

Guidelines for housing, handling and sampling techniques

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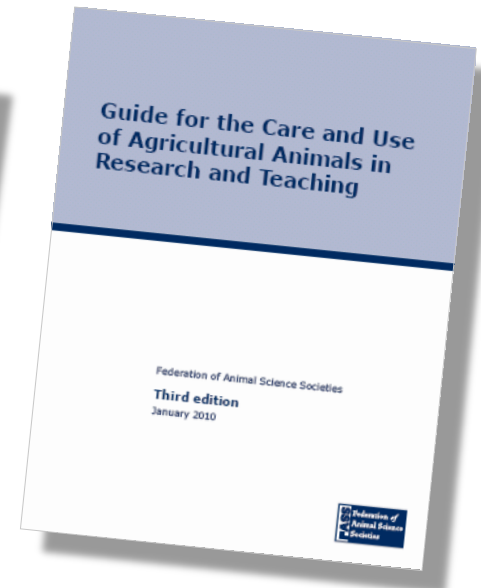
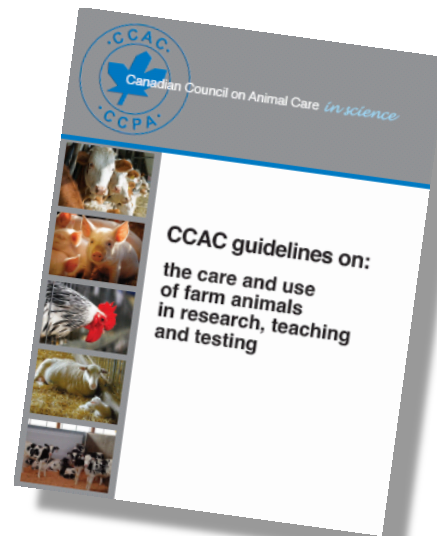
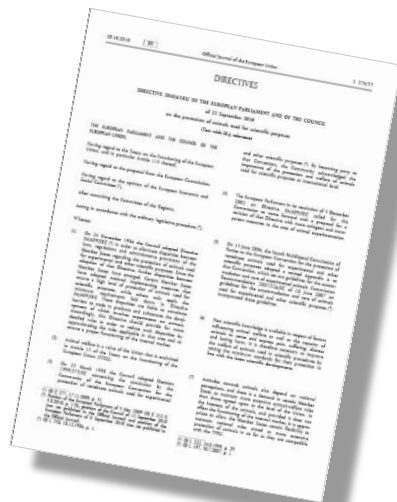


Approach

- Researched guidelines for agricultural animals in research, not farm situation
- EU and US regulations and guidance
- Well known information sources:
 - USDA AWIC
 - CCAC
 - ANZCCART
 - NC3Rs
 - Norwegian School of Veterinary Medicine

Major guidelines with a focus on housing are ...

- EU Directive and CoE Convention
- US FASS (Ag) Guide
- US Guide for the Care and Use of Lab Animals
- CCAC Guidelines
- UFAW Handbook



Also some species or technique-specific guidelines ...

- Sheep: ANZCCART, Monash, NSW ARRP
- Chicken: ANZCCART
- Pigs, cattle, sheep, domestic fowl: RSPCA
- Rabbits: RSPCA/UFAW
- Blood sampling pigs: NC3Rs, NSVS
- Blood sampling sheep: Purdue
- Taking blood from livestock: Victoria, NZ
NAEAC

1 Housing, husbandry and care



Some principles - what should good guidelines contain?

