



Johns Hopkins University

Animal Care and Use Committee

Guidelines for Research Animal Housing in Satellite Facilities

PURPOSE: JHU is committed to a uniform standard of excellence in all aspects of its animal care and use program. The entire program is based on the recommendations of the National Research Council *Guide for the Care and Use of Laboratory Animals* (“*Guide*,” 8th edition, 2011). The present document sets forth JHU standards regarding satellite animal housing facilities, outlines the salient features of such housing that must be addressed, and summarizes the activities needed to ensure that the entire animal housing and care program meet JHU standards.

“Satellite facility” is defined as any area outside of JHU’s centrally-managed housing facilities where animals are maintained for more than 24 hours (12 hrs for species covered by the Animal Welfare Act Regulations). Species covered by the Animal Welfare Act (i.e., “USDA species”) include all mammals and wild-caught birds. Rats, mice, and birds that were bred for use in research are specifically excluded from coverage by the Act.

In brief, the elements critical to our success include a laboratory point (or points) of contact (POC) with direct or delegated responsibility for the satellite facility; physical plant and environmental considerations; appropriate choices of caging, husbandry procedures, and sanitation procedures for equipment used with animals; management of caging and supplies; arrangements for daily animal care; and veterinary care.

I. SATELLITE HOUSING APPROVAL PROCESS

The operating standard at JHU is to maintain animals within its centralized animal housing program. The scientific needs of some research programs or particular phases of some projects may not be able to be accommodated within central facilities however. In those cases, satellite housing is requested by the Principal Investigator (PI). The JHU Animal Care and Use Committee (ACUC) reviews and approves the scientific rationale for short- or long-term satellite housing in the context of the applicable research protocol. The Research Animal Resources (RAR) unit assists in reviewing the rationale for and pertinent details of the plan for satellite housing.

The ACUC office provides RAR faculty veterinarians and the Director of Operations/Laboratory Animal Management copies of protocol and amendment applications requesting satellite housing to enable RAR to (1) determine whether the activity can be accommodated within central facilities and (2) provide consultation on the written plan for care in satellite housing. For first-time satellite housing location requests, ACUC evaluation of the request requires a consultative inspection of the location by a designated member of RAR, usually a faculty veterinarian and the Satellite Housing Coordinator, in conjunction with a member of the ACUC Training and Compliance staff.

II. GENERAL CONSIDERATIONS

Regardless of the length of time an animal is housed in an ACUC-approved satellite facility, the PI is responsible for seeing that housing and care are consistent with assuring the welfare of the animals. To facilitate this, the RAR Satellite Housing Coordinator maintains contact with the satellite facility to assure appropriate support, guidance, and oversight of the care of animals housed there.

By their very nature, physical plant, housing, and procedures in satellite facilities will deviate in some manner from those in central facilities. Adherence to the general principles of the *Guide* and to an overarching focus on animal welfare consistent with the needs of the research procedures approved by the ACUC is a basic tenet of this policy. The *Guide* itself sets forth an emphasis on a “performance approach,” as preferable to an “engineering approach.” That is, “Performance standard means a standard or guideline that, while describing a desired outcome, provides flexibility in achieving this outcome\ provides flexibility in achieving this outcome by granting discretion to those responsible for managing the animals care and use program, the researcher, and the IACUC.” (*Guide*, 2011, p. 6).

This document has been written to be very general, but applies primarily to satellite housing of mammals and birds. A supplementary policy applies to fish and aquatic species. Given the wide range of research at JHU, it is possible that this document does not adequately address potential variations on housing and procedures that will arise. We anticipate that variations will be discussed as they arise and incorporated in the laboratory standard operating procedures as appropriate.

III. STANDARDS

A. The Laboratory Point of Contact (POC)

Accountability for the care of animals housed in satellite facilities rests with the PI. The PI may serve as the designated POC or may delegate that responsibility to a qualified member of the laboratory. When delegated by the PI to a JHU staff member, POC responsibility should be listed as a major element on the individual’s job description and annual performance evaluation. In some laboratories, depending on the continuity of animals in satellite housing, it is desirable to appoint a secondary POC as well.

