

Mass killing - Poultry

Mass killing of large numbers of farm animals may be required in the event of an emergency animal disease outbreak to control and prevent further spread of the disease. Other circumstances in which mass killing may be required include natural disasters or for animal welfare reasons, such as where transport to an abattoir cannot occur causing on-farm overcrowding or feed shortages.

General considerations

In any circumstance where mass killing is required, animal welfare must be one of the primary considerations when deciding on the most appropriate method. The purpose of this document is to provide general guidance on the animal welfare considerations associated with some of the current accepted methods for mass killing.

Application of any method of mass killing of farm animals must be subject to professional and expert advice and ensure compliance with relevant animal welfare legislation and with the Australian Model Codes of Practice for the Welfare of Animals. A person experienced in the killing of the species and trained in animal welfare aspects of killing must be always present during the mass killing process.

Further guidance on mass killing can be found in:

[AUSVETPLAN Operational Manual: Destruction of animals Version 3.2, 2015](#)

[AVMA Guidelines for the Killing of Animals: 2020 Edition](#)

[AVMA Guidelines for the Depopulation of Animals: 2019 Edition](#)

[EFSA Panel on Animal Health and Welfare Scientific Opinion: Killing for purposes other than slaughter: poultry](#)

ANIMAL WELFARE

When mass killing is required, there are three critical points in which animal welfare must be considered:

1. Animal handling prior to killing
2. Effectiveness and choice of the killing method
3. Confirmation of death

1. Animal handling prior to mass killing

When handling animals, low-stress handling techniques must be used to handle animals in a calm and quiet manner with an awareness of their flight zone. Any animal handling or restraint must occur in a way that minimises pain, injury, suffering, or distress to the animal. Those responsible for the killing of animals must be appropriately trained and competent.

Regarding the order and priority in which certain animals should be euthanased, some welfare situations should override disease control/eradication considerations during the mass killing process. Some of these welfare situations may include:

- animals that cannot obtain feed or water or that have compromised shelter/housing, should be killed as a matter of priority
- sick and distressed animals should be killed before healthy animals
- young and unweaned animals should be killed before or at the same time as their mothers
- potentially dangerous or aggressive animals (such as bulls, sows with litters, or boars)
- special consideration should be given to animals in parturition or late pregnancy.

2. Effectiveness and choice of killing method

The aim of killing is to humanely kill animals. RSPCA Australia defines humane killing as when an animal is either killed instantly or rendered insensible until death ensues, without pain, suffering, or distress. When possible, the method of mass killing should be the same or similar to methods used for standard on-farm killing of sick/injured animals or the killing of animals determined unfit for human consumption at the time of slaughter.

Animal-related factors that must be considered when choosing the most appropriate killing method include:

- type of infectious agent and sampling considerations
- species and age of animals
- number of animals involved
- state of domestication (tame, handled, wild)
- potential stress and amount of animal handling required
- location and housing system of the farm
- method and location of killing (on-farm, move to another location, abattoir/knackery)
- presence of nearby farms/premises with animals
- removal, disposal and destruction of carcasses.

Other factors that must also be considered when choosing the most appropriate killing method include:

- public safety risk (i.e. zoonotic disease)
- facilities on farm
- availability of trained staff/equipment
- response time frame
- biosecurity and environmental issues
- decontamination
- human health and safety
- legal and regulatory requirements
- financial cost.

3. Confirmation of death

After the killing method has been applied, animals must be checked using at least three signs to confirm death. Where it is not feasible to confirm the death of each individual animal then a minimum number of animals representative of all animals must have death confirmed. Signs to confirm death may include:

- loss of consciousness (not enough in itself, as the animal may only be stunned)
- absence of rhythmic respiratory movements (may also be temporary respiratory failure)
- lack of corneal reflex or 'blinking' when the cornea is touched or stimulated (also happens in heavily anaesthetised animals)
- lack of nictitating membrane reflex or movement of the third eyelid across the eye when stimulated
- lack of pupillary reflex or pupils constricting in response to light (i.e. the pupils remain fixed and dilated)
- glazing of the eyes where the cornea becomes opaque, dry and wrinkled
- absence of heartbeat (requires expertise to detect; heartbeat can persist for some minutes)
- absence of a pulse (requires expertise to detect)
- loss of colour in the mucous membranes where they become pale and mottled, without refill
- lack of response to painful stimuli or withdrawal reflex (not a reliable method)
- lack of jaw muscle tension and slack tongue (may be difficult to determine)
- rigor mortis (onset after several hours).

Poultry

Mass killing methods

Methods for mass killing of poultry currently accepted include carbon dioxide gas, inert gases with carbon dioxide gas, foam, and non-penetrating captive bolt.