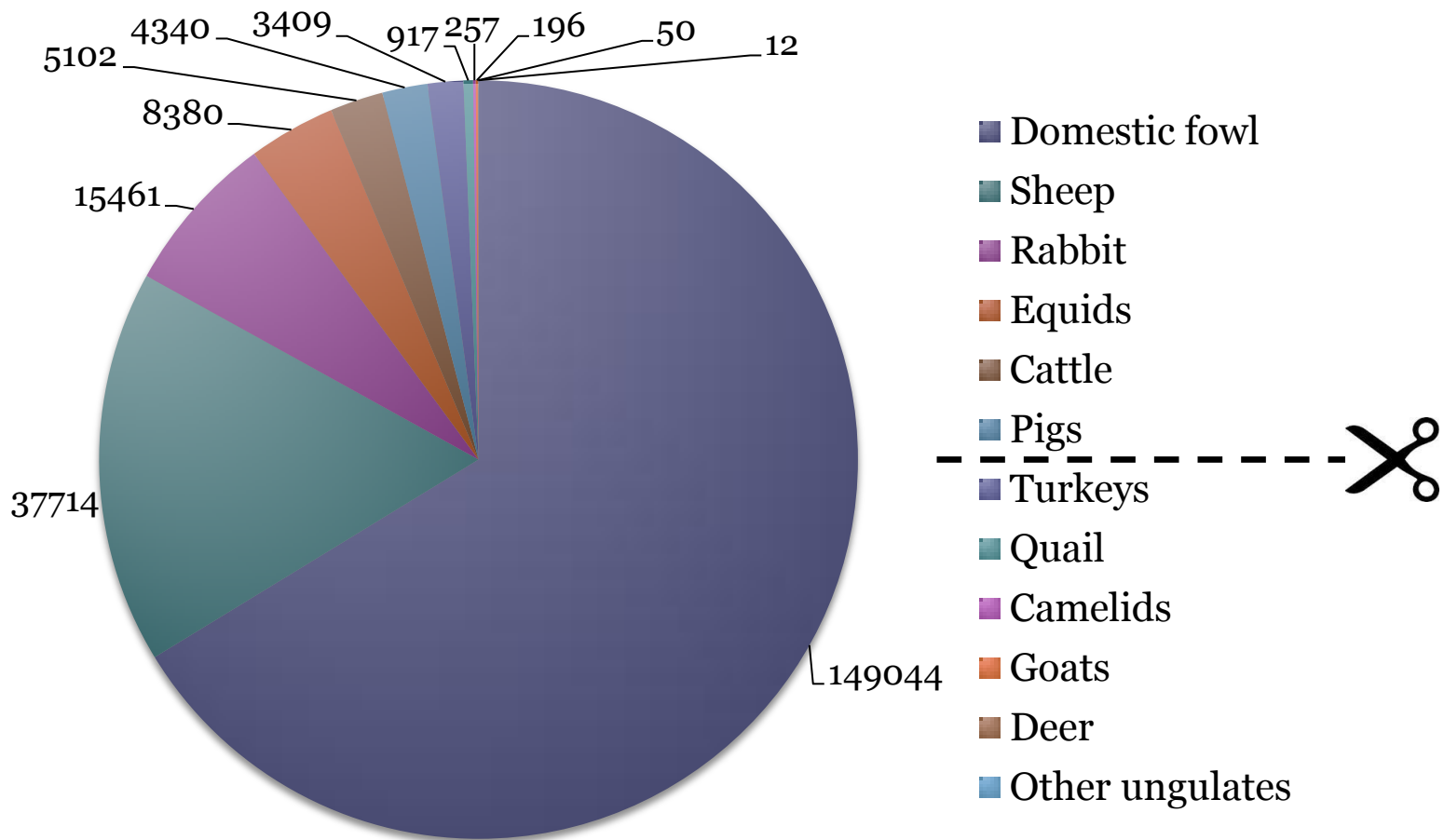
1. Natural history and behaviour
 2. Discussion of 'dual use' of agricultural animals
 3. Guidelines based on meeting the animals' needs (5 Freedoms) – not on agricultural practice
 4. Pain and (di)stress management during husbandry procedures
- ... points 3 and 4 apply unless there is sound scientific justification
 - and there should still be compliance with relevant legislation and guidance for farmed animals

Where should research be conducted?

- Guidelines should include pros and cons of farm vs. laboratory or university farm
 - Scientific – translatability
 - Practical – can/should animal return to food chain?
 - Welfare – which can provide a better environment; what transport is involved; how old will animals be when sourced and transported?
- Consider on case by case basis

What else would 'good' guidelines include?