The POC may operate by directing and overseeing others in the laboratory who are performing hands-on care, may perform laboratory-based care as a primary function, or may provide RAR technical personnel with specialty guidance to enable them to care for animals with unique experimental requirements in the satellite facility. The POCs are required to be familiar with and to follow the provisions of this policy and other institutional standards (e.g., RAR policies and ACUC-approved policies and guidelines) in support of the institution’s mission to provide high quality care to all laboratory animals, regardless of housing location.

Laboratories are encouraged to create a simple task list for animal care, to have a posted list of the trained personnel who will provide back-up care in the absence of the primary

caregiver(s), and to clearly establish the mechanism for arranging coverage by back-up personnel. Regardless of the approach to providing care, the POC is seen as responsible for assuring that all animals housed in the satellite receive adequate care every day.

Each satellite facility must have a copy of the *Guide* readily available, and the POC should be familiar with its contents. The *Guide* may be obtained free of charge from the ACUC office. Training and orientation sessions on satellite housing are arranged periodically by the ACUC office and/or RAR for POCs and others who are interested in this topic. In addition, RAR personnel make regular, usually every 2 weeks, visits to each satellite facility, which provides the opportunity for addressing emerging issues relevant to each location.

B. Satellite Room Checklist

Most of the critical elements of a basic program of laboratory-based care are included in a “*Satellite Room Checklist*” used in central facilities, which is available from RAR. This checklist provides a means for recording basic required elements of animal maintenance (i.e., temperature and humidity in the housing location as well as annotation that all animals were visually inspected daily, including weekends and holidays). It may also incorporate other actions performed in support of the animals in that location, as applicable. A modified version of the checklist is permitted if the satellite laboratory records relevant information elsewhere; such documentation should be made available for inspection (for example, by the RAR Satellite Coordinator, ACUC members, and veterinarians). At the minimum, the room temperature, and humidity, checking of rodent live traps (if present), checking of feed/water (unless withdrawal thereof is approved in the ACUC protocol), and abnormal health observations/clinical calls should be recorded.

C. Physical Plant and Environmental Conditions in Satellite Housing Areas

General Principles: According to the *Guide* (Chapter 4, Physical Plant), animal housing facilities should be constructed with smooth, durable, impervious surfaces to aid in maintaining a high level of sanitation and to permit effective pest and infection control efforts. The room interior should have sealed penetrations (for pest control), ceiling mounted and sealed light fixtures, and minimal cabinetry or shelf work. The room heating, ventilation and air conditioning system should provide 10-15 or more air changes per hour in a temperature range suited for the species involved, and between 30-70% relative humidity. Whenever possible, animal housing areas should be isolated from other areas containing personnel who do not need to have animal contact, and the differential airflow between the housing area and other personnel areas should be negative pressure to reduce personnel exposures. All JHU personnel should be afforded the opportunity to work with minimal exposure to animal allergens. In housing areas where wet sanitation of walls and floors is conducted on a routine basis, water resistant (i.e., with ground-fault interruption control) electrical outlets and switches should be installed. Animals should be provided with a regular diurnal light cycle of appropriate duration for the species, unless otherwise approved in their ACUC protocol.

Some satellite housing facilities at JHU were constructed to be consistent with the above. Others are in laboratories, constructed for other purposes, but which may be acceptable if the basic principles of the *Guide* and performance standards are kept in mind. Thus, those

arranging satellite housing in a laboratory should direct their efforts to create an acceptable environment by implementing the following:

