Code of Practice for the housing and care of animals used in scientific procedures

Introduction

1. This Code of Practice is based on Appendix A of the European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes (ETS No.123), supplemented by information taken from the EU Expert working groups and from UK Codes of Practice for the Housing and Care of Animals used in Scientific Procedures and for the Housing and Care of Animals in Designated Breeding and Supplying Establishments. One of the aims of [UK legislation] is to protect animals used for experimental and other scientific purposes to ensure that any possible pain, suffering, distress or lasting harm inflicted as a consequence shall be kept to a minimum and minimise scientific variables.

2. Some procedures are conducted under field conditions on free-living, self-supporting, wild animals, but such procedures are relatively few in number. The great majority of animals used in procedures are kept in facilities ranging from outdoor corrals to cages for small animals in an animal house. This is a situation where there are often highly conflicting interests between the scientific requirements and the needs of the animal. In this conflict, the basic physiological and ethological needs of the animals (freedom of movement, social contact, meaningful activity, nutrition, water) should be restricted only for the minimum necessary period of time and degree. Such restrictions should be reviewed by scientists, animal technicians and those competent persons charged with advisory duties in relation to the well-being of the animals before procedures are undertaken to ensure that the extent of the compromise to animal welfare is minimised to a level consistent with the scientific objectives of the study*.

3. This Code of Practice provides guidelines for the accommodation and care of animals, based on present knowledge and good practice. It explains and supplements the basic principles adopted in Article 5 of ETS123. The object of

* Specific terms will be defined in the Guidance
the Code of Practice is thus to help authorities, institutions and individuals in their pursuit of the aims of the Secretary of State in this matter.

4. The General section provides guidelines on accommodation, housing and care relevant to all animals used for experimental and other scientific purposes. Supplementary guidance concerning commonly used species is presented in specific sections. Where no information is included in these specific sections, the provisions of the general section apply.

The species-specific sections are based on proposals made by expert groups on rodents, rabbits, dogs, cats, ferrets, non-human primates, farm species, mini-pigs, birds, amphibians, reptiles and fish. In addition to these proposals, the expert groups also submitted background information to support their proposals, based on scientific evidence and practical experiences.

This background information is the sole responsibility of the respective expert groups and is separately available. For some groups of species, namely amphibians, reptiles and fish, these explanatory documents also provide additional information on less commonly used species not referred to in the species-specific guidelines.

Should behavioural or breeding problems occur, or should further information on specific requirements for other species be required, advice should be sought from experts specialised in the species concerned and care staff or veterinary surgeon, to ensure that any particular species' needs are adequately addressed.

5. Care is a word which, when used in connection with animals intended for, or in actual use in procedures, or in connection with animals kept for breeding purposes, covers all aspects of the relationship between animals and man. Its substance is the sum of material and non-material resources provided by man to obtain and maintain an animal in a physical and mental state where it suffers least, and promotes good science. It starts from the moment the animal is intended to be used in procedures, including breeding or keeping for
that purpose, and continues until it is humanely killed or otherwise disposed of by the establishment in accordance with [UK legislation] after the completion of the procedure.

6. The Code of Practice includes advice about the design of appropriate animal facilities and provides recommendations and guidance about how the welfare provisions contained within [UK legislation] can be met. However, the recommended standards of space represent minimum allowances. These may be increased, as environmental requirements for individual animals might vary according, for example, to species, age, physiological conditions, stocking density and whether the animals are kept as stock, for breeding or experiments, whether long-term or short-term. Environmental enrichment is also an important factor for the welfare of the animals.

7. Existing facilities or equipment that do not meet the minima in these guidelines should be altered or replaced within a reasonable period of time, having regard to animal welfare priorities and financial and practical concerns. Pending such replacement or alteration, adjustments should be made to numbers and sizes of animals in existing enclosures in order to comply, as far as possible, with these guidelines.

Definitions
Definition of terms used in this Code of Practice in addition to those contained in Article 1.2 of the ETS123.

“Animal enclosure” is defined as the primary accommodation in which the animals are confined, such as:

– “cage” -a permanently fixed or movable container that is enclosed by solid walls and, at least on one side, by bars or meshed wire or, where appropriate, nets, and in which one or more animals are kept or transported; depending on the stocking density and the size of the container, the freedom of movement of the animals is relatively restricted;
– “pen” - an area enclosed, for example, by walls, bars or meshed wire in which one or more animals are kept; depending on the size of the pen and the stocking density, the freedom of movement of the animals is usually less restricted than in a cage;

– “run” - an area closed, for example, by fences, walls, bars or meshed wire and frequently situated outside permanently fixed buildings, in which animals kept in cages or pens can move freely during certain periods of time in accordance with their ethological and physiological needs, such as exercise;

– “stall” - a small enclosure with three sides, usually a feed-rack and lateral separations, where one or two animals may be kept tethered.