- Enclosure size *with basis*
- Solid flooring, litter, bedding
- Social housing & group size
- Enrichment
- Temperature, humidity, light, noise levels
- Ensuring good health and welfare, detecting problems
- Recognising and dealing with abnormal behaviour
- 'Weaning' ages and strategies
- Marking for identification
- Stockmanship and handling
- Sourcing
- Transport
- Training animals
- Training staff; competency
- Humane killing
- Special needs
 - fistulae
 - cannulae
 - GA animals
 - urine/faeces collection
- Fate of animals

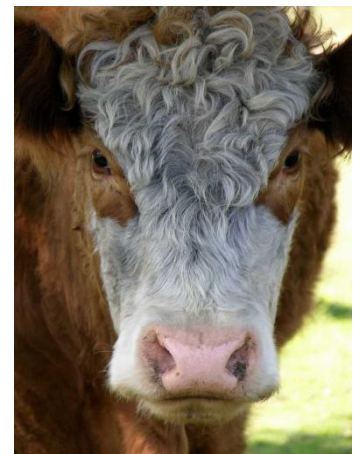


Numbers of agricultural animals used in scientific procedures in UK, 2011 – enclosure sizes compared for top 6

Space allowances were compared for representative animals within ‘major’ guidelines:

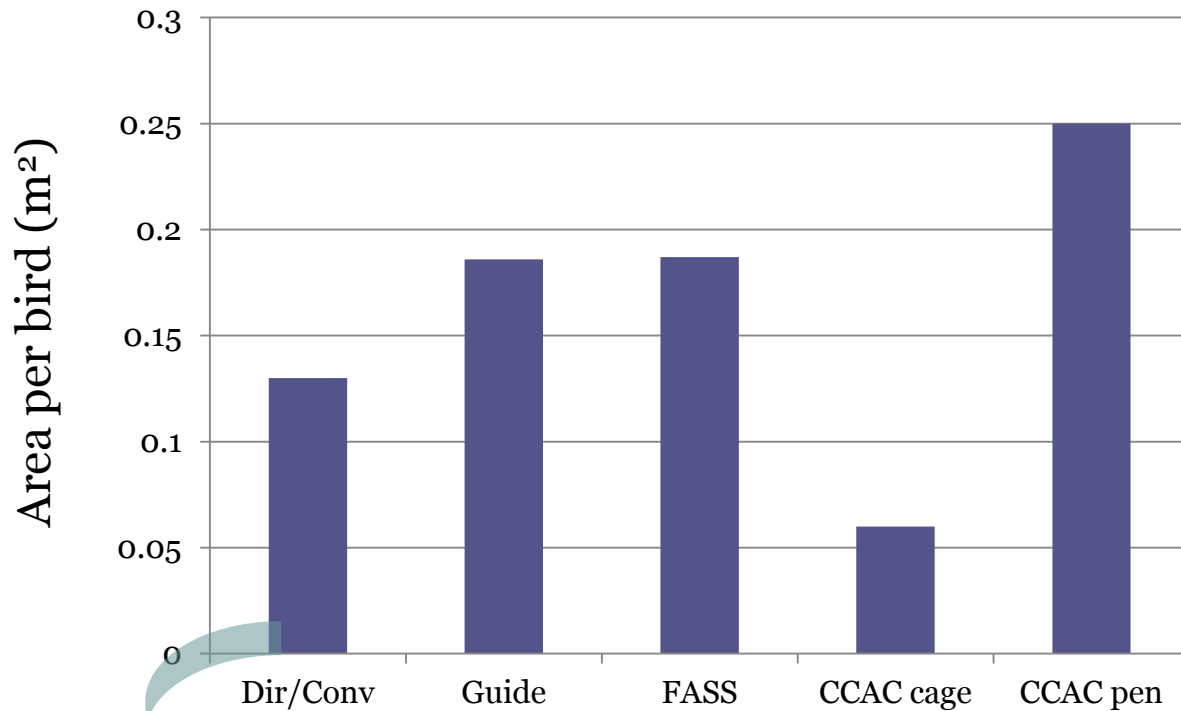
- EU Directive and CoE Convention
- US FASS Guide
- US Guide for the Care and Use of Lab Animals
- CCAC Guidelines

