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MEAT & LIVESTOCK AUSTRALIA

Management of unfit-to-load livestock

Guidelines for persons in charge and veterinarians involved in pre-embarkation live export inspectionsof cattle and sheep

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1 Introduction

A small proportion of livestock are identified as being unfit to load onto ships during pre-embarkation inspections. These animals are identified as sick, injured, weak or physiologically unsuitable for transport and must be managed optimally to ensure welfare is not unduly compromised. The information provided in this manual will assist in standardising the approaches to treatment and management of these animals. Content includes:

- information on the treatment and management of common diseases and conditions that cause rejection of cattle and sheep prior to export by sea
- criteria for assessment of when and where euthanasia, salvage slaughter, treatment or monitoring are necessary
- recommendations for management of rejected animals prior to road transport.

The information is intended to facilitate optimal health and welfare outcomes for compromised animals and to allow exporters, managers of quarantine premises and veterinarians to meet regulatory requirements with more certainty. The A5 size of this manual is intended to increase its portability and use as a ready-reference.

Every effort has been made to ensure relevance and accuracy by consulting industry experts and referring to the following publications:

- *Australian Animal Welfare Standards and Guidelines–Land Transport of Livestock* published by Animal Health Australia
- *Is it fit to load* published by Meat & Livestock Australia (MLA)
- *Australian Standards for the Export of Livestock (Version 2.3) 2011* published by the Australian Government Department of Agriculture, Fisheries and Forestry
- *Live Export Veterinary Disease Handbook* (in preparation); a current MLA–LiveCorp project (W.LIV.0278).

Where these guidelines are inconsistent with state or territory acts and regulations about loading and transport of animals, seek advice from appropriate local professionals and experts. Persons responsible for animals are expected to be familiar with the relevant animal welfare legislation.

2 Treatment and management of common diseases and conditions of unfit-to-load cattle

The following diseases and conditions are those most commonly identified in animals rejected at assembly points and dockside as unfit to load onto a livestock vessel.

Treatments and management during convalescence would ordinarily occur in the quarantine premises where the pre-embarkation inspection took place (usually a feedlot or farm). Sometimes, urgent treatments may be administered to sick and injured animals on a transport vehicle or dockside (if the pre-embarkation inspection occurred there), after which the animals may be transported back to the quarantine premises for further treatment and care. Section 5 details management of reject animals prior to and during road transport.

Animals under treatment or being monitored should not be confined alone, as sheep and cattle separated from their herd and flock may become severely distressed. Treated animals should be penned, yarded and managed in the company of a small group of quiet, easily handled animals.

2.1 Eye conditions

Pinkeye (infectious keratoconjunctivitis)

- Handle severe cases carefully to prevent bumping of the eye and risk of corneal rupture.
- Without treatment, most cases of pinkeye—even severe infections—will fully recover with no or minimal scarring. However, treatment is recommended as progression of the disease is unpredictable, and some animals may be permanently blinded from corneal rupture or extensive scarring.
- If recent history suggests that grass seeds, chaff or other foreign bodies have entered the eye, restrain affected animals in a crush with head bale, halter and nose grips for a close eye examination, especially of the conjunctival sacs.
- Treat with parenteral antibiotics (preferably procaine penicillin and oxytetracycline, but almost any antibiotic will be effective). Stop antibiotic treatment once signs of recovery are evident, which may be after 1 day in early cases.
- Non-steroidal, anti-inflammatory drugs (NSAIDs), such as flunixin meglumine, ketoprofen, meloxicam or tolfenamic acid, will reduce pain and may reduce scarring.
- Animals with severe corneal ulceration and imminent corneal rupture may benefit from applying an eye patch, suturing the eyelids closed (ensuring suture material does not rub against the cornea) or performing a third eye lid flap (drawing the third eye lid across the cornea and anchoring it to the skin at the lateral corner of the eye with a suture).

- Avoid co-mingling with at-risk animals (ie young, unexposed or unvaccinated) and reduce exposure to dust, flies, sunlight and grass seeds until healing has commenced.

2.2 Lameness

Footrot (interdigital necrobacillosis)

- Inspect the foot and remove any foreign bodies that may be lodged in the interdigital cleft.
- Administer parenteral antibiotics only (procaine penicillin, oxytetracycline, florfenicol); topical treatment and bandaging are unnecessary.
- The prognosis is excellent if treated early with a maximal dose of antibiotics; recovery (reduced lameness and swelling) will begin within a few hours and will be completed within 1–2 days. If the lameness does not resolve in a few days, check for extension of infection into deeper structures or presence of an interdigital foreign body, solar abscess or other lesion.
- Amputation of the claw may be required in cases of severe, chronic lameness, where joint or other deeper structures are affected. Cattle can walk adequately on one claw.

Solar abscesses, sole puncture wounds and sole bruising

- Early and aggressive treatment is required to prevent sepsis extending up the leg, seriously incapacitating the animal.
- Solar abscesses and puncture wounds must be treated with a course of parenteral antibiotics (procaine penicillin) and NSAIDs (flunixin meglumine, ketoprofen, meloxicam, tolfenamic acid), followed by paring the under-run sole and hoof wall around the injury to establish drainage.
- Segregate affected animals and confine to areas with gravel-free ground softened and dried by sawdust, straw or well-drained pasture. Provide easy access to feed and water in a non-competitive environment. This will hasten recovery and make monitoring and treatment easier.
- In severely lame animals with single claws of feet affected, apply a lift to the healthy claw of the affected foot, such as encasing in a plastic shoe or gluing a wooden or plastic block to the sole. This will usually provide dramatic pain relief and keep the animal on its feet.
- Prognosis mainly depends on the severity of the soft tissue injury, the stage at which drainage is established and the animal's body weight and temperament.
- Seek immediate intervention and expertise for successful reduction of dislocated joints (ie hip, elbow, fetlock). Xylazine sedation or anaesthesia may be necessary.

