

A Historical Perspective on Social Housing

An examination of the evolution of social housing of laboratory animals not only reveals the foundation of the philosophies, management practices and expectations for social housing and how these have changed over time, but also leads to a better perspective to gauge beneficial future directions. Thus, pausing to reflect on changes over time shows the progress made, which Nisbet (1980) described as that “inexorable change over time from lower to higher states of knowledge.” As we evaluate our progress in providing social housing to the variety of laboratory animals we study, it is clear that our knowledge base to accomplish this has increased over time, resulting in greater success in our efforts to socially house our research animals and in improving their welfare.

Our industry’s current widespread bias toward housing research animals socially whenever possible illustrates a journey in maturing our understanding of the benefits to the individual animal and the research data they produce. The changes in housing conditions of nonhuman primates used in research serve as a good illustration of this journey in

management practices. When rhesus monkeys were imported into the U.S. from India, they were placed in groups in holding rooms during the quarantine period. But, the animals were not necessarily familiar with each other, and so many experienced social stress which was compounded by the stress of shipping and the novelty of the environment. One report documented 95 percent of the animals having intestinal parasites and other diseases under these conditions. The adverse effects on the health and well-being of the animals maintained in this type of housing resulted in significant changes in management procedures for imported primates. The accepted methodology was modified such that animals were housed in individual cages to ensure adequate nutrition and to treat (or prevent the spread of) disease conditions. However, the impact on the animals’ behavior and welfare was not recognized. In 1978, the challenges associated with housing imported primates in quarantine were made mostly moot when the Indian government banned exportation of nonhuman primates. This

action prompted the expansion of domestic breeding colonies, which meant shorter transportation times and a well-defined health history of the primates. These animals typically had a social rearing history, but quarantine procedures still entailed single housing, primarily to facilitate management procedures.

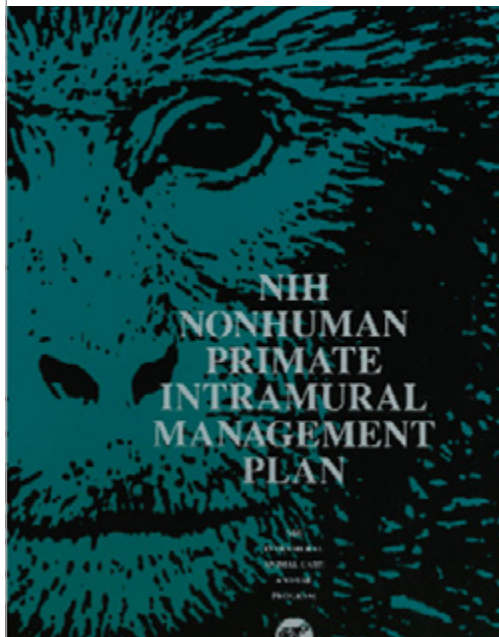
Just seven years later, the Food Security Act of 1985 was passed which directed the Secretary of Agriculture to establish regulations to provide a physical environment adequate to promote the psychological well-being of nonhuman primates. The Act stated that “Social interaction is an integral part of the psychological well-being of nonhuman primates, and we believe it is appropriate to address such social grouping in the context of an overall approach to promoting the psychological well-being of nonhuman primates.” In the same vein, the U.S. Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training (IRAC 1985), also published by federal agencies, stated in Principle VII, “The living conditions of animals should

be appropriate for their species and contribute to their health and comfort." The implication that animal housing should not only support animal well-being, but actually contribute to or enhance it, was novel for the time.

Contemporaneous to this pivotal declaration from the federal government was the publication of the 6th edition of the *Guide for the Care and Use of Laboratory Animals* (*Guide*, NRC 1985). The tone taken toward social housing in this report was much more conservative. The *Guide* limited the scope of interactions to animals that are able to communicate, leaving one to wonder what species this excluded. The *Guide* stated, "The effects of social environment on caged animals vary with the species and experience of the animals. They are often more difficult to define than the effects of physical environment." And, "there is little objective evidence for defining adequate care in relation to social environment.... The data are limited and contradictory... and lack sufficient guidance to establish absolute recommendation...."

In light of this philosophically contradictory environment, the Director of the National Institutes of Health (NIH), Dr. James Wyngaarden,

instructed the Deputy Director for Intramural Research, Dr. J.E. (Ed) Rall, to develop an NIH Nonhuman Primate Management Plan to address the issue of promoting the psychological well-being of non-human primates used in research.



To that end, in 1987, a survey was conducted of the intramural research community and a set of recommendations was developed based on those survey results. Specifically, the Plan recommended that social housing be considered "an appropriate means of providing enrichment...." Others were also moving forward with plans to socially house their research primates. But, the risks associated with social housing were not fully understood or anticipated. For example, Line et al. (1990) reported ten of thirteen monkeys sustaining injuries during fights in the

first eight days following group formation; one female died of general trauma.

As our knowledge about appropriate methods to provide social housing of nonhuman primates increased, so too did the philosophical tone in the *Guide* become biased toward social housing. The seventh edition of the *Guide* (NRC 1996) stated "It is desirable that social animals be housed in groups.... When it is appropriate and compatible with the protocol, social animals should be housed in physical contact with conspecifics."



