The purpose of this policy is to serve as the plan for principal investigators or lab designee (PI), the Attending Veterinarian or designee (AV), and the Institutional Care and Use Committee (IACUC) regarding the procedures for social housing of nonhuman primates (NHP). “The environment enhancement plan must include specific provisions to address the social needs of nonhuman primates of species known to exist in social groups in nature” (AWR 3.81 (a)). Additionally, nonhuman primates should normally have social housing (i.e., in compatible pairs or in larger groups of compatible animals) (Guide, p. 58). The institutional goal is to socially house all NHPs, with every effort made to find compatible pairs or groups.

This policy concentrates on the following topics regarding social housing of nonhuman primates:

- Procedures
- Exemptions and exceptions
- Continuing evaluation

PROCEDURES

Pre-grouping evaluation

Group composition is critical and numerous species-specific factors such as age, behavioral repertoire, sex, natural social organization, breeding requirements, and health status should be taken into consideration when forming a group (Guide, p. 59). All NHPs are assessed by the AV with the PI (including dedicated senior research staff) prior to the start of the group-housing process. Considerations for determining the suitability of grouping partners include:

1. Health status of proposed cagemates, including viral status or inoculation history and any behavioral issues/observations
2. Current protocol and any research related concerns
3. Physical attributes (age, weight, sex of the animal)
4. History of social/individual housing

Groups will be chosen by the AV and PI, based on likelihood for success. Referenced compatibility methodologies will be used to initiate the process of compatibility determination (e.g. juveniles may be grouped with adult males).

Documentation of group-housing process

Every NHP housed in a Penn animal facility will have a “Social Housing Documentation” template form that will document the group-housing process. These forms will be kept in a central location in the facility. This document will serve as a history of attempted efforts to group house the specific animal and must be maintained for at least the life of the animal.
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Group-housing process
All attempts will be made to procure nonhuman primates in established groups. If this is not possible, social housing will be accomplished in five steps, with the goal being continuous group-housing for as many NHPs as possible. All behavioral observations must be documented clearly on the Social Housing Documentation form. With the approval of the AV, animals are allowed to advance to subsequent steps as long as they exhibit consistent approach/retreat interactions and threat/submission gestures. The timeframe for moving through the steps is determined on a case-by-case basis, but should typically be no less than 3 successful interactions for each step before advancing. Groups are considered incompatible if one partner continually attempts to escape from another, or the aggression is severe and constant, as determined by the AV.

1. **Physical Separation.** Designated personnel (AV or PI) will observe animal interactions and development of the dominant/subordinate relationships while there is no physical contact between the animals. This can be accomplished via clear plastic panels, separated mesh dividers, or home cages can be placed in close proximity to each other. Observations must be recorded and will include (but not limited to): signs of aggression (e.g. threatening, grimacing, yawning, charging) or subordinate behavior (e.g. withdrawing, yielding, presentation, unidirectional fear-grinning). Affiliative behaviors will also be noted and include (but not limited to) one or more of the animals preferring to be near the divider and mimicking behavior.

2. **Limited-contact familiarization.** NHPs can touch one another through a partition, but can also retreat if they feel threatened. Initial attempts should include two small holed panels separating the animals. If the animals show affiliative behaviors, then one small holed panel can be used. Finger-fighting through the grate or other aggressive displays are an indication the two may not be compatible. All behavioral observations will be recorded, and the animals will be frequently observed for the first several attempts.

3. **Supervised grouping.** NHPs are allowed free physical access to one another while the AV or PI monitors closely. The AV must be notified and be immediately available during the initial grouping. Some aggression may be tolerated while dominance is established. Minor conflicts may be expected. Reconciliation is an important aspect of social behavior and if the conflict is interrupted too early, the problems may not resolve. During this time some aggression may be tolerated while dominance is established. However, an individual session will be terminated if serious injury occurs or appears imminent. Activity of the animals during the first 30 minutes after pairing is highly predictive of the success of the pair. When it can be established that a group is compatible, then they may move on to “grouping with intermittent supervision”.

4. **Grouping with intermittent supervision.** NHPs are grouped during a portion of or the full “work day”—overnight grouping is not yet considered at this stage. Groupings are checked periodically throughout the day and behavior observations recorded. Food and water should be available at several locations within the cage to decrease resource competition.
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5. **Continuous grouping.** NHPs are checked at least once daily to determine continued group stability. The AV will use professional judgment to determine when a group is considered “stable” and no longer needing specific monitoring of the grouping.