Ventilation shutdown in any form as a killing method is not acceptable.

Carbon dioxide gas (CO₂)

Whole shed, partial shed or container gas killing is possible if the appropriate equipment is available. Although it requires minimal handling of birds, which is a benefit, this method has challenges in regard to confirming death in all birds, carcass disposal and decontamination. The use of skips, trays or tents that are sealable may be most appropriate and allow easier carcass disposal.

Welfare considerations

- A gradual displacement method must be used so that birds are not exposed to levels >40% until they are unconscious. Birds show signs of aversion and discomfort with sudden exposure to CO₂ concentrations of 40-50% or higher.
- Any set up must allow for only a single layer of birds and birds must be able to comfortably sit and stand in the container.
- Ensure that the container allows for visual observation of birds during gas exposure.
- Gas concentration, temperature and flow rate must be monitored at all times.
- Gas inlet and flow must not be aimed directly at birds (at least >300mm above the birds).
- Birds must be kept in the container for adequate time to ensure death.

Inert gases (argon or nitrogen)

Currently not available for on-site or on-farm setting but should be explored further as a potentially more humane method in comparison to carbon dioxide gas. Inert gases have the benefit of being undetectable to poultry, therefore when mixed with low concentrations of CO₂, no aversion is observed in birds.

Welfare considerations

- Any set up must allow for only a single layer of birds and birds must be able to comfortably sit and stand in the container.
- Container must be sealable.
- Ensure that the container allows for visual observation of birds during gas exposure.
- Gas concentration, temperature and flow rate must be monitored at all times.
- Gas inlet and flow must not be aimed directly at birds (at least >300mm above the birds).
- Birds must be kept in the container for adequate time to ensure death.

Low atmospheric pressure systems

Low atmospheric pressure systems have been validated as a method of commercial stunning and killing of meat chickens and shows potential for other poultry species. Portable low atmospheric pressure systems are available overseas and may provide a potentially more humane method in comparison to using carbon dioxide gas or foam methods.

Welfare considerations

- Any set up must allow for only a single layer of birds and birds must be able to comfortably sit and stand in the container.
- Only purpose built portable systems under the prescribed technical conditions must be used.
- Decompression and recompression profiles must be monitored at all times.

Foam (water-based air-filled or high expansion gas-filled)

There are two types of foam: water-based air-filled foam or high expansion gas-filled (nitrogen or CO₂) foam. These methods are most practical for floor-based housing systems such as meat chicken sheds or layer hen sheds that utilise a deep litter system. High expansion gas-filled foam should be used preferentially because it provides a more humane mechanism of death compared to water-based foam.

Welfare considerations

- Must ensure the rate of foam production is able to engulf the entire shed floor and cover birds and account for the breakdown of foam due to bird movements. Foam production should be continued until all birds are dead.
- High expansion gas-filled foam must consider expansion ratio and bubble size. The use of nitrogen gas is preferable to CO₂ due to nitrogen being an inert gas and therefore unlike CO₂ is undetectable to birds.
- Water-based air-filled foam must consider bubble size, depth, persistence and fluidity. Consideration must be given to the foam mixture used, as foam can include hydrocarbon surfactants, solvents and stabilisers, alcohols, propylene glycol, and corrosion inhibitors, which can cause eye and mild skin irritation in birds.
- Consideration must be given as to how death will be confirmed given that birds are unable to be observed or accessed easily under foam.

Non-penetrating captive bolt

Appropriate in larger birds (turkeys, emus, ostriches) or birds that are known to be resistant to the effects of CO₂ gas (such as water birds like ducks and geese). The captive bolt gun must be designed and calibrated for the size and type of bird.

Welfare considerations

- Handling, catching and restraint of individual birds must follow correct normal handling procedures.
- Use of purpose-built buckets or containers that may assist in handling must be considered (e.g. a bucket with a small head hole that can be placed over the bird and allow easy access to the head).
- A secondary method such as cervical dislocation or exsanguination must be used following captive bolt use to ensure death.

Maceration - only acceptable for chicks <24 hours old

Only appropriate for chicks at hatcheries. The two types of maceration machines include roller-type or knife-type maceration.

Welfare considerations

- Chicks must enter the macerator in a single layer at an appropriate speed for the macerator capacity.
- For roller-type macerators the gaps between each roller must be considered.
- For knife-type macerators the type of blade, angle of the blade and speed at which blades rotate must be considered.

New or previously un-used killing methods

Other killing methods not mentioned above must be subject to a humaneness assessment to determine the animal welfare impact of the method and whether it is justified, effective and humane. The humaneness assessment must also consider the three critical points where animal welfare can be negatively impacted during mass killing, which includes the animal handling and restraint prior to killing, the stunning/killing method being used, and confirmation of death.