The secondary accommodation, in which the animal enclosure(s), as defined above, may be kept, will be designated as “holding rooms” for the purpose of this Code of Practice. Examples of “holding rooms” are:

– rooms where animals are normally housed, either for breeding and stocking, or during the course of a procedure;

– “containment systems”, such as isolators, laminar flow cabinets and individually ventilated cage systems.

General section

1. The physical facilities

1.1 Functions and general design

1.1.1 All facilities should be so designed, sited and constructed as to provide a suitable environment for the species to be kept, taking into account their physiological and ethological needs. This includes any special requirement for exercise or social contact for the species to be housed, and should incorporate adequate facilities sufficient for the activities planned to be carried
out. Facilities should also be designed and managed to prevent access by unauthorised persons and the ingress and escape of animals.

When substantial alterations to the premises are proposed, the Inspector should be consulted at an early stage.

Facilities that are part of a larger building complex should also be protected by appropriate security and building measures and arrangements that limit the number of entrances. Advice should be taken about security from Crime Prevention Officers, from the local police or other experts during the design of new facilities or modifications of existing premises.

When siting an animal house, consideration should be given to the activities in the adjacent buildings and any effect these may have on the welfare of the animals. An animal facility forming part of a larger complex should be designed to be self-contained. Wild, stray or pet animals should not be able to gain entry to any part of the animal house, including stores and personnel areas. Special care should be taken where drains and other services pierce the walls or floors to ensure that they have been properly proofed against rodents and insects.

1.1.2 There should be an active maintenance programme in order to prevent and remedy any defect of buildings or equipment.

1.2.1 All necessary measures should be taken to ensure regular and efficient cleaning of the rooms and the maintenance of satisfactory hygienic standards. Ceilings and walls should be damage-resistant with a smooth, impervious and easily washable surface. Special attention should be paid to junctions, including those with doors, ducts, pipes and cables. All joints between door frames and wall etc. should be sealed. Floor to wall, wall to ceiling and wall to wall junctions should be coved for easy cleaning. Where appropriate, an inspection window which should ideally be fitted in the door and consideration should be given to using a flush fitted window to reduce maintenance. Floors
should be smooth, impervious and have a non-slippery, easily washable surface, which can carry the weight of racks and other heavy equipment without being damaged. Drains, if present, should be adequately covered and fitted with a barrier, which will prevent vermin from gaining access or animals from escaping.

1.2.2 Where the animals are allowed to run freely, walls and floors should be surfaced with a material resistant to the heavy wear and tear caused by the animals and the cleaning process. The material should not be detrimental to the health of the animals and should be such that the animals cannot hurt themselves. Additional protection should be given to any equipment or fixtures so that they may not be damaged by the animals or injure the animals themselves. Services should be installed in such a way that they are either buried within the fabric of the building, boxed in or clear of the wall surface for easy cleaning.

1.2.3 Species that are incompatible, for example predator and prey, animals requiring different environmental conditions, or animals of different health status, should not be housed in the same room nor, in the cases of predator and prey, within sight, smell or sound.

1.2.4 Holding rooms should, where appropriate, be provided with facilities for carrying out minor procedures and manipulations.

1.2.5 Farm animals in pens generally require more robust wall and floor finishes and there should be no projections which may present a hazard to animals or staff. Farm animals which are kept in animal houses should be given at least as much room as recommended in other relevant legislation and codes of practice. For some procedures the standards of environment and housing required may be much higher than where animals are kept under farm conditions. Exercise areas should be provided for larger farm animals but, in some cases, such facilities may be impracticable from an experimental, environmental, disease control or security point of view.
1.3 General and special purpose procedure rooms

1.3.1 At breeding or supplying establishments suitable facilities for making consignments of animals ready for dispatch should be available.

1.3.2 All establishments should also have available, as a minimum, laboratory facilities for the carrying out of simple diagnostic tests, post-mortem examinations, and/or the collection of samples which are to be subjected to more extensive laboratory investigations elsewhere.

1.3.3 Facilities should be provided to enable newly-acquired animals to be isolated until their health status can be determined, and the potential health risk to established animals assessed and minimised.

