

Guidance for the Control of Animal Allergens

I. Background

Laboratory animal allergy (LAA) is an occupationally acquired condition that affects up to 1/3 of laboratory animal personnel. Technicians that provide animal care can be exposed to abnormally high levels of allergenic animal proteins which can lead to LAA. The most common symptoms are rhinitis, conjunctivitis, contact dermatitis and asthma. Within the affected population 10% are likely to develop LAA related asthma. The most common LAA is in response to rodent urine proteins from the house mouse (*Mus musculus*) and the common rat (*Rattus norvegicus*). Currently there are no maximum exposure levels set in the United States. However, the University of Minnesota Health and Safety Steering Committee has recommended the maximum exposure be no more than 0.005 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) of these rodent urinary proteins over a half hour period.

II. Recommendations

The UW EHS Environmental & Occupational Health (EOH) program recommends animal allergen exposure levels as low as reasonably achievable and when possible below the 0.005 $\mu\text{g}/\text{m}^3$ level recommended by the University of Minnesota (UM). Personnel who are already allergic, or considered high risk (positive mouse/rat protein skin test or highly atopic) do not have a recommended exposure level, and should have an individual risk assessment completed from their personal physician or UW Occupational Medicine staff before engaging in work with laboratory animals.

III. Procedure

Initial Data Gathering

- Determination of allergen exposure levels in rodent facilities throughout campus have been collected through air sampling of various areas and work practices. Allergens measured will include mouse urinary protein (Mus m1) and rat urinary protein (Rat n1) where applicable. This data will be used to characterize facilities by allergen exposure level.
- UW employees with animal contact will be asked to complete the Animal Contact Risk Questionnaire (ACRQ) or Service Personnel Limited Animal Area Access Form (SPLAAAF) depending on animal contact. These forms consist of questions about: the areas they work in, species, engineering controls, personal protective equipment, and asked to list their respiratory and allergy symptoms both current and prior to starting their position.

Personalized Risk Assessment (PRA)

- All employees receive a personalized risk assessment consisting of the current ACRQ or SPLAAAF. For personnel with a pertinent history of or current significant allergies, a medical evaluation is recommended. The ACRQ, SPLAAAF and medical evaluation is already an established workflow administered by Occupational Health & Medicine at UHS.

Facility Exposure Reduction:

- Based on the data gathered, areas with high allergen levels will have engineering controls evaluated and recommendations for improvements made where appropriate. If improvements are not possible, PPE requirements will be increased to reduce exposure to employees in those areas.
- Areas may be re-sampled after engineering improvements have been made and re-characterized, if needed.

Workflow:

- For personnel referred for medical evaluation, medical history including past allergy history will be reviewed. Allergens of particular interest include mouse urinary protein and rat urinary protein; however, all animal contact cases are reviewed. Based on the medical review, employees will be ranked into allergy risk groups by medical personnel.
- Ongoing Monitoring: All employees will receive ongoing allergy management review. Employees in high risk, medium and low risk groups will all be reviewed annually.

IV. Managing Exposure and Medical Risk Categories

Work environments will be classified according to the following characteristics.

1. **Exposure Guideline:** The UM references a guideline exposure level of 0.005 $\mu\text{g}/\text{m}^3$ for mouse urine protein over a 30-minute period. Based on workplace monitoring, certain ventilation practices are more successful than others at achieving airborne allergen levels below 0.005 $\mu\text{g}/\text{m}^3$.

2. **Facilities with Preferred Local Exhaust:** Preferred local exhaust systems are considered facilities with one of the following ventilation systems:
- Class II Biological Safety Cabinet (BSC) for cage changing and/or cage dumping
 - Animal Transfer Station for cage changing
 - Class I Biological Safety Cabinet for cage dumping

Monitoring of facilities that use these devices indicates levels of airborne allergens are often close to or below the exposure guideline.

3. **Facilities Without Preferred Local Exhaust:** Facilities without local exhaust systems are not recommended for cage changing or dumping without use of respiratory protection.

Note: air monitoring data during cage changing operations with the use cage washer dust collection systems indicate airborne allergen levels well above $0.005 \mu\text{g}/\text{m}^3$ and are therefore not considered preferred.