Musculoskeletal injuries

- Hobbling the hind legs to prevent the splits may benefit weak animals but they must have a quiet temperament.
- Euthanase animals with limb bone fractures, longstanding (>24 hours) limb dislocations or injuries causing extended (>24 hours) recumbency (see Section 4).

Wounds (lacerations)

- Closely examine wounds to determine damage to underlying tissues and the presence of foreign bodies. Good restraint, sedation and local anaesthesia may be required for this examination and subsequent treatment.
- Treat superficial wounds with a topical antibiotic spray or lotion.
- If possible, apply a pressure bandage for a moderate-to-severe haemorrhage.
- The principles of wound treatment—lavage (irrigation), debridement (removal of damaged tissue), suturing and bandaging—apply especially to large, deep, gaping and contaminated wounds if complications are to be avoided.
- Apply debridement by cutting or scraping away with a scalpel blade any blue–black, leathery or obviously necrotic tissue and gross contamination.
- Manage grossly contaminated wounds as open (unsutured) wounds using lavage, debridement and, if on a limb, bandaging.
- Apply lavage using sterile saline solution or clean, mildly salty water squirted under moderate pressure with a 35mL syringe and 19g needle.
- Only suture wounds after lavage and debridement if they are not grossly contaminated. Use tension-relieving sutures if required, and bandage if on a limb.
- On limbs, apply bandages that are close fitting, snug, long, firm and thick so they act like a cast. This can be achieved using rolls of gauze, cotton wool and elastic adhesive bandages. The objectives of bandaging are to stop bleeding, immobilise the area, prevent further trauma and contamination, keep the wound warm and prevent it drying out. Without bandaging, wound healing may be severely compromised.
- An inexpensive, easily applied, waterproof-conforming bandage suitable for emergency conditions can be made using rolls of plastic food wrap, foam rubber and electrical or duct tape.
- Treat deep or penetrating wounds with a course of parenteral antibiotics (procaine penicillin, oxytetracycline, erythromycin, tylosin, ceftiofur).
- Administer NSAIDs (flunixin meglumine, ketoprofen, meloxicam, tolfenamic acid) if the animal is in pain.
- For the duration of recovery, provide clean, non-slip flooring in a non-competitive environment with easy access to food and water.
- Encourage affected animals to stand as much as possible.

2.3 Nervous disease

Transit tetany (hypomagnesaemia, hypocalcaemia)

- Administer 2–4 bags of under-the-skin, over-the-ribs commercially available solutions containing both calcium borogluconate and magnesium sulphate, and rub in well to hasten absorption into the bloodstream. Slow intravenous administration of half a bag (with the remainder injected subcutaneously) may be attempted in seriously affected animals, but it carries the risk of causing cardiac arrest and death.
- As soon as possible, sit the animal upright if in lateral recumbency—especially if bloated—to avoid inhalation of any regurgitated rumen contents.
- Encourage the animal to stand as soon it has regained strength to avoid it becoming a 'downer'.
- Isolate the animal from others until strength and coordination have fully recovered to avoid it being knocked down and injured. Then provide a small number of quiet cattle for company.

Polioencephalomalacia (cerebrocortical necrosis)

- Relapse is rare, however the animal should be closely monitored for at least 24 hours after treatment.

2.4 Respiratory distress

Heat stress (hyperthermia, heat stroke)

- If given early, 12-hourly injections of 50mg/kg bodyweight thiamine (vitamin B1) usually results in rapid improvement and eventual full recovery. NSAIDs may reduce brain swelling.
- As soon as possible, sit animal upright if in lateral recumbency to avoid bloating or inhalation of any regurgitated rumen contents.
- Encourage the animal to stand as soon as it has regained its strength to avoid it becoming a downer.
- Isolate the animal from others until strength and coordination have fully recovered to avoid it being knocked down and injured.
- With minimal exertion, relocate the animal to shaded, well-ventilated, uncrowded areas with easy access to good quality, freely available water. If necessary, displace Bos indicus cattle to make space for affected Bos taurus cattle. Use feed troughs to provide extra water if water trough space is limited.
- Spray wetting of the head and neck of affected animals may be lifesaving in severely affected animals. Continue until respiratory distress has eased.

Pneumonia

- Treat suspected cases aggressively with parenteral antibiotics (ceftiofur sodium, florfenicol, tilmicosin, tulathromycin, procaine penicillin, oxytetracycline, erythromycin, trimethoprim sulpha, tylosin) and NSAIDs (flunixin meglumine, ketoprofen, meloxicam, tolfenamic acid). NSAIDs have a role because damage to the respiratory tract and clinical signs are the result of the body's powerful inflammatory response to pathogens.
- Animals with concurrent arthritis may require treatment with antibiotics after respiratory signs have disappeared.
- Isolate affected animal in a well-ventilated area protected from excessive cold or heat, maintain hydration and stimulate appetite by offering good quality hay or roughly chopped chaff made from cereal hay.

