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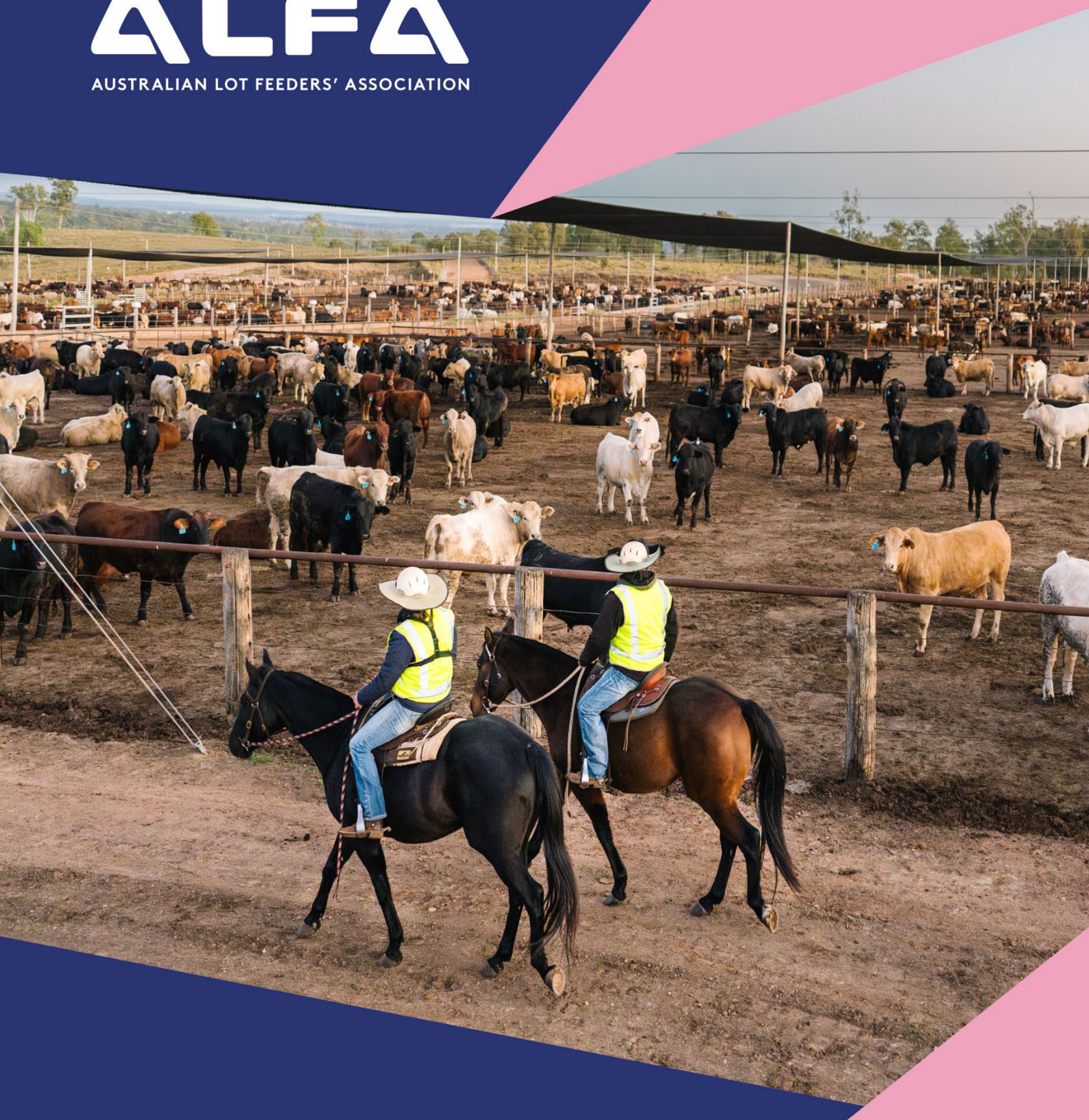

Preventative biosecurity practices for emergency animal diseases on feedlots

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BIOSECURITY TOOLKIT

mla

MEAT & LIVESTOCK AUSTRALIA

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Purpose

Australia is free from many significant cattle diseases. Therefore, basic biosecurity practices used in combination are generally sufficient enough to balance costs against disease management.

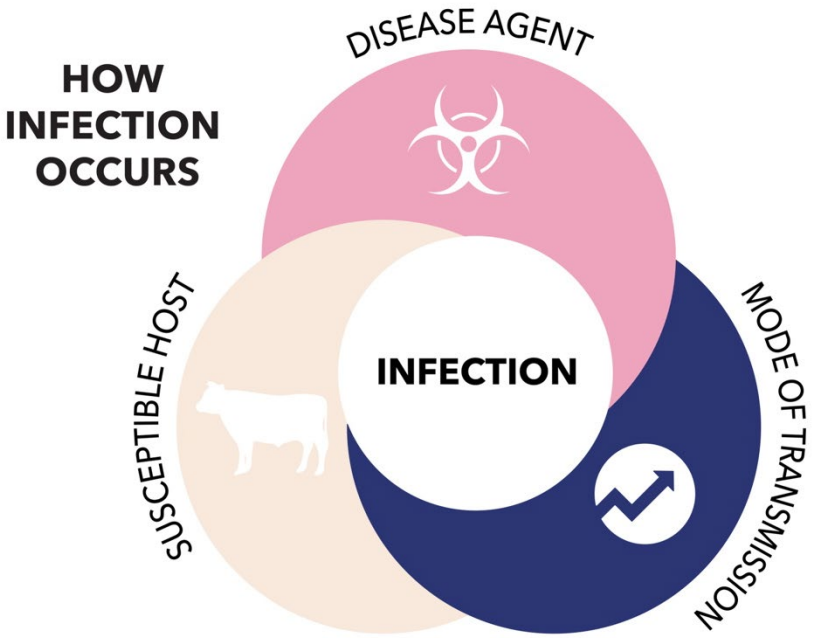
EADs exotic to Australia are significantly more contagious, cause larger economic impacts, as well as high mortality or morbidity rates. Therefore, should an EAD enter Australia, feedlots would be required to enhance their biosecurity practices to minimise disease impact on the feedlot.

Not all EADs are spread in the same way, therefore it's important to first understand their transmission points to implement specific preventative strategies.

This document outlines the specific hygiene practices required for specific EAD diseases that impact cattle and horses.

The purpose of this document is to outline biosecurity hygiene practices to prevent an EAD from entering a feedlot. It aims to assist a feedlot in completing step 3 of the Feedlot EAD Action Plan required for NFAS.

Enhancing key biosecurity practices to prevent disease entry (Step 3 of the EAD Plan)



Biosecurity is a general term that includes a range of key biosecurity practices that can be divided into two categories based in their function:

Bio-exclusion, the prevention of any outside agent from entering a production animal operation and;

Bio-containment, the protocols that prevent agents (namely viruses and bacteria) from spreading outside of the facility.

Key biosecurity practices and their efficacy depend on the type of disease how an EAD is transmitted as outlined below:

For the purpose of this document and the relevant EADs it addresses, there are 6 disease categories:

- Viruses (categorised into A, B and C based on characteristics)
- Prion
- Bacteria (including spore forming bacteria)
- Protozoa
- Fungal
- Parasitic

There are 5 ways an animal disease can spread directly or indirectly via the following methods:

- Airborne (inhalation of infective droplets/particles)
- Ingestion (contaminated water, feed or contaminated environmental objects)
- Vector borne (spread by a living organism, usually an insect, from an infected animal to another host)
- Fomite spread (inanimate objects, such as equipment, clothing, footwear or vehicles, that can transfer microorganisms from an infected animal to another)
- Direct contact (direct contact with saliva, urine, faeces, tissues etc of an infected animal).

The following table is a guide of key biosecurity practices that can be used to prevent an EAD for each major transmission pathway.

Table 1. Biosecurity practices for each transmission pathway.

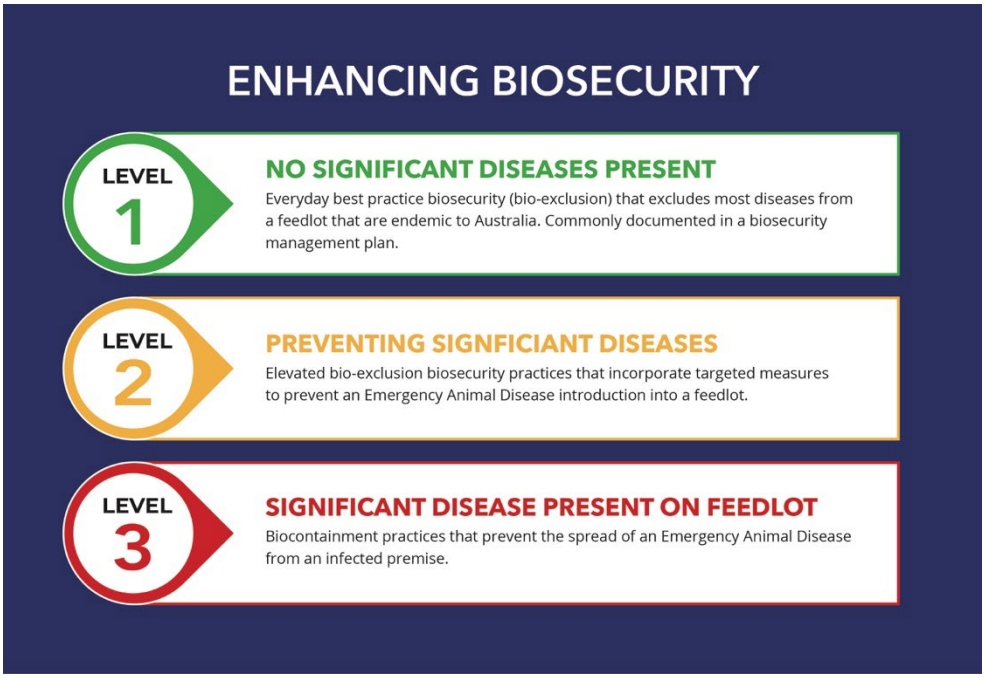
Biosecurity Practice	Airborne (Inhalation)	Ingestion	Vector Borne	Fomite Spread	Direct Contact
Bio-exclusion					
Increasing hygiene practices to level 2	X			X	
Segregation	X	X	X		X
Managing livestock purchases	X	X	X	X	X
Preventative insect treatments and control			X		
Physical barriers to prevent carrier or pathogen and host interaction		X	X	X	X
Bio-containment					
Vaccination*	X	X	X	X	X
Increasing hygiene practices to level 3	X			X	
Reducing host density	X				X
Managing feed sources accordingly		X			

Note one or more biosecurity practices may be required to prevent an EAD from occurring. *NB vaccination strategies are restricted to those with available safe vaccines.

Biosecurity and Hygiene Practices

Planning for and operationalising different levels of biosecurity will assist feedlots in preventing disease entry.

Increasing biosecurity hygiene practices for fomite or highly contagious disease without respirator (FMD etc).



Level 1 biosecurity practices encompass a range of low to medium cost bio-exclusion practices that are effective against most endemic animal diseases to Australia. However, they are not likely to be effective against an EAD and therefore it is important that feedlots elevate their biosecurity hygiene practices in accordance with the risk.

Before you visit a feedlot

- Visitors should shower shortly before leaving the house using soap and shampoo. Nasal passages should also be cleared.
- All non-essential items should be removed (scarves, belts, gloves, jewellery, watches etc) It is better to leave these items at home.
- Clothing and footwear must be able to be cleaned via submersion. E.g. no leather boots. Gumboots are a practical solution to prevent damaging footwear. Any footwear that is worn to the premises must be clean with no visible debris or soil.
- Essential items of clothing worn should be clean and laundered. Do not re-wear items like jumpers and gloves without washing them in between uses.
- Consideration must be given to items that cannot be laundered such as hats, gloves, footwear and sunglasses that cannot be laundered (or may be chemically damaged during cleaning processes). These items where critical for a staff member may be left at the feedlot on a permanent basis.
- Long hair should be worn up and consideration should be given to hair bands being used and how they are being decontaminated.
- Visitors should cover cuts with waterproof dressing at home if necessary.

- Visitors must not have visited another feedlot or premises with susceptible species in the last 24 hours where the EAD is fomite spread.

General principles

- **Where there is no infection** on the feedlot and the disease is more than 10km in distance from the feedlot level 2 biosecurity practices should be implemented/exit procedures.
- **Where there is infection**, or the diseases is within 10kms implement level 3 biosecurity entry/exit procedures (under direction from the lead government agency).
- Increased hygiene practices may also include setting up decontamination stations between hot and cold zones and applying personal protective equipment.
- Scaled daily operations must continue on the feedlot with animal welfare considerations to remain a priority, this will likely include receiving feed and fodder supplies and veterinarian visits.
- For the purpose of this document, Personal Protective Equipment references are for the prevention of animal to animal transmission only. Where the EAD is zoonotic, the lead agency will manage animal handling unless the feedlot has annual training to utilise respiratory protection.

The following section lists out the corresponding biosecurity practices associated with each level of biosecurity practices.

Veterinarians may be managed via visitor practices (wearing disposable overalls) or shower on and off practices, depending on their preferences and the tasks they are required to undertake at the feedlot and the practicality of wearing disposable overalls. A 24 hour stand down between feedlots must apply to all veterinarians where the EAD is fomite spread, and the veterinarian has been handling sick animals or taking samples. This is to reduce disease spread risk where results may not have been received yet to exclude the presence of the EAD. This may become problematic if veterinarian numbers are limited. Therefore, feedlots should consider using technology such as video calling / photographs or point of care testing in conjunction with their veterinarian's advice and visits. Advice for veterinarians responding to an EAD can be found here. Alternative the Guidelines for veterinary personal biosecurity is also a useful tool.