Difficult to compare these because of differences in size ranges, lines and housing systems (next 6 slides)



Picture: RSPCA

Domestic fowl - 2 kg

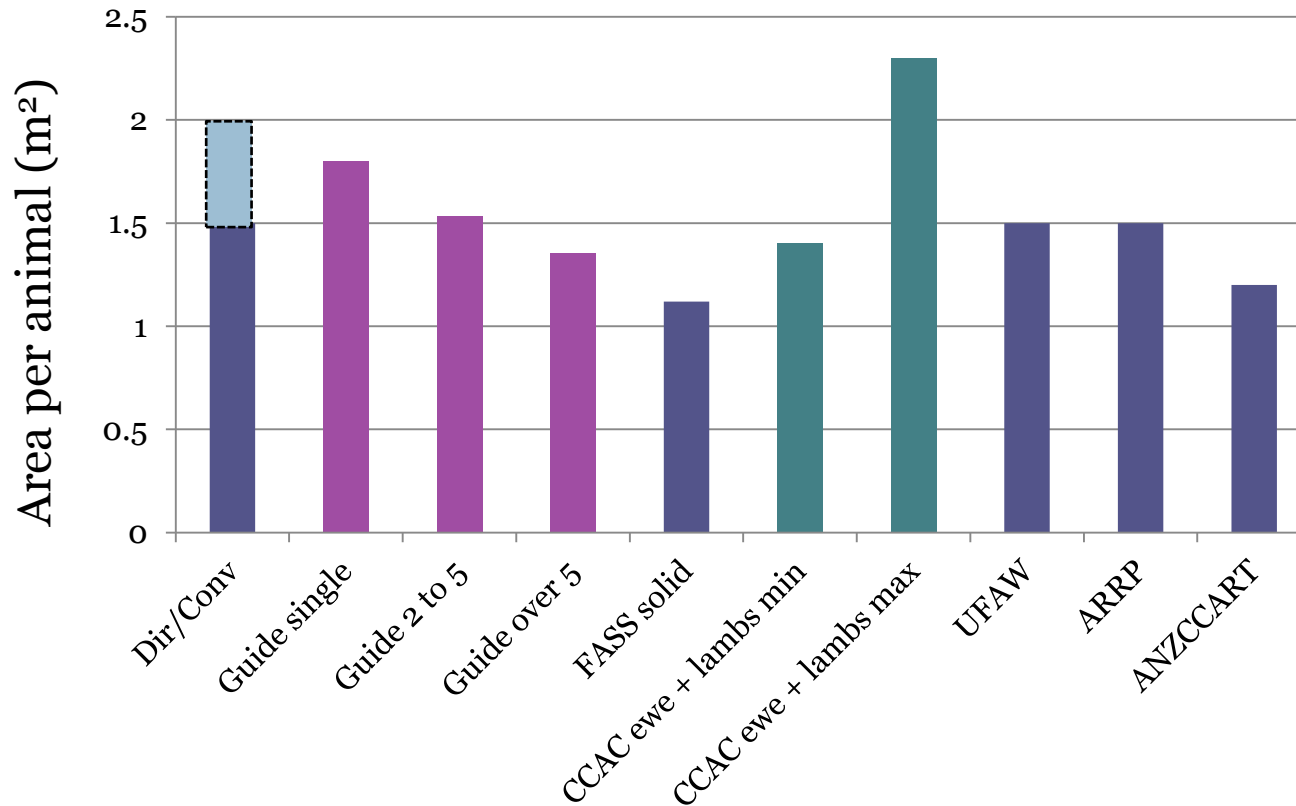


But minimum area of 2 m² = 15 birds;
engineering standard aiming to encourage
group housing

