



PILA In Pigs



1

PILA elements

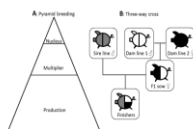
- Principles of care and use
- Biology and husbandry of relevant species.
- Common diseases in the relevant species.
- Recognition of wellbeing, pain, suffering and distress in relevant species.
- Health monitoring and disease prevention and control.
- Handling and restraint of relevant species.
- Conduct of minor procedures.
- Introduction to anaesthesia and analgesia.
- Humane methods of killing

2

LO: 3.1.1 & 4.10

3

UK Pig Industry



Structure of Industry

Nucleus herds	–	High health status
↓		
Multiplier herds	–	High health status
↓		
Commercial producers	–	Conventional health

- All pig keepers must be registered with DEFRA/DAERA

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LO: 3.1.1

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Uses in research

- Organ system very similar to humans
- Cardiovascular system – models for myocardial infarction, atherosclerosis,
- Digestive models
- Urinary models
- Skin and plastic surgical procedures
- Transplantation studies – often organ donors for xenograft procedures

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LO-3.1.1

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Pigs in ASPA

- Pigs are not on the Schedule 2 list, meaning they can be obtained from sources which do not purpose breed them for use in research procedures
- Audit of vendors advised before purchase



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LO-4.4.1

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Code of Practice (CoP)

Section 3 Chapter 8 Farm animals (including equines)



Used for Scientific Purposes
from the Veterinary Practitioner

Section 3, Chapter 8: Farm animals and equines

This chapter must be read in conjunction with the Introduction and Section 3 Chapter 1: Advice applicable to all animals.

1 Advice applicable to all farm animals except equines

In addition to the mandatory requirements covered in Sections 1 and 2 of this Code of Practice, in the case of farm animals, compliance with legislation relating to the identification, welfare, keeping, breeding, transport and slaughter of these species is necessary.

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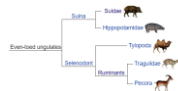
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LO-3.1.1

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Taxonomic classification of pigs

- Kingdom: Animalia
- Phylum: Chordata
- Class: Mammalia
- Order: Artiodactyla (even-toed ungulate)
- Family: Suidae
- Genus: Sus



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LO3.1.1

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Pig Terminology

- Piglet : baby pig
- Gilt : young female pig that has not had a litter
- Sow : female pig that has produced a litter(s)
- Hog*: young/sexually immature male pig
- Boar: Sexually mature male pig

*Hog in the UK is used to refer to sexually immature or castrated male pigs. In other parts of the world, the term describes all adult swine/pigs (*Sus scrofa*).

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LO: 3.1.7

Breeds of pig



Most commercial pigs are hybrids

Pure breeds are becoming rare

- Large White
- Landrace
- Duroc
- Pietrain
- Saddleback
- Tamworth
- Gloucester Old Spot
- Meishan



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LO: 3.1.7

Other pig breeds

Miniature pigs (mini-pigs)

Yucatan
Gottingen
Minnesota



Pet pigs

Vietnamese pot-bellied
KuneKune



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LO: 3.1.1

Skin, Hair, and Teeth

- Large Fat layer
- Not much hair
 - Depends on breed and climate
- 'Whites' are easily sunburned
 - Large White
 - Landrace
- Tusks are modified canine teeth
 - Erupt in both male and female pigs between 10-15 months of age
 - Tusks continually grow throughout life

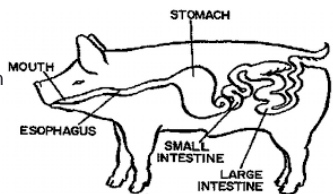


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LO: 3.1.1

Digestive system

- Omnivore
- Simple stomach
- Small intestine: main site for digestion
- Caecum
- Large colon – absorption of water



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LO: 3.1.1

Reproductive system

- Breed all year
 - nonseasonal polyoestrous breeders
 - Oestrus every 21 days
- Two ovaries
- Long uterine horns
- Cervix
- Vagina
- Average 12-14 teats



