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Statement before the Committee to

Update the *Guide for the Care and Use of Laboratory Animals*

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at the National Academy of Sciences, Washington, DC

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Thank you very much for this opportunity to provide brief oral comments regarding the revision of the *Guide for the Care and Use of Laboratory Animals* (the Guide). The Animal Welfare Institute is very engaged in improving the lot of animals used for experimentation, testing and teaching purposes. We publish a variety of books that detail enrichments and refinements that can be implemented to reduce the suffering and improve the quality of life of animals in the laboratory. Our publications include: Comfortable Quarters for Laboratory Animals (2002), Variables, Refinement and Environmental Enrichment for Rodents and Rabbits Kept in Research Institutions (2006), Making Lives Easier for Animals in Research Labs (2007), Taking Better Care of Monkeys and Apes (2008), and Safe Pair Housing of Macaques (2008). A revision of AWI's book, Environmental Enrichment for Caged Rhesus Macaques is in press; this book has been expanded to include all non-human primates. I have a single copy of the publications for the Committee with me and additional copies can be provided to any committee members who are interested. All of the publications are accessible via our website, www.awionline.org, with the exception of the two most recent which haven't yet been uploaded (Safe Pair Housing and Environmental Enrichment). Please note that scientific references are contained in each of the publications.

Before getting into some of the specific changes we hope to see, I have a few broader remarks. The first is our hope that each of the committee members will keep in mind what a minimalist institution will do with the *Guide*. The staff at these facilities can be counted on to exploit every opportunity where there is no language calling for mandatory action. These are the same facilities where animals are most in need of help. We believe the animals are better served—and therefore the science is better served--by vastly increasing the mandatory requirements (the "shall"s) while permitting the IACUC in consultation with the veterinarian to allow for exceptions to these rules. All exceptions would be documented in the institutions records.

In addition, we object vehemently to the oft repeated suggestion that the *Guide* should be cleansed of as many engineering standards as possible in lieu of performance standards. Conceptually performance standards sound like a good approach, but when seeking to have a practical impact on animals, they fall flat unless they are bolstered by specific engineering

requirements. It might be that multiple engineering requirements could be offered and a sufficient number of them be selected to ensure the desired performance outcome.

A review of the attempt to implement performance standards for housing nonhuman primates demonstrates the failure of this approach. Once these standards were implemented, the inspectors were left unsure of how to ensure compliance with this requirement and staffs within research facilities were unsure of what they should be doing. Worst of all, performance standards open the door wide to those who seek to do the minimum as who's to challenge them on it and they are free to point to having done something (regardless of how effective or ineffective it may be) and suggest that they are doing what they can according to their "professional judgment." Institutions have toys sitting unused in primate cages or suggest that the single-caged animals are socializing with others in the room as the animals engage in stereotypies or self-mutilations in their barren cages. The requirement for a physical environment adequate to promote psychological wellbeing in primates was adopted by Congress in 1985. Nearly twenty-three years later, the majority of primates used for experimentation in the United States remain in single-caging.

I should note that there is no clear data regarding social versus single housing for primates. While USDA conducted a survey in fiscal year 2001 which stated that 65 percent of primates in research were pair or group-housed, this data actually included animals who were used for breeding purposes and therefore it is heavily skewed.

As noted on pages 92 and 93 in AWI's publication, *Taking Better Care of Monkeys and Apes* by Viktor Reinhardt, published in 2008:
"Two independent surveys of primate facilities located in the United States revealed that the percentage of indoor caged macaques housed socially did not increase over a time period of nine years. Both in 1994 and 2003, only about one third of the animals lived with one or several partners, while two thirds were living alone." The reference for the 2003 survey is: Baker KC, Weed JL, Crockett CM and Bloomsmith MA 2007 Survey of environmental enhancement programs for laboratory primates. *American Journal of Primatology* 69: 377-394 and the reference for the 1994 survey is: Reinhardt V 1994 Pair-housing rather than single-housing for laboratory rhesus macaques. *Journal of Medical Primatology* 23: 426-431.

