

### **Cumulative severity and lifetime experience in non-human primates used in neuroscience research**

With the coming of European Directive 2010/63/EU, and the consequent revision of the UK Animals (Scientific Procedures) Act, the Animal Procedures Committee (the UK national ethics committee that advises the Home Secretary on matters to do with research using animals) has given way to the new Animals in Science Committee. The Animal Procedures Committee may have expired but it has done so with a final large and loud report dealing with the practicalities of assessing the cumulative lifetime experience of non-human primates undergoing neuroscience research during research.

The committee approached this difficult task by inviting initial thoughts in a consultation exercise. It then held a stakeholders' meeting that amongst other issues considered what markers might be used to assess welfare changes. Those at this meeting noted that while behaviour and physiological changes occur as a result of stress the quantification of welfare as a result of these changes is problematic. They also thought that animal-based measures rather than resource-based measures should be used to assess welfare. Despite the obvious complexity of the task of assessing cumulative suffering, the stakeholders felt that collection of data on the subject would be a valuable exercise.

Thus encouraged, the sub-committee produced an online questionnaire for researchers, certificate holders, and animal care staff at establishments in the UK and EU carrying out neuroscience research on macaques and marmosets. Respondents were asked to provide information on adverse effects, for example resulting from procedures and husbandry including non-intended procedural complications. They were also asked to assess the cumulative severity experienced by the animals by considering whether the animals experienced unchanging, diminishing, or increasing cumulative effects as they underwent continuing procedures (anaesthesia, surgery, restraint, food and fluid control, housing and husbandry, long-term implants and training). Data on the reasons for premature termination and euthanasia of animals were also collected. The exercise resulted in 27 responses for 152 macaques and 82 common marmosets.

The APC has broken new ground with this collection of quantitative and qualitative information on the various causes of severity, and the data will undoubtedly prove very valuable as a benchmark and a baseline for further improvements. Those assessing this research and those carrying out the work will find it useful to know, for example, that the incidence of adverse effects in macaques with long-term implants is 22%, and that while a minority (11%) had five complications, the majority (87%) of those undergoing surgery suffered none. It is also useful and reassuring to know that many establishments are making active and continuous efforts to refine their husbandry and procedures through, for example, refinement of surgical techniques, care, management of implants and the use of positive reinforcement training.

Nonetheless, while there is value in achieving a better general understanding of the ethical issues involved in non-human primate neuroscience studies, it is unlikely that the report's conclusions will satisfy all those concerned about the welfare of primates in this research. For example, the report considers the (apparently often raised) issue of the extent of the primates' choice regarding its co-operation in tasks and procedures. The authors conclude that the general view is that co-operation is required and argue that the monkeys' behaviour (co-operation in tasks) does not resemble learnt helplessness (characterised by depressed/passive responses). However, many may feel that the animals' choice as to whether to co-operate is somewhat limited by the use of techniques such as fluid provision reduction by 10–15% until the animal is sufficiently thirsty and motivated to obtain fluid rewards that 'adequate performance on a task is achieved'. Some will also be concerned that all the respondents considered their work should be classified as moderate, and that they apparently did not consider surgery as a source of severity. On the other hand, the report makes the point that those who argue that procedures such as these are always substantial (severe) must also consider how, surgery of this type is usually well tolerated in humans and that if all surgery was assessed at substantial (severe), then no distinction could be made between surgery and more extreme events. Moreover, moving all research of this type into the substantial band could well be counterproductive in terms of animal welfare as, in the UK, researchers have been strongly motivated to ensure that the animals stay within the moderate limit, as if an animal experiences more suffering than the licence limit they have to notify the regulators and if necessary attempt to amend their licence.

The report notes that there was little evidence for additive effects of procedures on severity, but this may be challenged on the grounds that the assessment of cumulative severity was made by those at the establishment and performed in a way that was certainly not blind to the treatments. While a more scientific approach would not have been possible as this was a retrospective study, the assessments cannot be considered disinterested and this may cause some to have less confidence in the respondents' assertions. One example that struck me as strange was that respondents reported that one monkey developed a tendency to hold its headcap, and that while this was acknowledged as a welfare concern, the respondents' assessment of cumulative severity was unchanged. Some of the respondents also suggested that fluid and food control had no adverse effects and that the tasks to which the monkeys were trained was enriching itself. A different view would be that if this were really always the case, then there should be no need to use food/fluid control to motivate the animals. In fact, as the report notes, the monkeys' motivation to perform tasks under fluid control falls off after the weekend when they had more water suggesting that the task is not rewarding enough on its own to motivate the animals to work at a sufficiently high level. Moreover, it is asserted in an appendix that to reduce to a minimum the time that the

primates spend on the protocol and to ensure that time and resources are not wasted it may be best to move the animals as soon as possible to the highest level of fluid control (in which the animal is trained to the task and receives most of its daily fluid requirements during task training) although once trained some relaxation may be possible.