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LO: 3.1.1

Reproductive Biology

- Mated at 6-8 months of age
- Served by boar or AI
 - Semen resilient (fresh up to 3 days)
 - Embryos sensitive to freezing
- Gestation length 113-115 days (3 months 3 weeks, 3 days)
- Litter size 8-14
- Litters weaned at 21 to 28 days
 - HO advises 28 days
- Sow re-mated at first oestrus post-weaning



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LO: 3.1.1

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Pig Behaviour

- Rooting – use the snout to push or nudge into something repeatedly
 - Comfort
 - Communication
 - Cool off (e.g. mud hole)
 - Search for food
- Poor eyesight– can be easily frightened
- Great sense of smell
- Intelligent, stubborn and very vocal



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LO: 4.1

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Hierarchy

- Pigs develop a dominance hierarchy and mixing new members into a stable group will result in fighting and possible deaths
- Do not re-mix groups once they have been separated



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LO: 3.1.1

Potential Injuries

- When aggressive, pigs will use their tusks (razor sharp teeth) to fight
- Adult sows and boars can inflict severe injuries
- Will come to the rescue of a distressed herd mate
- Always have an escape route when working with pigs

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LO: 4.7 & 7.1

Pig Handling

Pig Boards

- Used to move pig(s)
- Flat, solid pieces of wood or plastic, large enough to cover the handler's legs and prevent bite wounds
- Use as barrier to move pig in direction you want
- Make sure board is touching ground, otherwise pig will put nose under it and charge through



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LO: 4.7 & 7.1

Pig Restraint

Small pigs (up to 10kg)

- Lift the pig by a back leg, taking care not to 'snatch' or 'swing' the piglet as you lift it.
- Support the chest with your other hand, when moving with the piglet over any distance to avoid undue pressure on the leg joints.
- V- trough can be used for placing smaller pigs on their back.
 - Useful for venepuncture from the jugular or anterior vena cava



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LO: 4.7 & 7.1

Pig Restraint

Larger pigs

- Pig Snatch - long pole with cable loop
 - Use for larger pigs > 20kgs
 - Dangle loop in front of pig's snout
 - When pig opens mouth, push loop into mouth behind tusks and tight



- Pig Snare – rope with loop on end

Never grab/restrain a pig by the ears or tail



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Routine tasks



- Indoor piglets
 - Iron injection
- Vaccination
- Worm and external parasite monitoring and control
- Foot monitoring and care
- Tusk trimming (as needed)
- Should not be routinely done:
 - Tail clipping
 - Teeth clipping
 - Castration

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Housing and Care for Pigs

CODE OF PRACTICE FOR THE HOUSING AND CARE OF ANIMALS

- Temperature and humidity
- Ventilation
- Stocking densities
- Lighting
- Noise
- Feeding
- Bedding



