



CM SOP #400 – Rodent Cage Changing

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I. Purpose & Scope

This Standard Operating Procedure (SOP) establishes standardized procedures for routine cage changing of mice and rats housed in Comparative Medicine facilities in order to maintain appropriate sanitation, animal welfare, and biosecurity.

This SOP applies to all personnel performing cage changes for rodents housed in:

- Tecniplast Emerald mouse cages
- Tecniplast Greenline mouse cages
- Tecniplast Emerald and Greenline DVC cages
- Innovive disposable mouse cages
- Tecniplast Greenline rat cages
- Tecniplast Greenline double-decker rat cages

Cage changing procedures must:

- Maintain barrier integrity
- Prevent cross-contamination
- Minimize animal stress
- Ensure animals remain clean and dry

II. Roles & Responsibilities

Comparative Medicine Staff

Comparative Medicine staff responsible for husbandry duties must:

- Perform cage changes according to this SOP.
- Maintain separation of clean and dirty equipment.
- Handle animals using appropriate restraint techniques.
- Ensure cages contain adequate food, water, bedding, and enrichment.
- Maintain correct cage identification during cage transfers.
- Collect dirty bedding samples as required for the environmental health surveillance program.
- Ensure samples are collected only from cages assigned to the appropriate surveillance group.
- Prevent cross-contamination between racks, rooms, and research colonies during bedding transfer.
- Ensure surveillance cages or sample containers are properly labeled and handled according to the health monitoring program.
- Follow all PPE, biosafety, and facility procedures.

Research Staff, Students, Visitors

Research staff performing cage changes must:

- Follow this SOP and facility procedures.



- Maintain cage identification and experimental integrity.
- Ensure procedures are consistent with approved IACUC protocols.
- Complete required training prior to performing cage changes.

CM Management

Facility Managers and supervisory staff are responsible for:

- Ensuring staff are trained and competent.
- Ensuring cage change schedules maintain appropriate sanitation.
- Providing appropriate equipment and supplies.
- Monitoring compliance with this SOP.

CM Director and AV

The Director and Attending Veterinarian are responsible for:

- Oversight of cage sanitation practices.
- Establishing cage change frequency standards.
- Ensuring procedures align with regulatory and veterinary best practices.

III. General Notes & Definitions

- Do not leave animals unattended in the CCS with the cage lid open.
- Animal room doors must remain closed except when actively passing or moving equipment through. Do not prop the doors open.
- **Barrier cage:** Micro-isolator housing system designed to prevent contamination.
- **Static Caging:** Rodent housing cages that are not connected to a rack ventilation system and rely on passive air exchange with the room environment through a filtered cage lid or micro-isolator top.
- **IVC (Individually Ventilated Cage):** Cage connected to rack ventilation.
 - **TPG:** Tecniplast Green Line Caging
 - **TPE:** Tecniplast Emerald Line Caging
 - **IC:** Innovive Caging
- **DVC (Digital Ventilated Cage):** Tecniplast IVC system with digital activity monitoring.
- **Change Station (CCS):** Cage changing station or biosafety cabinet used during cage transfers.
- **Spot Change:** Partial cage replacement when bedding becomes excessively wet or soiled.
- **Standard Change Frequency** (unless otherwise approved)

	Minimum frequency	Spot changes if
Mouse IVC bottoms (≤ 3 adults)	q 4 weeks*	cages become: <ul style="list-style-type: none"> • Wet • Excessively soiled • Compromised
Mouse IVC bottoms (4-5 adults)	q 2 weeks	
Rat IVC bottoms	weekly	
Static caging	weekly	
Tops & associated components	q 4 weeks	
Water bottles	Replace when ≤100 mL of water remains	<ul style="list-style-type: none"> • Contamination is observed • Bottles or sippers are damaged • Sanitation concerns are present



*CM has an approved exemption to the required cage sanitization frequency of every 2 weeks as outlined in IACUC Policy 10.4.7 'Sanitization of Housing and Experimental Equipment by Research Laboratories and Comparative Medicine' wherein low-risk, low-density cages can have their cage change interval extended by no more than 2 weeks.

