



Lab Animal Allergens: Exposure Control Plan
Revised November 2016

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Purpose of Document

UBC is committed to providing a safe and healthy environment for staff and faculty. The purpose of this Exposure Control Plan (ECP) is to outline the key responsibilities and establish expectations that will effectively reduce the frequency and severity of occupational exposure to Laboratory Animal Allergens.

This plan outlines best practice recommendations for all UBC staff and students exposed to fur-bearing laboratory animals or the cage-related materials (bedding, excrement, etc.) which may result in a condition termed Laboratory Animal Allergy (LAA). UBC staff includes technicians, animal care workers, veterinarians, researchers, and scientists.

Each department or facility that has employees at risk for occupational exposure to LAA will develop specific guidelines or Standard Operating Procedures (SOP's) in addition to this plan.

Lab Animal Allergies

Allergies are the body's immune response from exposure to proteins called allergens. In animal settings, the sources of allergens include dander, scales, fur, tissues, serum proteins, body wastes, and saliva.

An individual may be exposed to allergens by inhalation, direct contact with the skin, airborne contact with the eyes and mucous membranes, or through breaks in the skin from bites or scratches.

Inhalation is one of the most potent routes of exposure. Allergens can be released into the air as animals shed fur or dander and when materials containing allergens are disturbed.

It is important to note that persons do not have to work directly with animals to be exposed to animal allergens. If allergens are released into the air, anyone in the in the air space may be exposed.

Once LAA has been diagnosed and sensitization takes place, even small doses of exposure can trigger an allergic reaction. Allergic reactions may be very serious, potentially such that staff may no longer be able to enter their workplaces. This can lead to career-altering consequences. For these reasons, prevention is a key strategy in reducing the potential for this to occur. It is therefore of great importance that personnel who work with laboratory animals understand the risk factors, the routes of exposure, the signs and symptoms, and the preventative measures to be taken as they relate to LAA.

Roles and Responsibilities

UBC Departmental Managers/Supervisors/PIs will:

- Conduct risk assessments to identify hazardous workplace activities leading to allergen exposure.
- Ensure the hierarchy of controls is implemented with engineering controls being the first line of protection against hazards and PPE being the last.



- Ensure staff is trained on the use of engineering controls, administrative controls, and PPE controls.
- Ensure engineering controls are inspected and maintained as per manufacturer requirements.
- Ensure those requiring the use of a fit-tested respirator for respiratory protection are fit-tested annually. Individuals who have successfully passed a fit test are provided a card by Risk Management Services affirming the make and model of respirator successfully fitted.
- Ensure employee access to appropriate PPE to safely carry out job duties.
- Ensure the workplace equipment and processes are inspected regularly.
- When respirator use is required, ensure employees who have not been successfully fit tested within the past one year are not permitted to perform tasks requiring respirator use until a successful updated fit test has been achieved.
- Communicate safety controls decisions to each affected employee.
- Be aware of workplace tasks that can increase employees' exposure to animal allergens.
- Accommodate employees, where possible and without undue hardship, who have medical needs that divert from standard workplace practices.
- Suggest employees with specific health concerns consult with Occupational & Preventive Health or their family doctor.

UBC Employees will:

- Review with this Exposure Control Plan in its entirety.
- Ensure the proper hierarchy of controls are used when carrying out tasks.
- Provide a copy of your fit test record to your supervisor.
- Ask your supervisor if you have any questions related to the appropriate use of safety controls.
- Never perform a task for which a safety control is required but not available.
- Always use required safety controls correctly.
- Never use any safety controls that are defective or damaged.
- Participate in and document training received for safety controls (i.e. biological safety cabinets / respirators etc.).
- Always have available a current record of up-to-date respiratory fit test.
- Never perform tasks requiring respiratory protection when a successful fit test has not been achieved within the past one year.

Occupational & Preventive Health (OPH) will:

- Be a resource for UBC faculty, staff and departmental managers.
- Assist employees, supervisors and RMS in identifying individuals at risk and requiring respiratory protection.
- Provide medical clearance to employees required to wear a fit-tested respirator.
- Address medical problems and questions related to respiratory protection.