2.5 Skin conditions

Ringworm (dermatomycosis)

- Ringworm usually heals with or without treatment in about 6–8 weeks.
- Topical application of preparations containing imidazole may stop progression of lesions and reduce spread to other animals on the premises. Topical preparations containing chlorine and iodine are much less effective.
- Moving affected animals into lightly stocked, dry, sunlit areas during the acute phase may be an adjunct or alternative to topical treatment.
- The prognosis is excellent given time.

Warts (papillomatosis)

- Treatment is usually unnecessary because self-cure is common. The prognosis is usually excellent given time; lesions take 1–12 months to slough off. The exception is immunocompromised cattle, such as those with persistent pestivirus infection, that become progressively debilitated by enlargement, ulceration, bacterial infection and flystrike of the warts and require euthanasia.
- Large, ulcerated or awkwardly located warts may require surgical removal, or ligation if pendunculated (hanging from a stem of tissue). Wart growth may be stimulated by surgery that is performed too early, although 'too early' is an unknown timeframe.
- Isolating affected animals may offer little protection to other cattle on the premises because shedding of the virus will have occurred during its long incubation period, and the virus can endure in the environment for more than 12 months.
- The prognosis is excellent, except in immunocompromised animals, such as those persistently infected with pestivirus.

2.6 Swellings

Abscess

- Treatment of the large noticeable skin and superficial lymph node abscesses that cause animals to be rejected at pre-embarkation inspections should only be attempted in circumstances where a timely, aesthetic outcome is achievable that would allow the animal to re-enter the export process. The alternative is salvage slaughter.
- Treatment of large vaccination and other injection site abscesses involves incision and drainage. Ensure that the lump or swelling is an early-stage abscess that contains pus—suitable for draining—and is not in-filled with fibrous tissue. Cuts into fibrous lumps may cause profuse bleeding, infection, delayed healing and ugly scarring.
- Before incising, double check that the swelling is fluid-filled and not a hardened fibrous lump, hernia or haematoma.
- Restrain the animal in a crush (with sedation if fractious), or by anaesthesia.
- Make a vertical incision extending downward from the most fluctuant point, creating a wide opening to facilitate drainage. Flush thoroughly with clean water under moderate pressure from a hose or syringe, using a gloved finger to gently aid removal of pus. Local anaesthesia is usually not required if the incision is made quickly with a new scalpel blade. In any case, local anaesthesia may be difficult to administer effectively to the tensioned skin over the abscess.
- Antibiotics are not recommended, as they are unlikely to penetrate the fibrous capsule and pus. The exception is if infection is spreading (or is likely to spread after incision) through the soft tissues around the abscess (ie cellulitis) or if the abscess is causing severe pain (ie the animal has a stiff neck and has difficulty feeding and watering), in which case NSAIDs (flunixin meglumine, ketoprofen) and antibiotics (procaine penicillin, erythromycin) should be administered.
- Some abscesses left untreated will shrink with time, which may allow the animal to re-enter the live export process. However, shrinkage may take many weeks or even months.
- Large abscesses of head and neck lymph nodes (ie grass seed abscesses, cheesy gland abscesses) are notoriously difficult to treat successfully, often requiring excision of the node, many weeks of antibiotic treatment and months to heal, with no guarantee of complete healing. Affected animals should probably be sent for salvage slaughter.

Congestive heart failure

- The damage to the heart and the debilitating symptoms are irreversible. Salvage slaughter is indicated for mild cases still fit to travel and euthanasia for other cases.
- Animals with traumatic reticulopericarditis are likely to be wholly condemned at slaughter and would be rarely fit to travel. This diagnosis should be excluded in heart failure cases that are judged fit to travel and consigned to an abattoir for salvage slaughter.

Haematoma (blood blister)

- Leave them alone as they usually heal spontaneously. Large haematomas will leave residual, sometimes unsightly skin folds. Resist the temptation to insert a needle to determine contents, or to lance and drain an intact haematoma, as this often causes an abscess or an unsightly infected mess.
- Some will become abscesses and will need wide incision, flushing and draining.

Hernia (traumatic hernia of the abdominal wall, scrotal, inguinal, rupture of prepubic tendon)

- Surgical and bandaging options are available but are unlikely to be practical or successful.
- Animals in distress should be euthanased without delay. Those not distressed may be sent for emergency slaughter at a knackery or abattoir.
- Pregnant animals may be induced to abort or calve with corticosteroids (dexamethasone) and prostaglandins (cloprostanol, dinoprost trometamolin), and should be assisted when this occurs.

Lumpy jaw (actinomycosis, ‘actino’)

- Lumpy jaw is notoriously difficult to treat successfully. Treating valuable animals with early lesions could be attempted, such as an extended treatment with ceftiofur, oxytetracyclines or sodium iodide, but relapse should be expected.
- Strong consideration should be given to slaughtering affected animals before they experience weight loss and the risk of condemnation.

Wooden tongue (actinobacillosis, ‘actino’, woody tongue)

- Parenterally administered procaine penicillin or oxytetracycline (daily for at least 3 days) is usually curative except in advanced cases, where the tongue is irreversibly fibrosed.

3 Treatment and management of common diseases and conditions of unfit-to-load sheep

3.1 Diarrhoea

Salmonellosis

- Administer parenteral antibiotics (trimethoprim sulpha; oxytetracycline) until first signs of recovery.
- Provide oral fluids containing isotonic or hypotonic concentrations of electrolytes.
- Feed cereal hay or roughly cut chaff off the ground to stimulate appetite and restore digestion.
- Isolate from other at-risk animals in an area protected from heat and cold stress, and provide ready access to good quality feed and water.
- Blanket administration of antibiotics via drinking water is not recommended. Sick sheep are unlikely to drink enough and the illness may be exacerbated by disruption to rumen microflora.
- The prognosis is poor without aggressive treatment of early-stage disease.