- **Litters**
 - Cages containing newborn litters should not be routinely changed during the first 3 days post-partum, unless sanitation conditions require intervention.
- **Clean/Dirty Separation**
 - Clean and dirty materials must remain physically separated throughout cage changing procedures.
 - Never open two cages in the CCS at one time unless combining animals for breeding-related purposes.
- **Sentinel-Free Environmental Health Surveillance (Dirty Bedding Surveillance)**
 - CM utilizes a sentinel-free environmental health surveillance program in which soiled bedding from colony cages is transferred to designated surveillance cages for microbiological monitoring of rodent colonies.
 - Dirty bedding collection is performed during routine cage changing and must be conducted in a manner that prevents cross-contamination between rooms, investigators, or housing units. This practice is utilized for Innovive caging (IC)

IV. Materials & Equipment

Typical equipment and supplies include:

- Cage changing station (CCS) or biosafety cabinet
- Clean cage setups appropriate to species
- Bedding
- Enrichment materials
- Rodent diet
- Water bottles or autowater valves
- Approved disinfectant
- Disinfectant wipes or towels
- Clean and dirty transport carts
- For Innovive disposable caging:
 - Sentinel-free environmental surveillance cage or sample container
 - Dedicated scoop or collection utensil
 - Clean surveillance cage (if using bedding-exposure cages)
 - Labels or identification materials for surveillance cages
- Personal protective equipment (PPE)

V. Procedure

A. Preparation

The day before scheduled cage changing:

1. Ensure sufficient supply of complete cage set-ups for the type of caging needed and, in coordination with cagewash technicians, stage clean setups on a cart or presentation rack for use the following day.
2. In the designated room, ensure an adequate supply of extra enrichment, rodent diet, water bottles, appropriate glove disinfectant, disinfecting wipes, gloves, and cage cards (for the applicable animal use protocol[s]).



3. Reserve the CCS for the duration of the changes.

Day of cage changing:

1. Cover (if applicable) and transport all prepared cleaning caging and supplies to the animal room to be changed.
2. Gather the following as needed:
 - a. foaming hand pump with disinfectant
 - b. disinfectant wipes,
 - c. autowater valves, empty valve tray or empty static rat cage to collect dirty bottles,
 - d. Wypalls,
 - e. pen and paper,
 - f. step stool,
 - g. kneeling pad.
3. Verify the cage changing station is operating properly.
4. Disinfect all interior surfaces of the change station.
5. Prepare clean cages containing:
 - a. bedding
 - b. enrichment
 - c. food hopper
 - d. water bottle or autowater valve
6. Arrange supplies to maintain clear clean/dirty workflow.
7. Inspect all breeder cages scheduled for changing from the outside to ensure that there are no PND4 litters or younger present.
8. *Review cage cards and posted instructions for special husbandry requirements.*

B. Cage Changing

All cage changes must be performed inside a cage changing station.

1. Disinfect the work surfaces of the CCS before first use, between differing PIs, and after use.
2. Remove the first dirty cage to be changed wipe down cage slot pipes, hinges and metal bars (if present) with appropriate wipe (as approved by management) and place the wipe inside the slot to mark the spot.
3. Place the **dirty** cage inside the station on the **dirty** side.
4. Place the **clean** cage setup on the **clean** side.
5. Transfer the cage card or identification device to the clean cage.
6. *Cages with autowater systems:* If a bottle is present with a long sipper due to the presence of recently weaned animals, check the wean date on the cage card and remove the water bottle if the date has passed.
7. *Cages with water bottles:* replace only if less than 100 ml of water remain.
8. Remove cage lid as appropriate for the type of caging and food hopper as needed.
9. Disinfect gloves by using a foam pump and rubbing hands together (comparable methods are permitted with approval from CM management).
10. Transfer animals carefully from dirty cage to clean cage using non-aversive handling techniques, minimizing animal handling time and stress, but doing a brief external exam during the transfer. Take care that the animal is not dropped and can not escape.
 - a. When small pups are present, scoop the pups and their nesting material up with both hands when possible
 - b. Be aware that pups that are nearing wean age may “pop” up.
11. Note any health or welfare concerns.