1.3.4 General and special purpose procedure rooms should be made available for situations where it is undesirable to carry out the procedures or observations in the holding rooms. Major procedures, surgery or euthanasia should not be performed in rooms where animals are normally housed or where other conscious animals are undergoing procedures.

1.3.5 Where appropriate, there should be provision for one or more separate rooms suitably equipped for the performance of surgical procedures under aseptic conditions. There should be separate preparation areas for animals, equipment and staff. There should be facilities for post-operative recovery.

1.3.6 There should be accommodation for separate housing of sick or injured animals, including facilities for isolation, where necessary. Animals inoculated with infective agents that are transmissible to man or to other animals held on the premises should be contained within an area reserved for this purpose which has been designed, built and maintained in accordance with appropriate health and safety regulations.

1.4 Service rooms

1.4.1 Storerooms should be designed, used and maintained to safeguard the quality of food and bedding. These rooms should be clean, dry, vermin and
insect-proof. Other materials, which may be contaminated or present a hazard
to animals or staff, should be stored separately. Special facilities may be
required for storing and handling chemicals.

1.4.2 Separate storerooms for clean cages, instruments and equipment
should be provided. There should be adequate storage space; corridors
should not be used for storage.

1.4.3 The cleaning and washing areas should be large enough to
accommodate the installations necessary to decontaminate and clean used
equipment. The cleaning process should be arranged so as to separate the
flow of clean and dirty equipment to prevent the contamination of newly-
cleaned equipment. Walls and floors should be covered with a suitably
durable surface material and the ventilation system should have ample
capacity to carry away the excess heat and humidity.

1.4.4 Provision should be made for the hygienic storage and disposal of
carcasses and animal waste. If incineration on the site is not possible or
necessary, suitable arrangements should be made for the safe disposal of
such material, having regard to national and local regulation and by-laws.
Special precautions should be taken with toxic, radioactive or infectious
waste.

1.4.5 The general design and construction of circulation areas should
correspond to the standards of the holding rooms. The corridors should be
wide enough to allow easy circulation of movable equipment.

2. The environment and its control

Experimental results may be influenced by environmental conditions and
animals should be kept under conditions that favour a consistency of
response to scientific procedures. Unstable environmental conditions are
likely to introduce avoidable variability into biological responses. To
demonstrate any experimental response against such a variable background
generates a requirement for greater animal usage if the result is to be statistically valid. Good control of variables such as ventilation, humidity, temperature, lighting and noise can therefore contribute both to good science and to the minimisation of animal use. Measures should be in place to ensure that breakdowns in equipment or systems controlling the environment are remedied promptly. Consideration should be given to maintaining a stock of critical share parts.

Conditions should not override the welfare of the animals concerned unless necessary to achieve the scientific objective.

For breeding in some species, however, a controlled daily fluctuation in temperature may be positively beneficial.

**2.1 Ventilation**

2.1.1 Adequate ventilation should be provided in the holding room and the animal enclosures to satisfy the requirements of the animals housed. The purpose of the ventilation system is to provide sufficient fresh air of an appropriate quality and to keep down the levels and spread of odours, noxious gases, dust and infectious agents of any kind. It also provides for the removal of excess heat and humidity.

2.1.2 The air in the room should be renewed at frequent intervals. A ventilation rate of fifteen to twenty air changes per hour of fresh or conditioned air distributed throughout the room is normally adequate for a fully-stocked room of rodents and lagomorphs. However, in some circumstances, for example where stocking density is low, eight to ten air changes per hour may suffice. For cats, dogs and primates, ten to twelve changes per hour may be adequate. In some cases, natural ventilation may suffice and mechanical ventilation may not even be needed. Recirculation of untreated air should be avoided. However, it should be emphasised that even the most efficient system cannot compensate for poor cleaning routines or negligence. Any smell of ammonia probably reflects overstocking, too little ventilation, inadequate cleaning, or a combination of these factors; the causes should be
investigated and rectified. The stocking density for each room for each species likely to be housed should be calculated and be readily available.

2.1.3 The ventilation system should be so designed as to avoid harmful draughts and noise disturbance while delivering air as evenly as possible.

2.1.4 Smoking in rooms where there are animals should be forbidden.

2.1.5 The ventilation system can be used to create differential air pressures within the building as part of a “barrier system”. “Clean” areas are generally maintained at higher pressure and “hazardous” areas at lower pressure than those adjacent to them to minimise the leakage of “dirty” air into “cleaner” areas and the escape of airborne hazards into the air outside the premises. This is effective only if the supply air is itself clean or is suitably filtered to be free from contaminants.

