

NC3Rs Guidelines

Primate accommodation, care and use





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- 1.1 Use of captive-bred primates (Wellcome Trust)
- 1.2 Use of wild primates (Mark Prescott)
- 3.1 Accommodation (Wellcome Trust)
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Please note that throughout this document the term 'primates' is used to refer to non-human primates

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Introduction

Established by the UK Government in 2004, the National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs) is a scientific organisation which provides innovative solutions to replace or avoid the use of animals in scientific procedures and, where this is not possible, to reduce the number of animals used and to minimise suffering and improve welfare by refinement of husbandry and procedures (the 3Rs). The Centre funds high-quality 3Rs research, organises workshops and symposia to disseminate and advance the 3Rs, and develops 3Rs information resources and guidelines.

The Medical Research Council (MRC), Biotechnology and Biological Sciences Research Council (BBSRC), Royal Society, Wellcome Trust and other member charities of the Association of Medical Research Charities (AMRC) support the principles of the 3Rs and expect high standards of accommodation and care for the animals used in the research which they fund. All research using animals in scientific procedures that may cause pain, suffering, distress or lasting harm must comply with the Animals (Scientific Procedures) Act 1986 (ASPA) and its associated codes of practice on animal housing and care. However, the funding bodies are also committed to exceeding the legal minima and to introducing and implementing standards which reflect contemporary good practice.

Use of primates in research

A small proportion of research or fellowships funded by the MRC, BBSRC, Royal Society, Wellcome Trust and other AMRC charities involves the use of primates: usually common marmosets (*Callithrix jacchus*) and macaques (eg, *Macaca mulatta*, *M. fascicularis*, *M. arctoides*)¹. The funding bodies recognise concerns about the use of primates in research, and the difficulties associated with meeting the environmental, behavioural and social needs of these highly intelligent animals in a laboratory environment. To help address these important issues, the NC3Rs, in partnership with the funding bodies, has produced guidelines on primate accommodation, care and use.

¹ The use of great apes in scientific procedures was formally banned in the UK in 1997. The MRC, Wellcome Trust and other AMRC charities do not support research involving great apes. The BBSRC funds a small amount of non-invasive behavioural research with great apes.

The guidelines apply to any research involving primates conducted in the UK and abroad which is funded by the MRC, BBSRC, Royal Society, Wellcome Trust or other AMRC charities. They complement the peer review process for grant applications involving primates, which takes into account welfare and implementation of the 3Rs through the involvement of the NC3Rs.

The scope of the guidelines

The guidelines were developed by reviewing the published literature and through consultation with the scientific community, veterinary and animal care staff, the Animals (Scientific Procedures) Inspectorate, and animal welfare organisations. They represent a framework for applying and reviewing the expectations of the funding bodies in the humane use of primates. The guidelines set out contemporary best practice in the use of primates in biomedical, biological, veterinary and behavioural research, and include principles relating to the source, housing, capture, handling, restraint and training of primates, and the provision of technical and veterinary care and support. They are readily applicable to the majority of research programmes using primates. The funding bodies, however, accept that there may be rare circumstances, for example to protect staff or animals, in which it may not be possible to fully implement the guidelines.

Putting the guidelines into practice

Researchers (staff and grant holders) and their host establishments are responsible for applying the guidelines. The ethical review process (ERP) plays a key role in ensuring high standards of animal welfare. It is therefore recommended that the ERP should be central to implementing the guidelines.

Questions on compliance with these guidelines may be asked of the applicant, ERP or named persons under the ASPA as part of the peer review process for grant applications. The NC3Rs may be asked by the funding bodies to give advice on compliance.



1 Source of primates

The source and transport of primates are important factors in minimising the overall impact on the animals.

1.1 Use of captive-bred primates

- 1.1.1 All primates used in the laboratory should be captive-bred and come from a source in the UK wherever possible².
- 1.1.2 Establishments breeding primates should adhere to the principles set out in the Laboratory Animal Science Association/MRC statement on *Key Considerations in the Breeding of Macaques and Marmosets for Research Purposes* (www.mrc.ac.uk/pdf-lasa_mrc_primate_breeding.pdf).
- 1.1.3 All researchers purchasing rhesus macaques are required to obtain their animals from the UK Centre for Macaques (CFM). Where there is justification for using rhesus macaques from in-house breeding colonies, these should adhere to the principles set out in the Laboratory Animal Science Association/MRC statement above.



