



Title	Rodent Housing – Policy and Guidelines
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Authorized by	IACUC

**I. Background & Purpose**

Central Michigan University (CMU) requires that all use of vertebrate animals for research, teaching and outreach abide by the regulations, standards and guidelines provided by Public Health Service (PHS) Policy<sup>1</sup> or the Animal Welfare Act Regulations (AWARs)<sup>2</sup>, as applicable.

The PHS policy and AWARs contain specific requirements for animal housing. The applicability of those requirements depends on the species housed. The AWARs do not cover “... rats of the genus *Rattus*, and mice of the genus *Mus*, bred for use in research...”<sup>2</sup>, the rodent species typically housed at CMU. These species are instead covered by PHS policy (i.e., rats of the genus *Rattus* and mice of the genus *Mus*) and standards for housing are provided in the Guide for the Care and Use of Laboratory Animals (the Guide)<sup>3</sup>.

**II. Policy**

When USDA covered species (e.g., hamsters, Guinea pigs) are housed at CMU, CMU will follow the exact requirements of the AWARs unless exceptions are justified in writing in an Institutional Animal Care and Use Committee (IACUC) approved protocol.

The remainder of this section defines the minimum standards for housing laboratory rats and mice at Central Michigan University (CMU).

At a minimum, animals must have enough space to express their natural postures and postural adjustments without touching the enclosure walls or ceiling, be able to turn around, and have ready access to food and water<sup>3</sup>. In addition, there must be sufficient space to for animals to rest away from areas soiled by urine and feces. Floor space taken up by food bowls, water containers, litter boxes, and enrichment devices (e.g., novel objects, toys, foraging devices) should not be considered part of the floor space.<sup>3</sup>

In assessing the efficacy of space allocations, the IACUC will consider “variables that may affect the animals’ response to different cage sizes and housing densities include, but are not limited to, species, strain (and social behavior of the strain), phenotype, age, gender, quality of the space (e.g., vertical access), and structures placed in the cage. These issues remain complex and should be carefully considered when housing rodents”.<sup>3</sup>

In non-technical language, it is the policy of CMU and the CMU IACUC that investigators and husbandry staff will follow the space recommendations set forth in the Guide, except when certain other factors are determined to be more important to an animal’s welfare or are experimentally justified. Exceptions may be allowed in some circumstances (e.g., to ensure that social species remain socially housed). In certain cases, the IACUC or Attending Veterinarian (AV) may find that space recommendations are insufficient, and more space must be provided than the minimum (e.g. for strains prone to cage aggression).

Exceptions to this policy must be approved by the IACUC as described in section IV.A. Variance from the space recommendations without IACUC approval as described in section IV.A will be considered non-compliance.

### III. Definitions

- A. Overcrowding: Situation in which the population exceeds the cage capacity guidelines or the pups in a cage have reached the 21-day weaning age.
- B. PI: Principal Investigator (for the purposes of this policy PI may mean a faculty member or their research staff acting on their direction)
- C. Staff: Vivarium (non-research) animal care staff or veterinary staff or designee

### IV. Procedures

#### A. IACUC assessment

- 1. The IACUC considers the space recommendations in Table 3.2 of the Guide<sup>3</sup> to be the minimum acceptable space for laboratory rats and mice unless specific justification is provided to diverge from these recommendations. The justification must include one or more of the following:
  - a. Scientific justification: A rationale has been provided indicating that strict adherence to space recommendations would negatively impact the conduct or outcome of the proposed research (e.g., implants that may be damaged by other animals).
  - b. Animal welfare justification: A rationale has been provided indicating that strict adherence to space recommendations would negatively impact animal welfare (e.g., result in singly housing of a social species).
  - c. The IACUC will also consider other factors that may require implementation of space recommendations that exceed the minimum outlined in table 3.2 (e.g., aggressive species or strain, retired male breeders)
- 2. Exceptions shall be approved:
  - a. In advance in an approved animal care and use protocol
  - b. At the time the exception is determined necessary by either:
    - i. Protocol amendment (preferred method) or;
    - ii. Approval of an exception by the IACUC that must be posted in the animal housing room (e.g., when more than one protocol/PI is potentially impacted) or;
    - iii. Temporary approval of an exception by the AV that must be posted in the animal housing room. Temporary exceptions must be evaluated by the convened IACUC at the next convened meeting.

#### B. Vivarium Implementation:

- 1. If an overcrowded cage is noted by animal care or veterinary staff, an "Overcrowded Cage" card will be placed on the front of the cage notifying the PI of the concern.
  - a. The PI will be notified by e-mail of the room number(s), cage number(s) and the specific concerns noted by staff (e.g., cage appears overcrowded, overcrowding appears to be contributing to aggression, potential overcrowding in a species known for cage aggression)
  - b. Vivarium staff will not handle/weigh the animals unless they have been given permission to do so by the PI, have been directed to do so by the AV or are in the process of routine cage changes.
  - c. The PI will have 48 hours beginning from the time notification is sent to:
    - i. Separate the animals; or,
    - ii. Request that vivarium staff separate the animals; or,
    - iii. Notify staff via notation on the card that the cage has been assessed and is not overcrowded and there are no signs of cage aggression; or,
    - iv. Notify staff via notation on the cage card (or posted exception) of an IACUC approved exception or AV approved temporary exception.
  - d. If the PI fails to respond within 48 hours, then vivarium staff will notify the AV with the details indicated in IV.B.1.a.