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Husbandry

4.2 Pigs and stings being used in production

Use estimate	Use estimate		Use estimate	
	Minimum floor area for each pig (m ²)	Minimum floor area for each pig (m ²)	Minimum floor area for each pig (m ²)	Minimum floor area for each pig (m ²)
100-150	0.75	1.00	0.75	1.00
150-200	0.75	1.00	0.75	1.00
200-250	0.75	1.00	0.75	1.00
250-300	0.75	1.00	0.75	1.00
300-350	0.75	1.00	0.75	1.00
350-400	0.75	1.00	0.75	1.00
400-450	0.75	1.00	0.75	1.00
450-500	0.75	1.00	0.75	1.00
500-550	0.75	1.00	0.75	1.00
550-600	0.75	1.00	0.75	1.00
600-650	0.75	1.00	0.75	1.00
650-700	0.75	1.00	0.75	1.00
700-750	0.75	1.00	0.75	1.00
750-800	0.75	1.00	0.75	1.00
800-850	0.75	1.00	0.75	1.00
850-900	0.75	1.00	0.75	1.00
900-950	0.75	1.00	0.75	1.00
950-1000	0.75	1.00	0.75	1.00
1000-1050	0.75	1.00	0.75	1.00
1050-1100	0.75	1.00	0.75	1.00
1100-1150	0.75	1.00	0.75	1.00
1150-1200	0.75	1.00	0.75	1.00
1200-1250	0.75	1.00	0.75	1.00
1250-1300	0.75	1.00	0.75	1.00
1300-1350	0.75	1.00	0.75	1.00
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2150-2200	0.75	1.00	0.75	1.00
2200-2250	0.75	1.00	0.75	1.00
2250-2300	0.75	1.00	0.75	1.00
2300-2350	0.75	1.00	0.75	1.00
2350-2400	0.75	1.00	0.75	1.00
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2600-2650	0.75	1.00	0.75	1.00
2650-2700	0.75	1.00	0.75	1.00
2700-2750	0.75	1.00	0.75	1.00
2750-2800	0.75	1.00	0.75	1.00
2800-2850	0.75	1.00	0.75	1.00
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3300-3350	0.75	1.00	0.75	1.00
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3750-3800	0.75	1.00	0.75	1.00
3800-3850	0.75	1.00	0.75	1.00
3850-3900	0.75	1.00	0.75	1.00
3900-3950	0.75	1.00	0.75	1.00
3950-4000	0.75	1.00	0.75	1.00
4000-4050	0.75	1.00	0.75	1.00
4050-4100	0.75	1.00	0.75	1.00
4100-4150	0.75	1.00	0.75	1.00
4150-4200	0.75	1.00	0.75	1.00
4200-4250	0.75	1.00	0.75	1.00
4250-4300	0.75	1.00	0.75	1.00
4300-4350	0.75	1.00	0.75	1.00
4350-4400	0.75	1.00	0.75	1.00
4400-4450	0.75	1.00	0.75	1.00
4450-4500	0.75	1.00	0.75	1.00
4500-4550	0.75	1.00	0.75	1.00
4550-4600	0.75	1.00	0.75	1.00
4600-4650	0.75	1.00	0.75	1.00
4650-4700	0.75	1.00	0.75	1.00
4700-4750	0.75	1.00	0.75	1.00
4750-4800	0.75	1.00	0.75	1.00
4800-4850	0.75	1.00	0.75	1.00
4850-4900	0.75	1.00	0.75	1.00
4900-4950	0.75	1.00	0.75	1.00
4950-5000	0.75	1.00	0.75	1.00

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4.2.1 Identification
 4.2.2 Temperature

HO advice on housing, ventilation, temperature, etc.

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Housing

- Most sows are kept indoors
 - There are outdoor herds
- Social animals so should be kept in groups within sight and sound of each other



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LO: 4.2

25

Housing - Farrowing

- Farrowing crates for perinatal period
 - 'Save area for piglets' - may be used to protect piglets from being crushed
 - Defra/DAERA allows a maximum of 5 weeks
 - Piglets must be provided with additional warmth
- Outdoor farrowing occurs in pig arks



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LO: 4.2

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Husbandry & Environment

- Temperature – determined by stocking density and age
 - Adults 15- 24°C
 - Piglets
 - Newly weaned 27-32°C
 - >6 weeks 21 to 22°C
- Humidity – extremes have adverse effect
 - Range 45 - 65%
- Ventilation – reducing humidity without creating draughts
 - Minimum 10-12 room changes/hour, increase according based on signs (e.g. odour)
- Lighting
 - Natural
 - 8 to 12 light with dusk/dawn
 - Defra/DAERA requires a minimum of 40 lux of lighting for 8 hours
- Noise
 - <50 decibels

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LO: 3.1.5

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Pig feeding

- Omnivores – scavengers that eat anything (including grass and hay)
- Mainly fed commercial pig feeds – dependant on stage of development
 - Weaning feed
 - Lactation feed
 - Fattening feed
- Antibiotic in feed banned in the UK
- Ad-lib water needed
 - Trough
 - Bowl/bucket
 - Nipple drinkers



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LO: 4.1

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Environmental Enrichment

- Look at natural pig behaviour
- Provide substrate for rooting
- Toys
- Noise - talking & music
- Rotate stimuli



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LO: 5.2

29

Health status

Conventional Farm

- Most are unknown health status
- "high" health status is often dependent of location in the pyramid
- Specific pathogen free (SPF)
 - Tested and certified
- Gnotobiotic
 - All microorganisms are known or excluded
 - Born in isolators, usually be caesarean

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LO: 5.2

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Health and disease

Animal Health checks (e.g. on arrival)