I'd like to take this opportunity to mention a few specific changes we hope to see in the revised document. The first is to suggest that at least two public members serve on the Institutional Animal Care and Use Committee (IACUC) to represent "general community interests in the proper care and treatment of animals." [Animal Welfare Act] It would be our hope that *at least* one of these two nonaffiliated members has a demonstrated interest in animal protection. Including two individuals on the IACUC will help to ensure that at least one representative will be in attendance for all IACUC activities, relieves the burden of responsibility from resting solely on only one set of shoulders and provides the opportunity for greater diversity and representation within the committee.

The section on Physical Restraint in the current *Guide* gives little attention to the benefits of positive reinforcement training (for the animals, the staff and the science) merely noting that animals can be trained to present limbs or remain immobile for brief periods. This must be

strengthened and expanded upon. Most importantly, positive reinforcement training should be specifically encouraged.

Coleman K, Pranger L, Maier A, Lambeth SP, Perlman JE, Thiele E, Schapiro SJ 2008. Training rhesus macaques for venipuncture using positive reinforcement techniques: A comparison with chimpanzees. Journal of the American Association for Laboratory Animal Science 47, 37-41

Lambeth SP, Hau J, Perlman JE, Martino M, Schapiro SJ 2006. Positive reinforcement training affects hematologic and serum chemistry values in captive chimpanzees (*Pan troglodytes*). American Journal of Primatology 68(3), 245-256

McKinley J, Buchanan-Smith HM, Bassett L, Morris K 2003. Training common marmosets (*Callithrix jacchus*) to cooperate during routine laboratory procedures: Ease of training and time investment. Journal of Applied Animal Welfare Science 6, 209-220

Reinhardt V 1996. Refining the blood collection procedure for macaques. Lab Animal 25(1), 32-35. http://www.awionline.org/Lab_animals/biblio/la-refin.htm

Reinhardt V 1997. Training nonhuman primates to cooperate during blood collection: A review. Laboratory Primate Newsletter 36(4), 1-4.
http://www.brown.edu/Research/Primate/lpn36-4.html#blood

Reinhardt V, Cowley D, Eisele S, Scheffler J 1991. Avoiding undue cortisol responses to venipuncture in adult male rhesus macaques. Animal Technology 42, 83-86
http://www.awionline.org/Lab_animals/biblio/at83.htm

Schapiro SJ 2005. Chimpanzees used in research: Voluntary blood samples differ from anesthetized samples. AWI Quarterly 54(3), 15-16
http://www.awionline.org/pubs/Quarterly/05_54_03/05_54_3p15_6.htm

Turkkan JS 1990. New methodology for measuring blood pressure in awake baboons with use of behavioral training techniques. Journal of Medical Primatology 19, 455-466
http://www.awionline.org/Lab_animals/biblio/jmp19-4.htm

Videan EN, Fritz J, Murphy J, Borman R, Smith HF, Howell S 2005. Training captive chimpanzees to cooperate for an anesthetic injection. Lab Animal 34(5), 43-48

"Primates dislike being handled and are stressed by it; training animals to co-operate should be encouraged, as this will reduce the stress otherwise caused by handling. Training the animals is a most important aspect of husbandry, particularly in long-term studies. .. Training can often be employed to encourage the animals to accept minor interventions, such as blood sampling" (p 48).

