Module 17

Euthanasia and Emergency Killing

This lecture was first developed for **World Animal Protection** by Dr David Main (University of Bristol) in 2003. It was revised by **World Animal Protection** scientific advisors in 2012 using updates provided by Dr Caroline Hewson.

Free online resources

To get free updates and additional materials, please go to

www.animalmosaic.org/education/tertiary-education/

This module will enable you to understand

What euthanasia is

Why we euthanise animals

When to euthanise and who decides

How to kill animals humanely

Other relevant points

Euthanasia vs. alternatives

Euthanasia

"Euthanasia is the humane killing of an animal for its own benefit" (Broom, 2007)

Humane by definition: Greek: '*eu*' = good, '*thanatos*' = death

Slaughter

"The killing of animals intended for human consumption" (EC, 2009)

Emergency killing

Eg for disease control

Humane Killing

"Killing by using a method that causes rapid and irreversible loss of consciousness with minimum pain and distress to the animal" (OIE, 2011)

Euthanasia

An act of mercy

- When an animal has an incurable illness
- When rescue or treatment is impossible
- To avoid future suffering
  (eg in natural disasters, wars, market collapse)
- Not all methods of ‘mercy killing’ are euthanasia

Views on killing animals 1

Cultural

Until the introduction of the 1998 Animal Protection Bill in Taiwan, stray animals were killed by 'bulk drowning'

A number of countries use 'dog shooting days' as a means of eliminating unwanted or stray animals

Views on killing animals 2

Different religions

‘Suffering is a feature of life’

- It is unnatural to kill an animal (i.e. shorten his/her life) in order to prevent or end suffering

‘Suffering may reach a point at which humane killing can be justified, to end the suffering’

- This justified end to suffering, by humane killing, is the basis of a ‘good death’

Veterinarian’s responsibility to provide good death

- Unconsciousness followed quickly by death

Guidelines available online

American Veterinary Medical Association (2007)
www.avma.org/issues/animal_welfare/euthanasia.pdf

World Organisation for Animal Health (OIE) Terrestrial Animal Health Code (2011)
www.oie.int/en/international-standard-setting/terrestrial-code/access-online/

Humane Slaughter Association (2011)
www.hsa.org.uk/Humane%20Slaughter%20Information.htm

ICAM (2007) Methods for the euthanasia of dogs and cats: comparisons and recommendations:
icam-coalition.org/resources.html

Summary so far

What euthanasia is

Why euthanise?

A justifiable end to suffering

Next:

When to euthanise and who decides

Humane killing of individual animals

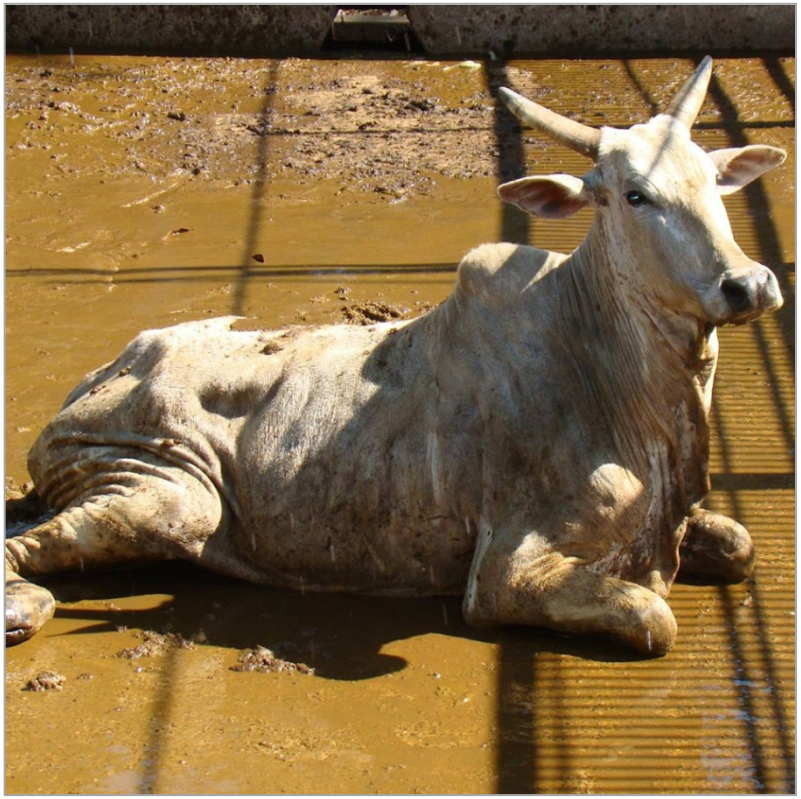
Severely injured animals

Animals with terminal conditions in which suffering is likely or cannot be prevented