- History of illness
- Clinical examination should include:
 - body condition score
 - Appearance
 - Lameness
 - Breathing
 - Diarrhoea
- Laboratory tests - blood, faeces, skin scraping

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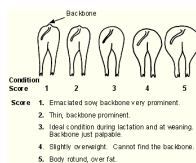
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Health examination

Rectal Temperature 38.5 – 40.0°C
 Respiratory rate 10-20 / minute
 Heart rate 90-110 / minute
 Blood volume 60ml/kg

- Check eating/drinking/urinating/faeces
- Check weight or BCS
- Check skin
- Rectal examination if required



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LO: 5.2

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Signs of illness and/or pain

- Loss of appetite
- Lethargy
- Social isolation
- Hunched/abnormal posture
- Lameness



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LO: 5.2

33

Signs indicating system affected

Respiratory - Coughing and sneezing, Ocular-nasal discharge, Raised temperature, Increased respiratory rate

Gastrointestinal – chronic weight loss, diarrhoea, dehydration, low temperature

Locomotor – lameness, joint swelling

Nervous – tremor, head-tilt, circling, seizures



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LO: 5.2

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Notifiable diseases

• A **notifiable disease** is any disease that is required by law to be reported to government authorities.

• REPORT TO DEFRA/DAERA

- **Anthrax**
- Aujeszky's disease
- **Rabies**
- Classical and African swine fever.
- Swine vesicular disease (SVD)
- Foot and mouth disease (FMDV)



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LO: 5.2

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Zoonotic diseases

- Notifiable: Anthrax and Rabies
- Skin: ringworm, erysipelas
- Digestive: Cryptosporidiosis, salmonellosis, E.coli O157
- Respiratory: Influenza, Tuberculosis
- Nervous: Streptococcal meningitis
- Other: Leptospirosis



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LO: 5.2

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Common porcine diseases

- Skin – Lice, mites, ringworm, erysipelas
- Locomotor – joint ill, trauma
- Respiratory - Mycoplasma hyopneumoniae, PRRS Influenza, APP hypopneumonia
- Gastro-intestinal – bacterial, viral, parasitic
- Viral – PWMS, parvovirus



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Vaccination

Vaccines are available against:

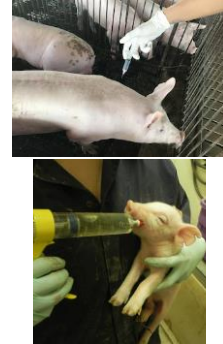
- Erysipelas
- E. Coli enteritis
- Strep suis type II
- Atrophic Rhinitis
- Glasser's disease
- M hyo pneumonia
- APP pneumonia
- Parvovirus
- PMWS
- PRRS



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Minor procedures

- Oral
- Subcutaneous
- Intramuscular
- Intravenous
- Intranasal



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Minor procedures

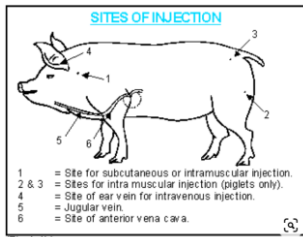


Figure from "The Pig Site:" <https://www.thepigsite.com/pig-management/on-farm-procedures/sites-of-injection>

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Blood sampling



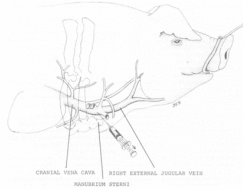
Marginal ear vein

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LO: 7.5 & 8.1 41

Venous sampling

Sample from pig's
Right side to avoid
injuring phrenic nerve



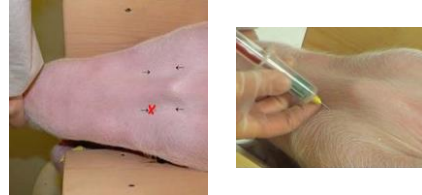
Pictures and video from Norecopa: <https://norecopa.no/films-and-slideshows/pig>

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LO: 7.5 & 8.1

Anterior vena-cava bleeding

Small pig



Arrows are pointing to the left and right jugular furrows with the sternum protuberance visible in between the furrows and shoulders on either side. These three structures are used to identify the location for blood sampling (red 'X').