- a. For emergency health concerns, secure the animal(s) and contact the vet staff immediately.
 - b. For non-urgent health concerns, place a *Health Concern Vet Evaluation* card on the front of the cage and follow *CM SOP 202: Rodent Health Monitoring and Reporting*.
 - c. Remove any dead mice or rats, place in a carcass bag, label appropriately, and follow *CM SOP 202: Rodent Health Monitoring and Reporting* for documentation and reporting instructions.
 - d. Report overcrowded cages per *CM SOP 202: Rodent Health Monitoring and Reporting*.
12. Transfer a small amount of nesting material to the new cage when appropriate.
 13. Transfer or add enrichment as required. *Note: remove from circulation any damaged, excessively worn/soiled, or foggy enrichment devices.*
 14. During partial change-outs, dump old food and transfer cage top and associated parts to the new, clean cage.
 15. Ensure food is topped off in the hopper.
 16. Secure the cage lid properly, confirming all animals can move about the cage freely.
- C. Water and Feeding**
- During cage changing:
1. Ensure adequate food is present
 2. Ensure water source is functional
 3. Water bottles should be replaced only when ≤ 100 mL remains or when sanitation concerns exist.
 4. Autowater valves must be inspected for proper function.
 - a. Install a clean autowater valve if required.
 - b. Wipe valve with a Hydroxigard wipe prior to replacing cage in slot
 - c. After placing the cage on the rack:
 - (i) confirm proper seating
 - (ii) verify water flow
 - (iii) Inspect bedding beneath the valve for leaks.
- D. Dirty Bedding Collection** (Innovive disposable caging only)
- For Innovive racks with disposable caging, dirty bedding must be collected during routine cage changing as follows:
1. After transfer of animals and closing the clean cage, but before closing the dirty cage, use the dedicated transfer scoop to transfer ~2-5 ml of dry, dirty bedding with fecal material (avoid wet or excessively soiled bedding) to the designated surveillance cage (see *CM SOP 201: Environmental Health and Monitoring for Innovive Caging*) and replace lid.
 2. Repeat for all cages within the assigned rack or colony group until all cages have been changed on the side of the rack or until the surveillance cage is ~50% full (if necessary, start a second surveillance cage).
 3. Once all bedding collection and transfer is complete, close and label the surveillance cage and place on the top left slot on the rack.
- Dirty bedding collection must not compromise barrier integrity or introduce contamination between research colonies.
- E. Cage Placement**
1. Return the clean cage to the appropriate rack location and remove the wipe from the water valve.
 2. Place the cage into the slot and push until it 'clicks' into place.



3. Confirm cage ventilation connections when applicable.
4. Ensure animals have immediate access to food and water.
5. Continue from left-to-right, top-to-bottom until the complete rack side has been changed, or as assigned.
6. Change gloves between cages of different investigators, after completion of one rack side, or when gloves become soiled or damaged.

F. Completion of Cage Changes

After completing cage changes:

1. Verify each clean cage contains:
 - a. animals
 - b. food
 - c. functional water source
 - d. appropriate enrichment
2. Verify that there are no remaining animals in the dirty cage (if a breeding cage, spend extra time confirming all pups have been transferred).
3. Ensure cage lids are fully secured and that animals can move freely.

G. Post-Procedure

1. Remove debris and bedding from work areas.
2. Disinfect the cage changing station.
3. Transport dirty cages to cagewash and place in the appropriate Innovive bags.
4. Bring the bags of dirty Innovive caging to the associated gaylord box in the dirty side hallway or cage wash.
5. Dispose of waste appropriately.
6. Complete husbandry documentation.
7. Report any animal health concerns according to *SOP 202 – Rodent Health Monitoring and Reporting*.

VI. Health & Safety

Personnel must comply with all vivarium safety requirements including:

- Required PPE
- Biosafety procedures
- Ergonomic practices
- Safe animal handling techniques

Eating, drinking, and applying cosmetics are prohibited in vivarium areas.

VII. References & Attachments

- *Guide for the Care and Use of Laboratory Animals*. National Research Council
- Public Health Service Policy on Humane Care and Use of Laboratory Animals
- Biosafety in Microbiological and Biomedical Laboratories (BMBL)
- Related SOPs:
 - SOP 402 – Rodent Husbandry and Care
 - SOP 202 – Rodent Health Monitoring and Reporting
 - SOP 201 – Environmental Health and Monitoring for Innovive Caging
 - SOP 102 – Sanitizing the Vivaria

VIII. Revision History

Revision Date	Revision Number	Summary of Changes
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03/22/17	3	Added section for FM and AV, updated formatting, removed 71 exemptions, removed open-top rat cages, added 35B exemptions
07/26/2017	4	Added checking food and water in cages once changes are complete.
11/14/2017	5	Changed static cage interval to once per week rather than every two weeks
12/05/2017	6	Added discard any food that is off color, wet, sticky, moldy etc.
7/1/20	7	Added auto water valves, clarified "rack cleaning", changed section 5.d.xviii to exclude dirty bedding, made some changes to the order of information, added information about enrichment devices
2/17/2021	8	Overhaul of procedures to improve efficiency
4/3/2024	9	Removed old caging and general updates, added DVC
7/10/24	10	
03/09/2026	11	Complete rewrite: reduced unnecessary or redundant details, streamlined processes, removed sections on: spot changes (found in SOP 402), rodent health concern reporting details (found in SOP 202), how to handle overcrowded caging (SOP 202), added language related to extended cage change interval approval, procedural change to change tops/parts monthly and water bottles only when below a certain level rather than at a set frequency, removed details on DVC caging (out of use currently, will create a standalone SOP when relevant)

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