FASS: medium
weight egg-laying
female in pen
with litter

Sheep - 55 kg

Light blue area on top of Dir/Conv bar = minimum pen size



Rabbit - 4.5 kg

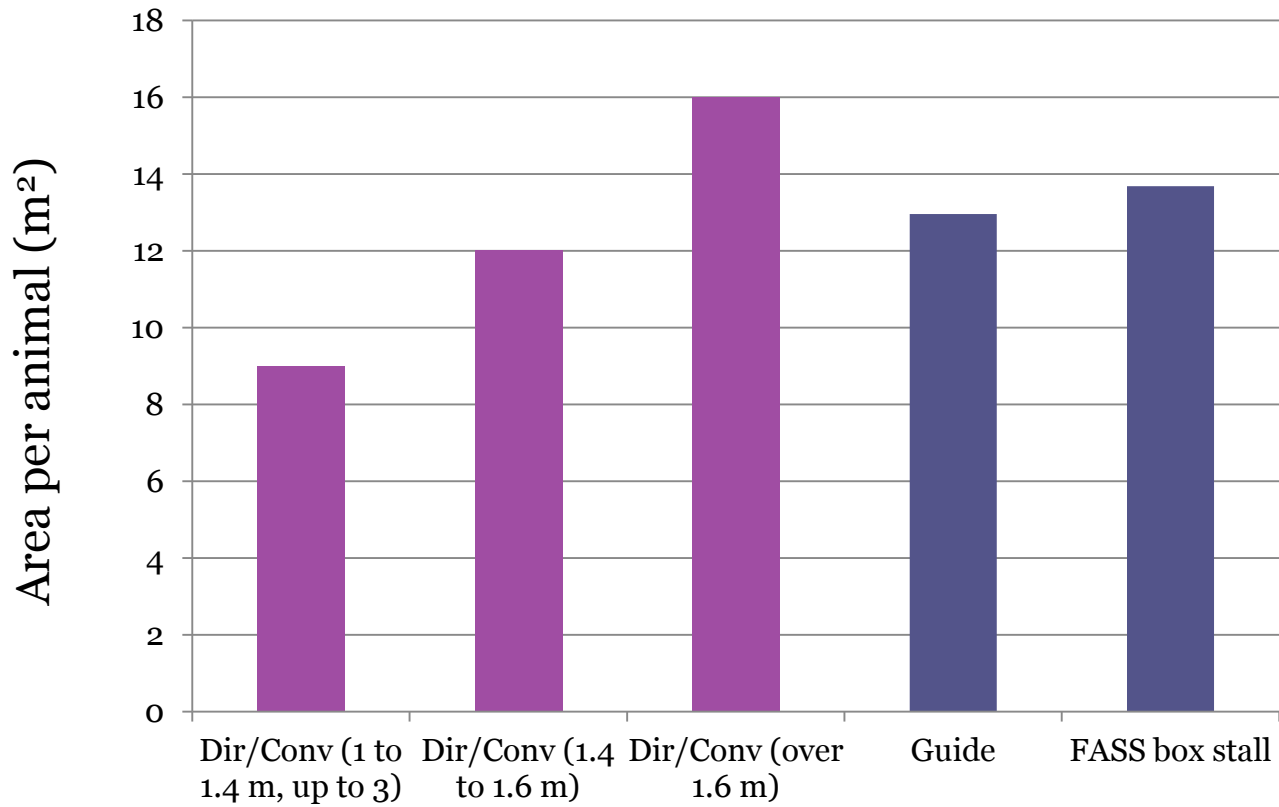
	Area per animal (m ²)	Height (m)	Shelf area (m ²)
Dir/Conv/UFAW*	0.42	0.45	0.165
Guide	0.37	0.405	-