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LO: 7.5 & 8.1

Anterior vena-cava bleeding

Large pig



Blood sampling using needle and syringe

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LO: 7.5 & 8.1

Radial Vein

Mini-pig



Figure from: [Radial Vein Blood Collection in the Miniature Pig - LabPartner](#)

Red line – carpal glands (brown discharge)
Red circle – accessory carpal bone
Groove along radius/ulna

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LO: 7.5 & 8.1

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Needle selection

Influencing factors:

- Age – pig vs piglet
- Route of administration IM (longer) v subcutaneous (shorter)
- Viscosity of liquid to be injected – wider gauge needed for thick substances

Recommended Needle Sizes and Lengths for Swine*				
Type of Pig	Intramuscular (IM)		Subcutaneous (SQ)	
	Needle Gauge	Needle Length	Needle Gauge	Needle Length
Baby pigs	18 or 20	5/8" or 1/2"	--	--
Nursery pigs	16 or 18	3/4" or 5/8"	16 or 18	1/2"
Finishing pigs	16	1"	16	3/4"
Breeding stock	14 or 16	1" or 1 1/2"	14 or 16	1"

*Source: NPPC Pork Quality Assurance Guidelines

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Anaesthesia



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LO: 20.3

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Local anaesthesia

- Commonly used in pigs in combination with sedation for wound repair
 - Many lidocaine derivatives are no longer licensed for use in farm animals the UK (e.g. lignocaine)
 - Procaine (Pronestetic) is licensed for use in horse, cattle, pigs and sheep
- ear vein blood sampling
 - Lidocain-based topical treatment (e.g. Emla cream)



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LO: 20.5

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Pre-anaesthesia considerations

- Acclimatisation
- Health check (PiL responsibility)
- Fasting – up to 8 hours (controversial)
- Pre-medication
- Poor temperature regulation
 - Malignant hyperthermia (Porcine Stress Syndrome) – high temperature
 - Halothane induced
 - Stress
 - Maintain body temperature – low temperature



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LO: 20.6

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Pre-medication/sedation

Sedation combinations



+



Azaperone 2mg/kg

Midazolam 0.5mg/kg

Alternative: Medetomidine & Tiletamine-zolazepam (Zoletil)

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LO: 20.6

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Injectable agents

Alphaxalone (Alfaxan) I/V



Propofol I/V



Ketamine and xylazine I/M

- Not recommended
- Used by farm vets (available)
- Better alternatives
 - Tiletamine-zolazepam (Zoletil) & Medetomidine IM

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LO: 20.6

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Inhalation agents



Halothane gene in some pig breeds

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LO: 20.9

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Anaesthesia protocol

- Sedation – Azaperone +midazolam
- Induction – Alphaxalone IV
- Maintenance – isoflurane inhalation



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LO: 20.12

53

Analgesic agents

Opioids

Buprenorphine (Vetergesic)

Morphine/pethidine



Non-steroidals

Ketoprofen

Meloxicam



53

LO: 20.9

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Intra-operative considerations

- Positioning: flat area with heat pad
- Ventilation – should be used (e.g. chest surgery)
- Heat source
- Fluid support
- Monitoring – pulse oximetry, capnography, Blood pressure measurement

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LO: 20.12

55

Post-op recovery

- Warming
- Fluids
- Wet food
- Soft bedding



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LO: 1.12

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Schedule 1 methods

ALL UNGULATES (Sheep, Goats, Cattle, Pigs, Horses)

- 1) **Overdose of anaesthetic using a route and agent appropriate for the size and species of animal**
- 2) Destruction of the brain by a free bullet, **carried out by a veterinary surgeon**
- 3) Captive bolt, percussion or electrical stunning followed by destruction of the brain or exsanguination before return of consciousness, **carried out by a veterinary surgeon or licenced slaughter-man**

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LO: 1.12

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Foetal or embryonic forms

The only Schedule 1 method for fetuses and embryos of ungulates is overdose of an anaesthetic, using a route and agent appropriate for the size and species of animal.

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LO: 1.12

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Confirmation of death

- 1) **Permanent cessation of the circulation** /destruction of the brain
- 2) Dislocation of the neck
- 3) **Exsanguination**
- 4) **Onset of rigor mortis**
- 5) Instantaneous destruction of the body in a macerator

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