Level 1 Biosecurity practices (Broad scale bio-exclusion)

Level 1 Feedlot Biosecurity Practices refer to biosecurity practices that are documented within a feedlot's biosecurity plan that aid to protect against most endemic diseases in Australia through a collection of non-specific, cost-effective measures.

Australia remains free of most significant contagious diseases, meaning that the most likely introduction of endemic disease is directly by permitting sick or carrier livestock into a feedlot and penning them in close proximity to naive livestock.

Level 1 Biosecurity Practices include:

Managing Livestock and other animals

- Managing incoming livestock through vaccination programs on induction or targeted purchases using natural immune response
- Storing and handling of feedstuff to prevent contamination
- Erecting, repairing or stock proofing fencing around the designated area on the feedlot or external perimeter to prevent access by other animals
- Erecting, repairing or stock proofing fencing around carcass management areas to prevent scavenger animal access
- Managing incoming livestock through segregation activities (e.g. new introductions kept at one end of the feedlot)
- Managing feed inputs by complying with national programs (swill feeding ban and ruminant feed ban (RFB)) to reduce disease risk
- Managing effluent
- Managing manure

Managing People, Vehicles and Equipment

- Zoning activities to reduce the risk of visitors that have recently been outside of Australia coming into close contact with livestock
- Managing visitors through low-risk entry biosecurity hygiene procedures

Level 1 biosecurity entry procedures for visitors

For routine, low biosecurity risk site visits, standard procedures might include:

- Wearing clean laundered clothing or overalls daily
- Wearing clean boots and/or washing footwear before entry to remove mud and debris when present
- Hand washing prior to entry and regularly when handling livestock.
- Covering cuts and abrasions (band-aids etc)
- Using clean equipment for husbandry practices and cleaning equipment after use with soapy water and disinfectant
- Wearing gloves when handling sick animals or carcasses
- Maintaining hygienic processes when handling livestock (regular hand washing after handling, no food in livestock production areas
- Correct disposing of used gloves, disposable overalls and other wastes
- Removing and bagging dirty garments (such as overalls) prior to exiting the feedlot

- Washing hands prior to exiting the feedlot
- When a visitor does not meet these criteria Additional Biosecurity Practices when Level 1 Biosecurity Hygiene Practices may need to be applied to address the risk.

Visitor risk assessment

For Level 1 day to day management of visitors should include a biosecurity risk assessment that excludes visitors that have been overseas in a country where FMD is present for 7 days since leaving that country.

Vehicles and Equipment

- Vehicles and equipment to follow come clean go clean practices.
- Equipment used to remove carcasses from pens must be cleaned and decontaminated before being used for feedstuff.

Level 2 Biosecurity Practices (enhanced bio-exclusion)

Level 2 biosecurity practices should be implemented when Australia is experiencing an EAD incursion and may include proportional financial investments to implement.

Level 2 biosecurity practices apply to feedlots where **no infection exists** and aim to prevent the entry of the EAD into the feedlot with more targeted practices. These include:

- Managing visitors via a minimum of Level 2 entry/exit procedures or;
- Implementing a combination of the preventative measures outlined in this document to manage the risk.
- Manage visitor entry practically whilst adequately managing the risk

Managing Livestock and other animals

- Minimise livestock movements on the feedlot or surrounding premises, this could include:
    - Erecting pig/stock proof fencing around a designated area on the feedlot or external perimeter to prevent access of susceptible species or contact with livestock from wildlife or feral animals.
    - Erecting pig/stock proof fencing around identified carcass management areas to prevent access.
    - Cover stock drinking water sources as required.
- Purchasing new livestock from areas known to be free of the EAD only.
- Ensuring movement permits and other health documentation are provided with new purchases.
- Managing incoming livestock through segregation activities, these may include;
    - Checkering pen fills

- Installation of individual water troughs in pens
- Incoming livestock segregated to one end of the feedlot in a progressive entry to exit style.

- Livestock effluent is managed to ensure there is no contact between effluent pond or manure piles and livestock. (Where pasture irrigation is occurring following guidelines). This practice may need to be re-evaluated to ensure it is safe to continue or can be stopped immediately if an EAD is suspected.
- Stock drinking water is managed to reduce livestock and wild animal interface.

Managing People, Vehicles and Equipment

Only essential persons are permitted to attend the feedlot. This includes:

- Essential Feedlot staff
- Veterinarians
- Government representatives
- Feed truck deliveries

- Visitors to have undertaken a risk assessment to enter the hot zone and are to follow high risk entry/exit procedures.
- Non-essential vehicles should be left in cold zones or the designated carpark on the feedlot to minimise the likelihood of contamination with the exception of feed truck deliveries that enter the hot zone)
- Only essential items must be brought onto the feedlot (all excess jewellery and clothing must be removed and left in the vehicle or cold area)
- Visitors should cover cuts with waterproof dressing if necessary
- Visitors must not have visited another feedlot or premises with susceptible species in the last 24 hours where the EAD is fomite spread.

Level 2 entry/exit procedures for visitors.

- Visitors are to undergo a shower with soap and wash their hair before entry. This can be performed at home if the visitor is coming straight to the feedlot thereafter and has no contact with other susceptible species outside of the feedlot.
- Visitors are to change into clean laundered clothing or disposable PPE and utilise separately identified gumboots that do not leave the feedlot (e.g. a specific colour or numbering system).
- No footwear is to be brought onto the feedlot by visitors.
- No clothing or equipment is to be brought onto the feedlot by visitors that cannot be decontaminated.
- Staff who require specific footwear to undertake their role must have footwear that can be decontaminated (e.g. able to step through a footbath) or the footwear must not leave the hot zone area.

- Visitors may be required to wear a respirator where contact is required with sick animals, and the EAD is fomite or airborne spread or presents a risk of zoonosis.
- Where footbaths and decontamination stations are opted to be set up see Appendix 2

Visitor risk assessment

For level 2 biosecurity management of visitors the biosecurity risk assessment should aim to ensure that visitors undertake appropriate decontamination procedures for fomite spread pathogens.

Vehicles and Equipment

- Non-essential vehicles should remain in the cold zone.
- Vehicles and equipment to be decontaminated on and off when entering hot zone see Appendix 2.
- Separate equipment should be used to remove carcasses from pens or must be cleaned and decontaminated before being used for feedstuff.

Level 3 Biosecurity Practices (bio-containment)

Level 3 biosecurity practices must be established when a property becomes infected, or infection is suspected.

Level 3 biosecurity practices are to prevent further spread of the disease from the feedlot as the feedlot undertakes depopulation, disposal and decontamination activities.

Where there is infection, the lead government agency will take the lead in coordinating disease management activities. Where the lead government agency determines a practice that is not covered by this document, **their direction must be followed**. It is important that feedlots follow the directions of the lead agency to prevent further spread of the EAD.

At this point, surveillance, testing and control measures will be in place to monitor disease spread therefore footbaths will be required to set up to manage a visitor cohort where showering on and off is not practical.

Watch these two videos on how to set up a decontamination station and don personal protective equipment.

Watch this video on how to exit a hot zone and remove (doff) personal protective equipment safely.

Managing Livestock and other animals

Effective Level 3 EAD management requires specific management practices that prevent the EAD from spreading from the feedlot and/or reduces the speed in which the EAD spreads on the feedlot to manage the welfare of the animals.

- Cease livestock movements on the feedlot and/or surrounding premises
- Erect fencing as required to contain disease spread.
- Livestock effluent is managed to ensure there is no contact between effluent pond or manure piles and livestock.
- Pasture irrigation practices should cease until a risk assessment can be conducted.
- No effluent is to leave the feedlot.
- Stock drinking water is managed to reduce livestock and wild animal interface as required.
- Drinking water is separate to each pen to prevent rapid spread as required.
- The feedlots DDD plan is implemented.

Managing People, Vehicles and Equipment

Only essential persons are permitted to attend the feedlot, and this may be at further discretion of the lead agency. These include:

- Essential Feedlot Staff
- Veterinarians
- Government representatives
- Feed truck deliveries

A 72 hour stand down must apply to persons visiting infected livestock properties where the EAD is fomite spread.

Level 3 entry/exit procedures for visitors

General considerations

- Showering on and off at the feedlot may be required for certain EADs for visitors entering the feedlots hot zone.
- Specific footwear or clothing required by staff to undertake their role must be able to be decontaminated (e.g. able to step through a footbath) and the footwear/clothing article must not leave the hot zone without being cleaned.
- Visitors are to change into clean laundered clothing and utilise separately identified gumboots/footwear that do not leave the feedlot (e.g. a specific colour or numbering system).
- No footwear is to be brought onto the feedlot by visitors
- Staff who require specific footwear to undertake their role must have footwear that can be decontaminated (e.g. able to step through a footbath) or the footwear must not leave the hot zone.
- Visitors may be required to wear a respirator where contact is required with sick animals, and the EAD is fomite or airborne spread or presents a risk of zoonosis.
- Visitors must not have visited another feedlot or premises with susceptible species in the last 24 hours where the EAD is fomite spread. Further to this, for

fomite spread diseases, visitors are to undergo a shower with soap and hair washing before entering another premises. This includes attending veterinarians.

- Where footbaths and decontamination stations are to be set up, see Appendix 2

Visitors entering the hot zone (using overalls and a footbath)

All visitors entering the hot zone are to don personal protective equipment while still in the cold zone and:

- Remove all excess jewellery and excess clothing before entering the feedlot
- Tie long hair back into a pony tail
- Apply sunscreen as required
- Wash hands with soap and dry with paper towel and discard paper towel in waste bin provided.
- Cover all cuts with waterproof dressing if necessary
- Remove footwear and leave in the cold zone
- Put on impermeable overalls with legs outside boots
  - Do the zipper up your chin but leave hood down for now
- Put on rubber boots and place legs of overalls outside the rubber boots
- Put on a respirator (if required) and check the fit
- Put on eye protection, ensuring it fits snugly over respirator
- Put on two pairs of gloves
  - Put on inner gloves, the cuffs should be under the sleeves of the overall
  - Put on the second pair of gloves outer pair fitting snugly over overall sleeves
  - Secure the outer glove onto the sleeves of impermeable overalls with tape over gloves onto sleeves
  - Fold the tip of the duct tape inwards, thereby creating a tab to make it easier to remove
- Pull hood up over your hair and reposition zip under your chin.
- Enter the hot zone via a footbath (See Appendix 2 – footbaths for set up)
- Step into disinfectant tub and wash boots
- Step through detergent bucket and step into hot zone taking all equipment with you.

Moving personal equipment onto the feedlot

- Preference materials that are able to be submerged in water and cleaned or leave sets of equipment in the hot zone for future use.
- Place as much of your equipment as possible into separate sealable waterproof plastic bags so that only the required equipment and consumables are exposed.

- Phones or other essential electronical equipment should be placed in a zip lock bag sealed with tape and not removed until decontaminated and back in the cold zone.
- All equipment including veterinary equipment is to be sprayed in disinfectant prior to entering the hot zone.
- Systematically spray disinfectant on all equipment and plastic bags containing items and to be taken in to the “hot zone,” before placing it across the imaginary line onto the “dirty” side of your drop sheet.
- This is a biosecurity risk mitigation measure and also ensures that you are not potentially bring infectious agents or contaminants onto the premises.

Visitors exit procedure from the hot zone (using overalls and a footbath)

At the completion of each day or activity feedlot staff must undertake decontamination procedures to prevent further spread of the EAD. Whilst still in the hot zone:

- Bag all rubbish or disposable items in a large garbage bag,
- Clean down the work area taking care to clean surfaces and equipment contaminated by blood, excretions, or tissues as thoroughly as possible and disinfect. Care must be taken that wastewater in clean down areas is not entering waterways.
- While still in the hot zone:
    - Undertake gross cleaning prior to stepping onto the personal decontamination station.
    - Gross cleaning must be undertaken using a hose or bucket of water and detergent, a hoof pick and a hard brush. Items to be cleaned include the soles of boots, PPE (overalls and gloves) and equipment, taking care to remove any visible blood, soil or debris.
    - If sample/equipment cleaning is required, remove samples and record bags from esky without opening the sealable bags and remove any visible debris.
    - Clean esky / carrying bucket inside and out and place samples back in the esky.
    - Scrub all equipment that came in direct contact with susceptible species in detergent solution
- Proceed to the personal decontamination station taking all equipment and samples with you (Transition zone)
- Decontaminating equipment and or samples
    - Place all disposable equipment in sharps contain / biohazard bags in bin
    - Rinse gloves in the disinfectant bucket

- Remove samples and equipment from esky / buckets and disinfectant with spray.
- Double bag samples and spray the outside of the bag with disinfectant spray
- Place samples on the clean side of the mat
- Leave the esky on site
- Immerse instruments/equipment in an appropriate concentration of disinfectant solution (or leave behind for subsequent disinfection).