Social stability should be carefully monitored; in cases of severe or prolonged aggression, incompatible individuals need to be separated (Guide, p. 64). If hostility or other signs of incompatibility persists in any of the above referenced steps, the animals will be considered incompatible and a new partner will be identified and evaluated based on current professional standards. *Individually housed nonhuman primates must be able to see and hear nonhuman primates of their own or compatible species unless the attending veterinarian determines that it would endanger their health, safety, or well-being* (AWR 3.81 (a)(3)). If individual animals cannot be co-housed successfully, singly-housed animals will have visual, auditory and olfactory contact with at least one social partner, unless exempt for research purposes (IACUC) or clinical care (AV). There is also considerable positive human interaction provided by laboratory and animal care staff as part of the psychological and environmental enrichment plans, covered under departmental SOPS.

Successfully group-housed animals that are separated due to clinical conditions should be returned to their partner as soon as possible, provided they are fully recovered. If separation is prolonged, separation with a mesh divider may be necessary until compatibility is re-established. Successfully group-housed animals that are separated due to research-related concerns should be returned to their partner as soon as possible, when the portion of the study that required separation has been completed.

EXEMPTIONS AND EXCEPTIONS

*Single housing of social species should be the exception and justified based on experimental requirements or veterinary-related concerns about animal well-being* (Guide, p. 64). Exemptions to this policy may be evaluated based on the experimental and/or clinical requirements of the particular animal.

- **Scientific-related requests** for an exemption to social housing must be submitted to the IACUC, well in advance, by completing the ARIES “Exemption” form. Examples of research-related exemptions that may be considered for review include: viral or antibody status, requirement for continuous monitoring or sample collection, or special instrumentation. If approved, such exemptions may be valid for up to one year, consistent with the annual continuing review of the protocol (AWR 3.81 (e)(2)).

- **Veterinary-related concerns** will be initiated by the AV and focus on temporary single housing due to the NHP’s health or condition, or in consideration of its well-being. These exemptions must be re-evaluated and documented by the AV at least every 30 days (AWR 3.81 (e)(1)).

Additionally, exceptions to social housing of NHPs may be made by the AV. Exceptions will be re-evaluated at intervals determined by the AV.
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1. If a nonhuman primate exhibits vicious or overly aggressive behavior (AWR 3.81 (a)(1)) after at least three failed group-housing attempts (with cohorts that would typically be compatible) it will be singly-housed for the safety of personnel and other NHPs. Future grouping attempts with new partners may be made with these aggressive animals, at the discretion of the AV, as new animals enter the facility. A NHP may be deemed overly aggressive by the AV following fewer than three failed attempts if there is severe aggression displayed.

2. If a nonhuman primate ... is debilitated as a result of age or other conditions (AWR 3.81 (a)(1)), then it will be singly-housed to preserve the welfare of that animal. “Debilitated” may include chronic health issues, excessive stress or distress, or other conditions as determined by the AV.

3. Nonhuman primates that have or are suspected of having a contagious disease must be isolated from healthy animals in the colony as directed by the attending veterinarian (AWR 3.81 (a)(2)). When/if the concern for the contagion has passed, the AV will reconsider group-housing.

Lack of available social partners
In order to better assure a high level of disease biosecurity between study groups, NHPs are often separated within different rooms of the facility. If a study contains an odd number of nonhuman primates or nonhuman primates of the opposite sex (if intact), a NHP may be singly-housed within a study group. The ability to house these nonhuman primates with others from different laboratory groups will be explored and documented by the AV.

Risks of social incompatibility are greatly reduced if...the design of the animals’ enclosure and their environmental enrichment facilitate the avoidance of social conflicts (Guide, p. 64). The PI and AV will discuss the alternate housing strategies that may promote successful introduction attempts. Singly-housed animals may have an opportunity for increased psychological enrichment and/or use of alternate housing designs (e.g. more space than the standard required space—particularly for animals housed singly for extended periods of time due to an approved exemption or exception for social housing). Not allowing periodic release to alternate housing or additional enrichment may be considered for clinical- or research-related justifications, but such requests are expected to be rare.

CONTINUING EVALUATION

As new animals are brought into the facility, NHPs that have previously been unsuccessfully group-housed should be given reconsideration for the group housing process with the new animals. On rare occasions, the AV may determine that a specific animal will not be used in future attempts—this decision will be based on significantly aggressive prior interactions with documentation. Additionally, post-approval monitoring of this policy, practices, and documentation will be routinely evaluated to assure institutional compliance.
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CITED REFERENCES


OTHER REFERENCES

Association of Primate Veterinarians. Socialization Guidelines for Nonhuman Primates in Biomedical Research.

http://grants1.nih.gov/grants/olaw/Macaques.pdf

https://awionline.org/sites/default/files/products/Store-SafePairHousingFullPublication.pdf