2.2 Temperature

2.2.1 The subsequent species-specific sections give the range within which it is recommended that the temperature should be maintained. It should also be emphasised that the figures given in these sections apply only to adult, normal animals. New-born, young, hairless, newly-operated, sick or injured animals will often require a much higher temperature level. The temperature of the premises should be regulated according to possible changes in the animals' thermal regulation, which may be compromised due to special physiological conditions or to the effects of the procedures.

Temperature in the holding rooms should be monitored continually and logged on a daily basis.

2.2.2 It may be necessary to provide a ventilation system having the capacity both to heat and cool the air supplied.

2.2.3 In user establishments a precise temperature control in the holding rooms may be required, because the temperature of the environment is a
physical factor which has a profound effect on the metabolism and behaviour of all animals, and therefore affects the validity of certain scientific outcomes.

Outdoor areas provided for animals to exercise and interact cannot have strict temperature regulation. Animals should not be restricted to such areas under climatic conditions which may cause them distress.

2.3 Humidity
For some species, such as rats and gerbils, the relative humidity may need to be controlled within a fairly narrow range to minimise the possibility of health or welfare problems, whereas other species, such as dogs, tolerate well wide fluctuations in humidity levels. As a general rule, prolonged periods below 40% or above 70% should be avoided.

2.4 Lighting
Where natural light does not provide an appropriate light/dark cycle, it is necessary to provide controlled lighting both to satisfy the biological requirements of the animals and to provide a satisfactory working environment. Exposure of some species to bright light should be avoided and darker areas for withdrawal should be available within the animal enclosures. There should be adequate illumination for the performance of husbandry procedures and inspection of the animals.

Regular photoperiods and intensity of light suitable to the species should be provided and interruptions to these should be avoided. The circadian “clock” of some species may be affected as much by light pulses of less than one second during the dark phase as by a long photoperiod; thus it may be important not to turn on lights during the dark period. On the other hand, intervals of darkness during the light period are not known to be disruptive. When animals are maintained on reverse photoperiod, daily inspections of the animals must still be undertaken.

When keeping albino animals, one should take into account their sensitivity to light.
Consideration should be given to the inclusion of windows in holding rooms, since they are a source of natural light and can provide environmental enrichment for some species, especially non-human primates, dogs, cats, some farm animals and other large mammals.

2.5 Noise
Noise can be a disturbing factor for animals. High noise levels and sudden noises can cause stress which, in addition to the welfare consequences for the animal, may influence experimental data. Noise levels within the hearing ranges of animals, including in some cases ultrasound (sound above the hearing range of the human being, conventionally taken to be sounds exceeding 20 kHz) should be minimised particularly during their resting phase. Alarm systems should sound outside the sensitive hearing range of the animals, where this does not conflict with their audibility to humans or should be of a silent type, including flashing lights. The layout of rooms and corridors can be major factors influencing the acoustic environment and this should be taken into account in their design. Holding rooms should be provided with adequate noise insulation and absorption materials. It has been found empirically that if the general background sound level in an empty animal room can be kept below about 50dB; below a noise rating curve of 45; and free from distinct tonal content, then it is unlikely that there will be damage to animals or personnel when the room is in use.

2.6 Vibration
[text to be added]

2.7 Alarm systems
A technologically dependent animal facility is a vulnerable entity. It is strongly recommended that such facilities are appropriately protected to detect hazards such as fires, the intrusion of unauthorised persons, and the breakdown of essential equipment, such as ventilation fans, air heaters or coolers and humidifiers.
Animal facilities which rely heavily on electrical or mechanical equipment for environmental control and protection should have a stand-by system to maintain essential services and emergency lighting systems as well as to ensure that alarm systems themselves do not fail to operate.

Heating and ventilation systems should be equipped with monitoring devices and alarms to ensure that any faults can be quickly identified and promptly rectified.

Clear instructions on emergency procedures should be prominently displayed. Alarms are recommended for water tanks for fish and other aquatic animals in case of failure of the water or air supply. Care should be taken to ensure that the operation of an alarm system causes as little disturbance as possible to the animals.

2.8 Special environments e.g. IVCs, isolators

[Text in preparation]

3. Education and Training

[Text in preparation]

4. Care

4.1 Health

4.1.1 Animals within an animal facility are totally dependent on humans for their health and well-being. The physical and psychological state of the animals will be influenced by their local environment, food, water and the care and attention provided by the animal care staff.