- Removing PPE
  - Step into the first footbath (detergent) and remove any visible contaminated materials from boot treads using hoof pick and hard scrubbing brush
  - Step from the detergent footbath (Tub 1) into the disinfectant tub (Tub 2) and scrub your boots again, then disinfect your cleaning equipment through thorough rinsing in the Virkon® S tub and place in the garbage bag serving as an “equipment bag” for reusable equipment.
  - Step onto the transition zone mat
  - Spray mist the disposable overalls (this is easier with two people)
  - If wearing a hat or sunglasses, remove scrub with detergent and spray with disinfectant
  - Outer glove removal:
    - Remove duct tape from sleeves and place discarded gloves in the biohazard bag/bin on dirty side
    - Remove the outer gloves by turning them inside out After removing the first glove, place one finger inside the outer glove on the other hand, to avoid touching the contaminated side Turn this glove inside out as well, leaving the first glove rolled up inside the second
    - Spray gloves with disinfectant and place them in a biohazard bag/bin on the “dirty” side
  - Remove overalls and boots
    - Minimise touching the outside surface of the overalls as much as possible.
    - Pull hood back and unzip overalls and remove but avoid touching the outside of the overalls as you remove them.
    - Peel and roll the disposable overalls off and away from your body and down around your ankles over the rubber boots, leaving them wrapped around the boots.
    - Step out of the boots and outer layer of disposable overalls and onto the “clean” side of the drop sheet.

    - Remove overalls from the boots, roll them up and place in a biohazard bag on the “dirty” side.
  - Remove inner gloves, put in plastic bag with other personal protective equipment and close securely.
  - Disinfect plastic bag then put in second plastic bag and disinfect again.
  - Wash hands, face and other exposed skin surfaces with soap and water. Your nose should be blown several times into disposable tissues. Discard tissues in bin provided and wash hands.

Further disinfection

- Stay standing on the drop sheet and remove outer clothing, if necessary (personal clothes), then disinfect and double bag to a “vehicle” or “equipment” bag for laundering in an appropriate disinfectant
- Disinfect and scrub all potentially contaminated parts and exposed skin with disinfectant and allow to air dry.
- Dress in clean clothes and footwear.

Staff entry /exit onto a feedlot

Feedlot staff undertake a variety of roles some of which cannot be undertaken in disposable overalls therefore entry procedures must be modified to be able to clean and launder clothes in the hot zone for staff to change into. It is highly recommended that staff leave sunglasses, hats, boots, and other items they use daily in the hot zone and do not disinfect these items on and off daily to prevent damage to these items. Staff should bring a clean pair of clothes and undergarments with them each day and keep a spare pair at the feedlot.

Staff entering the hot zone (without disposable overalls)

- Staff must shower before entering the hot zone
  - Staff may shower at home If they have no contact with other livestock or people and travel directly to the feedlot from home if approved by the feedlot or they must shower at the feedlot
- Staff must change into clean laundered clothes left at the feedlot in the cold zone
- Clothing should be strictly required PPE only and preference PPE that can be disinfected on exit
- Remove all jewellery and non-waterproof watches etc
- Remove your footwear, and leave them in the “cold zone”
- Cross into the hot zone taking all necessary equipment with you. Phones must be placed in waterproof cases / sealable plastic bags and disinfected before entry into the hot zone
- Put on footwear and other PPE (hat and sunglasses etc)

- Commence employment duties

Staff exit procedure from the hot zone

- At the completion of each day or activity feedlot staff must undertake decontamination procedures to prevent further spread of the EAD.

While still in the hot zone:

- Bag all rubbish or disposable items in a large garbage bag
- Remove gross contamination from boots with a hard brush, hoof pick and or hose
- Immerse instruments/equipment in an appropriate concentration of disinfectant solution (or leave behind for subsequent disinfection).
- Remove footwear, sunglasses, hat, notebooks etc and leave in the hot zone.
- Put waste in a plastic bag, disinfect it, put it in a second bag and disinfect again, then either leave in the designated rubbish area or place in cold zone for other disposal.
- Bag all clothing for laundering and place in washing machine.
- Enter the transition zone and:
    - Enter shower and wash thoroughly including hair with soap / shampoo. Your nose should be blown several times.
    - Dress in clean clothing or clothing you wore to work that morning.
- Once in the cold zone
    - Put on footwear that has not left the cold zone.

Laundering staff clothing

Clothing should be laundered in the hot zone as a preference. This may need to be undertaken by a single person or completed by staff in the mornings, so clothing has time to dry and be available for the next day. Care should be taken when setting up washing machine facilities to manage waterways.

Clothing despite being laundered should not leave the hot zone and will likely need to be disposed of at the end of its use rather than leaving the feedlot unless it can be laundered using a specific product that de-activates the EAD in question.

Visitor risk assessment

Level 3 biosecurity practices exclude any visitor that is not considered to be essential to enter the feedlot. Essential services may include staff caring for livestock and conducting surveillance, management and veterinarians/ nutritionists.

Vehicles and Large Equipment

- Non-essential vehicles should be excluded from the feedlot.
- Vehicles and equipment to be decontaminated on and off when entering warm or hot zones or off the feedlot.

- Separate equipment should be used to remove dead livestock from pens or must be cleaned and decontaminated before being used for feedstuff.

Other biosecurity practices

The following section includes individual information on how to enhance other biosecurity practices for diseases that are spread by ingestion, airborne, vector spread or direct contact. Appendix 1 table 1 sets out how each disease is transmitted, and which biosecurity practice groups are applicable. Appendix 1 table 3 sets out each relevant practice by EAD and transmission.

Segregation

Segregating animals from a pathogen eliminates the likelihood of disease occurrence.

The distance of separation required will depend on the pathogen's transmission radius (in what area can it remain viable) and can be short (direct contact or inhalation) or long (insect vectors or inhalation).

Airborne transmission

Airborne diseases are extremely difficult to manage through common biosecurity measures. Airborne diseases are transmitted by aerosols, which are liquid or solid particles suspended in the air and that act as a carrier for the infectious pathogens enabling them to move from infected animals to susceptible animals. Pathogens that are carried on aerosols are therefore called airborne pathogens. Aerosols can remain airborne or settle on surfaces (fomites) due to gravity (La, Zhang, Cicek, & Coombs, 2022)

For the purpose of this document, airborne transmittable diseases have been categorised into short (direct or within 100m) or long transmission. For diseases that are airborne it is recommended to move susceptible livestock outside of the transmission radius and potentially utilise hygiene practices to prevent fomite spread depending on the disease.

This may include implementing short distance segregation from neighbouring or sick livestock on the feedlot or long-distance segregation as part of movement restrictions to prevent disease transmission.

Diseases that can be airborne are Aujeszky's Disease, Equine Influenza, Bovine Tuberculosis, Foot and Mouth Disease, Anthrax (minimal risk of transmission) and Rinderpest (extinct).

Contact transmitted disease

- Short distance segregation such as eliminating or reducing nose to nose contact may suffice whereas for airborne transmission this would be set by the distance where the disease agent is still viable.

Insect vector transmission

Effective segregation distances for insect vector transmission are dependent on the flying radius of the insect/s or the insect's habitat depending on whether the insect is cable of biological or mechanical transmission.

Biological transmission is more difficult to prevent than manual transmission due to the ability of insects to keep moving the disease. (See Insect Control for more information).

This may include implementing segregation from neighbouring livestock or major supply chain modifications and should be further considered where vector/ insect control cannot be implemented.

Containment lines and large-scale zoning may also be implemented by the lead agency as a preventative to spread.

Mechanical and biological transmission plays a key role in determining preventative strategies. Mechanical transmission remains somewhat limited by the insect's size and flight zones whereas biological transmissive disease agents can continue to move infections over distances depending on their access to susceptible hosts.

See preventative Insect/tick treatments and control for more information.

Appendix 1, Table 2 (Vector transmitted EADs for Cattle and Horses) defines vector transmission more clearly against each categorised EAD.

Managing new livestock purchases

Managing livestock purchases is a good biosecurity practice that should be implemented through daily biosecurity planning. Purchasing livestock from areas that are known to be disease free during an incursion will help prevent introduction of disease into the feedlot through direct introduction. Livestock purchased from infected areas will not likely be able to be moved into a feedlot that is in a different zone. Care must be taken when introducing livestock and strategies might include:

- no new livestock introductions or
- offsite pre-entry inspections
- isolation of new introductions for a period greater than the disease incubation period, as far away from other animals as possible.
- purchasing from areas where disease is not present (for diseases that can be subclinical or produce carrier animals).

Segregation of new livestock

Bringing on new livestock presents a risk of direct contact disease introduction.

Whilst it may not be practical to not bring on new livestock to the feedlot, new measures may be used to minimise risk. These may include:

- All in, all out
- Keeping new livestock segregated to one side of the feedlot as far away from other livestock
- Trying to achieve a buffer of empty pens to prevent nose to nose contact
- Checkering pens to prevent nose to nose contact
- Installing individual pen water sources
- Modifying shared bunkers to ensure there is no feed sharing between pens

Preventative Insect/tick treatments and control

Insect and tick management is one of the more labour-intensive biosecurity practices where moving susceptible livestock outside of the transmission zone is not possible.

Its success will depend heavily on the vector. Diseases spread by insects are mostly viral but are spread by the insect either mechanically or biologically and is further complicated by the insect's mouth parts, size and feeding action.

Mechanical transmission occurs when an insect comes into contact with viral particles (usually in blood or mucous). This mostly occurs when the insect feeds, especially with insects that have larger serrated mouth parts. Mechanical transmission differs from biological transmission which requires the virus to pass the midgut of the insect to infect developing eggs, resulting in infective offspring. This is known as transovarial or vertical transmission.

Insect / tick control could be a combination of measures including:

- Removing or reducing manure
- Use of automatic insecticide dispensers within the feedlot to manage flying insects.
- Apply insect repellent to animals according to manufacturers' recommendations.
- Manage insect breeding sites on the feedlot such as:
  - drain, cover, or treat effluent ponds
  - remove, cover, or treat manure piles
  - turning off unused water troughs
- Adequate drainage to prevent pooling of water around the feedlot
- Use insect traps around the feedlot to monitor the effectiveness of protection measures.
- Use of ivermectin products to manage both biting flies and ticks
- Use of animal housing with screens
- Stabling horses at dusk and dawn (when vectors are more active)
- Reduce lights at night

More information on managing Culicoides can be found in Understanding and responding to Culicoides sp. vectors in an emergency animal disease response.

Appendix 1, Table 2 (Vector transmitted EADs for Cattle and Horses) defines vector transmission more clearly against each categorised EAD.

Tick management for feedlots will require management off the feedlot to prevent ticks from entering the feedlot to break the host/reservoir host lifecycle. Management and controls will depend on the species of tick.

More information on tick management can be found on TickBoss.

Physical barriers to prevent insect/ host interaction can be expensive and include installation of new infrastructure such as housing animals in vector-protected housing, especially from 2 hours before sunset until 2 hours after sunrise (note that this will not protect animals from midges that are active during the day).

This could include:

- Purpose build barns
- Screened pens
- Screened stables

Physical barriers to prevent carrier/pathogen and host interaction

Other livestock, wildlife, and other animals can also pose a risk of EAD transmission through direct and indirect contact.

Physical barriers to prevent access to livestock can include the following:

- External fencing to contain livestock to specific areas and exclude feral animals
- Managing feed storage areas to deter feral animal access by removing their food source (covering or restricting grain sources etc).
- Removing discarded grain from bunkers to prevent feral animal access in pens/laneways
- Ensure effluent ponds are fenced off from livestock to prevent wild bird contact
- Ensure grain and feed storage are vermin proof
- Cover drinking water sources as much as practical (mains water vs dam water sources etc).

Preventing feral animal and wildlife interactions

In addition to physical separation, feral animal and wildlife interactions may be minimised by:

- Recycling water to reduce effluent pond volumes or covering systems to deter water birds
- Implement feral animal control methods to reduce populations

Vaccination

Use of vaccines may be effective in either preventing or managing the spread of an EAD depending on the EAD and type of vaccine available.

However, vaccines can be limiting as some can have adverse effects whilst others may require the animal to be slaughtered to attain previous market access statuses. Most vaccines are also not available for ready use in Australia and thus will need significant government management to be utilised in Australia.

Therefore, vaccines may play a role in coordinated disease suppression but are not likely to be a long-term management strategy.

For a list of EADs with viable vaccinations see Appendix 1 Table 3

Reducing host density

Reducing the host density reduces the likelihood of some transmission pathways as animals are not coming into contact with each other as much as they would with a denser pen population.

This may include reducing the number of animals in a pen to give animals more space to reduce nose to nose contact.

Managing feed sources accordingly

Some EADs can be spread via animals ingesting contaminated food stuff either within the food via other animal parts or contamination through processing and storage therefore it is appropriate to ensure that biosecurity practices remain in place that include:

- Preventing swill feeding of pigs
- Preventing ruminants from accessing carcasses / animal products
- Ensuring stock feeds that contain Restricted Animal Materials are not fed to ruminants as per the Australian Ruminant Feed Ban
- Ensuring Used Cooking Fats and Oils are sourced only from ARA-Accredited processors
- Good hygiene practices when the same equipment is used to handle dead animals as well as handle livestock feeds
- Secure and vermin proof feed storage
- Request commodity vendor declarations

Managing People, Vehicles and Equipment

Increased biosecurity hygiene practices may be required for certain EADs to prevent access to the feedlot via fomites on people or on vehicles and equipment.

- Establishment of the hot and cold zone
- Establishment of decontamination stations

- Establishment of vehicle wash down
- Implement Level 2 or 3 biosecurity hygiene practices
- Wash down of all vehicles and equipment entering the hot zone

Increasing Surveillance

Whilst feedlots undertake daily inspections, it is important that surveillance across the pens is maintained whilst hospital pens are monitored closely. It is also imperative that training is delivered to staff undertaking surveillance activities to ensure they are aware of signs of disease.

Enhanced Record Keeping

Good record keeping is essential to EAD management. All NFAS accredited feedlots must keep records of visitors to the feedlot.