Social housing stimulates the expression of species-typical behaviors.

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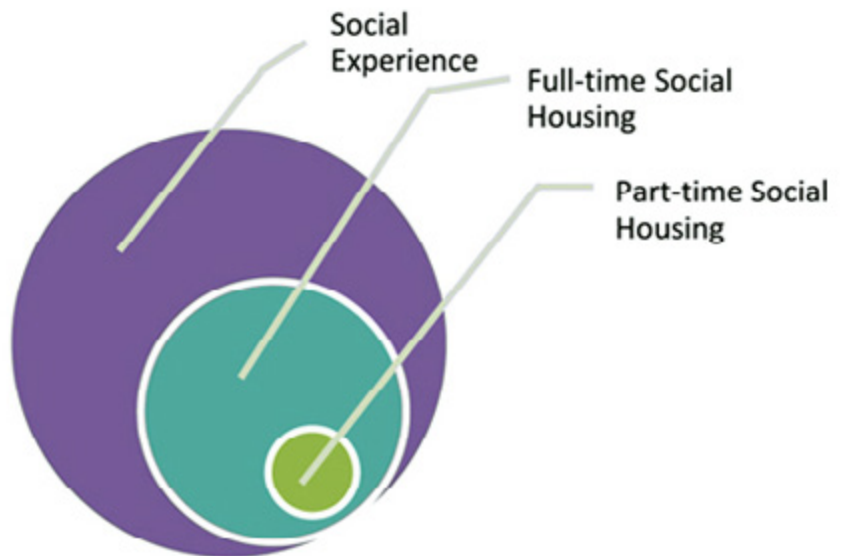
This edition of the *Guide* further stated, "Appropriate social interactions among members of the same species (conspecifics) are essential to normal development and well-being...." It was noted that social housing might buffer the effects of a stressful situation, reduce behavioral abnormality, increase opportunities for exercise, and expand species-typical behavior and cognitive stimulation. The *Guide's* position on social housing matured even further in the eighth edition (NRC 2011). In this latest edition, the *Guide* states that "Single housing should be the exception and justified based on experimental requirements or veterinary-related concerns about animal well-being" and that "The need for single housing should be reviewed on a regular basis by the IACUC and veterinarian."

Of note, AAALAC International, which uses the *Guide* in its assessments of animal care and use programs, has taken an even stronger stance, stating in one of its very few Position Statements that "Social housing will be considered by AAALAC International as the default method of housing unless otherwise justified based on social incompatibility resulting from inappropriate behavior, veterinary concerns regarding animal well-being, or scientific necessity approved by the

IACUC (or comparable oversight body)." AAALAC offers this further guidance: "When necessary, single housing of social animals should be limited to the minimum period necessary and, where possible, visual, auditory, olfactory and, depending on the species, protected tactile contact with compatible conspecifics should be provided. In the absence of other animals, additional enrichment should be offered, such as safe and positive interaction with the animal care staff, as appropriate to the species of concern; periodic release into larger enclosures; supplemental enrichment items; and/or the

addition of a companion animal in the room or housing area." AAALAC has also issued a "Frequently Asked Question" related to this subject, which notes that the total social experience of an animal is larger than that offered solely through full-time social housing. AAALAC notes that the entire social experience of the animal can include interactions with other animals in the room, personnel, etc. AAALAC states that there is a spectrum of social experiences that can be made available to an animal, which, when properly managed, can significantly enhance the welfare of the animal.

The Institutional Animal Care and Use Committee (or comparable oversight body) and veterinarian should periodically review the strategies for providing social housing or other social experience to the animals at the institution to ensure conformance with the *Guide*.



The relative social experience of a laboratory animal.

AAALAC expands on this approach in a podcast available on its website <http://www.aaalac.org/education/index.cfm>

The ever-broadening scope of social housing of research animals is increasingly encompassing the diversity of species used in research, including dogs, cats, rabbits, a variety of rodent species, agricultural animals, aquatic animals, and others.

described a similar evolution for the housing of rodents used in research. They describe the changes in cages for socially housed rats over a 50 year period—reflecting back on how cages used circa 1960 had a low cage height and were mostly wire-bottom, to the use of solid-bottom bedded cages in common use circa 1990, to the highly enriched cage environment currently in use.

returning to an approach that is predominantly based on the natural social behavior of the animal, but unlike the methods of social housing used decades ago, our methods are based on an increased understanding of the species' behavior, more attention is paid to ensuring animal health is not compromised, and the welfare of the animal and quality of the research animal model are overarching factors in animal housing decisions.



Socialization of dogs promotes normal behaviors such as play.

For some of these species, such as cats and dogs, a concomitant effort is underway to reduce the “institutional” appearance of the housing environments by designing the enclosures to be colorful, include sight-lines and be highly enriched. Baumans and Van Loo (2012) have

These examples illustrate the point that social housing is increasingly being considered in the context of facility design, cage design, cage space, and cage/pen complexities (e.g., enrichment strategies). In this way, to some degree, the past is prologue. Our animal housing systems are

References

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