash and disinfect water and feed troughs thoroughly.
- Separate affected animals from apparently healthy ones and treat separately.
- Wear gloves and wash hands thoroughly after contact with affected animals.
- Visit sick animals for treatments as the last stop in the day's events to avoid cross contaminating other pens.

What should I do next?

- Decrease stocking rate to 5m^2/lamb if it is higher than this.
- If water is pooling in the pens rectify drainage issues.

Consult the *National procedures and guidelines for intensive sheep and lamb feeding systems* for further information.

Glossary

Anorexia	Lack or loss of appetite.
Body condition scoring (BCS)	A simple, effective management tool for all flock managers to assess the body reserves of adult sheep. BCS is a simple manual check to assess the amount of fat cover and muscle mass which can be scored between 1 (thin) and 5 (fat).
Lymph node	A small usually, bean-shaped structure that is part of the body's immune system.
Oedema	A condition characterised by an excess of watery fluid collecting in the cavities or tissues of the body.
Pathogen	A bacterium, virus or other microorganism that can cause disease.
Pericardial fluid	The fluid surrounding the heart sac.
Peritoneal cavity (abdominal cavity)	The space within the abdomen that contains the intestines, the four stomachs, sex organs, kidneys, bladder, liver and spleen.
Rigor mortis	Stiffening of the joints and muscles of a body a few hours after death.
Recumbency	The state of lying down.
Thoracic cavity (chest cavity)	The space contained by the rib cage that contains the heart and lungs.

Other resources

Holst PJ (2004) **Lamb autopsy: Notes on a procedure for determining cause of death** NSW Agriculture (PDF 663.9KB)

Everett-Hincks M and Duncan SJ (2008) **Lamb post-mortem protocol for use on farm: To diagnose primary cause of lamb death from birth to three days of age**. *The Open Veterinary Science Journal*, 2, 55–62 (PDF 1.8MB)

National procedures and guidelines for intensive sheep and lamb feeding systems (2020)

Recording sheet

Date | Pen ID | Name of PM conductor

Observation Sign typically seen XXX Sign often seen but not always XX Sign occasionally seen X	Tick if applicable	Anthrax DO NOT CONDUCT PM	Pulpy kidney	Acidosis	Pneumonia	Coccidiosis	Urolithiasis (water belly)	Shy feeder	Polio/PEM	Salmonella
History (signs observed before lamb death)										
Space allocation of <2.1m²/lamb			XX	XX	XX			XX		XX
Concentrate/grain induction period <7 days			XX	XX				XX		
Mob sizes >350 lambs per pen								XX		
Lamb entry weight <35kg								XX		
Inclement weather in the previous 24 hrs					XXX					XX
Water pooling in pens						XX				XX
Incomplete/unknown '3 in 1' or '5 in 1' vaccination status			XXX							
Sudden death		XXX	XXX		XX					
Recumbent			X	XX	X		X	X		X
Anorexic			X	XXX	XX	XXX	XXX			XX
Dull			X	XX	XX		XX	XX		XX

Recording sheet

Observation **Sign typically seen XXX** **Sign often seen but not always XX** **Sign occasionally seen X**	Tick if applicable	**Anthrax DO NOT CONDUCT PM**	Pulpy kidney	Acidosis	Pneumonia	Coccidiosis	Urolithiasis (water belly)	Shy feeder	Polio/PEM	Salmonella
Star gazing									XX	
Blind									XX	
Circling									XX	
Lame				XX						
Penis twitching							XX			
Straining to urinate										
Abdominal distension				XXX			XX			
Frothing at the mouth			X		X					
Rule out anthrax										
No signs of rigor mortis (stiffness of body)		**XXX**								
Bloody discharge from any orifice		**XXX**								
History of anthrax on the property		**X**								

If any of the above three are present DO NOT CONDUCT PM. Notify district veterinary officer (DVO) of suspect case of anthrax so that they may test for this disease which is contagious to humans. CALL 1800 675 888.

Recording sheet

Observation **Sign typically seen XXX** **Sign often seen but not always XX** **Sign occasionally seen X**	Tick if applicable	Anthrax DO NOT CONDUCT PM	Pulpy kidney	Acidosis	Pneumonia	Coccidiosis	Urolithiasis (water belly)	Shy feeder	Polio/PEM	Salmonella
External observations										
Low body condition score ≤2/5					XX			XXX		
Crusty discharge at nostrils				XX	XX					
Sunken eyes					XX			XX		
Red line around hoof wall(s)				XX						
High dag score/scours/diarrhoea				XX		XX				XX
Rectal prolapse					XX	XX				
Internal observations										
Urethra or urethral process obstructed by one or more uroliths or fine sandy material							XX			
Urine accumulation within abdominal wall							XX			
Urine in peritoneal cavity							XX			
Glucose in urine			XX							
Ruptured bladder							XX			