Other causes

- Specific treatment will be dictated by diagnosis, which may include ruminal acidosis, coccidiosis, indigestion (ie nutritional scours) and gastrointestinal parasitism.
- Until the diagnosis is confirmed, or even if unconfirmed, sheep with diarrhoea will benefit from ready access to good quality cereal hay and clean fresh water and provision of shelter in a clean, dry environment protected from heat and cold stress and competition from stronger sheep.

3.2 Eye conditions and blindness

Pinkeye

- Individually restrain every affected sheep to closely examine eyes and remove grass seeds that may be irritating.
- Administer parenteral antibiotics (oxytetracycline, procaine penicillin, trimethoprim sulpha) until first signs of recovery. Only a single treatment may be required in early cases.
- Administration of parenteral NSAIDs is recommended for animals at risk of developing permanent, blinding eye damage.
- Isolate from other at-risk animals in an area that minimises exposure to dust, flies, sunlight and long grass during the treatment phase.
- Animals blind in both eyes will require careful handling and feed and water management in hazard-free confined areas.
- Topical treatment with sprays and powders has shown little or no benefit, and some powders and aerosol sprays may be irritant and detrimental. Parenteral antibiotics provide sustained therapeutic concentrations of antibiotic in tears and intraocular fluids, and topical treatments do not.
- In large outbreaks, mass medication of drinking water with antibiotics (tetracycline) may be attempted, but effectiveness is uncertain. It requires careful calculation of dose rates as the water intake is variable with some animals not drinking enough, and it carries the risk of disrupting rumen function and feed intake.
- The prognosis is good without treatment, even in severe cases. However, correct treatment applied early may shorten the course of the disease and prevent permanent blindness and corneal scarring that occurs rarely and unpredictably.

3.3 Ill thrift

Malnutrition

- Identify correct dietary deficiencies by reviewing the composition of the diet and blood testing.
- The prognosis is poor if underlying chronic infections or conditions are suspected, such as Johne's disease, pneumonia, pyrrolizidine alkaloidosis, arthritis or intestinal adenocarcinoma, and the animal should be euthanased without delay, or sent for salvage slaughter if fit to travel (see Section 4).
- Early pneumonia, trace element and vitamin deficiencies or internal parasitism are responsive conditions that should be treated with antibiotics, mineral and vitamin supplements or anthelmintics, respectively.
- Salvage slaughter is an option if fit to travel, subject to abattoir consultation and acceptance.
- Manage treated sheep separately from other animals if competition for food, water and shelter will impede recovery.
- The prognosis is good to excellent for dietary deficiencies and internal parasitism.

Shy feeders

- Treatment with drugs is generally unsatisfactory.
- Provide hay or chaff—on the ground initially, if necessary—in a quiet, less competitive feeding environment.
- Do not isolate individual animals.
- The prognosis is good for animals returned to a grazing environment, but may be poor for those remaining in the live export process.

3.4 Lameness

Arthritis

- Treatment is unlikely to benefit affected animals; once detected, most cases are longstanding with irreversible joint changes.
- Salvage slaughter is an option for lame animals that can still move freely and are fit to travel, subject to abattoir consultation and acceptance. Polyarthritic animals in light body condition are likely to be wholly condemned.

Fractures and dislocations

- Seek immediate intervention and expertise for successful reduction of dislocated joints (ie hip, elbow, fetlock). Xylazine sedation or anaesthesia may be necessary to facilitate reductions.
- Hobbling the hind legs to prevent the splits may benefit weak animals but they must have a quiet temperament.
- Euthanase animals with limb bone fractures, longstanding (>24 hours) limb dislocations and injuries causing extended (>24 hours) recumbency. The exception is fractured long bones in young animals that are still walking; the prognosis is fair if the limb is splinted or preferably cast, and the animal receives pain relief (eg NSAIDs) and nursing care.

Foot abscess

- Administer parenterally a maximal dose of procaine penicillin. Usually only a single shot is required for obvious recovery to commence, otherwise continue treatment until signs of recovery (eg reduction in lameness and swelling).
- With a toe abscess, pare the hoof to allow pus to drain, which will prevent the need for further antibiotics.
- A heel abscess is difficult to treat successfully. It may not drain well when opened, requiring a longer course of antibiotics (procaine penicillin, oxytetracycline) to resolve infection.
- Avoid dirty, wet conditions under foot during the treatment period.
- Except for a heel abscess, the prognosis is excellent, and if interdigital joint infection is prevented by early treatment.

Footrot

- Treatment with parenteral antibiotics (procaine penicillin, oxytetracycline) and dry underfoot conditions usually resolve even severe lameness after a few days without the need to pare away dead horn, and may eliminate infection. If antibiotics are injected, topical application of aerosol sprays, such as cetrimide or oxytetracycline, are unnecessary.
- A footbath of formalin or zinc sulphate (with surfactant) is an option, but the cost, chemical hazards, need for paring and unpredictable results when compared to parental antibiotics makes it unattractive.
- Avoid co-mingling with susceptible sheep or running on ground that susceptible sheep may contact within 14 days.
- In Western Australia, properties with footrot-affected sheep are quarantined and infected sheep may only be transported under permit to specified export feedlots (not saleyards or other properties).
- Prevent flystrike.