To assist with official tracing activities, compile a documented history of all livestock, personnel (staff, contractors, and visitors including livestock truck drivers, stockfeed delivery drivers, freight services and drivers) and vehicle movements for at least the previous 28 days.

Enhanced record keeping should capture the following information:

- Daily surveillance times
- Enhance movement records – digital where possible with time stamp
- Enhanced visitor / delivery records

Failing to keep good records may result in additional restrictions being placed on the feedlot as records were not available to verify time frames etc and movements on and off the feedlot.

Decontamination

Fomite spread diseases require extensive decontamination of common areas or indirectly used equipment to prevent spread.

Areas where sick animals have been housed will require deep cleaning with an appropriate cleaning agent.

Table 2.1 on page 14 of the AUSVETPLAN decontamination manual shows the Emergency Animal Disease Response Agreement (EADRA)-listed diseases and the type of disease-causing agents, from which their susceptibilities to common chemicals can be deduced.

More information on disease control, including vector control and decontamination, is provided in the relevant AUSVETPLAN disease response strategy.

Key issues to be considered when developing a decontamination plan are outlined in the AUSVETPLAN decontamination manual which should be used to develop a decontamination plan specific to the feedlot.

Appendix 1 Disease transmission tables

Table 1: EAD transmission table and biosecurity control

Name of disease	AUSVETPLAN Policy	Disease Agent	Affected Species	Incubation period	Transmission	Bio exclusion	Bio containment	Notes
African horse sickness Listed Disease Phytosanitary Measures (SPS Agreement)	Eradication	Virus (C)	Horses, mules and dogs	3-14 days	Vector borne	• Manage livestock purchases. • Isolate and inspect newly introduced horses for a minimum of 14 days. • Stable horses in insect proof housing between dusk till dawn. • Use insect repellents, insecticides and rugs to prevent insect transmission with a focus on Culicoides.	• Isolate animals showing signs to hospital pens. • Euthanise infected animals under government direction. • Government may establish vaccination and or movement control programs to contain the disease.	• Listed Disease Phytosanitary Measures (SPS Agreement)
Anthrax (major outbreaks) **N.B Anthrax is zoonotic**	Control	Bacteria *Bacillus anthracis*	Mammals	1-14 days	Inhalation - Short Ingestion Contact	• Isolate and inspect newly introduced livestock for a minimum of 14 days. • Minimise environmental exposure in known areas.	• Segregate livestock from carcasses over short distances. • Burn carcasses (with appropriate PPE) • Government may establish vaccination* program to contain the disease.	• **Zoonotic**
Aujeszky's disease	Stamping out	Virus (A)	Predominantly pigs, cattle, sheep, goats and dead-end hosts.	2-6 days	Contact Inhalation Fomites	• Isolate and inspect newly introduced livestock for a minimum of 6 days. • Prevent pigs from accessing pens and feed storage areas by fencing and control programs.	• Isolate animals showing signs to hospital pens. • Disinfect areas where infected animals have been present. • Government may establish vaccination* and or movement control programs to contain the disease.	

Avian Influenza H5N1 (limited information available on cattle)	Stamping out	Virus (A)	Poultry, cattle (in the USA). wild birds.	4-6 days	Contact Inhalation Ingestion	• Isolate and inspect newly introduced cattle for 6 days. • Prevent wild bird access to effluent ponds and drinking water sources. • Manage effluent processes on to pastures to reduce risk.	• Isolate animals showing signs to hospital pens. • Euthanise infected animals under government direction. • Government may establish vaccination* and or movement control programs to contain the disease.	• HPAI A(H5N1) virus, clade 2.3.4.4b relevant to cattle.
Bluetongue Present in North Australia Subclinical in cattle	Minimise economic impact and eliminate clinical disease if possible.	Virus (C)	All ruminants but sheep are the most severely affected	4-8 days	Vector Borne Limited Culicoides species. C Brevitarsis.	• Manage livestock purchases. • Isolate and inspect newly introduced livestock for a minimum of 8 days. • Reduce exposure to Culicoides vectors using a combination of mechanical, chemical, biological, and generic methods to prevent introduction.	• Isolate animals showing signs to hospital pens. • Euthanise infected animals under government direction. • Government may establish vaccination* and or movement control programs to contain the disease.	• Limited Culicoides species. • Present in North Australia
Borna disease Subclinical in horses **Zoonotic**	-	Virus (A)	Horses, Sheep, sometimes Pigs, Cattle, Goats. Dead end host.	14 days to several months. Typically, 2-3 months.	Contact with secretions	• Isolate and inspect newly introduced livestock for 14 days. • Increase hygiene practices to manage vermin/ cattle interactions through feed and water.	• Euthanise infected animals under government direction. • Government may establish vaccination* and or movement control programs to contain the disease. • Decontaminate areas where infected animals have come into contact with.	
Bovine brucellosis	Destocking, test and slaughter	Bacteria *Brucella abortus*	Cattle most livestock	Varies, minimum 1 month	Ingestion (contaminated feed or water)	• Isolate and inspect newly introduced livestock for 21 days.	• Euthanise infected animals under government direction. • Decontaminate areas where infected animals have come into contact with.	• Zoonotic

Bovine Spongiform encephalopathy (Classical)	Modified stamping out	Prion (No effective treatment or vaccine)	Cattle	2-8 years	Ingestion	• Buy feedstuff from reputable sources. • Ensure adequate hygiene between machinery used for feedstuff and carcasses. • Ensure adequate practices are in place to prevent the feeding of RAM to ruminants including in used cooking fats/oils.	• Isolate animals showing signs to hospital pens. • Euthanise infected animals under government direction. • Decontaminate areas where infected animals have come into contact with. • Identify the source of contamination and remove as required.	• Solid/partial ingestion. • No effective treatment or vaccine.
Bovine tuberculosis due to Mycobacterium Bovis	-	Bacteria	Cattle and other animals Horses are susceptible to M. Bovis.	2 months to several years	Contact Ingestion Inhalation - Short	• Isolate and inspect newly introduced livestock for a minimum of 21 days. • Pens should not share water troughs or feed.	• Isolate animals showing signs to hospital pens. • Euthanise infected animals under government direction. • Decontaminate areas where infected animals have come into contact with	• Horses and people are susceptible to M. Bovis.
Contagious bovine pleuropneumonia	-	Bacteria *Mycoplasma mycoides*	Cattle	3 weeks to 6 months	Ingestion Fomite experimentally	• Isolate and inspect newly introduced livestock for a minimum of 21 days. • Maintain surveillance for up to 6 months. • Pens should not share water troughs or feed. • Source feedstuff from reputable sources to prevent cross contamination of infective material.	• Isolate animals showing signs to hospital pens. • Euthanise infected animals under government direction. • Decontaminate areas where infected animals have come into contact with. • Government may establish vaccination* and or movement control programs to contain the disease.	•
Contagious equine metritis	-	Bacteria	Horses	14 days	Venereal Contact	• Manage new purchases.	• Isolate animals showing signs to hospital pen.	• No available vaccine.

		Taylorella equigenitalis No available vaccine.				• Isolate and inspect newly introduced livestock for 14 days. • Ensure adequate hygiene between shared gear and at mating.	• Euthanise infected animals under government direction. • Decontaminate areas where infected animals have come into contact with.	
Dourine	-	Protozoan *Trypanosoma equiperdum*	Horses	6 months	Venereal In utero Fomite Contact	• Implement testing regime to prevent infected animals from entering feedlots. • Manage and house stallions accordingly to reduce transmission risks.	• Isolate animals showing signs to hospital pen. • Euthanise infected animals under government direction. • Decontaminate areas where infected animals have come into contact with. • Government may establish vaccination* and or movement control programs to contain the disease.	• No available vaccine.
East coast fever (Theileria parva) Exotic strains of Theileria	-	Protozoan *Rhipicephalus appendiculatus*	Cattle	8-12 days	Vector Borne	• Treat visible ticks before entering the feedlot. • Isolate newly introduced cattle for a minimum of 12 days. • Isolate symptomatic animals into own pen. • Destock paddocks where vectors are found or apply tick treatment program to livestock entering these areas to reduce vector population.	• Government may establish vaccination* and or movement control programs to contain the disease. • Treatment of infected animals under government direction.	• Exotic strains of Theileria
Encephalitides (tick-borne)	-	Virus (A)	Cattle, horses, sheep, goats, some wild and domestic animals.	2-28 days	Vector Borne	• Treat visible ticks before entering the feedlot. • Isolate and inspect newly introduced cattle for a minimum of 28 days. • Isolate symptomatic animals into own pen.	• Euthanise infected animals under government direction. • Government may movement control programs to contain disease.	•

Epizootic lymphangitis	-	Fungus *Histoplasma capsulatum var farciminosum*	Horses	3 weeks to 2 months	Contact Fomite Insect vectors	• Isolate and inspect newly introduced livestock for a minimum of 8 weeks.	• Isolate animals showing signs into their own pen and cover wounds where possible to minimise transmission.	•
Equine encephalosis (EE)	-	Virus (C)	Horses	1-14 days	Vector Borne	• Isolate and inspect newly introduced livestock for a minimum of 14 days. • reduce exposure to Culicoides vectors using a combination of mechanical, chemical, biological, and genetic methods introduction.	• Euthanise infected animals under government direction.	•
Equine influenza	Contain and eradicate.	Virus (A)	Horses	1-3 days	Inhalation – Long Contact Fomite	• Isolate and inspect newly introduced livestock for a minimum of 3 days. • Implement level 3 biosecurity practices.	• Implement level 3 biosecurity practices. • Government may establish vaccination* and or movement control programs to contain the disease. • Treatment of infected animals under government direction.	•
Equine piroplasmosis Theileria Equi and Babesia caballi	-	Protozoan	Horses	10-30 days strain dependent	Vector Borne Contact (with infected blood)	• Treat visible ticks. • Isolate newly introduced horses for a minimum of 30 days. • Avoid shared gear or medical supplies or thoroughly disinfect gear between horses.	• Isolate animals showing signs to hospital pen. • Government may establish vaccination* and or movement control programs to contain the disease. • Treatment of infected animals under government direction.	• Contact with infected blood

Foot-and-mouth disease	Stamping out	Virus (B)	All cloven hoof animals incl cattle Pigs are more susceptible to ingestion, cattle aerosol.	2-14 days	Ingestion Fomites Inhalation - Long Contact	• Isolate and inspect newly introduced cattle for a minimum of 14 days. • Implement level 2 or 3 biosecurity hygiene practices.	• Government may establish vaccination* and or movement control programs to contain the disease. • Implement level 3 biosecurity practices.	• Pigs are more susceptible to ingestion and amplify the amount of virus excreted.
Getah virus	-	Virus (A)	Livestock	3-4 days (experimentally)	Vector Borne Mosquitos	• Isolate and inspect newly introduced livestock for a minimum of 4 days. • Apply integrated mosquito management practices.	• Government may establish vaccination* and or movement control programs to contain the disease.	•
Glanders	-	Bacteria *Burkholderia mallei*	Horses	14 days -6 months	Ingestion (of items contaminated by nasal discharged) Fomites	• Isolate and inspect newly introduced livestock for a minimum of 14 days. • Prevent sharing of water and feed troughs by horses where possible. • Prevent sharing of bits and equipment or disinfect between uses with an effective product.	• Isolate animals showing signs to hospital pen. • Decontaminate areas where infected animals have come into contact with.	• Ingestion of food or water contaminated with infected nasal discharge.
Hemorrhagic septicemia	-	Bacteria Pasteurella multocida	Cattle and Buffalo	3-5days	Ingestion Inhalation Contact	• Isolate and inspect newly introduced livestock for a minimum of 5 days. • Prevent sharing of water troughs between pens.	• Control of the disease depends on compulsory notification and management of infected animals. • Decontaminate equipment that has come in contact with infected livestock.	
Hendra virus **HV is zoonotic**	Modified stamping out	Virus (A)	Horses	5-21 days	Ingestion Contact	• Isolate and inspect newly introduced horses for a minimum of 21 days.	• Control of the disease depends on compulsory notification and stamping out of infected animals.	• **Zoonotic**

						• Manage livestock wildlife interface namely feeding areas and bat population cross over.	• Decontaminate equipment that has come in contact with infected livestock.	
Japanese encephalitis JE is present in Australia and is **zoonotic**	Control	Virus (A)	Pigs and Horses Water birds	21 days	Vector Borne	• Isolate and inspect newly introduced horses for a minimum of 21 days. • Manage livestock wildlife interface namely wild birds	• Control of the disease depends on compulsory notification and management of infected animals. • Decontaminate equipment that has come in contact with infected livestock. •	• Water birds • **Zoonotic**
Jembrana disease		Virus (A)	Cattle	5-12 days	Contact Vector Borne	• Isolate and inspect newly introduced cattle for a minimum of 12days. • Prevent sharing of water troughs between pens.	• Control of the disease depends on compulsory notification and management of infected animals. • Decontaminate equipment that has come in contact with infected livestock. •	
Lumpy skin disease	Stamping out	Virus (A)	Cattle	4-28 days	Vector Borne	• Manage new livestock purchases. • Isolate and inspect newly introduced cattle for a minimum of 28 days.	• Control of the disease depends on compulsory notification and slaughter of infected animals and vectors. • Decontaminate equipment that has come in contact with infected livestock.	•
Peste des petits ruminants	Stamping out	Virus (A)	Ruminants Cattle (subclinical infection with no transmission for cattle)	21 days	Contact	• Manage new livestock purchases. • Isolate and inspect newly introduced cattle for a minimum of 21 days.	• Control of the disease depends on compulsory notification and slaughter of infected animals. • Decontaminate equipment that has come in contact with infected livestock.	• Cattle don't transmit PPR, listed due to WOAH.