Aggressive animals

Aged animals where there are no resources for their needs

Emergency killing of farm animals
(Woods et al., 2010)



Who decides? 1

Owner – animal as property

Ideally in consultation with the vet

- **Ethically, the vet may need to override the owner's wishes but this may be difficult** (Rollin, 2002; Morgan, 2007)
- **Must also respect owner's autonomy** (Morgan, 2007)

Who decides? 2

Credit: Dr Thevi

Credit: Dr Thevi

Ethical questions in humane killing

“Convenience euthanasia” (Rollin, 2002; Yeates, 2010)

- **Are animals disposable?**
- **Do we have a responsibility to provide animals with quantity of life, as well as a reasonable quality of life?**
- **Does the age at death matter if there is no suffering?**

The importance of having a protocol

Written consent on a standardised practice form

Will not euthanise without a vet exam

Eg sometimes animal has a treatable condition whereas owner thought s/he was dying

Regular servicing schedule for the captive-bolt pistol

Humane killing of multiple animals 1

Stray dogs and cats – when there are insufficient resources to provide a reasonable quality of life

Planned population control of wildlife

- For the ‘greater good’ of the remaining population and sometimes domesticated species too
- Not an effective control strategy

Humane killing of multiple animals 2

Infectious disease outbreaks

Legal requirement, eg avian influenza, foot and mouth disease

Market pressures

Eg collapse of pig prices in North America in 2008-09 → mass killing, by law, of some newly weaned piglets (Whiting et al., 2011)

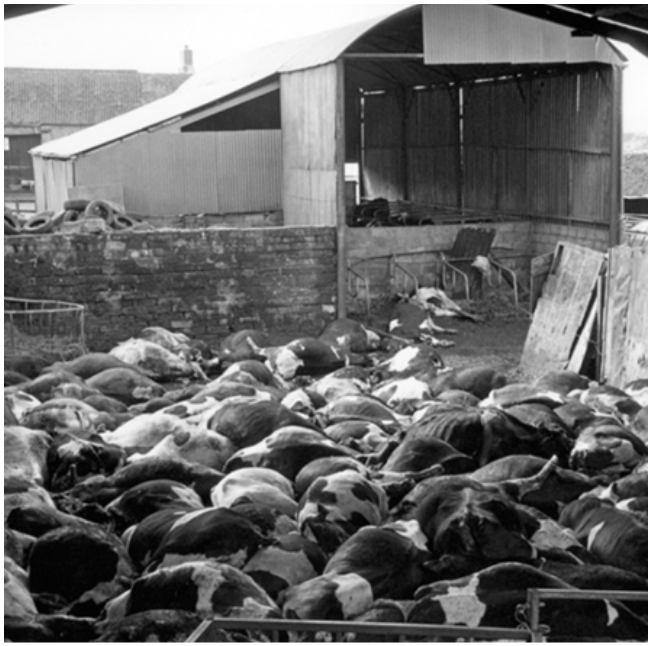
Routine killing of non-productive, neonatal farm animals, eg

Male calves in dairy herds male day-old chicks in layer-breeder farms

For research

Laboratory animals

Who decides?



Credit: Chris Chapman, 2001 (www.chrischapmanphotography.com)

Killing required by law

Summary so far

What euthanasia is

Why euthanise? Philosophical aspects

When to euthanise and who decides

Other types of emergency killing

How to euthanise animals

- **Ideal methods of euthanasia**
- **Methods to be avoided**
- **Signs that an animal is dead**

Ideal humane killing method (AVMA, 2007)

Rapidly induces unconsciousness and death without pain, distress, anxiety

- **Irreversible**
- **Reliable**

Does not put personnel at risk

Feasible for the circumstances in question, eg

- **Cost**
- **The animal can be restrained with little distress**

Is 'aesthetically' acceptable to operator and client

Can be administered competently by the staff available

Produces a dead body which can be disposed of safely

Common methods

Overdose of drugs

Intravenous pentobarbital

Stunning and exsanguination

Penetrative and non-penetrative stunning

Electrical stunning

Shooting – free bullet

Pistol, rifle, shotgun

Overdose of sodium pentobarbital by IV injection

150 mg/kg IV => anaesthesia then death by anoxia

Irritant if perivascular

Disposal: bodies contain barbiturates

Use of barbiturates illegal in some countries

Intraperitoneal pentobarbital 1

Not clear if this is an irritant

Does not seem to be, but do not inject into other organs by mistake (eg kidneys/liver, because of the relatively inelastic capsule)