1. Place animals in a dedicated, secure area (e.g., lab bay or portion thereof). The door(s) to the room should be locked when responsible personnel are not present.
2. The physical plant in the area should be in good condition. Surfaces should be constructed of materials that can be easily sanitized to the standards required by the research. Remove or seal unsealed wood (e.g., shelves), unnecessary wall attachments, and replace damaged ceiling tiles. The floor, coving, and walls should be free of defects that allow vermin harborage and impede sanitation.
3. Use a light timer to ensure that animals have a regular daily light cycle (unless an exception has been granted by the ACUC for scientific reasons). If a light timer cannot be used, a laboratory process should be implemented to ensure the animals get consistent light cycle on a daily basis. Windows should be blocked to prevent light contamination in the dark phase of the cycle. If the room has windows that provide natural light, a timer is not required; but the room light must be turned off reliably rather than left on overnight. Direct exposure of certain animals (e.g., albino mice and rats) to sunlight should be prevented. Per the *Guide*, for animals that have been shown to be susceptible to phototoxic retinopathy, light should be between 130 and 325 lux in the room at cage level.
4. Ensure temperature and relative humidity fall within the recommended ranges. When temperature or humidity fall out of the *Guide* range for more than three consecutive days, facilities management should be contacted to make adjustments. In some areas, humidity is difficult to maintain at greater than 30% in the winter in Baltimore, even by use of a portable room humidifier. If humidity remains <30%, , monitor the animals daily for clinical signs such as ringtail, nose bleeds, and increased morbidity/ pre-weaning mortality, the "Health Observations" column in the *Satellite Room Checklist* is filled out daily, which documents general and focused health observations

D. General Housekeeping Provisions for Satellite Housing Areas

1. The housing area must be maintained in a clean and orderly condition.
2. The placement of standard rodent housing cages should permit easy visualization of the animals contained within unless otherwise precluded by the requirements of the experimental protocol.
3. The priority should be on arranging the housing area to facilitate sanitation and pest control. Considerations include:
 - a. Remove laboratory apparatus, equipment, furniture, books, papers and supplies that are not needed for ongoing experimental or husbandry. Fabric-covered chairs should be moved out of the area.
 - b. Where practical, movable racks or carts should be used to hold animal cages in the laboratory. The racks or carts ideally will be capable of withstanding sanitation in a mechanical cage washer. If wall mounted shelves or bench tops are used for cage placement, these surfaces should be sanitized when cages are changed.
 - c. Corrugated cardboard boxes should be moved away from the animal housing area, because the glue in them supports vermin propagation.
 - d. Potentially harmful chemicals should not be stored near animal cages, or in biosafety cabinets or fume hoods when animals are present. All risks that a chemical spill would injure or contaminate animals should be eliminated.

- e. Bench space used for animal manipulations should be wiped down with a disinfectant/soap solution after each use.
- f. Sweep and mop the floors of the housing area weekly, or more frequently as needed. Other surfaces in the housing area (e.g., walls) should be sanitized semi-annually, or more frequently as needed.

E. Husbandry/Caging Requirements for Rodents: Type, Sanitation Schedule, Movement to and from Laboratory

1. Rodents housed in laboratories must be housed in microisolator (closed top) caging with a cage lid that is appropriate to the circumstances. These cages aid in infection control, allergen and odor control, and in some cases may improve intra-cage humidity under low room humidity conditions. Whenever appropriate and practical, given the needs of the research, animals/cages in the laboratory should be handled with the infection control techniques (exterior disinfection, manipulation in a biosafety cabinet or cage change station) that are practiced in central facilities.
 - a. Satellite areas that hold mouse populations in excess of 35 cages in rooms that were not designed for animal housing should strongly consider using individually ventilated caging (IVC) rack, if it can be accommodated in the space available. Such a rack helps address issues related to animal health, animal allergens, and cage-changing frequency that may be problematic in satellite facilities. Other containment devices, such as semi-rigid or flexible film isolators, may also be considered for mice or rats in areas with lower cage counts if satellite housing is in a mixed function area. Cage changing in the IVC system should be adequate at the two-week interval used in central facilities.
 - b. Laboratories housing few rodent cages will be provided with static microisolator cages. The tops of these cages are perforated to permit air exchange and dispersion of intra-cage moisture. Static microisolator cages require sanitation weekly for mice, and twice weekly for rats, although longer intervals may be appropriate where rodents are singly housed.
 - c. If specialized caging used for experimental purposes does not provide an effective cage level barrier between the animal and the laboratory environment, a method of secondary containment is desirable if the housing is in a multiple use area. Specialized cages of this type should be designed to permit the detachment of sensitive components and constructed from materials that permit the cage to be washed in a mechanical cage washer on a weekly or bi-weekly basis. **If mechanical washing cannot be done, the method of cage sanitation, including agent(s) used, is to be described in a written standard operating procedure (SOP; see below).**
2. The acquisition of clean cages must be coordinated through RAR, if applicable. Arrangements may be made by the POC to have RAR personnel transport cages to the laboratory.
3. Reassemble dirty cages that contain bedding in the closed position to prevent spillage and access by pests. Transport of cages in the closed-box position is preferred because the piston action of cage stacking has been associated with the airborne spread of pathogens. This may not be practical if large numbers of cages must be moved to the cage wash facilities. If dirty cages are stacked without lids to aid transportation, they must be bagged or covered to prevent the spread of waste, allergens and airborne pathogens during transit. Dirty cages must be taken to the RAR cage wash centers no later than the morning after cage changing. To aid the institutional vermin and infection control efforts, dirty cages with bedding should