Potomac fever	-	Bacteria Neorickettsia risticii via fluke, aquatic snail or infected aquatic insect / fly.	Horses	10-20 days	Inhalation - Short Ingestion Contact	• Isolate and inspect newly introduced horses for a minimum of 20 days. • Provide water in troughs to prevent host interaction (water snails). • Cover water sources to prevent insect activity as much as practical. • Clean troughs regularly to remove insects. • Ensure adequate effluent management to prevent accidental ingestion of trematode if horses graze in paddocks treated with effluent. • Reduce use of lighting at night where horses are kept to reduce vector interaction. • Store hay under cover to prevent vector infestation. • Collect manure regularly from horse living areas	• Control of the disease depends on compulsory notification and management of infected animals. • Isolate infected horses to own pen. • Decontaminate suspected source to remove vector.	• Accidental ingestion of insects harbouring the metacercaria of an infected trematode.
Rift Valley fever	Stamping out	Virus (A)	Ruminants	1-6 days	Vector Borne Contact with organs or fluids of infected animals	• Isolate and inspect newly introduced livestock for a minimum of 6 days. • Apply integrated mosquito management practices.	• Control of the disease depends on compulsory notification and management of infected animals.	• Contact with organs or fluids of infected animals
Rinderpest (Eradicated)	Stamping out	Virus (A)	Cattle and other Cloven Hoof Animals	21 days	Inhalation	• Isolate and inspect newly introduced cattle for a minimum of 14 days. • Enable level 2 or 3 biosecurity hygiene practices.	• Control of the disease depends on compulsory notification and slaughter or vaccination of infected animals. • Enable level 3 biosecurity practices.	• Eradicated

Screw worm fly	Contain and eradicate	Insect	Mammals		Screw worm fly lays eggs in an open wound	• Inspect new livestock on entry for open wounds and maggot larvae.	• Control of screw worn fly depends on compulsory notification and management of infected animals.	
Surra (Trypanosoma evansi)	Eradication	Protozoan No available vaccine.	Vertebrate animals	7-28 days (could be up to 56 days).	Vector Borne (biological) and Mechanical via biting flies transferring blood (husbandry instruments or ingestion of contaminated products)	• Isolate and inspect newly introduced cattle for a minimum of 28 days.	• Control of the disease depends on compulsory notification and slaughter of infected animals. • Movement control enforced by legislation. • Decontaminate equipment that has come in contact with infected horse	• Biting flies • No available vaccine.
Trichinellosis Zoonotic	-	Parasitic nematode (genus Trichinella) round worm. No available vaccine.	Pigs, horses, many carnivores, among other animals. No definitive preferred host, and three 'cycles' consisting of feral animal populations, domestic animals, and dead-end human hosts.	7-14 days	Ingestion of infected meat products.	• Buy feedstuff from reputable sources. • Ensure adequate hygiene between machinery used for feedstuff and carcasses.	• Isolate animals showing signs to hospital pen. • Euthanise as soon as clinical diagnosis is confirmed. • Identify the source of contamination and remove as required.	• No definitive preferred host, and three 'cycles' consisting of feral animal populations, domestic animals, and dead-end human hosts. • No available vaccine.
Vesicular stomatitis	-	Virus (A) No available vaccine.	Cattle, horses, sheep and goats. Direct contact between	2-8 days	Vector Borne - black flies simuliidae, sand flies Lutzomyia and Culicoides spp. Contact	• Manage new livestock purchases by testing for seroconversion before entry.	• Isolate animals showing signs to hospital pen. • Euthanise as soon as clinical diagnosis is confirmed.	• Direct contact between domestic or wild animals and susceptible livestock

			domestic or wild animals and susceptible livestock Contaminated equipment Drinking water contaminated with infected saliva or vesicular fluid.			• Isolate and inspect newly introduced cattle for a minimum of 8 days. • Inspect for lesions on non-haired areas. • Vector mitigation including physically limiting vector contact and or application of insecticides	• Identify the source of contamination and remove as required.	• Contaminated equipment • Drinking water contaminated with infected saliva or vesicular fluid. • No available vaccine.
Wesselsbron disease	-	Virus (A)	Sheep Cattle, goats	2-5 days	Vector Borne Mosquitos	• Manage new livestock purchases. • Isolate and inspect newly introduced cattle for a minimum of 5 days. • Apply integrated mosquito management practices with a focus on keeping hosts away from insect vectors.	• Isolate animals showing signs to hospital pen. • Euthanise as soon as clinical diagnosis is confirmed. • Identify the source of contamination and remove as required. • Vaccination of at risk non pregnant stock as required by lead government agency.	• Not a listed disease
Western, equine encephalomyelitis (WEEV) **WEEV is zoonotic**		Virus (A)	Horses, pigs, wild animals, reptiles.	5-15 days	Wild birds Blacktail jackrabbit Snowshoes hares Snowshoes hares (amplifying hosts)	• Isolate and inspect newly introduced horses for a minimum of 15 days. • Stable horses in insect proof housing between dusk till dawn. • Use insect repellents, insecticides and rugs to prevent insect transmission.	• Isolate animals showing signs to hospital pen. • Euthanise infected animals under government direction. • Government may establish vaccination and or movement control programs to contain the disease.	• **Zoonotic**
Eastern equine encephalomyelitis (EEEV)		Virus (A)	Horses, sheep, cattle camelids,	5-15 days	Wild birds including passerines and	• Isolate and inspect newly introduced horses for a minimum of 15 days.	• Isolate animals showing signs to hospital pen.	• **Zoonotic**

EEEV is zoonotic			pigs and other mammals		water birds possibly rodents	• Stable horses in insect proof housing between dusk till dawn. • Use insect repellents, insecticides and rugs to prevent insect transmission.	• Euthanise infected animals under government direction. • Government may establish vaccination and or movement control programs to contain the disease.	
Venezuelan equine encephalomyelitis (VEEV) Epizootic		Virus (A)	Horses	5-15 days	Wild rodents and small mammals (reservoir)	• Isolate and inspect newly introduced horses for a minimum of 15 days. • Stable horses in insect proof housing between dusk till dawn. • Use insect repellents, insecticides and rugs to prevent insect transmission.	• Isolate animals showing signs to hospital pen. • Euthanise infected animals under government direction. • Government may establish vaccination and or movement control programs to contain the disease.	• Epizootic VEEV – I-AB and I-C • Enzootic – VEEV I-D and IE • **Zoonotic**
Venezuelan equine encephalomyelitis (VEE) Enzootic		Virus (A)	Horses	5-15 days	Wild animals	• Manage livestock purchases. • Isolate and inspect newly introduced horses for a minimum of 14 days. • Stable horses in insect proof housing between dusk till dawn. • Use insect repellents, insecticides and rugs to prevent insect transmission.	• Isolate animals showing signs to hospital pen. • Euthanise infected animals under government direction. • Government may establish vaccination and or movement control programs to contain the disease.	• Listed Disease Phytosanitary Measures (SPS Agreement) • **Zoonotic**

Table 2: Vector transmitted EADs for Cattle and Horses

Name of disease	Disease Agent	Affected Species	Other Hosts	Transmission	Incubation period	Species suspected of spread
African horse sickness	Virus (C)	Horses	Horses	Biological	3-14 days	Listed Disease Culicoides species C. imicola and C. bolitinos
Bluetongue	Virus (C)	All ruminants but sheep are the most severely affected	Ruminants	Biological Direct	4-8 days	Present in North Australia Limited Culicoides species
East coast fever (Theileria parva)	Protozoa	Cattle	Buffalo and Cattle Ixodid tick species	Biological	8-12 days	T. orientalis is present in Australia
Encephalitides (tick-borne)	Virus (A)	Cattle, horses, sheep, goats, some wild and domestic animals.	Small Rodents Ticks	Biological	2-28 days	complex interactions between vectors, reservoir hosts, and the environment
Epizootic lymphangitis	Fungus	Horses	Flies	Biological	3 weeks to 2 months	Musca or Stomoxys genera.
Equine piroplasmosis Theileria Equi and Babesia caballi	Protozoan	Horses	Horses Ixodid tick species	Biological	10-30 days strain dependent	Ixodid ticks
Equine Encephalosis (EE)	Virus (C)	Horses	Horses	Biological	1-14 days	Orbivirus Culicoides spp

Eastern equine encephalomyelitis (EEE)	Virus (A)	Horses, sheep, cattle camelids, pigs and other mammals	Wild birds including passerines and water birds possibly rodents	Biological	5-15 days	Mosquitos Culiseta melanura, Culex tarsalis, Culex spp.
Getah virus	Virus (A)	Horses and pigs and other animals	Mosquito – vertebrate host-mosquito cycle.	Biological	3-4 days (experimentally)	Culicoides spp Mosquitos Culex, Anopheles, Armigeres, -Aedes and Mansonia Midges Mostly associated with horses but has been isolated in a range of animals
Japanese encephalitis	Virus (A)	Pigs and Horses	Water birds	Biological	4 to 15 days	Culex species mosquitoes particularly Culex tritaeniorhynchus
Jembrana disease	Virus (A)	Cattle	Cattle	Mechanical	5-12 days	Hematophagous arthropods
Lumpy skin disease	Virus (A)	Cattle	Cattle	Mechanical	4-28 days	Insects
Potomac fever Neorickettsia risticii	Bacteria Rickettsia	Horses	Brown bats (Eptesicus fuscus and Myotis lucifungus) are the definitive hosts of trematodes	Ingestion of digenic trematodes via intermediate hosts Lymnaeid snails or aquatic insect.	10-20 days	Intermediate host: Lymnaeid snails Other larvae of aquatic insects include flies. When the adult flies later emerge, they carry *N. risticii.*
Rift Valley fever	Virus (A)	Ruminants	Vertebrates	Biological	1-6 days	Culex species mosquitoes and other insects
Surra Trypanosoma evansi	Protozoan	Vertebrate animals	Camels and Horses	Biological	7-28 days (could be up to 56 days).	Generally, blood sucking flies: Tabanus, Stomoxys, Atylotus, Chrysops, Lyperosia and Haematobia.
Vesicular stomatitis	Virus (A)	Cattle, horses, sheep and goats, pigs.	Vertebrates	Biological and mechanically with flies	2-8 days	Sandflies, midges, mosquitoes, mites, flies and other insects.

Wesselsbron disease	Virus (A)	Sheep Cattle Goats, Rodents and Wild Fowls.	Rodents	Biological	2-5 days	Aedes Spp Mosquitos
Western, equine encephalomyelitis (WEEV)	Virus (A)	Horses, pigs, wild animals, reptiles.	Wild birds Blacktail jackrabbit Snowshoes hares Snowshoes hares (amplifying hosts)	Biological	5-15 days	Mosquitos Culiseta melanura, Culex tarsalis, Culex spp. Aedes melanimon
Venezuelan equine encephalomyelitis (VEEV) Epizootic	Virus (A)	Horses	Wild rodents and small mammals (reservoir)	Biological	5-15 days	Mosquitos Culiseta melanura, Culex tarsalis.
Venezuelan equine encephalomyelitis (VEE) Enzootic	Virus (A)	Horses	Wild animals	Biological	5-15 days	Culex spp and mosquitoes

Table 3: Transmission prevention by disease

Name of disease	Transmission	Increased hygiene practice	Segregation	Managing livestock purchases	Preventative insect treatments and controls	Physical preventatives	Vaccination*	Reducing host density	Managing feed sources
African horse sickness	Vector Borne		X	X	X	X	X		
Anthrax (major outbreaks)	Inhalation Ingestion Contact		X			X	X		X
Aujeszky's disease	Contact		X	X		X	X **	X	
Avian Influenza H5N1	Inhalation Ingestion Contact?		X	X		X			
Bluetongue	Vector Borne		X	X	X	X	X		
Borna disease	Contact			X		X	X		X
Bovine Spongiform encephalopathy	Ingestion								X
Bovine brucellosis	Contact Ingestion		X	X				X	X
Bovine tuberculosis due to Mycobacterium Bovis	Contact Ingestion		X	X		X	X	X	X

Contagious bovine pleuropneumonia	Ingestion	X	X	X	X	X	X		X
Contagious equine metritis	Contact Venereal			X		X			
Dourine	Contact Venereal			X		X			
East coast fever (Theileria parva)	Vector Borne		X	X	X	X	X		
Encephalitides (tick-borne)	Vector Borne		X	X	X	X			
Epizootic lymphangitis	Contact		X	X	X	X	X		
Equine encephalosis	Vector Borne		X	X	X	X	X		
Equine influenza	Inhalation Contact		X	X		X	X		
Equine piroplasmosis Theileria Equi and Babesia caballi	Vector Borne Contact		X	X	X	X	X		
Foot-and-mouth disease	Ingestion Fomites Inhalation Contact	Level 2 biosecurity	X	X		X	X		X
Getah virus	Vector Borne		X	X	X	X	X		
Glanders	Ingestion Fomites	X	X	X		X	X		X

Hemorrhagic septicemia	Contact		X	X		X	X	X	
Hendra virus	Ingestion Contact		X	X		X	X	X	X
Japanese encephalitis	Vector Borne		X	X	X	X	X		
Jembrana disease	Contact Vector Borne		X	X	X	X	X	X	
Lumpy skin disease	Vector Borne		X	X	X	X	X		
Peste des petits ruminants	Contact		X	X		X	X	X	
Potomac fever Neorickettsia risticii	Vector Borne		X	X	X	X	X		
Rift Valley fever	Vector Borne Contact		X	X	X	X	X	X	
Rinderpest	Inhalation						X		
Screw worm fly	Screw Worm Fly lays eggs in an open wound				X				
Surra (Trypanosoma evansi)	Vector Borne and Mechanical via blood	X	X	X	X		X		
Trichinellosis	Ingestion								X