² The BBSRC funds some behavioural and biological research with primates in their natural habitats and held in zoos.

- 1.1.4 Where it is necessary to import primates from breeding establishments overseas, the Home Office must agree the source. Ideally these should be second-generation animals to avoid use of wild-caught animals as breeding stock. Every effort should be taken to minimise the journey times and any associated distress caused by transport.

1.2 Use of wild primates

Wild primates used in research are either studied in situ as free-living animals, captured for removal to the laboratory environment, or else held in zoos.



- 1.2.1 The funding bodies will not normally fund research involving the use of wild-caught primates. Applicants proposing to use wild-caught primates will have to make a special case justifying why captive-bred animals cannot be used.
- 1.2.2 Studies of free-living primates in their natural habitats can cause disruption, particularly if feeding, capture, marking or scientific procedures are involved. Investigators studying free-living animals should take precautions to minimise interference with individuals, as well as the populations and ecosystems of which they are a part. Persons trapping primates should be adequately trained and competent in humane methods of capture. Holding facilities in the field should have standards equivalent to those set out in the *IPS International Guidelines for the Acquisition, Care and Breeding of Nonhuman Primates* (pin.primate.wisc.edu/ips/)



2 Experimental design

Experimental design is an important consideration for scientific, ethical and economic reasons.

- 2.1 All applications for funding must include full justification for the species and numbers of primates required for each experiment, and describe how the principles of the 3Rs have been implemented.
- 2.2 A statistician or other appropriate expert in study design should be consulted to ensure robust experimental design and statistical analysis. The NC3Rs can provide access to a statistician.
- 2.4 Where experiments involve scientific procedures, the most refined method should be used. This will involve careful consideration of the experimental aims, animals (species and individuals), techniques and staff involved.
- 2.5 Researchers should identify humane endpoints for each experiment, before the work starts and after consulting the literature and the Named Veterinary Surgeon (NVS) and Named Animal Care and Welfare Officer (NACWO).
- 2.6 The implementation of humane endpoints should be monitored and recorded during the experiment (eg, using score sheets).
- 2.7 Humane endpoints should be continually reviewed and refined as required.

3 Accommodation and environment

Captive primates must be provided with a complex and stimulating environment which promotes good health and psychological well-being and provides full opportunity for social interactions, exercise and to express a wide range of behaviours appropriate to the species. The ERP should review the accommodation and environment annually to ensure that the principles described below are applied.

3.1 Accommodation

- 3.1.1 The accommodation should provide primates with sufficient space to carry out their normal locomotor and behavioural repertoire (eg, resting, running, climbing, leaping, foraging and social interactions).
- 3.1.2 In the UK, the Home Office Codes of Practice set out minimum, rather than optimal, space allocations. Wherever primates are used, every effort should be placed on exceeding these minimum space allocations in order to provide primates with a complex and varied environment and greater opportunity for exercise and expression of species-typical behaviours.
- 3.1.3 The volume and height of the cage (or enclosure) are particularly important for primates, which flee upwards when alarmed. Their cages and enclosures should be floor to ceiling high wherever possible, with adequate perching to allow all animals to move up to heights where they feel more secure.





- 3.1.4 Double-tiered cages should not be used since they restrict the amount of vertical space available to the animals.
- 3.1.5 Special justification should be given for using cages with grid floors (eg, compelling scientific or veterinary reasons) as this restricts the opportunity to provide substrate and foraging.
- 3.1.6 In the case of macaques, cages should be linked to a 'play' area or enclosure which increases the opportunities for exercise and social interaction. They should have unlimited access to this area unless it is necessary to confine them for scientific, husbandry, veterinary or welfare purposes.
- 3.1.7 Where security permits, the accommodation should have natural light.

3.2 Social housing

Social interactions are one of the most important factors influencing the well-being of primates. Social housing promotes a wide range of species-typical behaviours and reduces the frequency of abnormal behaviours.