Laminitis

- Place animals with acute laminitis on soft flooring and maintain on an energy-restricted diet, moving them occasionally but not excessively.
- Pain relief using NSAIDs (flunixin meglumine, ketoprofen) can be provided to severely lame animals to prevent permanent recumbency. Careful paring of the overgrown horn may also help relieve pain.
- The prognosis is excellent for animals that can stand.
- Consider euthanasia or salvage slaughter if chronic or animal is recumbent for more than 24 hours.

Nutritional myopathy

- Injections and oral drenches containing vitamin E and selenium are available for treatment.
- Handle and move animals carefully and slowly.
- Provide easy access to feed and water in a confined area until mobility improves.
- The prognosis is good for mildly affected animals, but moderate to poor for others.
- Care must be taken when treating with selenium as the threshold for toxicity is low.
- Overgrown hooves
- Re-establish the normal shape of the hoof by paring with secateurs to remove excess horn.

Wounds (lacerations)

- Treat superficial wounds with a topical antibiotic spray or lotion.
- Apply a pressure bandage if there is moderate-to-severe haemorrhage.
- The principles of wound treatment—lavage, debridement and, where appropriate, suturing and bandaging—apply especially to large, deep, gaping and contaminated wounds if complications are to be avoided.

- Apply debridement by cutting or scraping away with a scalpel blade any blue–black, leathery or obviously necrotic tissue and gross contamination.
- Manage grossly contaminated wounds as open wounds using lavage, debridement and if on a limb, bandaging.
- Apply lavage using sterile saline solution or clean, mildly salty water squirted under moderate pressure with a 35mL syringe and 19g needle.
- Suture wounds after lavage and debridement only if they are not grossly contaminated. Use tension-relieving sutures if required, and bandage if on a limb.
- To limbs, apply bandages that are close fitting, snug, long, firm and thick so they are like a cast. This can be achieved using rolls of gauze, cotton wool and elastic adhesive bandages. The objectives of bandaging are to stop bleeding, immobilise the area, prevent further trauma and contamination, keep the wound warm and prevent it drying out. Without bandaging, wound healing may be severely compromised.
- An inexpensive, easily applied, waterproof-conforming bandage suitable for emergency conditions can be made using rolls of plastic food wrap, foam rubber and electrical or duct tape.
- Treat deep or penetrating wounds with a course of parenteral antibiotics (procaine penicillin, oxytetracycline, erythromycin, tylosin, ceftiofur).
- Administer NSAIDs (flunixin meglumine, ketoprofen, meloxicam, tolfenamic acid) if animal is in pain.
- For the duration of recovery, provide clean, non-slip flooring in a non-competitive environment with easy access to food and water.

3.5 Skin conditions

Cancer (squamous cell carcinoma)

- No practical treatment is available for sheep.
- The prognosis is poor; ulceration, flystrike, toxaemia and metastasis (spread to non-adjacent organs or body parts) are inevitable.
- If severely affected (eg bleeding, necrotising bacterial infection, flystrike), euthanase without delay. Consignment for salvage slaughter is an option for mildly affected cases, subject to being fit for travel and after consultation and acceptance by the destination abattoir or knackery.

Flystrike (cutaneous myiasis)

- Cut away matted hair and wool, remove accessible maggots and apply insecticide or larvicide to kill the remaining maggots.
- Administer broad-spectrum, parenteral antibiotics (procaine penicillin, oxytetracycline) to animals showing signs of toxaemia (eg dullness, reluctance to stand, eat or drink).
- The prognosis is poor for animals showing signs of toxaemia.

Scabby mouth

- No effective treatment is available; the disease must be allowed to run its course of 3–4 weeks.
- Animals with secondary bacterial infections, especially of the feet, will benefit from parenterally administered antibiotics (procaine penicillin).
- Avoid co-mingling with sheep that have not been fully immunised by vaccine or natural exposure.
- For animals with severe muzzle lesions, provide ready access to soft feed and clean water to encourage eating and hasten recovery.
- Prevent flystrike.
- The prognosis is excellent for a full recovery in uncomplicated cases.

4 Considerations for euthanasia and other management options for animals rejected at pre-embarkation inspections

4.1 Introduction

In this context, animals are rejected at pre-embarkation inspections because they are sick, injured, weak or distressed, not because they are out of market specification. The four options for dealing with them are:

1. euthanase
2. salvage slaughter
3. treat
4. monitor

This section provides information and lists of key considerations to help decide which is the best option under different circumstances.

The first and foremost consideration must always be whether the level of pain and distress being experienced by the animal is undue and warrants prompt euthanasia.

4.2 Deciding considerations

In practice, when immediate euthanasia to relieve pain and distress is not required, a decision to euthanase for other reasons, or to salvage slaughter, treat or monitor, is often clear cut: one or two considerations become deciding factors, overriding all others. Considerations to aid decisions on management of reject animals, some of which may be deciding factors, are listed below:

- level of pain and distress of the animal
- ability to stand and walk
- likelihood of recovery with and without treatment
- likelihood of partial recovery, with or without treatment, to a state suitable for salvage slaughter
- likelihood of recovery to fulfil its intended purpose (ie milking, breeding)
- accuracy of diagnosis and the nature and stage of the disease or condition
- skill, time and facilities available to treat the animal properly, including at further stages along the export process
- length of drug withdrawal periods (ie antibiotic or chemical residues that exclude slaughter)
- value of the animal
- cost of treatment
- opportunity cost of treatment (ie time, money and effort best expended elsewhere)
- availability of salvage slaughter and the salvage value
- the likelihood of being condemned if sent for salvage slaughter
- value of diagnostic information obtained from necropsy
- ability to withstand further handling, including transport
- sufficient time for recovery before discharge at destination
- likelihood of rejection by the importing country
- availability and amount of insurance payable for sick and dead animals
- risk to other animals and people

4.3 Considerations for euthanasia

The overriding deciding factor for euthanasia is the welfare of the animal (level of pain and distress). The level of pain and distress warranting euthanasia is a matter of judgment taking into consideration changes in behaviour (activity, aggression, posture, response to handling, vocalisation) and clinical signs (demeanour, respiration rate, heart rate, weight loss, dehydration, urine production). When there is uncertainty, other considerations usually favour toward or away from euthanasia to assist decision-making.