Takes ~20 minutes; needs larger volume than IV to ensure animal dies quickly and is not left unconscious

Intraperitoneal pentobarbital 2

Injection site

- Ventral midline (half-way) or right lower lateral abdomen
- Avoid left abdomen b/c of stomach. Avoid caudal abdomen because of bladder (Rhoades, 1999)

IP barbiturates may not be feasible in mass killing of animals in groups because

- You need to weigh each animal to estimate dosage accurately
- Animals may lie on top of each other as they become unconscious → death by crushing and hypoxia (Whiting et al., 2011)
- It is costly
- Carcasses are unsafe to consume afterwards

Signs of death

Loss of spinal reflexes

Corneal reflex, toe-pinch

Extreme mydriasis and glassy appearance to cornea

Not breathing (c.f. agonal deep breathing immediately prior to death)

Heartbeat not palpable or audible

Common methods

Overdose of drugs

Intravenous pentobarbital

Stunning and exsanguination

Captive-bolt stunning followed by pithing or exsanguination

In some countries, the routine use of captive-bolt equipment is restricted to licensed slaughter personnel, but mercy killing may be carried out by any person

Credit: Dr N. Gregory

Non-penetrating percussive stunning followed by exsanguination

If infectious disease present, exsanguination provides increased risk transmission / contamination

Signs of effective stunning

- Animal collapses
- Gasping and gagging reflexes, but no rhythmic breathing or vocalisations
- No corneal reflex
- Fixed, fully dilated pupil
- Relaxed jaw
- Tongue hanging out
- Body hangs straight down – there is no arching of the back or struggling; the legs may move

Electrical stunning followed by exsanguination or electrocution

The use of electrical stunning for routine killing is restricted to licensed slaughtermen in many countries, and the use of trained personnel for this equipment in humane killing of pigs or sheep in a disease outbreak would be required. Use of this method is limited by the electric current supply

Tonic, then clonic phases (mammals)

Percussive killing of small mammals, birds and fish

Not the same as banging their heads on a hard surface

Requires training (as with all stunning)

The use of percussive killing of laboratory animals is regulated

Common methods

Overdose of drugs

Intravenous pentobarbital

Stunning and exsanguination

Penetrative and non-penetrative stunning

Electrical stunning

Shooting – free bullet

Free bullet: pistol shooting

Horses and donkeys

When a barbiturate overdose is not possible, a free-bullet pistol is an aesthetically acceptable and humane method of killing

Free bullet: rifle shooting

In many countries, the ownership and use of firearms is regulated

A repetitive rifle with a silencer is the best option if several animals must be killed


Credit: iStock.

Use of a shotgun for emergency humane killing

In many countries, the ownership and use of firearms is regulated

Credit: iStock.

Signs of death from a free bullet

- Animal collapses immediately
- No rhythmic breathing
- No corneal reflex
- Twitching and convulsions may start shortly afterwards

Stunning and shooting

Humane Slaughter Association website
www.hsa.org.uk/Humane%20Slaughter%20Information.htm

World Organisation for Animal Health (OIE) Terrestrial Code
www.oie.int/en/international-standard-setting/terrestrial-code/access-online/

Humane killing of pets/wild birds

Pentobarbital injection

- Into the occipital sinus (large vein at the back of the skull supported by bone)
- Intrahepatic injection by going under the sternum/keel from the bottom, angling cranially
- Ulnar (wing) vein or leg vein
- Can sedate first with medetomidine

Gaseous anaesthetic and intracardiac potassium chloride

Neck dislocation of birds

Neck dislocation or neck-pulling is widely used in killing birds, but is not ideal

Summary so far

- What euthanasia is
- Why euthanise?
- When to euthanise and who decides
- How to euthanise animals
- Miscellaneous points

Humane killing of foetuses and neonates 1

Humane killing of foetuses and neonates (Mellor et al., 2009; Mellor & Diesch 2006)

Altricial species (eg dogs, cats) are neurologically immature at birth

As neonates and foetuses, they cannot suffer; they are not mature enough to have consciousness

Precocial species could suffer because they are neurologically more mature

However, EEG studies show all those species are unconscious during gestation

Due to effect of neuroinhibitors eg adenosine

Death of mother ⇨ cessation of their oxygen supply, which makes their unconsciousness permanent as their brain approaches death

Humane killing of foetuses and neonates 3

OIE Terrestrial Code 7.5.5 (2011)

"Foetuses should not be removed from the uterus sooner than five minutes after the maternal neck or chest is cut, to ensure absence of consciousness. A foetal heartbeat will usually still be present and foetal movements may occur at this stage, but these are only a cause for concern if the exposed foetus successfully breathes air.
If a live mature foetus is removed from the uterus, it should be prevented from inflating its lungs and breathing air (eg By clamping the trachea)."