- 3.2.1 Primates should be socially-housed as compatible pairs or groups, depending on their age and sex and the nature of the scientific procedures or study.
- 3.2.2 Careful monitoring and management is necessary to ensure harmonious pairings or groupings and to minimise any aggression. Housing should be designed to minimise the impact of aggressive encounters and to ensure that dominant animals cannot restrict their cage mates' access to other parts of the cage or enclosure, or monopolise resources such as perches and water spouts.
- 3.2.3 Primates should not be housed singly unless there is exceptional scientific or veterinary justification. Where single housing is unavoidable, it must be for the shortest possible time. The funding bodies will require full justification for any procedure or study which requires single housing, and details of the additional resources which will be provided for the welfare of these animals. Single housing should not be used as a justification for reducing the animals' space allowance.

3.3 Environmental enrichment

- 3.3.1 Cages and enclosures should be furnished to encourage primates to express their full range of species-typical behaviours. Depending on the species, this should normally include provision for resting, running, climbing, leaping and foraging, and a degree of choice and control over their environment.



- 3.3.2 The vertical and horizontal dimensions of the cage and enclosure should be exploited fully by incorporating shelves, logs, ladders, climbing structures, branches, hammocks, swings, ropes and objects to manipulate.
- 3.3.3 Shelves, ladders and branches should be made from wood wherever possible, even though they will have to be replaced more often. Wooden furniture for gnawing and scent-marking is particularly important for marmosets.
- 3.3.4 The cage and enclosure should provide the animals with an area of privacy. For resting, macaques should be provided with fixed elevated shelving and marmosets with nest boxes or equivalents.
- 3.3.5 A varied diet should be provided as a source of enrichment.
- 3.3.6 To prevent boredom, novelty should be regularly introduced into the environment (eg, by re-arranging some of the cage furnishings or providing novel enrichment devices).



3.3.7 The impact of the environmental enrichment programme and any new forms of enrichment provided should be regularly and critically reviewed for their effectiveness.

3.4 Foraging

Foraging enhances welfare and minimises the expression of abnormal behaviours.

- 3.4.1 All primates should be given the opportunity to forage daily, by scattering food in litter or substrate on the floor, or in a tray, and by using devices that encourage foraging activity (eg, puzzle feeders). For marmosets, foraging devices should be provided in the upper parts of the cage or enclosure.
- 3.4.2 In studies where food restriction or control is unavoidable, consideration should be given to how the animals can be provided with daily foraging without compromising scientific objectives (eg, by providing foraging material of a low calorific value, or after the animals have completed any procedures).
- 3.4.3 The funding bodies will require justification for the use of scientific procedures that restrict the opportunity to forage.

4 Capture, handling, restraint and training

There can be significant benefits both for animal welfare and meeting scientific objectives by ensuring that animals are familiar and well socialised with humans. The ERP should review the methods of capture, handling, restraint and training of the primates annually to ensure the principles described below are applied.

- 4.1 Methods of capture, handling, restraint and training should seek to minimise any stress to the animals.
- 4.2 Positive reinforcement techniques should be used to train primates to cooperate with capture, handling, restraint and research procedures. The routine use of squeeze-back cages and nets should be actively discouraged.
- 4.3 Where restraint is necessary, it should be for the shortest possible time.





5 Veterinary care

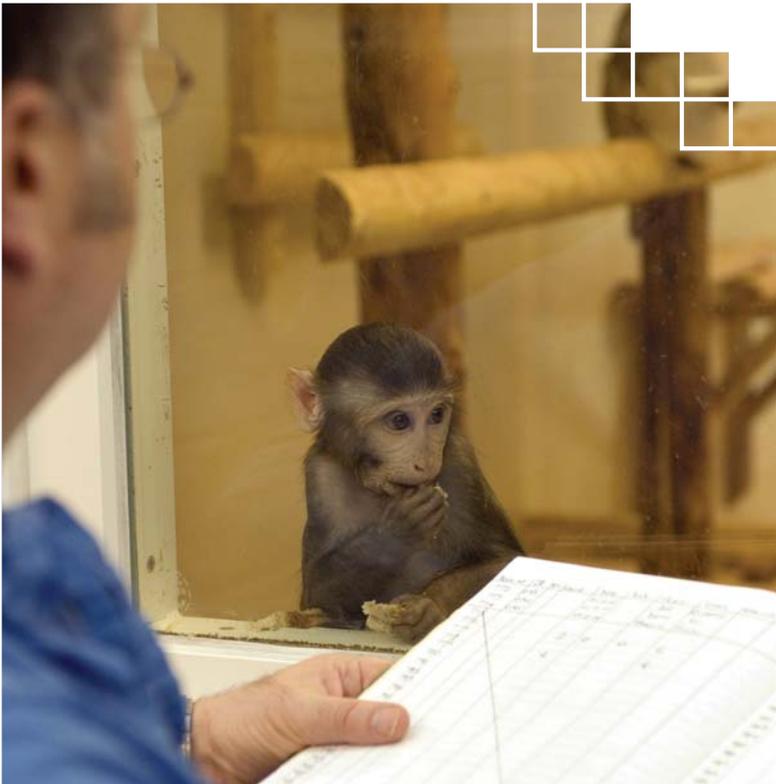
All primates should be given the highest standards of veterinary care, which should be reviewed annually by the ERP.