In the live export process, euthanasia is usually a clear-cut decision for non-ambulatory animals (unable to stand or walk). The ability of animals to walk well is central to the functioning of the live export process. Animals unable to walk and keep up can cause costly disruptions and delays.

Therefore, animals that require euthanasia without undue delay include:

- non-ambulatory animals that have unresponsive toxic conditions or broken, dislocated or infected legs
- animals with chronic debilitating conditions that can stand, but with difficulty, and have unsteady gaits and drag their hind feet (they would easily fall or be knocked over and have difficulty in accessing feed or water)

Life-threatening illness or injury will also warrant euthanasia. As long as the animal's welfare is the primary consideration, the possible exception is valuable animals that will receive intensive treatment and care.

Euthanasia is warranted if the cost of treatment is high relative to the value of the animal and the prognosis is poor. Even if the cost of treatment is low, euthanasia may be the best option for animals that would otherwise be maintained for extended periods in assembly points, waiting for expiration of lengthy withholding periods for meat, milk or export slaughter intervals.

Special mention must be made of downers. These are animals that have become recumbent, but have been treated and remained recumbent; their diagnosis and treatment is complex. As a general guideline, animals in sternal recumbency (sitting

up), alert, eating, drinking, that attempt to rise when encouraged and have been down for less than 48 hours should continue receiving treatment if conditions allow. Animals not fully matching these descriptors have a very poor prognosis and should be euthanased without delay.

Other considerations may exist favouring euthanasia of downers, such as:

- time and resources to treat properly (downers require considerable nursing care, including soft bedding and good footing, regular rolling and lifting, feeding and watering)
- time available for full recovery to walk (this may take many weeks or months).

Key considerations for euthanasia, some of which may be deciding factors, are as follows:

- uncontrollable pain and distress
- unable to stand or walk
- uncertain accuracy of diagnosis and severe nature and late stage of disease
- high value of diagnostic information obtained from necropsy
- poor prognosis with and without treatment
- inadequacy of treatment facilities and staff resources
- high risk to staff and animal cohorts
- inadequate time available for full recovery
- unsuitable for salvage slaughter, or salvage slaughter is unavailable

4.4 Considerations for salvage slaughter

Slaughter for salvage value may be considered for animals where:

- recovery is unlikely or incomplete
- treatment facilities are inadequate
- inadequate time is available for effective treatment and full recovery

Salvage slaughter is an option when there is a nearby slaughter facility, suitable transport is available to that facility and the animal is fit to travel. Strong consideration should be given to the animal's existing level of pain and distress, and what might happen should the process not go according to plan. The animal should also be free of antibiotic and chemical residues and have a low likelihood of being condemned for disease. A veterinary opinion should be sought if the animal's fitness for transport is in doubt.

Key considerations for salvage slaughter, some of which may be deciding factors, are as follows:

- a slaughter facility is nearby
- suitable transport is available
- the animal has been deemed fit for transport (by a veterinarian if necessary)
- the animal can withstand further handling after transport
- carcase condemnation for disease or residues is unlikely
- drug and chemical withholding periods have expired

4.5 Considerations for treatment

Treatment refers to administration of medicine or some therapeutic compound, surgery and the application of nursing care. Nursing care is an important part of treatment. It refers to provision of separate or specialised care in a hospital pen or defined area (eg provision of shelter, bedding and good quality feed and water). The full cost of treatment must take into account nursing care; it is easily underestimated.

Treatment is an option when the value of the animal exceeds the full cost of treatment, the prognosis with treatment is good and the time to recovery fits with the animal's stage of the export process. This is not always straightforward due to uncertainties about the diagnosis, the effectiveness of treatment, the full cost of treatment and the likelihood and time of full recovery. Other prominent considerations include the time and resources available to treat the animal and the opportunity cost of treatment (ie whether limited time and resources might be better spent elsewhere).

A decision to treat is influenced considerably by estimates of the cost-effectiveness of treatment. A simple formula can be used to help gauge a treatment's cost-effectiveness, but it should be used along with other considerations (the level of pain and distress always being primary):

$C = V \times P$

where C is the cost of treatment, V is value of the animal and P is the probability of recovery with treatment.

For example, if a steer worth $1,000 has pneumonia, then spending up to (but not more than) $1,000 on treatment is cost-effective if it will make a full recovery. If the steer, based on clinical findings and experience, has a 30% chance of full recovery with treatment and therefore a 30% chance of resuming its $1,000 value, then it is cost-effective to spend up to $300 (30% × $1000) on treatment. If the steer is not expected to make a full recovery but will return $300 from salvage slaughter after deducting costs, then it is still cost-effective to spend up to $300 on treatment.

Making a prognosis requires taking into account a range of uncertainties, such as the accuracy of diagnosis, effectiveness of treatment, time to recovery and the level of recovery. Making a prognosis in the live export process can sometimes be difficult because time, facilities and diagnostic backup are often unavailable (but it can sometimes be easier because of these constraints).