Vesicular stomatitis	Vector Borne Contact		X	X	X	X		X	
Wesselsbron disease	Vector Borne		X	X	X	X	X		
Western, equine encephalomyelitis (WEE)	Vector Borne		X	X	X	X	X		
Eastern equine encephalomyelitis (EEE)	Vector Borne		X	X	X	X	X		
Venezuelan equine encephalomyelitis (VEEV)	Vector Borne		X	X	X	X	X		

**Vaccination column indicates there is a vaccine but does not make any reference to its efficacy. ** Registered vaccinations are present but may not be registered for use in cattle and or horses.*

Table 4: Decontamination and disposal table

Name of disease	AUSVETPLAN Policy	Disease Agent	Transmission	Infection after death	Disinfection/treatment	Preferred disposal
African horse sickness Listed Disease Phytosanitary Measures (SPS Agreement)	Eradication	Virus (C)	Vector Borne	Nil -The relative acid lability of the virus suggests that it would be inactivated by the pH changes accompanying rigor mortis.	AHSV is inactivated by: • formalin (0.1%) for 48 hours • beta-propiolactone (0.4%) and binary ethyleneimine. • acetic acid (2%), potassium peroxymonosulfate/sodium chloride-VirkonS® (1%) • sodium hypochlorite (3%)	Carcasses and other materials from IPs should be disposed of in a manner that will prevent access to infectious material by scavenger animals.
Anthrax (major outbreaks) **Zoonotic** Present in Australia	Control	Bacteria *Bacillus anthracis*	Inhalation Ingestion Contact	All parts of the carcass and associated secretions are likely to be infective	Anthrax spores are generally resistant to alcohols, phenols, quaternary ammonium compounds, ionic or non-ionic surfactants, acids and alkalis	On site burning and burial of the ashes. Burial sites need to be permanently identified Off-site burial – carcasses to be wrapped and sealed for transport. Leaving animal in situ (intact) to putrefy after treating the carcass with 3.7% formaldehyde. The NLIS tag if present must be recorded before incineration
Aujeszky's disease	Eradicate - Stamping out	Virus (A)	Contact Inhalation Fomites	Possibly carcass and faeces / secretions.	ADV is inactivated by most disinfectants, including; Sodium hypochlorite 0.5% (seconds), phenolic derivatives 3% (10 minutes), Formaldehyde 0.6% (within one hour), Lipid solvents such as ethyl ether, acetone, chloroform, and alcohol. I	Carcasses and other materials from IPs should be disposed of in a manner that will prevent access to infectious material by scavenger animals.

Avian Influenza H5N1 (limited information available)	Eradicate - Stamping out	Virus (A)	Contact Inhalation Ingestion	All parts of the carcass and associated secretions are likely to be infective	HPAI virus is destroyed by both heat and lipid solvents such as detergents, as well as formalin, sodium hypochlorite, 60-95% ethanol, quaternary ammonium compounds, aldehydes, phenols, acids, povidone-iodine	On site composting achieving high heat and deep burial. Offsite burial, incineration, composting or rendering. Manure can be disposed of by plastic covered composting piles to achieve 45-55 degrees.
Bluetongue Present in North Australia Subclinical in Cattle	Minimise economic impact and eliminate clinical disease if possible.	Virus (C)	Vector Borne Limited Culicoides species. C Brevitarsis.	BTV does not persist in carcasses, meat products, milk, hides or faeces. BTV may persist in semen.	BTV is readily inactivated by heat (50° C in 3 hours and 60° C in 15 minutes). BTV is unstable below pH 6.5 and above pH 8.0. Virus is readily inactivated by disinfectants containing acid, alkali, sodium hypochlorite and iodophors.	Since the virus does not survive in the environment or in animal products and byproducts all disposal methods can be considered.
Borna disease Subclinical in horses **Zoonotic**	Eradicate - Stamping out	Virus (A)	Contact with secretions	Borna virus is not thought to persist in carcasses and meat products but may persist in secretions including urine.	BDV is sensitive to lipid solvents and UV light.	Due to gaps in knowledge on the transmission of borna disease, disposal should favor burning or incineration.
Bovine brucellosis	Destocking, test and slaughter	Bacteria *Brucella abortus*	Ingestion (contaminated feed or water)	Brucella abortus may survive in the environment for: • up to eight months in aborted fetuses (in the shade) • 2-3 months in wet soil • 1-2 months in dry soil • 3-4 months in faeces.	B. abortus is sensitive to heat, sunlight, and standard disinfectants, including phenolics, halogens, quaternary ammonium compounds, and aldehydes at 0.5-1.0%.	Hygienic measures should include the disposal of aborted fetuses and membranes, removal and disposal of infected animals, and disinfection of areas contaminated by aborted fetuses and membranes. Cattle carcasses may also be rendered.
Bovine Spongiform	Modified stamping out	Prion (No effective	Ingestion (Particles)	All tissues, soils and environmental matter.	The only completely effective methods is (20,000ppm) sodium hypochlorite solutions, applied for one hour.	Incineration or burning is preferred as per AUSVETPLAN Manual.

encephalopathy (Classical) **Zoonotic**		treatment or vaccine)			Boiling in 1M sodium hydroxide for at least one minute Gravity-displacement autoclaving in the presence of sodium hydroxide (e.g. 121° C for 30-60 minutes plus 1M or 2M NaOH).	Deep burial of ash or carcasses mixed with caustic materials to create an alkaline environment. Disposal sites are to be marked and recorded.
Bovine tuberculosis due to Mycobacterium Bovis	-	Bacteria	Contact Ingestion Inhalation	Carcasses and meat products, milk skin, hides, semen and embryos and faeces.	Formalin (3%), Lysol (2%), phenol (2.5%), activated chloramine (1- 3%), cresols and iodophors are effective. Alkaline hydrolysis	Composting, Alkaline hydrolysis, deep burial in an alkaloid environment.
Contagious bovine pleuropneumonia	Eradicate - Stamping out	Bacteria *Mycoplasma mycoides*	Ingestion Fomite experimentally	Faeces and urine.	The organism is inactivated within 60 minutes at 50o C and within two minutes at 60o C	Disposal methods should prevent scavenger access.
Contagious equine metritis	Eradicate testing and treatment	Bacteria *Taylorella equigenitalis* No available vaccine.	Venereal Contact	Semen/embryos.	pH below 4.5. Ten minutes of exposure to chlorhexidine diacetate (2%) or alkyldimethylbenzylammonium chloride (10%)	Disposal methods should prevent scavenger access.
Dourine	Eradicate – Stamping out	Protozoan *Trypanosoma equiperdum*	Venereal In utero Fomite Contact	Seminal fluid and genitalia mucous membranes.	Leave in situ.	Disposal methods should prevent scavenger access.
East coast fever (Theileria parva) Exotic strains of Theileria	Vector Eradication	Protozoan	Vector Borne via *Rhipicephalus appendiculatus*	Vector spread only	Destocking for 18 months to kill vector or paddock treatments.	Disposal methods should prevent scavenger access.

Encephalitides (tick-borne)	Eradicate – treatment / vaccinate	Virus (A)	Vector Borne	Carcasses where pH is higher than 6.0. Milk products. Lack of references found on faeces and semen/embryos.	sensitive to pH below 6.0. TBE is Inactivated by UV and gamma radiation and by proteases, lipid solvents and detergents, as well as by low concentrations of aldehydes, halogens, hydrogen peroxide, and beta-propiolactone	Deep burial or other rather than leave in situ due to potential for ingestion risk. Disposal methods should prevent scavenger animal access.
Epizootic lymphangitis **Zoonotic**	Eradicate – Stamping out	Fungus *Histoplasma capsulatum var farciminosum*	Contact Fomite Insect vectors	Little information found.	Little information found.	Incineration / burning due to limitations in literacy.
Equine encephalosis (EE)	Eradication – Movement Control	Virus (C)	Vector Borne	Little information found.	pH sensitive in vitro with 0.5% trypsin, or with exposure to pH 3.0 for one hour at 37o C. The virus was totally inactivated after 5 minutes at 60o C, with “considerable loss” of infectivity at 56o C after one hour.	Incineration / burning due to limitations in literacy.
Equine encephalomyelitis (WEE, EEE, VEE)	Eradication – Movement Control Possible stamping out	Virus (A)	Vector Borne	• Semen/ embryo’s	The thermal deactivation point for alphaviruses is 58 ℃ and virus half-life is 7 hours at 37℃. The virus is quickly inactivated at acidic pH levels. These viruses are sensitive to sunlight and heat (moist or dry heat)	Incineration / burning due to limitations in literacy.
Equine influenza	Contain and eradicate.	Virus (A)	Inhalation Contact Fomite	Respiratory secretions	Inactivated by exposure to UV light for 30 minutes or by heating at 50o C for 30 minutes. Quickly inactivated by; savlon, dettol, phenyl, alcohol, formalin, and potassium permanganate. 4% lysol. Antec Virkon©	Disposal methods should prevent scavenger animal access.

Equine piroplasmosis Theileria Equi and Babesia caballi	Vector Eradication	Protozoan	Vector Borne Contact (with infected blood)	Vector spread only. Found in heart lung and kidney for up to 8 hours after death.	Destocking for 18 months to kill vector or paddock treatments.	• Disposal methods should prevent scavenger animal access.
Foot-and-mouth disease	Eradicate-Stamping out	Virus (B)	Ingestion Fomites Inhalation Contact	Carcasses, milk and milk products, skins, hides, fibres, semen, embryos, faeces.	It is inactivated at temperature > 50o C. Heating meat to minimum core temperature of 100° C for 30 minutes inactivates the virus. FMD is inactivated by sodium hydroxide (2%), sodium carbonate (4%), citric acid (0.2%), acetic acid (2%) sodium hyperchlorite (3%) potassium peroxymonosulfate/sodium chloride (1%) and chlorine dioxide.	• Disposal methods should prevent scavenger animal access. • Burning must be completed with care to avoid airborne spread.
Getah virus	Eradication – Movement Control	Virus (A)	Vector Borne Mosquitos	Wide range of tissues including lymph nodes, lungs, spleen, liver and bone marrow	The thermal deactivation point for alphaviruses is 58 ℃ and virus half-life is 7 hours at 37℃. The virus is quickly inactivated at acidic pH levels. These viruses are sensitive to sunlight and heat (moist or dry heat) Inactivated by exposure to UV light for 30 minutes or by heating at 50o C for 30 minutes. Quickly inactivated by; savlon, dettol, phenyl, alcohol, formalin, and potassium permanganate. (4% lysol. Antec Virkon©	Disposal methods should prevent scavenger animal access.
Glanders	Eradication - Stamping out	Bacteria *Burkholderia mallei*	Ingestion (of items contaminated by nasal discharged) Fomites	Urine, saliva, tears, faeces, nasal discharges and pus of infected animals and some risk of unprocessed skins of equids.	Heating to 55o C for 10 minutes or by UV irradiation. Susceptible to many common disinfectants such as iodine, mercuric chloride in alcohol, potassium permanganate, benzalkonium chloride (1	• Disposal methods should prevent scavenger animal access.

					part per 2000), sodium hypochlorite (500 ppm of available chlorine), 70% ethanol and 2% glutaraldehyde but is 30 seconds of contact of copper surfaces. 0.35% or 0.5% of stabilised peracetic acid used at temperatures between 23-30o C.	
Hemorrhagic septicaemia	Eradication – Movement Control And vector eradication	Bacteria Coccobacillus Pasteurella multocida	Ingestion Inhalation Contact	Carcasses thought to be infective for a few days after death.	3% hydrogen peroxide is an effective disinfectant for *P. multocida*	Disposal methods should prevent scavenger animal access.
Hendra virus **Zoonotic**	Modified stamping out	Virus (A)	Ingestion Contact	Limited information available	Hendra virus is a lipid envelope virus susceptible outside the host to desiccation and changes in temperature. Under natural conditions and after application of a conservative precautionary approach, contaminated areas and fomites will be considered decontaminated 10 days after the last known exposure to HeV	Disposal on-site by deep burial or composting is the preferred option.
Japanese encephalitis JE is present in Australia **Zoonotic**	Control	Virus (A)	Vector Borne	Japanese encephalitis virus is unstable in the environment outside of its hosts and most of its fomites are not implicated in its natural spread	JEV is susceptible to detergents and certain common disinfectants (such as 1% sodium hypochlorite, iodine and iodophors JEV is destroyed by heating for 30 minutes at temperatures above 56℃	Disposal methods should prevent scavenger animal access.
Jembrana disease	Eradication – Movement Control	Virus (A)	Contact Vector Borne	Some organs such as spleen and milk.	sensitive to diethyl ether	Disposal methods should prevent scavenger animal access.

