

CONFIDENTIAL**ANIMAL HOUSING DENSITY****1. Policy statements**

This policy clarifies the minimum space required for animal housing at Comparative Medicine (CM) animal facility. All NUS animal users must follow this policy strictly. This policy is written with reference to the National Advisory Committee on Laboratory Animal Research (NACLAR) Guidelines and the *Guide for the Care and Use of Laboratory Animals*.

2 Definitions

Overcrowding	Housing density that exceeds what is stated in this policy, unless an approved exemption is obtained from NUS IACUC
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3 Scope

This policy applies to all species housed and used for research, testing and teaching in NUS.

For mouse breeding cages, also refer to NUS IACUC's policy on Mouse Cage Density for more details on breeding configurations and the definition of overcrowding, as it pertains to breeding cages.

4 Policy

Animal users are to ensure that their animals are kept within the allowable number written in this policy. Animals must be separated according to sex. Mixed-sex cages are only allowed for breeding purposes.

Overcrowding is a non-compliance issue. Therefore, it **must be corrected in a timely manner**.

When cages found with housing contrary to this policy or are overcrowded, **depending on the condition, as a courtesy, CM may** notify PI prior to separation – by placing an *Overcrowded Card* on the cage and sending a *Notification of Overcrowded* email.

- The overcrowded cages **must be corrected before 2.30 pm the next working day**, or sooner, as indicated by CM. If the overcrowded cage was identified by mistake (such as protocols approved by IACUC), researchers must reply to CM's email and provide information before 2.30 pm the next working day.
- *Notification of Overcrowding* email may be reported to IACUC.
- Overcrowded cages that have not been corrected by 2.30 pm the next business day, or within the timeline indicated by CM, will be separated by CM.

If the overcrowded condition had been found as a recurring issue, i.e. more than one event identified from **the same protocol in the same month**, or the condition is accompanied by a health or welfare related concern/issue, the separation will be done by CM **without prior notification** to the PI/researcher, following approval from the CM veterinarian.

For all cage separation done by CM due to overcrowding:

- A follow up email will be sent to the PI to notify about the separation, location of the cage, and charges.

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- These notification, assessment/monitoring and separation service fees will be charged to the PI (S\$ 25/cage). This will also be reported as a non-compliance to IACUC
- CM will not be held responsible for loss of research data or breeding data due to separation of overcrowded cages.

Specific information for mice breeding cages

1. Principal Investigator (PI) is responsible for ensuring adherence to this policy, and prevent overcrowding.
2. PIs/researchers must pre-emptively manage cages to prevent overcrowding as defined by this policy. It is the researcher's responsibility to maintain accurate breeding records, and wean pups in a timely manner.
3. It is not acceptable to rely on CM's Notification on Overcrowding email, or placement of the Overcrowded Card on the cage, before taking action to separate animals for weaning.
4. Litter card is available and can be used to properly track date of birth and weaning date.
5. It is strongly recommended that information regarding approval for trio breeding, alternative trio breeding, or weaning extension based on the protocol, be indicated on the cage card for cages with strains approved for that configuration.
6. If the weaning extension is not approved by protocol, this extension can only be done when approved by CM veterinarian on a case-by-case basis, based on clinical conditions/veterinary care reasons. The cage will be treated as a clinical case, tagged with an orange card, and the yellow form will be completed.

Table 1 provides the guidelines listing the maximum housing density for the different species, based on the type and size of primary enclosure (cages/pens/tanks) available at CM. This also takes into consideration blanket exemptions approved by NUS IACUC.

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5. Table 1

Species	Specification	Weight	Maximum number per cage	Note
Mice	Adult - Non-breeding protocol			
	Standard IVC mice cages	>25g	5 animals of the same sex	
	ABSL-3 BCU cages	>25g	4 animals of the same sex	
	Quarantine BCU cages**	>25g	5 animals of the same sex	
	Adult - Breeding protocol			With or without pups
	Standard IVC mice cages	Pair breeding [#]	1 male, 1 female	Refer to IACUC's Policy on <i>Mouse Cage Density</i>
		Trio Breeding ^{*#}	1 male, 2 females	
		Alternative Trio Breeding ^{*#}	1 male, 2 females	
	Pups	Up to 21 days	From the same litter or breeding group	
Rats	Non-breeding protocol			
	Standard IVC rats cages	< 500g	2 animals of the same sex	
	Multi species IVC rodents cages	>500g	3 animals of the same sex	
	Adult - Breeding protocol			
	Pair breeding [#]	< 500g	1 male, 1 female	
	Pups	Up to 21 days	From the same litter or breeding group	

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Species	Weight	Maximum number per cage	Note
Guinea Pigs	<350g	10	
	>350g	6	
Rabbits	<2kg	3	Two cages can be combined to allow socialization
	> 2 k	1	
Non-human Primates	< 1.5kg	2	Two cages can be combined to allow socialization
	>1.5 kg up to 10 kg	1	
Swine Large Pen	<15kg	4	Multiple cages can be combined to allow socialization
	<25kg	4	
	25-50kg	2	
	50- 100kg	1	
Swine Small Pen	Up to 25 kg	2	
	25- 50kg	1	

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Species	Tank Size	Maximum number per tank	Maximum number per tank
Zebrafish*		Breeder (Monthly Spawning)	Stock
	1 litre	8	10
	3.5 litres	30	35
	8.5 litres	70	85
Medaka		Breeder (Monthly Spawning)	Stock
	1 litre	3	5
	3.5 litres	10	16
	8.5 litres	26	42
Killifish		Breeder / Stock	
	10 litres	5	
	30 litres	15	
All fish larvae		Static Tank (<1 month old)	System (1-3 months old)
		20 per 400 ml of water	20 per litre of water
Xenopus	40 litres	13	

Reference to IACUC Policy on Mouse Cage Density dated 16 January 2012.

*Exemption of housing space approved by IACUC

** Approval must be obtained from CM management prior to arrival into quarantine

6. References

1. Guide for the Care and Use of Laboratory Animals. National Research Council, 2011.
2. Guidelines on the Care and Use of Animals for Scientific Purposes. National Advisory Committee for Laboratory Animal Research. 2022
3. 1. The Laboratory Xenopus sp. Sherril Green ASBN 978140091090

7. Related documents/SOPs

1. IACUC Policy on Mouse Cage Density
2. CM SOP 579: Husbandry of Small Laboratory Fish

Revision

Created

Revisions to:

1. ensure policies are in compliance with the NACLAR Guidelines 2022 and the updated Animals and Birds (Care and Use of Animals for Scientific Purposes) Rules 2004; and
2. up-to-date with current practices

No revision needed.

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