*One or two compatible animals



Picture: Novo Nordisk

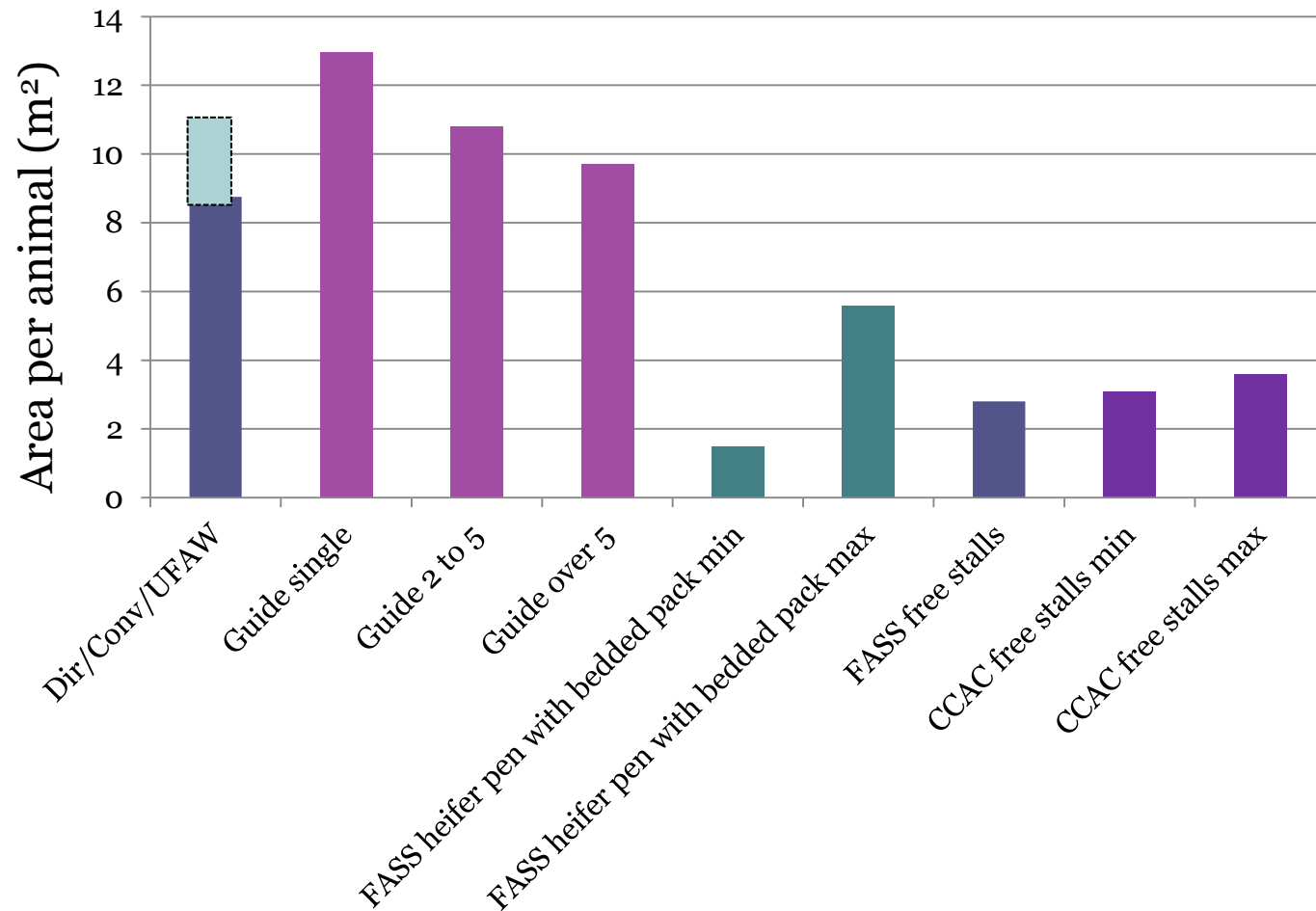
Equines



Picture: RSPCA

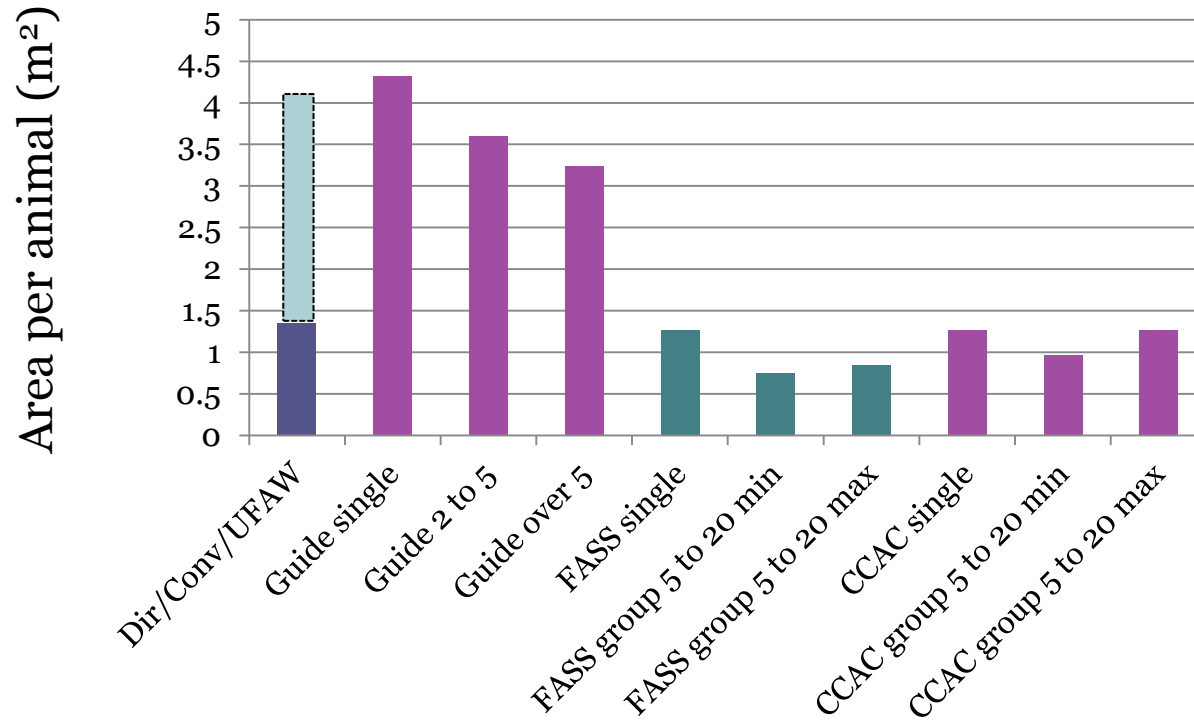
Cattle - 700 kg

Light blue area on top of
Dir/Conv bar =
minimum pen size



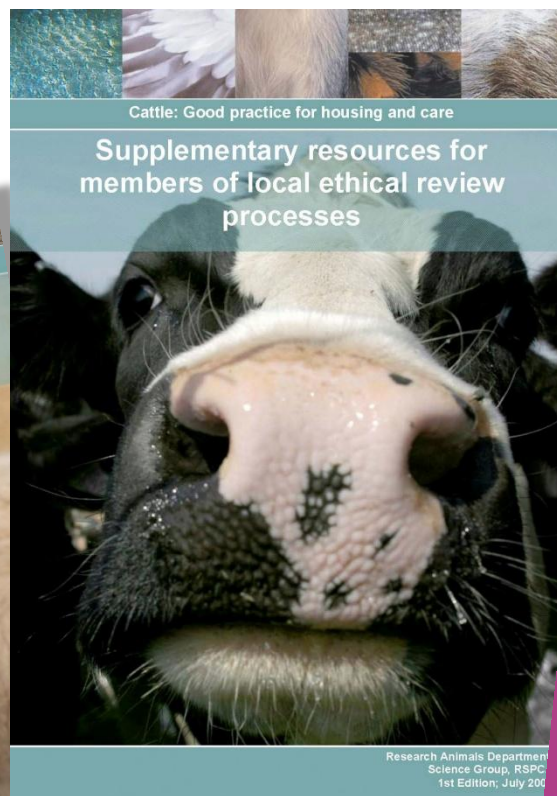
Pigs - 120 kg

Light blue area on top of Dir/Conv bar = minimum pen size



US Guide - overview

- States that protocol, not research category, should determine setting
- Applies to biomedical research, refers to FASS for 'farm' settings
- 'Performance standards'
 - Animals should be able to 'turn around and move freely' ... 'sufficient space to comfortably rest'
 - 'Singly housed animals may require more space'
- Plenty of further reading including good practice guidelines (e.g. next slide)



www.rspca.org.uk/researchanimals

FASS - overview

- Geared towards agricultural research
- Very detailed for different lines
- IACUC requirements; members and protocol review
- Standard agricultural practices should be reviewed by IACUC; follow best practice for pain management
- Enrichment clearly defined
 - Social, occupational, physical, sensory, nutritional