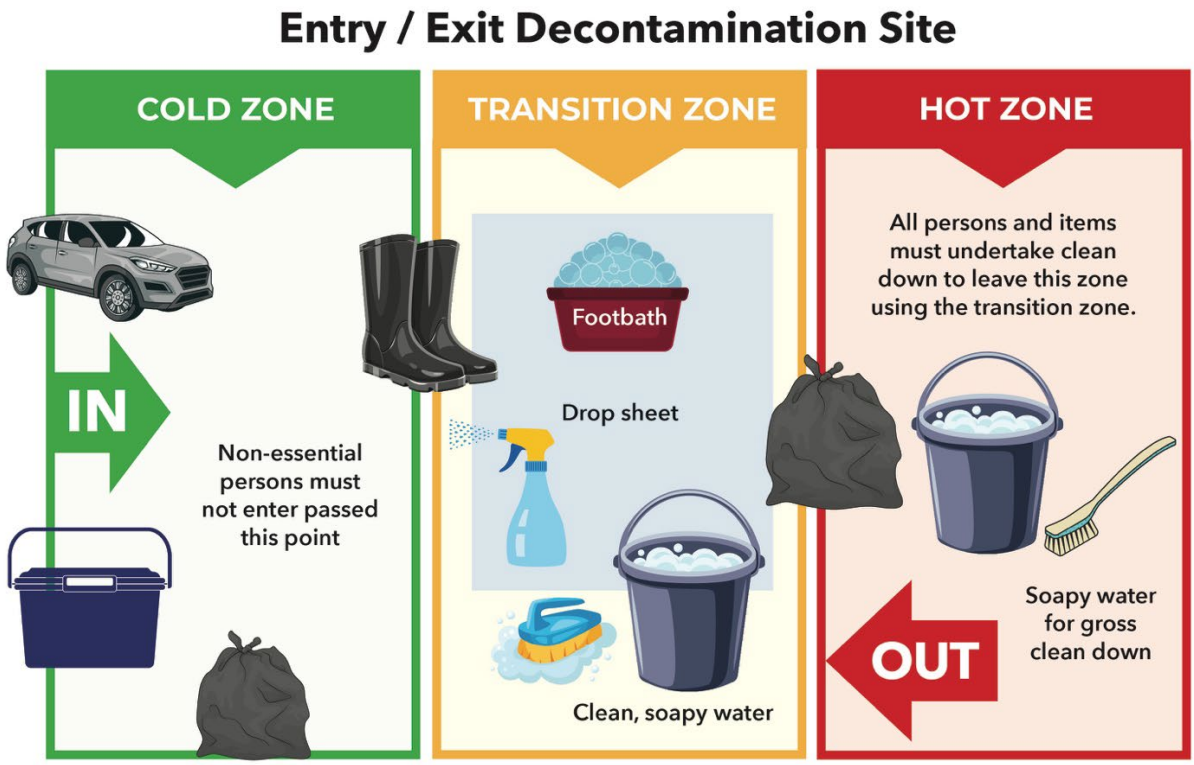
Lumpy skin disease	Eradicate - Stamping out	Virus (A)	Vector Borne	: LSDV may be found in the milk of infected animals. LSDV has shown infectivity in dried skin lesions on the animal for at least 33 days, and 18 days in scrapings from dry lesions at room temperature.	LSD Virus is susceptible to heat with inactivation at 55℃ in 2 hours, and at 65℃ in 30 minutes. Ether (20%), chloroform, formalin (1%) and some detergents e.g. Virus is susceptible to heat with inactivation at 55℃ in 2 hours, and at 65℃ in 30 minutes. Sodium dodecyl sulphate. LSD virus is also susceptible to phenol (2%/15 minutes), sodium hypochlorite (2-3%), iodine compounds (1:33 dilution), Virkon (2%) and quaternary ammonium compounds (0.5%). the detergent SDS, ether, and chloroform	Where possible, disposal will be by burial, burning or composting onsite. If there is a delay between destruction and disposal, methods of vector control should be sprayed with sodium hypochlorite or Virkon (for their virucidal properties), or chemicals from the pyrethroid family (to prevent insects feeding on carcasses).
Peste des petits ruminants	Eradicate - Stamping out	Virus (A)	Contact	Lymph nodes, the presence of virus on the skin of infected animals, by either excretion or external contamination, is highly likely. PPRV may be found in the faeces of infected animals	The virus is destroyed at temperatures of 50℃ for 60 minutes. The virus is inactivated at pH <4.0 or >11.0 Effective disinfectant agents include alcohol, ether, and common detergents. Virus is susceptible to most disinfectants e.g. phenol, sodium hydroxide. Halogens and alkalis are suitable for disinfecting buildings, concrete, structures, and equipment. For personal disinfection, citric acid, alcohol and iodophors are suitable. The virus is rapidly inactivated by UV light and desiccation within 4 days.	Carcasses are to be buried, composted or burned, or allowed to decompose provided that they are protected from scavengers such as dogs or feral pigs.
Potomac fever	Stamping out	Bacteria Neorickettsia risticii	Bacteria Neorickettsia risticii via fluke, aquatic snail or infected aquatic insect / fly	Nil	Decontamination involves managing water areas where transmission has been caused by aquatic host.	Disposal methods should prevent scavenger animal access and contain vectors as required.

Rift Valley fever	Stamping out	Virus (A)	Vector Borne Contact with organs or fluids of infected animals	Milk and possibly tissues of infected animals.	Rapidly inactivated below pH 6.8. Virus is inactivated by lipid solvents (ether, sodium deoxycholate and chloroform) and low concentrations of formalin or calcium hypochlorite (residual chlorine should exceed 5000 ppm)	Disposal methods should prevent scavenger animal access.
Rinderpest (Extinct)	Stamping out	Virus (A)	Inhalation	Skin hair and fibres, milk products and carcass/meant within 24 hours of death.	Rinderpest virus is sensitive to light and UV radiation and desiccation. In general alkalis, halogen and phenolic compounds are good for disinfecting buildings, floors and equipment. AUSVETPLAN stipulate personal disinfection with either citric acid, alcohol or iodophors.	Disposal methods should prevent scavenger animal access including the first 24 hours after destruction.
Screw worm fly	Contain and eradicate	Insect	Screw Worm Fly lays eggs in an open wound	Skin hair and fibres may hold larvae	Animals may need to be destroyed on welfare grounds, treat with insecticide to kill any SWF eggs, pupae or larvae before disposal.	Disposal methods should prevent scavenger animal access.
Surra (Trypanosoma evansi)	Eradication	Protozoan No available vaccine.	Vector Borne (biological) and Mechanical via biting flies transferring blood (husbandry instruments or ingestion of contaminated products)	Fresh carcasses, milk, semen	Once the host is dead, conditions are rapidly untenable for the parasite, and that the chance of survival in a carcass beyond 2-3 days is nil	Disposal methods should prevent scavenger animal access.
Trichinellosis Zoonotic	Eradicate - Stamping out	Parasitic nematode (genus Trichinella) round worm. No available vaccine.	Ingestion of infected meat products.	Carcasses	Survival in a carcass beyond 1 week in summer and 6 weeks in winter. Feed sources may be required to be managed if it is suspected to be the source of infection.	Burning, incineration, composting or rendering

Vesicular stomatitis	Eradicate- Stamping out	Virus (A) No available vaccine.	Vector Borne black flies simuliidae, sand flies Lutzomyia and Culicoides spp. Contact	Milk via transfer from teats,	VSV is inactivated in 2 hours at pH 4-5. It is inactivated by temperatures over 50o C	On site burial or methods that prevent scavenger animal access.
Wesselsbron disease	Control – Movement Control / vaccination	Virus (A)	Vector Borne Mosquitos	Nil – vector spread	Wesselsbron disease virus has not been well characterised, but it has the properties typical of hemagglutinating flaviviruses. These are sensitivity to acidity (< pH 8.0), temperatures above 40o C, lipid solvents and detergents.	Disposal methods should prevent scavenger animal access.

Appendix 2 setting up decontamination stations

Footbath decontamination stations



Footbath decontamination station equipment checklist

Number	Item	Area	Notes
1 x	Tarpaulin (2m x 3m) non slip types preferred	Transition Zone	Decontamination
1 x	large bucket or square container larger enough to stand in. (e.g. large heavy duty storage containers)	Transition Zone	Gross decontamination
1 x	large bucket or square container larger enough to stand in. (e.g. large heavy duty storage containers)	Hot Zone	Disinfection
1 x	long handled scrubbing brush	Hot zone	For gross decontamination
1 x	plastic horse hoof pick or screwdriver	Hot zone	For gross decontamination
1 x	Hand spray bottle	Transition Zone	
1 x	small scrubbing brush / nail brush	Transition Zone	
1 x	roll of black plastic large bin bags with ties	Transition Zone	For bagging reusable equipment after decontamination.
1 x	Roll of biohazard bags	Cold zone & Hot zone	For bagging up PPE etc.
1 x	Packet of zip ties		For securing bags
1 x	bar of soap	Transition Zone	Soap or disinfectant depending on EAD
1 x	Appropriate detergent	Transition Zone and Hot Zone	Tub 1
1 x	Appropriate disinfectant	Transition Zone	Tub 2
1 x	Water (hose or 20L minimum)	Transition Zone and Hot Zone	For Tubs
1 x	Garbage bin or bucket	Transition zone	For rubbish and PPE to keep transition zone tidy
1 x	Garbage bin or bucket	Hot Zone	For storing rubbish until it can be decontaminated off premises
1 x	Box of clip seal bags	Cold zone	For adding phones etc. for decontamination.

1 x	Box of gloves	Cold zone	PPE kit
1 x	Roll of duct tape	Cold zone	For taping gloves
1 x	Roll of clear tape	Cold zone	For taping gloves or zip lock bags
Spare Items			
5 x	Boxes clip seal bags	Stored in cold zone	As spares (double bagged)
2 x	Detergent, scrubbing brushes and a hoof pick or screwdriver	Stored in cold zone	As spares for breakages or losses
2 x	10L bucket	Stored in cold zone	Spare and to carry items
2 x	Boxes of spare disposable gloves in each size	Stored in cold zone	Spares
2 x	Cartons of drinking water	Stored in cold zone	Spares
1 x	Sharps container	Stored in cold zone	Spare

Footbath decontamination station set up

Watch this video to understand how to set up a decontamination station set up or follow the steps below:

1. Select and set up a personal decontamination site. The personal decontamination site should ideally be located at the periphery of the uninfected, or “cold zone” and the infected area, also called the “hot zone” or close to the premises entrance/exit. For level 3 biosecurity practices the decontamination site should be close to showering facilities.
2. Set up the decontamination site with a defined “dirty” area and “clean” area demarcated by an imaginary line that allows you, upon exiting the “hot zone” to decontaminate yourself plus any equipment that must be retrieved from the “dirty” area to the “clean” area.
3. Spread the drop sheet on the ground first and weight it down at the corners to prevent it blowing away. This forms your transition zone and gives you a dry platform to decontaminate off the property.
4. In the cold zone place:
    i. PPE that will be worn when entering into the “hot zone.”
    ii. Scissors and duct tape to fasten gloves to overall
    iii. Spare biohazard bags, garbage bags (“vehicle” or “equipment” bags), cable ties and Zip lock bags.
    iv. Personal items such as mobile phone must be bagged in a zip locked bags or not taken onto the premises

5. In the transition zone (usually on the drop sheet) place:
    v. A bucket containing disinfectant.
    vi. A wash bucket containing clean water with soap or disinfectant solution, nail brushes and paper towels for personal cleaning as a final step prior to leaving the premises.
    vii. A spray pack of suitable disinfectant.
    viii. Scissors and duct tape to remove gloves to overall.
    ix. Spare biohazard bags, garbage bags (“vehicle” or “equipment” bags), cable ties and Zip lock bags.

6. On the “hot” side of the drop sheet (or close by) place:
    i. At least 20 litres of water for cleaning of gross dirt and organic material off your PPE if you will not be able to do a gross clean up elsewhere on the premises.
    ii. Place Tub 1 with suitable detergent and water and a long handled scrubbing brush allow scrubbing and removal of any remaining gross contamination from boots and outerwear.
    iii. Place Tub 2 with a suitable disinfectant and water solution plus a scrubbing brush and nail brush in the transition zone.
    iv. Place 1 x hand sprayer containing suitable disinfectant and water solution *Ensure that you wear gloves when mixing these disinfectant solutions.*
    v. A minimum of 5 strong biohazard/garbage bags and sufficient cable / zip ties for collection of contaminated disposable equipment and PPE.
    vi. A minimum of 5 garbage bags in which to place reusable equipment after decontamination.
    vii. Optional bucket or bin to hold biohazard bag for contaminated waste.

Footbath set up

Footbaths are a useful and inexpensive method of cleaning footwear before entering and exiting production areas of a feedlot.

To set up a footbath station on your feedlot you will need:

Place a heavy-duty plastic container large enough for an adult person to step in and stand on a non-slip surface. The location of the footbath should be at an entry point to the feedlot (main office or production area). Fill the tub with water and a registered detergent.

Add 1-2 heavy-duty scrubbing brushes (at least one should be long handled) to make cleaning boots easier.

Add a scraping tool such as a horse pick or a flat head screwdriver for gross contamination removal.

Fill a spray bottle with a registered decontaminant.

You may also consider having an area to hang boots that remain at the feedlot to dry (optional).

Using the footbath

Where footwear must be taken onto a feedlot, there are three simple rules that must be followed to take other footwear into production areas:

1. **Scrub** footwear with soapy water and a brush to remove all visible plant material and soil. Take care that the underside of the footwear is also clean.
2. **Disinfect** footwear using a footbath containing a strong sanitising product. You could also use a spray bottle to treat shoes with a disinfecting solution. Be sure to follow the use instructions on the product label.