Healthy animals are an essential prerequisite for good animal welfare and good science. Intercurrent infection in the animal population may call into question the validity of information obtained from scientific procedures and make interpretation of results impossible.
A strategy should be in place in all establishments to ensure that an appropriate health status is maintained, which safeguards animal welfare and meets scientific requirements. This strategy should include a microbiological surveillance programme, plans for dealing with health breakdowns, and should define health parameters and procedures for the introduction of new animals. The aim is to maintain animals in good health and physical condition, behaving in a manner normal for the species and strain and with a reasonably full expression of their behavioural repertoire, and amenable to handling.

4.1.2 The person responsible for the establishment should ensure regular inspection of the animals and supervision of the accommodation and care by a veterinarian or other competent person. Inspection of the animals should be made at least daily by a person trained in accordance with paragraph 3 of the General section, to check the general well-being of all animals, ensure that all sick or injured animals are identified and appropriate action taken.

More detailed examinations should be carried out with sufficient frequency to ensure that the health and well-being of the animals is maintained. Animals which are undergoing scientific procedures must be inspected at a frequency commensurate with the severity of the procedure.

4.1.3 Because of the potential risk of contamination of animals and staff presented by the handling of animals, particular attention should be paid to the institution of hygiene procedures and supervision of staff health.

4.2 Capture from the wild

4.2.1. Many wild animals, including birds, reptiles and amphibians, and their capture are protected by other relevant legislation. When animals need to be captured, it should only be done by humane methods and by persons competent to apply them. The impact of the capturing procedures on the remaining wildlife and habitats should be minimised.

4.2.2. Any animal found, at or after capture, to be injured or in poor health should be examined by a competent person as soon as possible, and
appropriate action taken. This may require referral to a veterinarian for
treatment, or, in the case of serious injury, the animal should be killed
immediately by a humane method, in line with the principles set out in the
[document in preparation]. Appropriate and sufficient transport containers and
means of transport should be available at capture sites, in case animals need
to be moved for examination or treatment.

4.2.3. Special consideration should be given to the acclimatisation,
quarantine, housing, husbandry and care of wild caught animals. The eventual
fate of wild caught animals following the conclusion of scientific procedures
should also be given due consideration before the work begins. This is to
ensure that the practical difficulties and welfare issues associated with any
subsequent release to the wild can be satisfactorily addressed.

4.3 Transport of the animals

4.3.1. For animals, transportation is a stressful experience which should be
mitigated as far as possible. The following principles should apply to all animal
movements, from short journeys by vehicle within scientific establishments to
international transportation.

Animals should be transported in accordance with the principles of the
European Convention on the Protection of Animals during International
Transport (ETS No. 65 and ETS No. 193), having regard to the Resolution on
the acquisition and transport of laboratory animals, adopted by the May 1997
Multilateral Consultation of the Parties to Convention ETS No. 123.

[Further detail may be added]

4.3.2. Both sender and recipient should agree the conditions of transport,
departure and arrival times to ensure that full preparation can be made for the
animals' arrival. The sender should ensure that the animals are examined and
found to be fit for transport before being placed in the transport container.
Animals that are incompatible should not be transported together.
Containers for travel should:

- Confine the animals in comfortable hygienic conditions with minimal stress for the duration of the journey;
- Contain sufficient food and water or moisture in a suitable form;
- Contain sufficient bedding so that animals remain comfortable and in conditions close to their thermo-neutral zone;
- Be of such a design and finish that an animal will not damage itself during loading, transport and whilst being removed from the container;
- Be escape-proof, leak-proof and capable of being handled without the animals posing a risk to handlers;
- Be designed to prevent or limit the entry of micro-organisms;
- Be designed so that they can be thoroughly disinfected between shipments, if intended to be reusable;
- Allow sufficient ventilation;
- Be clearly labelled.

4.3.3. Animals that are sick or injured shall not be considered fit for transport, except for slightly injured or sick animals whose transport would not cause additional suffering, or where the transport is under veterinary supervision for, or following, veterinary treatment. Sick or injured animals may also be transported for experimental or other scientific purposes approved by the relevant competent authority, if the illness or injury is part of the research programme. No additional suffering should be imposed by the transport of such animals, and particular attention should be paid to any additional care which may be required. A competent person should confirm that such animals are fit for the intended journey. Pregnant animals need special care. Compliance with all relevant legislation and guideline is expected.