- e. If the AV agrees that animals need to be separated, then the AV will either contact the PI (e.g., in cases where there are no signs of cage aggression or other immediate animal welfare concerns) or will:
  - i. Instruct vivarium staff to separate the animals and to;
  - ii. Notify the PI that animals have been separated, including a detailed description of their new location(s).
- f. When instructed to do so by either the PI or AV, vivarium staff shall separate animals by sex, males from females into different cages, using the housing guidelines in C, below.
- g. If the PI is contacted by the AV and fails to respond, then the AV will direct animal care staff to separate the animals.
- h. If the PI responds to the AV and disagrees with the AV's direction to separate animals, they must provide justification to the AV.
  - i. If the AV disagrees with the justification, then they will refer the matter to the IACUC and Office of Research Compliance.
  - ii. If the AV agrees with the justification, they may allow a temporary exception to space requirements, in writing and will notify the IACUC and Office of Research Compliance.
  - iii. The IACUC will discuss the exception at the next scheduled convened meeting.

**C. Mouse Housing Guidelines - Recommended Minimum Space for Laboratory Mice:**

1. Mice >25 g (>15 sq. in/mouse).
2. Mice 15-25 g (12 sq. in/ mouse).
3. Mice 10-15 g (8 sq. in/mouse).
4. Mice <10 g (6 sq. in/mouse).
5. Female with litter (51 sq. in/group).
6. Two females with litters of up to a total of 15 pups can be housed per cage, when cages have a floor area of at least 65 square inches.
7. If a cage with two females contains more than 15 pups, one female with pups must be transferred to a separate cage when the oldest pups are 10 days old.
8. With IACUC approval, two females with litters of up to a total of 9 pups plus a male can be housed per cage (if more than 9 pups, one female with pups must be transferred to a separate cage when the oldest pups are 10 days old).

**D. Mouse Breeding Guidelines:**

1. Monogamous pairing (1 male, 1 female) is the preferred density to prevent overcrowding.
2. If breeding is difficult with the particular mouse strain (example transgenic mice), the investigator can request an exception to the monogamous pairing guideline. If IACUC grants this exception, two females, with litters, and a male can be housed in one cage, according to the cage densities described above. However, second litters from a given female cannot be in the same cage, so the first litter must be removed before the second litter is born.

**E. Mouse Weaning Guidelines:**

1. Mice should be weaned at 21 days of age. The PI will be notified via e-mail if litters have not been weaned after that time. If the PI does not separate the mice, at 48 hrs. after the notification, the litters will be weaned by vivarium staff and separated by sex, males from females into different cages, using the above housing density guidelines.
2. Requests for delayed weaning protocols must be pre-approved by the IACUC with specification of the actual weaning ages. Additionally, cages should be properly labeled by the PI to identify the group of mice approved for delayed weaning, with the approved weaning age stated on the label.

**F. Rat Housing Guidelines - Recommended Minimum Space for Laboratory rats:<sup>1,2</sup>**

1. Rats >500 g (70 sq. in/rat)
2. Rats 400-500 g (60 sq. in/ rat).
3. Rats 300-400 g (40 sq. in/rat).

4. Rats 200-300 g (29 sq. in/rat).
5. Rats 100-200 g (23 sq. in/rat).
6. Rats <100 g (17 sq. in/rat).

#### **G. Rat Breeding Guidelines:**

1. Monogamous pairing (1 male, 1 female) is the preferred density to prevent overcrowding.
2. A litter of rats should be housed only with the mother. No other adult rats should be present. The female rat and her litter should have at least 124 square inches of cage space.
3. If breeding is difficult with the particular rat strain (example transgenic rats), the investigator can request an exception to the monogamous pairing guideline. If this exception granted by IACUC, two females and a male can be housed in one cage, according to the cage densities described above. Pregnant females should be placed in separate boxes before they give birth.

#### **H. Rat Weaning Guidelines:**

1. Rats should be weaned at 21 days of age. The PI shall be notified via e-mail if litters have not been weaned by that time. If the PI does not separate the mice, at 48 hrs. after the notification, the litters will be weaned by vivarium staff and separated by sex, males from females into different cages, using the above housing density guidelines.
2. Requests for delayed weaning protocols must be pre-approved by the IACUC with specification of the actual weaning ages. Additionally, cages shall be properly labeled by the PI to identify the group of rats approved for delayed weaning, with the approved weaning age stated on the label.

#### **References:**

1. PHS Policy on Humane Care and Use of Laboratory Animals. (2015) <https://olaw.nih.gov/policies-laws/phs-policy.htm>.
2. Animal Welfare Act Regulations, 7 U.S.C. 2131-2159; 7 CFR 2.22, 2.80, and 371.7; §1.1. (2018) [https://www.aphis.usda.gov/animal\\_welfare/downloads/bluebook-ac-awa.pdf](https://www.aphis.usda.gov/animal_welfare/downloads/bluebook-ac-awa.pdf).
3. The Guide for the Care and Use of Laboratory Animals, 8th ed. 2011. National Research Council of the National Academies. Washington, D.C.: The National Academies Press.