never sit in the laboratory un-bagged. Empty water bottles in the lab prior to transport to RAR.

4. To ensure that food remains fresh and uncontaminated and does not attract vermin, it must be stored in a container that is kept tightly closed. The container must have the type and production date (mill date), which are found on the feed bag. Feed must be used before the expiration date, which is 180 days beyond the mill date in most cases. A common method of storing feed in a laboratory is to use a microbarrier sanitized or sterilized rodent cage. A container used for feed storage should be sanitized or replaced with a clean one each time it is emptied.

F. Standards for Sanitation and Specific Practices for Laboratory-Based Animal Care and Use Activities

Equipment used for research animal caging, restraint, transport, or experimentation should be designed and constructed to allow efficient cleaning or sterilization as necessary for effective infection control measures. A sound, comprehensive sanitation program for laboratory-based animal care and use activities involves the following components:

1. All surfaces should be cleaned and wiped with disinfectant before and after use.
2. All equipment used in animal housing or to support animal care or in vivo experimental activities must be sanitized at appropriate intervals as specified below. Pertinent equipment may include, but is not limited to, specialized lab housing systems, exposure chambers, restraint chairs, transport boxes, behavioral testing equipment (e.g., mazes, swim tanks), surgery support equipment (e.g., rodent surgery boards), and bell jars used for anesthesia with recovery. Apparatus that is only used in non-survival applications should be cleaned immediately after use, but documentation of effective sanitation is not required.
3. Equipment that can withstand treatment in the RAR cage washers could be scheduled with RAR for routine sanitation. Equipment that cannot withstand cage washing should be sanitized by appropriate methods devised in the laboratory (see item 8 below), which will need to be verified as efficacious by RAR, as described below.
4. Mechanisms (e.g., schedules, equipment identification codes) should be established so that a record can be kept of equipment that needs to be sanitized and of the dates on which it is sanitized.
5. Laboratories should give high priority to the replacement of equipment that may not be easily sanitized if improved versions that are easy to sanitize are available. If a wooden item is used, it should be sealed with a washable and impervious paint, polyurethane, or varnish that will allow disinfection.
6. In general, the minimum interval for the sanitation of equipment that has direct contact with animals used during in vivo studies is two weeks assuming the animals are all of a similar microbiological background. In some cases, more frequent sanitation may be required. The following list summarizes the usual sanitation recommendations for common items other than caging:
 - a. Large animal food containers on or within cage: Physically clean daily; sanitize every two weeks.
 - b. Large animal water containers: Sanitize every two weeks.
 - c. Mouse caging: Change static microisolator cages weekly; change IVC caging every other week.
 - d. Rat caging: Change static microisolator cages twice weekly.