CCAC - overview

- Research and teaching facilities should show leadership regarding best practice
- Ethical considerations
- Farm animals used in biomedical research
 - Selection of model
 - Potential pitfalls or confounds, e.g. growth rates, selection for milk production, greater genetic variation
 - Question need for lines with welfare problems
- GA farm animals and special needs, e.g. fistulation
- Non-lethal 'pest' control and cat care

Directive/Convention - overview

- Minimal background information
- Supplementary information would be required to implement
- ‘Part B’ (background) not available (apart from birds and rabbits)
- If agricultural conditions justified, must comply with relevant Directive

Suggested good practice

- Read FASS and CCAC as a basis
- Go by largest enclosure dimensions in ‘major’ guidelines (as a minimum)
- Refer to and implement elements of other ‘good practice’ guidelines such as ARRP for sheep, UFAW Handbook, RSPCA/UFAW Rabbit Resource and RSPCA sheets

2 Blood sampling and 'harvesting'



Good guidelines should include:



Picture: Novo Nordisk

- Handling, habituation
- Training for animals and humans
- Minimising pain (e.g. local anaesthesia, needle gauge)
- Minimising restraint stress and duration
- Asepsis
- Appropriate routes
- Maximum volumes
- Recovery intervals and changing sites
- Indicators that too much blood has been removed (and what to do if this happens)
- Stopping excess bleeding
- Success rates

CCAC

- Routes for poultry, pigs, sheep, cattle
- Importance of training personnel
- Training and habituating animals
- Alternatives to blood where possible, e.g. milk
- Minimise cannula diameter
- Routes, volumes, recovery times
- Check haematocrit when taking multiple samples

NC3Rs & Norecopa on pigs

- NC₃Rs
 - Two routes and volumes
 - Minimise stress, including by training
- Norecopa
 - Several routes
 - Much detail on techniques
 - No volumes



Picture: Norecopa

NAEAC New Zealand

- Horses, sheep, cattle, goats
- Effects of blood removal, signs of hypovolaemia
- Husbandry and health of 'donor' (i.e. source) animals
- Appropriate temperament of animals
- Volumes and frequencies
- Fluid replacement and resting
- Monitoring health and haematocrit
- AEC oversight

Victoria Dept of Primary Industries (DPI)

- Similar requirements to NZ but less detail, does not include adjuvants or maximum volumes over 4 weeks
- 6 month minimum age for taking blood – NZ has 12 months for sheep and goats, 3 years for horses

Confusing comparisons ...

- CCAC: no more than 10% TBV
- NZ NAEAC: no more than 15% CBV in any 4 week period
- DPI: no more than 15% TBV in any 4 week period

Blood removed (*%)	Recovery time (weeks)
7.5	1
10	2
15	4

* CCAC = % body weight, NZ = % CBV

Suggested good practice

- Read CCAC and NZ
- ... and 'classic' (old) JWGR report*, EFPIA/ECVAM
- Seek current expert advice on minimising physiological impact and stress



* Morton et al. (1993) *Laboratory Animals* **27**: 1-22

Conclusions



Blood removal

- Variation in volumes and ages
- Variation in levels of detail and focus
- Seem to be different levels of importance given to the wellbeing of the animals
 - Best two were CCAC and NZ



Picture: Novo Nordisk

Housing, husbandry and care

- There is no ‘one stop shop’ for guidance on good practice
- Plenty of good elements in guidelines but research needed to find and consolidate them
- A number of ‘local’ guidelines but basis and quality not always clear
- More is needed on ethical issues, translatability and perceptions of farmed animals
- **5 Freedoms would be a good basis**

Thank you!