Laying hens: mass killing of male chicks

Killed at one day old

Macerator

Gas

- 100 per cent carbon dioxide
- 90 per cent argon and <2 per cent oxygen by volume
- 30 per cent carbon dioxide, at least 60 per cent argon, <2 per cent oxygen, by volume

Alternatives to barbiturates in dogs and cats 1

Deeply anaesthetise, then IV potassium chloride (1-2 mmol/kg) death by cardiac arrest

Chloral hydrate?

No – slow, and has side-effects of gasping and distress

Inhalant anaesthetics

May be irritant and cause struggling

Alternatives to barbiturates in dogs and cats 2

Carbon monoxide

- Commercially prepared
- Special chamber needed
- Good ventilation in room
- Flow rate must achieve at least 6 per cent concentration very soon after animal has been placed in it

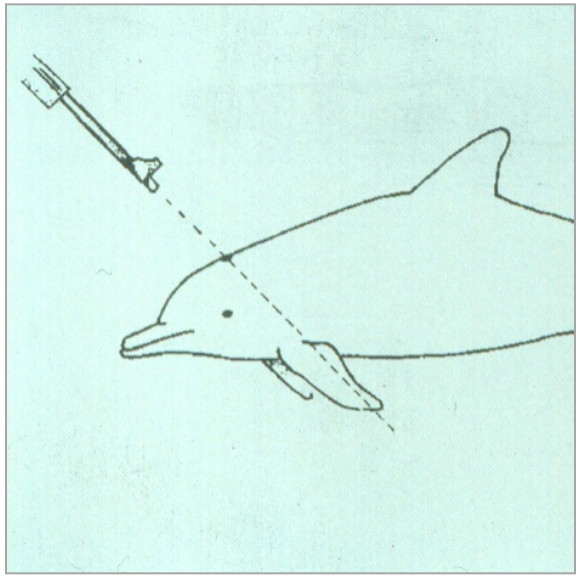
Penetrating captive bolt (large dogs) followed by pithing

Humane killing of stranded cetaceans 1

Best method for humane killing is not always apparent

Small cetaceans

- Overdose of etorphine or barbiturates
- Shoot in the head with a rifle



Humane killing of stranded cetaceans 2

Larger cetaceans

- No reliable method of humane killing is available
- Stranded whales do not usually survive even if they are returned to the water (due to compromised circulation)

Unacceptable methods of killing (AVMA, 2007)

- Decapitation (only very small mammals and birds; some fish, reptiles and amphibians with pithing)
- Neuromuscular blocking
- Starvation
- Strychnine
- Stunning
- Suffocation/smothering
- Use of non-specialist microwave equipment
- Air embolism
- Blow to the head (except neonates with thin skulls)
- Burning
- Chloroform
- Cyanide
- Drowning
- Exsanguination of conscious animals
- Freezing of conscious animals

Acceptable methods of killing 1
(AVMA, 2007)

For individual animals who can be adequately restrained, intravenous barbiturate is recommended (particularly for stray dogs and cats)

For horses and donkeys

Barbiturate overdose

Free-bullet pistol shooting

Acceptable methods of killing 2

Large animals on farm

Use of a race or crush for restraint

Captive-bolt stunning followed by bleeding or pithing

Large animals who are ‘free’

Accurate head, heart or high-neck shooting

Large groups in disease outbreaks (poultry, pigs)

Stunning followed by exsanguination

Euthanasia and client communication 1

Deciding to end an animal's life can be a very difficult decision for a client

Give the owner time to make the decision

- **Empathise**
- **Discuss the factors leading to the decision to euthanise**
- **Explain exactly what is involved, including the disposal of the body**
- **Do not judge**

Euthanasia and client communication 2

Schedule the procedure so that there is time

To talk and explain

To carry out the process without rushing

Obtain written informed consent

Client guilt and grief

Normal

The client should feel that his/her animal's life (and death) was important, and that the euthanasia was not simply routine for you

Euthanasia and vets' mental health

Can cause depression

(Whiting & Marion, 2011)

Euthanasia of individual animals

Mass killing of healthy animals

- Moral justifications, e.g. necessity, no alternative, killing done humanely

Summary

In deciding on euthanasia, different criteria may be applied depending on

- The use of the animal, and
- Whether the animal is treated as an individual or part of a group

Certain methods of killing are inhumane and should never be used

Effective client communication is important before euthanasia

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- **What did you like about it?**
- **What did you not like?**
- **Do you have any tips to share?**

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Your feedback will help other teachers like you

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