It is also noteworthy that despite the emphasis in the initial consultancy exercise on the need to use animal-based measures of welfare, the reasons provided by respondents for reporting diminishing levels of severity related to resource provision: *viz* successful re-housing of the subject with one or more cage mates, moving the animals to larger cages and providing swings and ropes, providing a playpen and improving the cleaning regime. Again, the inconsistency may have arisen because there were not good animal-based assessments available to the researchers in this retrospective exercise. Fortunately, under revised UK legislation in which retrospective assessment of these types of study is required, there should be better data in the future.

The report does, however, provide the first data-based study of cumulative severity and the Primates Sub-Committee of the Animals Procedures Committee should be commended for this. The report also makes many interesting points that will help to advance the debate. It draws attention, for example, to the various possibilities that the effects of procedures on severity may be either non-additive with complete recovery between events, non-additive with habituation between events, additive with partial recovery between events (stacking up) and additive with compounding by the effects of previous procedures. It also makes the interesting point that there is clearly a distinction to be made between Moderate, Multiple moderate without significant impact on welfare, and Severe. Additionally, the report provides many useful recommendations that could improve the welfare of primates used in neuroscience, including the wider use of CCTV to provide better monitoring of the animals; the use of timelines recording the incidence of procedural events, which can be used with eg veterinary records to assess the impact of life events; the need for research on the psychological effects of fluid control regimes on non-human primates; the need to spread best practice; and the need to continually assess animals for their suitability, and continued suitability for research.

**Review of the Assessment of Cumulative Severity and Lifetime Experience in Non-Human Primates used in Neuroscience Research** (2013). Report of the Animal Procedures Committee's Primate Subcommittee Working group Chaired by Professor John Picard FMedSci Available at <https://www.gov.uk/government/publications/animal-procedures-committee-cumulative-severity-review>.

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### **FeatherWel: practical strategies to reduce the risk of injurious pecking**

FeatherWel is an information resource which provides advice on practical measures and strategies to reduce the risk of injurious pecking in non-cage laying hens. Injurious pecking is a common problem in these hens. The consequences can range from relatively minor feather loss to serious damage to living tissue leading to death.

It can be a difficult problem to predict and prevent. The FeatherWel website provides information about the problem and about measures that can be taken to tackle it or minimise the risks.

The advice, produced in consultation with a wide range of experts, is based on the results of a four-year project at Bristol University, funded by the Tubney Trust. This compared the prevalence of injurious pecking in 50 flocks in which various forms of intervention were made to prevent or ameliorate pecking, with its prevalence in 40 control flocks (the Bristol Injurious Pecking Programme: [www.bris.ac.uk/vetscience/research/projects/peckingproject/](http://www.bris.ac.uk/vetscience/research/projects/peckingproject/)).

The guidance addresses various risk factors. Although there is no certain cure for the problem: "... recent studies have shown the *more proactive the management* of a flock, the less likely it is to show high levels of injurious pecking." This is a clearly presented and easy to read, science-based, package to help egg producers tackle and avoid the problem. Although based on research carried out on flocks in the UK it seems likely that it will be helpful much more widely.

**FeatherWel: Promoting Bird Welfare** (2013). An information resource led by the University of Bristol, supported by the RSPCA, the Soil Association, AssureWel, and the British Egg Industry Council. Available at: <http://www.featherwel.org/>.

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### **Tackling livestock effects on climate change**

The impact of global warming on animal welfare is likely to be complex and hard to predict. Among wild vertebrates, individuals of some species may benefit, some may be little affected, but those of species that are sensitive to temperature but which will not (eg for geographical reasons) be able to move, will be adversely affected. This will involve large numbers. Likewise, in the long run, global warming may adversely affect many kept animals also.

In its recent review of the role of farmed livestock on global emissions, the FAO calculated that the world's livestock produce 7.1 gigatonnes of CO<sub>2</sub>-equivalents per year, which is equal to 14.5% of all anthropogenic greenhouse gas (GHG) emissions. It is concluded that the livestock sector plays an important role in global warming.