Employees will be assigned to the following medical risk categories:

High Risk: Employees with existing, significant symptomatic allergies including asthma to mice and/or rats, or to other laboratory animals that they work with. These employees may have tested allergic to Mus m1 or Rat n1 and/or display significant allergic symptoms upon exposure to mice, rats or other animals they are working with. They may also display symptoms upon exposure to dirty bedding and cage wash areas, as well as other contaminated rodent equipment. High risk employees who have symptoms not well controlled with medication are of particular concern. These employees will be advised to avoid allergen exposure by preferentially avoiding exposure completely or by working in areas where cage dumping or changing is either not performed or with the aid of Preferred Local Exhaust Systems. Respiratory protection should be utilized as needed when working in any facility housing animals for which allergies exist for the employee. Powered Air Purifying Respirator (PAPR) use is recommended. Respirator usage requires a written respiratory protection plan, medical clearance and fit testing for tight fitting masks prior to use.

High risk personnel should minimize work in rodent facilities by themselves and should not be assigned as the exclusive caretaker for areas containing rodents on weekends or holidays.

Where medical limitations to perform a job safely are identified or participation in occupational health services is declined, the associated workplace health and safety concerns will be discussed with the employee. The campus process for accommodating medical limitations will also be reviewed. If either medical limitations or declination of health services could result in a significant risk of substantial harm to the individual or others, UHS shall make a referral to the respective Divisional Disability Representative for review of possible workplace accommodations to reduce the associated risk.

Moderate Risk: Employees with symptomatic animal allergies well controlled through medication. Individuals with a history of sensitization to Mus m1 or Rat n1, determined by detectable IgE or positive skin test results to either protein. Individuals with well controlled allergen-based asthma but not to lab animals, may also be placed in this category. This may include personnel with eczema, hives, allergic rhinitis, or seasonal hay fever.

Medical professionals will place employees into this category based on a comprehensive evaluation that determines that the individual is at a risk of allergy progression based on past history and current medical state. Cage changing and dumping for employees in this category should be done only with the use of Preferred Local Exhaust Systems. Where such systems are not available or where entry into facilities where preferred systems are not used is necessary, respiratory protection in the form of N95 or PAPR use is recommended, pending the implementation of proper administrative and engineering controls.

Low Risk: Employees without a history of sensitization to Mus m1 or Rat n1, and without current existing allergies.

Personnel in this category may have a history of past allergies, metal sensitivity or use of immune modulating drugs such as corticosteroids. Personnel in this category should update their animal contact questionnaire if allergic symptoms are noted during or after working with animals or if they develop other allergies. Individuals in this group can work in any facilities, however, voluntary respirator use is encouraged.

V. Practices to Reduce Allergen Levels

A. Transport of animal waste and bedding in sealed containers. Facilities that transported waste in sealed containers by simply replacing the microisolator lid on the cage had lower levels of rodent urine proteins present, based on monitoring data. This is an easy practice to implement and is also a best practice in terms of biosecurity. It also allows more versatile temporary storage of animal waste in areas like animal hallways without unnecessarily exposing users of the hallways.

B. Use of wet or damp floor cleaning implements instead of dry sweeping. Dry sweeping was identified as a dust/aerosol generating activity based on air monitoring results. Dry sweeping after cage changing is not recommended as it re-aerosolizes any rodent urine proteins present in settled dust. Wetting the debris prior to sweeping is recommended. If dry sweeping must be done, respiratory protection and safety goggle use is recommended for moderate and low risk employees and required for high risk and moderate risk employees with allergy history.

C. Integrated cage dumping and washing ventilation systems have shown to not provide sufficient containment for hazards aerosolized during cage dumping. While they may reduce the levels of allergens and dust, levels well above those recorded during table top changing were still present. Systems such as the Garbel and Washer Solutions SafeAir Dust Collection System units do not fully protect the employee from exposure to aerosols from the cage bedding and therefore should not be the primary

means of protection. For hazards that require ventilation or respiratory protection, a Class I BSC Cage Dump Station must be used when dumping these cages. Cage dumping into a Gar-bel with a Washer Solutions SafeAir Dust Collection System unit is considered a high-exposure activity and respiratory protection is required.