4.3.4. The person responsible for the transport of the animals has the overall control over the organisation, carrying out and completion of the whole journey, regardless of whether duties are subcontracted to other Parties during transport.
4.3.5. The person in charge of the welfare of the animals has direct physical responsibility for the care of the animals during transport. Such a person may be the attendant or the driver of a vehicle if fulfilling the same role. The person in charge of the welfare of animals being transported should be aware of the special needs of the animals in their care.

4.3.6. The route should be planned in order to ensure that the transport is carried out efficiently to minimise journey time, from loading to unloading, and to avoid delays in order to limit any stress and suffering of the animals. Care is needed to ensure that animals are maintained under suitable environmental conditions for the species, and that measures are taken to minimise sudden movements, excessive noise, or vibration during transport.

4.3.7. Where appropriate, the container should be designed to prevent or restrict the entry or spread of micro-organisms. It should allow visual inspection of the animals without compromising the microbiological status of the animals.

4.3.8. On arrival at their destination the animals should be removed from their transport containers and examined by a competent person with the least possible delay. After inspection, the animals should be transferred to clean cages or pens and be supplied with food and water as appropriate. Animals that are sick, injured or otherwise out of condition should be examined by a veterinary surgeon (or other competent person), kept under close observation and housed separately from other animals. These animals should be provided with veterinary treatment as appropriate or, if deemed necessary, promptly killed by a humane method.

4.4 Quarantine, acclimatisation and isolation

The objectives of quarantine and isolation periods are:

a. to protect other animals in the establishment;

b. to protect man against zoonotic infection; and

c. together with an acclimatisation period, to foster good scientific practice.
According to the circumstances, these periods may vary and are determined by national regulation or by a competent person, normally the veterinarian appointed by the establishment.

4.4.1. Quarantine
Quarantine is defined as a period of housing newly introduced or reintroduced animals separate from existing animals in the establishment to establish the state of health of the animals and to prevent the introduction of disease. Such a period is recommended when the health status of the animal is not known.

4.4.2. Acclimatisation
A period of acclimatisation is needed to allow animals to recover from transport stress, to become accustomed to a new environment and to husbandry and care practices. Even when the animals are seen to be in good health, it is necessary for them to undergo a period of acclimatisation before being used in a procedure. The time required depends on several factors, such as the stress to which the animals have been subjected which in turn depends on several factors such as the duration of the transportation and the age of the animal and change of the social environment. It should also be taken into account that international transport may necessitate an extended period of acclimatisation due to disturbance of the diurnal rhythm of the animals.

4.4.3. Isolation
A period of isolation is intended to reduce the risk of infection to other animals or humans. Any animal suspected of posing such a risk should be housed separately for an appropriate period of time.

4.5 Housing and enrichment
4.5.1. Introduction
All animals should be allowed adequate space to express a wide behavioural repertoire. Animals should be socially housed wherever possible and provided with an adequately complex environment within the animal enclosure to enable them to carry out a range of normal behaviours. Restricted
environments can lead to behavioural and physiological abnormalities and affect the validity of scientific data.

Consideration should be given to the potential impact of the type of accommodation, and that of the environmental and social enrichment programmes, on the outcome of scientific studies, in order to avoid the generation of invalid scientific data and consequential animal wastage.

The housing and enrichment strategies used in all establishments should be designed to fulfil the needs of the species housed and to ensure that the animals can make the best use of the space available. Their design should also take into account the need to observe the animals with minimum disruption and to facilitate handling. Suggested minimum animal enclosure sizes and space allowances are included in the subsequent individual species sections.

The shape of the enclosure and the furniture provided may be as important to the animal as overall size. Room must be allowed for growth of the animals. Some animals continue to grow into old age although they may become less active.

Unless otherwise specified, additional surface areas provided by enclosure additions, such as shelves, should be provided in addition to the recommended minimum floor areas.

Where the minimum enclosures sizes cannot be provided for scientific reasons, the duration of the confinement must be justified by the experimenter and permission obtained from the competent authority.

4.5.2. Housing

Animals, except those which are naturally solitary, should be socially housed in stable groups of compatible individuals. Single housing or housing in a barren environment on experimental grounds will require permission from the competent authority. If single housing is necessary on health or welfare
grounds it should be agreed with the competent person charged with advisory
duties in relation to the well-being of the animals and/or the veterinarian. In
such circumstances, additional resources should be targeted to the welfare
and care of these animals. In such cases, the duration should be limited to the
minimum period necessary and, where possible, visual, auditory, olfactory and
tactile contact should be maintained. The introduction or re-introduction of
animals to established groups should be carefully monitored by adequately
trained staff, to avoid problems of incompatibility and disrupted social
relationships. The possibility of social housing should be promoted by
purchasing compatible individuals when procuring animals of gregarious
species.