A prognosis can be made based on experience with previous cases, keeping in mind the wide variety of intrinsic animal factors and extrinsic management and environmental factors contributing to the uncertainty of the outcome. In the live export process, rate of

response to treatment is probably one of the most helpful methods of making a prognosis. Over a few hours or days, rapid improvements in demeanour, appetite and mobility usually indicate ongoing treatment will be rewarded. Slow or absent improvement gives cause for favouring euthanasia or salvage slaughter.

Key considerations that support treatment, some of which may be deciding factors, are as follows:

- pain and distress are controllable
- the value of the animal is greater than the full cost of treatment (including opportunity cost)
- high likelihood of recovery with or without treatment
- high likelihood of recovering to fulfil its intended purpose (ie milking, breeding)
- risk of disease and injury to other animals and people is controllable
- skill, time and facilities are available to treat properly (including at further stages along the export process, if necessary)
- sufficient time is available for recovery
- diagnosis is accurate
- sufficient time is available to meet withholding periods for meat, milk and export slaughter intervals
- the rate of response to treatment is encouraging

4.6 Considerations for monitoring

Monitoring is an option for animals with mild sickness or injury below the threshold of symptoms where intervention is considered necessary. It is also an option for cases where restraint for treatment (including repeated treatments) may cause undesirable levels of stress. If the animal deteriorates or fails to improve, then some type of intervention should be considered.

Key considerations that support monitoring, some of which may be deciding factors, are as follows:

- pain and distress are below the threshold for intervention
- resources are available for monitoring
- treatment may do more harm than good in terms of stress on the animal
- disease will not worsen or spread to other animals

5 Recommendations for management of reject animals prior to and during road transport

5.1 Introduction

This section provides guidelines for the pre-transport management of animals rejected from the live export process at pre-embarkation inspections. Unfit-to-load animals (rejects) are sick, injured, weak or physiologically unsuitable for export by sea. The inspections occur at quarantine premises (usually a feedlot or farm) or at the wharf. Depending on location, the animals may be euthanased, treated on site or transported by road away from the inspection point for treatment or salvage slaughter.

5.2 Decision-making

Decisions on the fate of reject animals are made by the person in charge[1]. This is done after individual assessment and where necessary, after obtaining veterinary advice. Information to assist decisions regarding reject animals is provided in Section 4. It is recommended to develop a system for sorting rejects during inspection at inspection points, enabling euthanasia, urgent treatment or monitoring of rejects to be performed quickly.

5.3 Legislation and criteria for rejection

The criteria for rejection from transport by sea are more comprehensive than the criteria for rejection from transport by land. Therefore, animals rejected from export may still be fit for road transport. For example, an animal rejected from live export for scabby mouth remains fit to travel by road.

The legislated criteria for rejecting cattle and sheep from the export process are provided in the Australian Standards for the Export of Livestock (Version 2.3) 2011. The criteria for rejection from land transport are provided in the Australian Animal Welfare Standards and Guidelines for the Land Transport of Livestock, which are—or soon will be—incorporated into each state and territory's animal welfare legislation. The rejection criteria for export and for land transport are reproduced in Appendixes 1 and 2, respectively.

5.4 Euthanasia

Euthanasia should be performed without delay on reject animals suffering undue pain and distress or when the options of salvage slaughter, treatment or monitoring are not available.

[1]The person responsible for the welfare of the livestock at the times that they are in charge for each stage of each journey, including before loading and after unloading. Responsibility for duty of care for livestock welfare may extend to the person's employer.

Euthanasia may need to occur on the transport vehicle. Use a rifle, captive bolt or veterinary-administered lethal injection, the choice being dictated primarily by issues subjecting them to unnecessary distress, fear or pain.

- Only involve the minimum number of people required to complete the procedure safely and effectively.
- Ask bystanders to leave, and keep the procedure out of public view.
- Restrain as necessary for effective euthanasia to ensure that death comes painlessly and rapidly.
- Confirm death systematically every time, satisfying yourself beyond doubt that the animal is dead before disposal

5.5 Pre-transport management

Many rejects will be transportable under routine arrangements. These animals are:

- ambulatory
- not suffering conditions where transport will increase pain and distress
- otherwise assessed as fit for the intended journey

These may include animals affected by conditions such as pinkeye, ill thrift, bony or soft tissue swellings and various skin conditions

Some rejects, however, must only be transported under veterinary advice. This is a legal obligation under the Australian standards for land transport of livestock[2]. Obtain veterinary advice before transporting animals that are:

- unable to walk unassisted and by bearing weight on all legs
- severely emaciated
- visibly dehydrated
- visibly suffering severe injury or distress
- suffering from conditions that are likely to increase pain or distress during transport
- blind in both eyes

5.6 Veterinary advice

Veterinary advice may be obtained remotely, by telephone, fax or email. Often an Australian Quarantine and Inspection Service (AQIS) Accredited Veterinarian is in attendance to complete inspection obligations to an importing country's health permit conditions. Animals may become injured after formal inspections have been completed and the veterinarian has departed.

The veterinarian should be provided with sufficient information to give sound advice on whether the animal should be euthanased or transported. Both the veterinarian and the person in charge should keep a written record of the information provided and the advice given.