Council of Europe 2006. Appendix A of the European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes (ETS No. 123) enacted June 15, 2007. Council of Europe, Strasbourg, France
http://conventions.coe.int/Treaty/EN/Treaties/PDF/123-Arev.pdf

"Primates of many species can be quickly trained using positive reinforcement techniques to cooperate with a wide range of scientific, veterinary and husbandry procedures. Such training is advocated whenever possible as a less stressful alternative to traditional methods using physical restraint. Techniques that reduce or eliminate adverse effects not only benefit animal welfare but can also enhance the quality of scientific research, since suffering in animals can result in physiological changes which are, at least, likely to increase variability in experimental data and, at worst, may even invalidate the research. Restraint procedures should be used only when less stressful alternatives are not feasible [p 22]."
International Primatological Society 2007. IPS International Guidelines for the Acquisition, Care and Breeding of Nonhuman Primates. International Primatological Society, Bronx, NY
http://www.internationalprimatologicalsociety.org/docs/IPS_International_Guidelines_for_the_Acquisition_Care_and_Breeding_of_Nonhuman_Primates_Second_Edition_2007.pdf

"Positive reinforcement techniques should be used to train primates to cooperate with catching, handling, restraint and research procedures. The routine use of squeeze-back cages and nets should be actively discouraged" [p. 10].
Medical Research Council 2004. MRC Ethics Guide: Best Practice in the Accomodation and Care of Primates used in Scientific Research. Medical Research Council, London, UK
http://www.mrc.ac.uk/pdf-primate-best-practice.pdf

Now that nearly all mice, rats and birds are specifically excluded from the protections afforded other animals used for experimentation under the federal Animal Welfare Act and given that these are the animals not just used in the largest numbers, but suffering in the greatest numbers as well, there is a strong onus to ensure solid requirements for their benefit and protection. This should be kept in mind when these species are assessed by the Committee and the language crafted regarding their needs.

Based on data in the scientific literature, we believe there is strong justification for mandating specific necessities in the animals' enclosure rather than suggesting they are voluntary recommendations.

For example, we believe that **mice must be provided with species appropriate nesting material**.

Armstrong, KR, Clark TR, Peterson MR 1998. Use of cornhusk nesting material to reduce aggression in caged mice. Contemporary Topics in Laboratory Animal Science 37(4), 64-66.

Gwinn LA, Krauthauser CL, Kerr JS 1999. Impact of home cage alterations on aggression in mice. Abstracts of the AALAS Meeting, 35 (Abstact).

Heinzmann V, Jonas I, Hirschenauer K, Havelec L 1998. Choice tests with groups of mice: nest box, nesting material and tubes as enrichment items for laboratory mice. Journal of Experimental Animal Science 39, 43-60.

Olsson IAS, Dahlborn K 2002. Improving housing conditions for laboratory mice: a review of 'environmental enrichment.' Laboratory Animals 36, 243-270.

Sherwin CM 1997. Observations on the prevalence of nest-building in non-breeding TO strain mice and their use of two nesting materials. Laboratory Animals 31, 125-132.

Van de Weerd HA, van Loo PLP, van Zutphen LFM, Koolhaas JM, Baumans V 1998. Strength of preference for nesting material as environmental enrichment for laboratory mice. Applied Animal Behaviour Science 55, 369-382. www.library.uu.nl/digiarchief/dip/diss/01801846/c5.pdf

Van Loo PLP, Kruitwagen CLJJ, Koolhaas JM, Van de Weerd HA, Van Sutphen LFM, Baumans V 2002. Influence of cage enrichment on aggressive behavior and physiological parameters in male mice. Applied Animal Behavior Science 76, 65-81.

Rats must be provided with species-appropriate shelter.

Callard MD, Bursten SN, Price EO 2000. Repetitive backflipping behavior in captive roof rats (Rattus rattus) and the effect of cage enrichment. Animal Welfare 9, 139-152.

Manser CE, Broom DM, Overend P, Morris TH 1998b. Operant studies to determine the strength of preference in laboratory rats for nest-boxes and nesting material. Laboratory Animals 32, 36-41.

Patterson-Kane EG 2003. Shelter enrichment for rats. Contemporary Topics in Laboratory Animal Science 42(2), 46-48.

Townsend P 1997. Use of in-cage shelters by laboratory rats. Animal Welfare 6, 95-103.

Hamsters must be provided with species-appropriate shelter.

McClure DE, Thomson JI 1992. Cage enrichment for hamsters housed in suspended wire cages. Contemporary Topics in Laboratory Animal Science 31(4), 33 (Abstract).