- e. Rodent water bottles: Provide fresh bottles weekly. Obtain treated water from central facilities if needed for the experiments being conducted. Otherwise, use water available in the laboratory.
 - f. Animal transport devices (e.g., boxes, carts): Clean between animals; sanitize every two weeks, or between animals if warranted by disease conditions.
 - g. Animal restraint chairs/devices – clean between animals, sanitize every two weeks or between animals if warranted by disease conditions.
 - h. Experimental animal exposure chambers: If the animals are contained in a cage within a chamber then every two weeks. If the animals have direct contact with the chamber, it should be cleaned between individuals and sanitized every other week.
 - i. Behavioral test apparatus: Clean between animals or cohorts as dictated by scientific requirements; sanitize every two weeks.
 - j. Equipment used to support animal survival surgery and post-operative care: Physically clean between animals or surgical cohorts (on a given day); sanitize every two weeks during periods of active use and keep area uncluttered.
 - k. Additional items can be discussed during meetings with RAR.
7. Sanitation of items should be recorded on the “*Satellite Room Checklist*” or on a comparably maintained sanitation record that can be submitted to RAR.
 8. Equipment that can be sanitized (or sterilized) in a cage washer is automatically afforded the benefit of existing quality assurance measures (i.e., temperature-time monitoring, microbiological monitoring). However, transportation of some equipment may preclude the use of such washers. As noted in the Guide, hand sanitation is less reliable than cage washing, and the process used must be shown to be efficacious. For caging and equipment that must be sanitized by hand, laboratories should have written SOPs that describe the sanitation process, specify the chemical agents used, and indicate the contact times necessary for disinfection as applicable. RAR will provide guidance on what information should be included in the SOPs and information on the laboratory disinfectants it has available for equipment, and will assist in the selection of suitable agents. Periodic assessment of the efficacy of the sanitation process will be conducted by RAR to determine whether alteration of the sanitation procedure or practices is needed.

G. Disaster plans and incident response

The Satellite Facility is expected to follow the Hopkins Animal Care and Use Program ***Disaster Plan*** unless the Satellite Facility creates a different one, in which case the plan is shared with the JHU Animal Care and Use Committee (ACUC) Office and RAR. Incident response might be led and will be coordinated by relevant personnel, like the PI or the POC.

III. Veterinary Care and Participation in the RAR Rodent Sentinel Surveillance Programs for Animals Housed in Satellite Areas

The program of veterinary care at JHU is housed in RAR, under its Director. The responsibility for veterinary care rests exclusively with the RAR veterinarians. The only exceptions to this policy are those specific elements of clinical care that are associated with the maintenance of an experimental animal that have been defined and explicitly stated in the ACUC-approved animal care and use protocol.

The RAR rodent disease surveillance program will be applied if the satellite facility houses each cohort of rodents for more than 30 days, or as deemed applicable or exempted by the Director of Rodent Resources. Participation in this program will help RAR promptly identify areas of disease that pose a risk for rodent populations in central facilities. Participation will involve either the placement of sentinel animals for the detection of infections or infestations, or the submission of tissues and blood samples from experimental animals residing in the facility at appropriate times.

IV. What assistance will be provided by RAR to Satellite Facilities?

To assure that standards and practices for laboratory animals housed in satellite areas conform to this policy, RAR provides the following assistance:

1. RAR Satellite Housing Coordinator will visit each satellite facility on a regular schedule (usually weekly) to review the provision of care in conformance with this and provide consultation; frequency of visits may increase or decrease as conditions warrant.
2. The RAR rodent technician will review animal health and coordinate submission of samples for disease surveillance activities, if applicable.
3. RAR will supply caging and water bottles, as well as racks and carts to hold rodent caging wherever possible; and will coordinate equipment and supply exchange between the laboratory and central RAR facilities.
4. RAR Satellite Housing Coordinator will perform pre- and post-sanitization quality assurance testing on laboratory equipment on a regular schedule.
5. RAR will help initiate the pest control program, especially putting satellite laboratories in contact with the pest control vendor.
6. RAR will recommend physical plant repairs and improvements to be made by the laboratory on a regular basis. The laboratory should forward the recommendations to the appropriate office to be addressed.
7. RAR will continue to look for new opportunities and approaches to accommodate specialized housing and research needs in central facilities.
8. As part of the overall disaster plan for the Hopkins Animal Care and Use Program, RAR will help manage disasters and related incidents.

REFERENCES:

1. Public Health Service (PHS) Policy on the Humane Care and Use of Laboratory Animals.
2. Guide to the Care and Use of Laboratory Animals (8th ed.), National Research Council's 2011.
3. U.S. Animal Welfare Act Regulations (enforced by the U.S. Department of Agriculture, USDA).