Recording sheet

Observation **Sign typically seen XXX** **Sign often seen but not always XX** **Sign occasionally seen X**	Tick if applicable	Anthrax DO NOT CONDUCT PM	Pulpy kidney	Acidosis	Pneumonia	Coccidiosis	Urolithiasis (water belly)	Shy feeder	Polio/PEM	Salmonella
Rumen full of undigested grain/pellets				XXX						
Ruminal pH between 4.0 and 5.0 between zero and two hours after death				XXX						
Red rumen wall/sloughing papillae				XX						
Intestines red										XX
Blood flecked faeces						XX				XX
Lungs stuck to chest wall			XX							
Lung lesions or pus on cut surface					XXX					
Lung feels meaty and the meaty part sinks when placed in water					XX					
Straw coloured heart sac fluid			XX							
Tally										
Likely diagnosis:										

Recording sheet: example

Date 18.2.23 **Pen ID** A2 **Name of PM conductor** MMC

Observation **Sign typically seen XXX** **Sign often seen but not always XX** **Sign occasionally seen X**	Tick if applicable	Anthrax DO NOT CONDUCT PM	Pulpy kidney	Acidosis	Pneumonia	Coccidiosis	Urolithiasis (water belly)	Shy feeder	Polio/PEM	Salmonella
History (signs observed before lamb death)										
Space allocation of <2.1m²/lamb	✓		XX	XX	XX			XX		XX
Concentrate/grain induction period <7 days	✓		XX	XX				XX		
Mob sizes >350 lambs per pen	✓							XX		
Lamb entry weight <35kg	✓							XX		
Inclement weather in the previous 24 hrs					XXX					XX
Water pooling in pens	✓					XX				XX
Incomplete/unknown '3 in 1' or '5 in 1' vaccination status			XXX							
Sudden death		XXX	XXX		XX					
Recumbent			X	XX	X		X	X		X
Anorexic			X	XXX	XX	XXX	XXX			XX
Dull			X	XX	XX		XX	XX		XX

Recording sheet: example

Observation **Sign typically seen XXX** **Sign often seen but not always XX** **Sign occasionally seen X**	Tick if applicable	**Anthrax DO NOT CONDUCT PM**	Pulpy kidney	Acidosis	Pneumonia	Coccidiosis	Urolithiasis (water belly)	Shy feeder	Polio/PEM	Salmonella
Star gazing									XX	
Blind									XX	
Circling									XX	
Lame				XX						
Penis twitching							XX			
Straining to urinate										
Abdominal distension				XXX			XX			
Frothing at the mouth			X		X					
Rule out anthrax										
No signs of rigor mortis (stiffness of body)		**XXX**								
Bloody discharge from any orifice		**XXX**								
History of anthrax on the property		**X**								

If any of the above three are present DO NOT CONDUCT PM. Notify district veterinary officer (DVO) of suspect case of anthrax so that they may test for this disease which is contagious to humans. CALL 1800 675 888.

Recording sheet: example

Observation **Sign typically seen XXX** **Sign often seen but not always XX** **Sign occasionally seen X**	Tick if applicable	Anthrax DO NOT CONDUCT PM	Pulpy kidney	Acidosis	Pneumonia	Coccidiosis	Urolithiasis (water belly)	Shy feeder	Polio/PEM	Salmonella
External observations										
Low body condition score ≤2/5	✓				XX			XXX		
Crusty discharge at nostrils				XX	XX					
Sunken eyes	✓				XX			XX		
Red line around hoof wall(s)				XX						
High dag score/scours/diarrhoea				XX		XX				XX
Rectal prolapse					XX	XX				
Internal observations										
Urethra or urethral process obstructed by one or more uroliths or fine sandy material							XX			
Urine accumulation within abdominal wall							XX			
Urine in peritoneal cavity							XX			
Glucose in urine			XX							
Ruptured bladder							XX			

Recording sheet: example

Observation **Sign typically seen XXX** **Sign often seen but not always XX** **Sign occasionally seen X**	Tick if applicable	Anthrax DO NOT CONDUCT PM	Pulpy kidney	Acidosis	Pneumonia	Coccidiosis	Urolithiasis (water belly)	Shy feeder	Polio/PEM	Salmonella
Rumen full of undigested grain/pellets				XXX						
Ruminal pH between 4.0 and 5.0 between zero and two hours after death				XXX						
Red rumen wall/sloughing papillae				XX						
Intestines red										XX
Blood flecked faeces						XX				XX
Lungs stuck to chest wall			XX							
Lung lesions or pus on cut surface					XXX					
Lung feels meaty and the meaty part sinks when placed in water					XX					
Straw coloured heart sac fluid			XX							
Tally		0	2	2	3	1	0	6		2
Likely diagnosis:	Shy feeder									

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