Animals should be housed so that they can be easily inspected: animals
should not be held in cages which are stacked so high that they cannot be
inspected without removing them from the rack. Some procedures may
require a more restrictive system of housing to cater for special requirements
imposed by experimental procedures, for example, the need to collect excreta
or expired air, or the use of radioactive isotopes. Such housing should be
used for the minimum time only.

4.5.3. Enrichment
All animals should be provided with sufficient space of adequate complexity to
allow expression of a wide range of normal behaviour. They should be given a
degree of control and choice over their environment to reduce stress-induced
behaviour. This may be achieved by using appropriate enrichment techniques,
which extend the range of activities available to the animal and increase their
coping activities. In addition to social activities, enrichment can be achieved
by allowing and promoting physical exercise, foraging, manipulative and
cognitive activities, as appropriate to the species. It is advisable to allow the
animals to exercise at every possible opportunity. Environmental enrichment
in animal enclosures should be appropriate to the species-specific and
individual needs of the animals concerned. Forms of enrichment should be
adaptable so that innovation based on new understanding may be
incorporated. The enrichment programme should be regularly reviewed and
updated. The staff responsible for animal care should understand the natural
behaviour and biology of the species, so that they can make sensible and
informed choices on enrichment. They should be aware that all enrichment
initiatives are not necessarily to the advantage of the animal and therefore
should monitor their effects and adjust the programme as required.

4.5.4. Animal enclosures
Animal enclosures should not be made out of materials detrimental to the
health of the animals. Their design and construction should be such that no
injury to the animals is caused. Unless they are disposable, they should be
made from materials that will withstand cleaning and decontamination
techniques. In particular, attention should be given to the design of animal
enclosure floors, which should be appropriate to the species and age of the
animals and be designed to facilitate the removal of excreta.

4.6 Feeding
4.6.1. The form, content and presentation of the diet should meet the
nutritional and behavioural needs of the animal. For some species, the
opportunity for foraging should be given. Roughage is an important
component of the diet for some species of animals, as well as a means of
satisfying some behavioural needs.

4.6.2. The animals’ diet should be palatable and non-contaminated. In the
selection of raw materials, production, preparation and presentation of food,
precautions should be taken to minimise chemical, physical and
microbiological contamination. The food should be packed in bags that
provide clear information on the identity of the product and its date of
production. An expiry date should be clearly defined by the manufacturer and
adhered to.

Packing, transport and storage should also be such as to avoid contamination,
deterioration or destruction. Storerooms should be cool, dark, dry, provided
with ventilation and vermin and insect-proof. Perishable food like greens,
vegetables, fruit, meat, fish should be stored in cold rooms, refrigerators or freezers.

All feed hoppers, troughs or other utensils used for feeding should be regularly cleaned and, if necessary, sterilised. If moist food is used, or if the food is easily contaminated with for example water or urine, daily cleaning is necessary.

4.6.3. Each animal should be able to access the food, with sufficient feeding space provided to limit competition. In some circumstances, food intake may need to be controlled to avoid obesity.

Where “with-holding of food” is necessary for experimental or safety reasons, such as prior to anaesthesia, care should be taken that “deprived” animals are not stressed by exclusion from food whilst other animals around them are fed. This may necessitate removal to another cage or room.

Diets for disease-free animals should be treated to destroy vegetative organisms, parasites, pests and spores. Autoclaving or irradiation may be required. Where special diets containing chemicals for testing have been used, the nutritional consequences of the preparation and storage of the diet should be considered.

4.7.2. Watering systems should be designed and used to provide an adequate quantity of water of suitable quality. Sufficient watering points (drinkers) should be available. When automatic watering systems are used, their functioning should be regularly checked at least daily, serviced and flushed to avoid accidents, such as blockages or leakages and the spread of infections. If solid-bottomed cages are used, care should be taken to minimise the risk of
flooding. Emergency supplies should be available in case pipes freeze or
supplies otherwise fail.

4.7.3. The tolerance of fish, amphibians and reptiles, to acidity, chlorine and
many other chemicals differs widely from species to species. Therefore
provision should be made to adapt the water supply for aquaria and tanks to
the needs and tolerance limits of the individual species.