Guinea pigs must be provided with species-appropriate shelter.

Banjanin S, Barley J, Bell L, Cunneen M, Johnston I, Quintero I, Weilenmann R, Reinhardt V 2004. Environmental enrichment for guinea pigs: A discussion by the Laboratory Animal Refinement & Enrichment Forum. Animal Technology and Welfare 3, 161-163. www.awionline.org/Lab_animals/biblio/atw5.html

Given their common use in the laboratory, we would suggest that language is needed stating that **frogs must be provided with species-appropriate shelter**.

Brown MJ, Nixon RM 2004. Enrichment for a captive environment – The Xenopus laevis. Animal Technology and Welfare 3, 87-95.

Harr J, Coyne L, Chaudhry A, Halliwell RF 2008. A study of the impact of environmental enrichment on *Xenopus Leavis* oocytes. AWI Quarterly 57 (3) 25.

Hedge TA, Saunders KE, Ross CA 2002. Innovative housing and environmental enrichment for bullfrogs (*Rana catesbiana*). Contemporary Topics in Laboratory Animal Science 41(4), 120-121 (Abstract).

Torreilles SL, Green SL 2007. Refuge cover decreases the incidence of bite wounds in laboratory south African clawed frogs (*Xenopus laevis*). Journal of the American Association for Laboratory Animal Science 46 (5).

Primates must be provided with a species-appropriate high resting surface.

Bayne K 2003. Environmental enrichment of nonhuman primates, dogs and rabbits used in toxicological studies. Toxicologic Pathology 31(Supplement), 132-137

Kitchen AM, Martin AA 1996. The effects of cage size and complexity on the behaviour of captive common marmosets, *Callithrix jacchus jacchus*. Laboratory Animals 30, 317-326

Nakamichi M, Asanuma K 1998. Behavioral effects of perches on group-housed adult female Japanese monkeys. Perceptual and Motor Skills 87, 707-714

Neveu H, Deputte BL 1996. Influence of availability of perches on the behavioral well-being of captive, group-living mangabeys. American Journal of Primatology 38, 175-185

Reinhardt V 1989. Evaluation of the long-term effectiveness of two environmental enrichment objects for singly caged rhesus macaques. Lab Animal 18(6), 31-33
Full Text: http://www.awionline.org/Lab_animals/biblio/la-eval.htm

Shimoji M, Bowers CL, Crockett CM 1993. Initial response to introduction of a PVC perch by singly caged *Macaca fascicularis*. Laboratory Primate Newsletter 32(4), 8-11
Full Text: http://www.brown.edu/Research/Primate/lpn32-4.html#pvc

Williams LE, Abee CR, Barnes SR, Ricker RB 1988. Cage design and configuration for an arboreal species of primate. Laboratory Animal Science 38, 289-291

"The flight reaction of non-human primates from terrestrial predators is vertical, rather than horizontal; even the least arboreal species seek refuge in trees or on cliff faces. As a result, enclosure height should be adequate to allow the animal to perch at a sufficiently high level for it to feel secure. .. The minimum enclosure height for caged marmosets and tamarins is 1.5 m; the minimum enclosure height for caged squirrel monkeys, macaques, vervets and baboons is 1.8 m. .. The structural division of space in primate enclosures is of paramount importance. It is essential that the animals should be able to utilise as much of the volume as possible because, being arobreal, they occupy a three-dimensional space. The make this possible, perches and climbing structures should be provided" (Council of Europe, 2006, p 42,52,54,).

Council of Europe 2006. Appendix A of the European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes (ETS No. 123) enacted June 15, 2007. Council of Europe, Strasbourg, France
Full Text: http://conventions.coe.int/Treaty/EN/Treaties/PDF/123-Arev.pdf

Primates must be provided with social housing.

More stringent conditions to grant exemptions to investigators; single-caging should not be allowed for conventience reasons but for **real** scientific methodology reasons or for veterinary reasons.