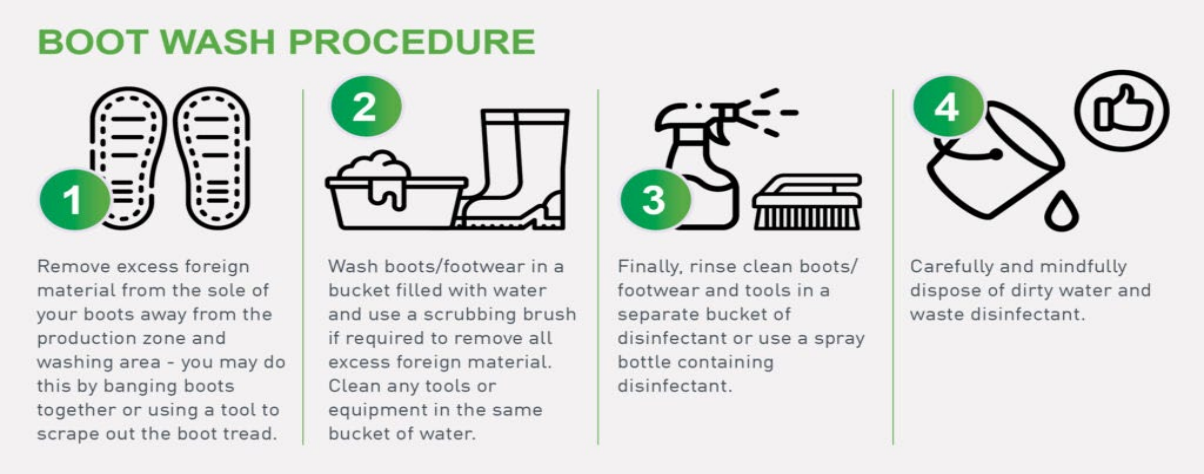


Image reference https://www.farmbiosecurity.com.au/footbath-foundations/

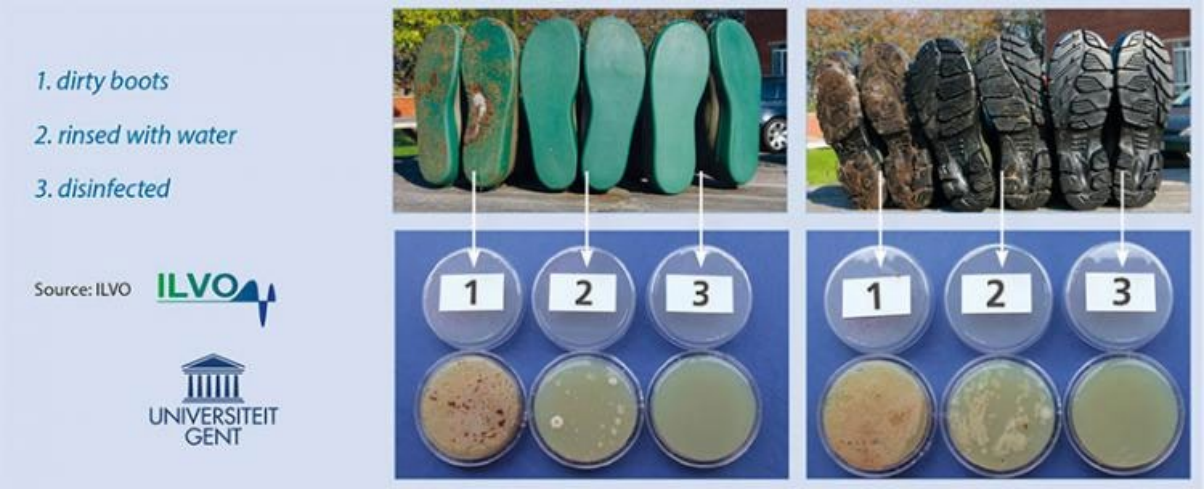


Image reference https://www.farmbiosecurity.com.au/biosecurity-basics-make-your-own-footbath/

After the footbaths have been used, dispose of the water and decontaminant away from production areas and water sources. Take note of label instructions for disposal of the decontaminant.

Note: the dirtier footwear is when entering the footbath, the faster the product used to decontaminate will deteriorate and become ineffective in denaturing pathogens.

Choosing a suitable disinfectant

In selecting suitable disinfectants, the characteristics of the disinfectant and the resistance characteristics and means of transmission of the particular EAD agent are the first considerations:

- Thirty of the EAD Response Agreement diseases are caused by Category A viruses.
- Four are caused by Category B viruses.
- Four are caused by Category C viruses, three of which are vector transmitted.
- Eight are caused by bacteria.
- Two are caused by prions.
- Most disease agents are inactivated by readily available and routinely used disinfectants.
- Many diseases are vector transmitted, which minimises the risk from direct transmission and thus the need for stringent decontamination. Therefore, only a small number of diseases requires specialised chemicals for decontamination.

To effectively eliminate emergency animal disease (EAD) agents from premises, clothing, vehicles, tools, carcases, or the environment requires a good understanding of the general properties of each disease agent and the ways each may persist in the environment and infect other animals.

There are two categories of disinfectants, the first is the natural processes of time, dehydration, warmth and sunlight and the other is through the use of chemicals to destroy the disease agent.

Many EAD Response Agreement disease agents are viruses which table 1.11 of the AUSVETPLAN-Operational-manual-Decontamination categorises into 3 main categories.

Category A viruses (intermediate to large size, contain lipid) — very susceptible to detergents, soaps and all the disinfectants listed in Section 3 of the AUSVETPLAN-Operational-manual-Decontamination susceptible to dehydration and often do not persist long unless the environment is moist and cool.

- Category B viruses (smaller, no lipid, more hydrophilic, e.g. picornaviruses and parvoviruses) — relatively resistant to lipophilic disinfectants such as detergents. Although Category B viruses are sensitive to all the other disinfectants listed in Section 3 of the AUSVETPLAN-Operational-manual-Decontamination they are less susceptible than viruses in Category A. Classical bactericides, such as quaternary ammonium compounds and phenolics, are not effective against these viruses.
- Category C viruses (intermediate in size, no lipid, e.g. adenoviruses and reoviruses) — intermediate between Categories A and B in sensitivity to the best antiviral disinfectants, such as hypochlorite's, alkalis, oxidising agents and aldehydes.

Other disease agents covered by the EAD Response Agreement include:

- bacteria
- mycoplasmas
- rickettsia's
- prions
- parasites of various types.

The characteristics of the disease agents, main modes of transmission and other epidemiological factors influence the need for decontamination and govern the extent of procedures to remove the EAD agent.

Disinfectants can be grouped into the following classes:

- soaps and detergents
- oxidising agents
- alkalis
- acids
- aldehydes
- insecticides.

- other chemical agents (for example biguanides, ionophores, quaternary ammonium compounds, phenolics).
- nonchemical methods of disinfection (steam, heat, sunlight etc)

Table 3.1 of the AUSVETPLAN-Operational-manual-Decontamination shows disinfectants that may be used to inactivate EAD agents and the required dilution or concentration.

For more information about disinfectants registered for use in Australia you can search PubCRIS, the APVMA's Public Chemical Registration Information System, using 'disinfectant' as the search term. Go here and scroll down to see the results.

According to the Food and Agriculture Organization (FAO), soaps and disinfectants are broadly categorized into several groups, including:

- **Soaps and detergents**

Soaps and detergents serve to remove dirt, grease, and organic material, facilitating the subsequent process of decontamination. They are cleaning agents. Hot water, brushing and scrubbing will all enhance the action of soaps and detergents. The surfactant action of many soaps and detergents is effective for those viruses that are enveloped, as the lipid nature of the envelope is disrupted by the surfactant. Some detergents contain phenolics or quaternary ammonium compounds which are effective antibacterials but have minimal effectiveness for nonenveloped viruses. Oxidizing agents, alkalis, acids, and aldehydes are all considered "disinfectants."

- **Oxidizing agents**

Oxidizing agents include sodium hypochlorite (household bleach), calcium hypochlorite (lime) and the commonly used commercially available agent Virkon S. These are the most widely used disinfectants, but the efficacy decreases in the presence of organic matter, which is why preliminary washing is so important. Oxidizing agents' inactive viruses by damaging any proteins that have disulfide bonds on the surface of the virus.

- **Alkalis**

Alkalis include sodium hydroxide (caustic soda) and sodium carbonate anhydrous (washing soda). They are virucidal, even under heavy burdens of organic matter. the action of alkalis may be to dissociate ribosomes due to conditions of high pH.

- **Acids**

Acids are especially helpful for some viruses, especially foot-and-mouth disease.

- **Aldehydes**

Aldehydes include glutaraldehyde, formalin, and formaldehyde gas. These are more expensive, making them unsuitable for large-scale decontamination. Also, there are adverse human health consequences associated with formaldehyde gas. Formalin, which is used to fix tissues for pathologic examination, will rapidly inactivate all infectious agents in the immersed specimen.

Personal Protective (PPE)

Appropriate PPE for the purpose of this document includes PPE that prevents the transmission of the EAD from animal to animal. Where respiratory protection is required, feedlots should request that the lead agency directly handle livestock unless the feedlot undertakes annual fit test training for respiratory protective equipment as part of their business as usual or training can be delivered to staff to utilise higher levels of respiratory protection including a fit test as required.

Other PPE should consider the disease agent, its zoonotic capability, any chemicals to be used, tasks to be performed and risks posed by other potential hazards such as weather conditions and the operating environment.

The Principles of Feedlot PPE selection are:

- The PPE prevents transmission of the EAD
- The PPE can be safely disposed of preferably onsite
- Where PPE needs to be removed from the feedlot, The PPE can be disinfected/decontaminated
- The PPE is fit for purpose
- Where training is required to operate the PPE (such as respiratory masks), this training is current and up to date.

During an emergency animal disease (EAD) response and where infection is found suitable PPE will be provided to staff that require it. Staff whom handle livestock and vets may maintain their own personal decontamination kit.

Always refer to equipment manufacturers' specific instructions and guidance before using any PPE.

PPE for veterinary professionals is outlined further in The Australian Veterinary Association's – Guidelines for Veterinary Personal Biosecurity 2017.

Alternative footwear and PPE management for feedlots

The use of footbaths and disposable clothing may be impractical for some feedlots where staff require specialised footwear (such as leather riding boots etc). In this instance, to prevent the spread of an EAD on and off a feedlot other system must be implemented.

These include the use of closed systems to leave sets of PPE that is needed for day-to-day activities by staff in the hot zone indefinitely. These systems work most effectively when there are shower facilities for staff to utilise in between transition through zones.

Whilst some PPE may be able to be decontaminated the long-term exposure to disinfectants may shorten their lifespan and therefore a closed system may be more suitable for feedlots to implement.

This may include:

- Felt Hats
- Footwear difficult to decontaminate
- Sunglasses
- Pen rider notebooks

Closed systems can also be used for visitors that need to enter the hot zone to perform maintenance and or handle animals and can include things such as:

- Gumboots
- Disposable overalls
- Overalls that can be laundered

Where level 3 biosecurity practices are in place it is mandatory that feedlots have spare supplies of the above to help manage visitors whilst maintaining feedlot daily operations. Laundry facility may be required to be installed to wash and reuse PPE.

Purpose built decontamination stations

Managing people

To support disease prevention strategies for fomite spread or contagious diseases, purpose built, or temporary structures may be required. This could include the installation of ablution blocks that assist staff with one way entry and exit procedures.

Ablution blocks should be surrounded by cleanable surfaces (such as concrete or temporary flooring) and should be able to be disinfected thoroughly.

Decontamination processes should be one directional, meaning that a person enters via one door and out another to prevent any form of recontamination.

Soaps and chemicals recommended for use for visitors should be fit for purpose and drainage systems should be adequate to prevent disease spread and meet environmental legislation.

This level of investment would require thorough consideration and may only be viable where there is a daily volume of visitors to the feedlot that cannot be excluded or a fomite spread disease is within close proximity to the feedlot.

Managing vehicles

To support disease prevention strategies for fomite spread or contagious diseases, purpose built, or temporary structures may be required. Alternatively other wash down facilities may be re-purposed.

Cleaning chemicals recommended for use should be fit for purpose and drainage systems should be adequate to prevent disease spread and environmental damage.

Appendix 3 Additional Biosecurity Practices when Level 1 Biosecurity Hygiene Practices have not been met by the visitor

Hygiene practice not met.	Control	Notes
The visitor has dirty hands, including dirt under the fingernails.	The visitor should be asked to wash their hands thoroughly, removing any dirt from under fingernails and sanitise their hands.	Feedlots can download a hand washing tip info graph as a PDF for placement in bathrooms or hand washing areas.
The visitor has visible dirt, mud, or animal fluids (blood, faeces etc.) on their clothing.	Soiled hats and jackets that are soiled should be left behind in the cold zone. For other clothing, the visitor should change their clothes or be provided with overalls or clean clothing or, Exclude the visitor from warm or hot zones on the feedlot.	Feedlots can keep a store of disposable or regular overalls and hats onsite for visitors.
The visitor has mud, dirt or debris on their footwear, or the footwear is not suitable to be cleaned.	The visitor should clean their footwear, removing visible soil, mud, and debris. For footwear not able to be cleaned substitution footwear should be adopted by the visitor.	Feedlots can maintain a footbath on the feedlot. Feedlots can keep a store of footbath equipment at the feedlot. Feedlots can keep a store of dedicated footwear for visitors.
The visitor has dirty equipment that is intended for use at the feedlot (equipment that might handle stock feeds or be used on livestock).	The visitors should clean their equipment by removing visible soil, mud, debris, and animal fluids or. Exclude the equipment from entering warm or hot zones or being used at feedlot.	Feedlots can keep a store of cleaning equipment. Feedlots can have a designated cleaning area.

The visitor has not covered cuts and abrasions.	The visitor should be asked to cover cuts and abrasions with personal first aid kits. The visitor can be excluded from warm or hot zones.	

ALFA

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