- 5.1 This annual review should include research protocols (eg, anaesthesia, analgesia and humane endpoints) and be carried out by the NVS and NACWO in conjunction with the ERP. It should also include confirmation that the facilities are suitably equipped for the procedures undertaken.
- 5.2 Veterinary staff should have appropriate training and experience in primate health and well-being. Resources should be provided to allow continuing professional development.

6 Staff

Ensuring that staff members have the proper attitude, training, motivation and skills is key to maintaining a 'culture of care'. The annual review by the ERP should include staff numbers, training and professional development.

- 6.1 Staff at all levels should be knowledgeable about the natural history, biology and behaviour of the species they are working with or caring for. They should have a good understanding of how the laboratory environment and scientific procedures can affect primate well-being, so that appropriate care can be given to provide the best possible quality of life and to minimise any pain, suffering, distress or lasting harm.





- 6.2 Staff should be trained to recognise early indicators of abnormal behaviour, to deal with them promptly, and to prevent their occurrence in the future.
- 6.3 Facilities should have sufficient trained and competent technical and veterinary staff to ensure high standards of care and welfare at all times.
- 6.4 Sufficient time and resources should be allocated to allow regular review of all aspects of primate care (animal health and well-being, procedures, humane endpoints, handling, socialisation, training, and environmental enrichment).
- 6.5 All staff should receive appropriate training for the duties they are required to perform. Their competence and the level of supervision and support required should be regularly assessed and recorded.
- 6.5 There should be a well resourced programme of continuing professional development for all staff.
- 6.6 Staff should be actively encouraged to extend their knowledge and experience and to spread good practice by visiting other establishments and attending meetings and symposia on primate care and welfare, such as the annual NC3Rs Primate Welfare Meeting (www.nc3rs.org.uk/primatelfaremeeting).
- 6.7 Information on appropriate training courses and meetings can be obtained from the NC3Rs Events Calendar (www.nc3rs.org.uk/events).

7 Fate of the animals

Careful consideration should be given at the project planning stage to the fate of the animals at the end of the programme of work.

- 7.1 Where an animal is to be euthanised, every effort should be made to utilise and share tissues and blood products.
- 7.2 The funding bodies support the retirement of animals wherever possible and appropriate, provided that all statutory requirements (eg, ASPA) are met; a high-quality, well-resourced and secure environment can be found to provide long-term accommodation and care; and it is the opinion of the NVS and NACWO that the animal will adapt well to the new conditions.





8 Implementing the 3Rs

The funding bodies fully support the principles of the 3Rs.

- 8.1 Developments in the 3Rs should be widely disseminated to colleagues and peers, ideally through publication in an appropriate journal.
- 8.2 Grant-holders and staff should include details of how they have implemented the 3Rs in their publications and final/progress reports.
- 8.3 The funding bodies will consider requests for resources for implementing the 3Rs in grant applications and during the lifetime of the award. Some of the funding bodies will recognise the publishing of significant and original contributions to the development of the 3Rs in reviews of their establishments and in progress reports on grants.
- 8.4 The funding bodies encourage their researchers to work with animal welfare scientists and ethologists to develop a programme of primate welfare research.

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Further resources

Further resources on primate accommodation, care and use can be found on the NC3Rs website (www.nc3rs.org.uk/informationportal and www.nc3rs.org.uk/primatelinks).

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**National Centre for the Replacement, Refinement
and Reduction of Animals in Research**

20 Park Crescent

London

W1B 1AL

Tel: 020 7670 5331

Fax: 020 7670 5178

email: enquiries@nc3rs.org.uk

www.nc3rs.org.uk

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