In providing advice for the transport of compromised animals, the veterinarian would need the following information on each animal:

- nature and extent of any injuries
- ability to bear weight on all four legs
- time off feed and water
- extent of any blindness
- stage of pregnancy
- level of heat or cold stress

To determine the likelihood that transport will unduly aggravate the animal's compromised welfare, the veterinarian would also need information on the following factors:

- journey time (the length of the journey must not exceed the fitness of the weakest animal on board)
- road conditions
- weather
- resources available to protect the animal during transport
- standard of treatment and care at destination

If the animals are intended for salvage slaughter, the veterinarian would need the following additional information:

- acceptability of the animal by the knackery or abattoir regarding residues and likely disposition of the carcase
- provisions for emergency slaughter, including euthanasia on the transport vehicle if necessary

If transport is decided, the veterinarian instructions on how the animals should be transported may include provision of:

- gently sloping rather than steep loading and unloading ramps
- non-slip flooring
- soft bedding
- separate compartment in transport vehicle
- transport in smaller specialised vehicle or trailer that is specifically reserved for sick and injured animals

[2] *Animal Health Australia (AHA) 2008, Australian Standards and Guidelines for the Welfare of Animals* — Land Transport of Livestock. AHA, Canberra. Edition 1, Version 1, Part A4, Pre-transport selection of livestock. Available at http://www.animalhealthaustralia.com.au

- separation from other animals
- penning with one quiet animal
- penning with other animals compatible in size, strength and temperament

The veterinarian may require assurances that:

- the animals will not go to a saleyard to be traded or sold
- if the animals become unduly compromised during the journey, they will be taken to the nearest suitable facility for treatment or euthanasia

The veterinarian may provide instructions for pre-transport treatment and care of compromised animals, including:

- a period of rest and recovery so that the animal can walk up a ramp unassisted
- feeding and watering
- subcutaneous administration of calcium borogluconate and magnesium sulphate solutions
- analgesia
- sedation
- parenteral or topical antibiotics
- bandaging, splinting or hobbling
- rehydration by stomach tube with fluids containing isotonic or hypotonic concentrations of electrolytes (if a competent operator is available)
- guidance on how an animal may be assisted on and off a transport vehicle or trailer

Appendix 1

Rejection criteria for the live export of cattle and sheep in the Australian Standards for the Export of Livestock—Appendix 3.1[3]

General requirement

- fail to meet requirements of protocol or import permit, such as sex, type, breed or tag number
- lactating animals with young at foot
- lactating animals
- pregnancy status not confirmed as appropriate for journey

Systemic conditions

- emaciated or overfat
- anorexia (inappetence)
- uncoordinated, collapsed, weak
- unwell, lethargic, dehydrated
- ill thrift

Musculoskeletal system

- lameness (eg footrot, foot abscess, arthritis, fractures) or abnormal gait
- abnormal soft tissue or bony swellings

Gastrointestinal system

- dysentery or profuse diarrhoea
- bloat

Nervous system

- nervous symptoms (eg head tilt, circling, incoordination)
- abnormal or aggressive behaviour (intractable or violent)

External and skin

- generalised papillomatosis or ringworm, dermatophilosis
- generalised and extensive buffalo fly lesions
- generalised skin disease
- visible external parasites
- significant lacerations
- discharging wounds or abscesses
- cutaneous myiasis (flystrike)
- balanitis (pizzle rot in sheep)
- blood or discharge from reproductive tract (vulva or prepuce)

Head

- blindness in one or both eyes
- cancer eye
- keratoconjunctivitis (pink eye)
- excessive salivation
- nasal discharge
- coughing
- respiratory distress or difficulty breathing
- horns causing damage to head or eyes
- bleeding horn stumps
- scabby mouth

[3]Australian Standards for the Export of Livestock (Version 2.3) 2011. Available at http://www.daff.gov.au/__data/assets/pdf_file/0010/1904365/australian-standards-v2.3.pdf

Appendix 2

Rejection criteria for land transport of cattle and sheep in the Australian Animal Welfare Standards and Guidelines for the Land Transport of Livestock

SA4.1 Livestock must be assessed as fit for the intended journey at every loading. An animal is not fit for a journey if it is:

- unable to walk on its own by bearing weight on all legs
- severely emaciated
- visibly dehydrated
- showing visible signs of severe injury or distress
- suffering from conditions that are likely to increase pain or distress during transport
- blind in both eyes
- known to be, or visually assessed to be within 2 weeks of parturition, unless the water-deprivation time and journey is less than 4 hours duration to another property

SA4.2 Any livestock assessed to be not fit for the intended journey must only be transported under veterinary advice.

SA4.3 The consignor must only supply livestock that are assessed as fit for the intended journey.

SA4.4 Where livestock are assessed to be not fit for the intended journey before loading, the person in charge must make effective arrangements for the care, appropriate treatment or humane destruction of weak, ill or injured livestock at the first opportunity.

Glossary

abridement	medical removal of dead, damaged or infected tissue
downer	an animal that cannot stand on its own and must be euthanased
fluctuant	moveable and compressible
lavage	irrigation or washing out
metastasis	spread of the disease from one organ or body part to a non-adjacent organ or body parts
opportunity cost	cost of any activity measured in terms of the value of the best alternative that is not chosen
parenteral	introduced through broken skin or membrane, usually by injection; not orally
pendunculated	a mass of tissue hanging from a peduncle (stalk or stem)
polyarthritis	any type of arthritis that involves five or more joints simultaneously
prognosis	a prediction of the future course of the disease
recumbency	lying down, especially in a position of comfort or rest
salvage slaughter	slaughter animal at an abattoir or knackery for its salvage value
sepsis	a severe illness in which the bloodstream is overwhelmed by bacteria
sternal recumbency	sitting up on the brisket with the legs tucked under the body

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