“Because the common laboratory non-human primates are social animals, they should be housed with one or more compatible conspecifics. .. Single housing should only occur if there is justification on veterinary or welfare ground. Single housing on experimental grounds should be determined in consultation with the animal technician and with the competent person charged with advisory duties in relation to the well-being of the animals (Council of Europe, 2006, p 44 & 14).
Council of Europe 2006. Appendix A of the European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes (ETS No. 123) enacted June 15, 2007. Council of Europe, Strasbourg, France
Full Text: http://conventions.coe.int/Treaty/EN/Treaties/PDF/123-Arev.pdf

”Pair or group housing in an enclosure ***must be considered the norm*** for gregarious animals, but only compatible (socially, virological status, etc.) animals should be kept together. Infectious disease study does not necessarily preclude the ability to keep primates in pairs or groups in the same enclosure, without interfering with study validity. Many infectious disease studies are carried out in paired or grouped primates. The same is true of many other types of studies and procedures, such as pharmacokinetic studies and drug safety testing. .. Individual subjects can be accessed for testing and manipulation through good enclosure design, separation chutes and training using positive reinforcement techniques. .. For experimental animals, where housing in groups is not possible, keeping them in compatible pairs is a viable alternative social arrangement. Single caging should only be allowed where there is an approved protocol justification on veterinary or welfare grounds. [p 11].“
International Primatological Society 2007. IPS International Guidelines for the Acquisition, Care and Breeding of Nonhuman Primates. International Primatological Society, Bronx, NY
Full Text:
http://www.internationalprimatologicalsociety.org/docs/IPS_International_Guidelines_for_the_Acquisition_Care_and_Breeding_of_Nonhuman_Primates_Second_Edition_2007.pdf

"Primates must [*sic*] be provided with a complex and stimulating environment that promotes good health and psychological well-being and provides full [*sic*] opportunity for social interactions, exercise and to express a range of behaviours appropriate to the species [p. 6].
Medical Research Council 2004. MRC Ethics Guide: Best Practice in the Accomodation and Care of Primates used in Scientific Research. Medical Research Council, London, UK
Full Text: http://www.mrc.ac.uk/pdf-primate-best-practice.pdf

Outdated double-tier caging systems for primates should be prohibited (or at minimum strongly discouraged and/or a phase-out encouraged). These cages, originally used as turkey cages, but then used as a means to quickly accommodate large numbers of primates for use in vaccine development/production in the 1950s. These cages do not and cannot provide uniform living conditions [illumination, arboreal vs. terrestrial] for all animals.

”A two-tiered system is not recommended as these cages are usually too small. The lower tiers do not allow primates to engage in their vertical flight response, are often darker, and animals in the lower cages tend to receive less attention from attending personnel [p 12].“
International Primatological Society 2007. IPS International Guidelines for the Acquisition, Care and Breeding of Nonhuman Primates. International Primatological Society, Bronx, NY
Full Text:
http://www.internationalprimatologicalsociety.org/docs/IPS_International_Guidelines_for_the_Acquisition_Care_and_Breeding_of_Nonhuman_Primates_Second_Edition_2007.pdf

“The volume and height of the cage (or enclosure) are particularly important for macaques and marmosets, which flee upwards when alarmed. Their cages and enclosures should be floor-to-ceiling high whenever possible, allowing the animals to move up to heights where they feel secure. Double-tiered cages should not be used since they restrict the amount of vertical space available to the animals” (p 7).
Medical Research Council 2004. MRC Ethics Guide: Best Practice in the Accomodation and Care of Primates used in Scientific Research. Medical Research Council, London, UK
Full Text: http://www.mrc.ac.uk/pdf-primate-best-practice.pdf

One final point which I hope can be rectified in the new edition is a shift in terminology from referring to an animal by the pronoun “it” rather than “he” or “she.” Referring to an animal as “it” is neither accurate nor scientific. Animals are not inanimate objects and should not be referred to as such.

Thank you very much for your time and attention.