4.8 Flooring, substrate, litter, bedding and nesting material

4.8.1. Appropriate bedding materials or sleeping structures should always be
provided for animals, as well as appropriate nesting materials or structures for
breeding animals.

Various materials are commonly placed into the animal enclosure to serve the
following functions: to absorb urine and faeces, and thus facilitate cleaning; to
allow the animal to perform certain species-specific behaviour, such as
foraging, digging or burrowing; to provide a comfortable, yielding surface or
secure area for sleeping; to allow the animal to build a nest for breeding
purposes. Certain materials may not serve all of these needs, and it is
therefore important to provide sufficient and appropriate materials. Any such
materials should be dry, absorbent, dust-free, non-toxic and free from
infectious agents or vermin and other forms of contamination. Materials
derived from wood that has been chemically treated or containing toxic natural
substances as well as products which cannot be clearly defined and
standardised should be avoided.

4.8.2. Within the animal enclosure, the flooring should provide a solid,
comfortable resting area for all animals. All sleeping areas should be kept
clean and dry.

4.9 Cleaning

4.9.1. The standard of a facility, including good husbandry, depends very
much on good hygiene. A very high standard of cleanliness and order should
also be maintained in holding, washing and storage rooms. Adequate routines
for the cleaning, washing, decontamination and, when necessary, sterilisation
of enclosures and accessories, bottles and other equipment should be
established and carried out.

4.9.2. These cleaning and disinfection regimes should not be detrimental to
animal health or welfare. Clear operating procedures, including a recording
system, should be in place for the changing of bedding in animal enclosures.

4.9.3. There should be regular cleaning and, where appropriate, renewal of
the materials forming the ground surface in animal enclosures to avoid them
becoming a source of infection and parasite infestation.

4.9.4. Odour-marking is an important form of behaviour in some species, and
cleaning disturbances will cause some degree of social disruption. Cleaning
regimes should have regard for these behavioural needs. Decisions on
frequency of cleaning should be based on the type of animal enclosure, the
type of animal, the stocking density, and the ability of the ventilation system to
maintain suitable air quality.

4.10 Handling
The quality of care animals are given may influence not only breeding
success, growth rate and welfare, but also the quality and outcome of
experimental procedures. Accustoming animals to competent and confident
handling during routine husbandry and procedures reduces stress both to
animals and personnel. For some species, for example dogs and non-human
primates, a training programme to encourage co-operation during procedures
can be beneficial to the animals, the animal care staff and the scientific
programme. For certain species, social contact with humans should be a
priority.

However, in some cases, handling should be avoided. This may be
particularly the case with wild animals, and is one reason why wild animals
can be less suitable as experimental subjects. Staff caring for animals are
expected, at all times, to have a caring and respectful attitude towards the
animals in their care, and to be proficient in the handling and restraint of the animals. Where appropriate, staff time should be set aside for talking to, handling, training and grooming animals.

4.11 Humane Killing

4.11.1. All humane methods of killing animals require expertise, which can only be attained by appropriate training. Animals should be killed using a method as set out [Document in preparation]

4.11.2. A deeply unconscious animal can be exsanguinated, but drugs which paralyse muscles before unconsciousness occurs, drugs with curariform effects and electrocution without passage of current through the brain, should not be used without prior anaesthesia.

Disposal should not be allowed until death has been confirmed.

Wherever practicable, animals to be killed should be removed from the immediate presence of others and handled carefully to ensure that they are not frightened or antagonised. With methods that are not instantaneous, unconsciousness should be induced as quickly as possible with minimum stress and should be fully maintained until death. Death must be confirmed by physical checks or ensured by exsanguinations, severance of the major blood vessels or ventricles of the heart, before disposal of the body. Personnel allowed to kill animals must be suitably trained.

4.12 Records

Records of source, use, retrospective severity of procedures and final disposal of all animals bred, kept for breeding, or for subsequent supply for use in scientific procedures should be used not only for statistical purposes but, in conjunction with health and breeding records, as indicators of animal welfare and for husbandry and planning purposes.
4.13 Identification

In some instances, it is necessary for animals to be individually identified, for example, when being used for breeding purposes or scientific procedures, to enable accurate records to be kept. The method chosen should be reliable and cause the minimum pain and discomfort to the animal when applied and in the long-term. Sedatives or local anaesthetics and analgesics should be used if necessary. Staff should be trained in carrying out the identification and marking techniques.