- Provide referral services to Occupational Health Physician where required.

Risk Management Services (RMS) will:

- Distribute the current Exposure Control Plan where required.
- Periodically audit departmental compliance.
- Review all exposure incidents using the RMS Accident/Incident Online Reporting tool.
- Administer Respiratory Fit Tests.
- Maintain records of Respiratory Fit Tests and provide a copy to the employee.
- Refer employees to OPH for medical clearance to safely wear respiratory protection when needed.
- Assist employees and supervisors in identifying individuals at risk and requiring respirator protection.

Hazard Identification

Overview of Lab Animal Allergens

Studies reported by The National Institute of Occupational Safety and Health (NIOSH) estimate that those staff who do not use protective measures when handling animals are at significant risk of development of animal allergies, including some who will develop asthma as a consequence to their animal exposure activities.

Personnel who regularly handle the animals are at the greatest risk of developing allergies. These would include workers who are responsible for carrying out specific procedures including shaving, injection, surgical processes or working with contaminated bedding, like during cage changing/dumping. Since allergens can become airborne on small particles or be carried on hair and clothing, people who do not directly work with animals may also be exposed.

Sensitization may occur as early as several months after exposure but may take many years to develop. Workers may develop symptoms even when exposed even to small amounts of the allergen. Epidemiologic studies have also shown that the greater exposure to animal allergens, the more likely workers will become sensitized and have symptoms related to occupational exposure.

Transmission and Symptoms

The principle route of exposure to animal allergens is inhalation of aeroallergens. Direct skin and eye contact is also a common route of exposure. Early symptoms may include rhinitis (runny or stuffy nose), conjunctivitis (eye redness or irritation), watery or prickly eyes and skin rashes. Other symptoms may develop such as difficulty breathing or asthma-like symptoms.



Skin reactions could include hives at the site of contact with the animal, animal urine or dander. Skin reactions may also be the result of local contact by animal bite or scratch. An itchy, reddened rash to the skin may occur under protective clothing as a result of systemic reaction to respiratory exposure to laboratory animal allergens.

In rare instances anaphylaxis may occur, which may be characterized by difficulty swallowing, progressing to severe life-threatening difficulty breathing. This severe reaction requires immediate medical intervention.

Risk Assessment

Employees at Risk

There are many levels of exposure to animal allergens. The highest exposure level typically occurs in handlers who have significant time-related and direct exposure to the animal. Examples of high exposure level are cage cleaning and feeding animals. Lower level exposures may include intermittent or occasional experimental use of animals. Those with minimal or no exposure may include persons working in an animal facility who have little or no contact with the animals, such as administrative staff.

In looking at specific tasks, cage cleaning and manipulating live animals are associated with significantly higher levels of airborne animal allergen exposure. Where these risk factors are significant, supervisors should make implementing the hierarchy of controls a requirement. For example, any high-risk activities should be carried out with proper engineering controls and PPE should be worn as the bare minimum.

Work activities which require special attention when assessing exposure include (in no particular order):

- handling animals;
- feeding or watering animals;
- transporting animals;
- performing procedures on animals (surgeries, necropsy, etc.);
- cage cleaning and dumping;
- room cleaning;
- disposal of allergen-contaminated waste.

Please note: Air quality sampling is conducted only under certain circumstances. Usually the risk assessment should be based on the activities, engineering and administrative controls available in the facility.



Prevention

A variety of control procedures are used to eliminate or minimize the risk of occupational exposure to LAA. These involve:

Administrative Controls

Training and Education

Employee education and training is essential. Adequately trained employees should be able to answer the following questions:

1. What rooms and tasks present the highest level of risk for exposure to LAA?
2. What precautions are required to prevent exposure?
3. Where would you go for further information?

Trained and educated workers have the knowledge required to reduce the risk of sensitization to Laboratory Animal Allergens. The education and training must be appropriate to the worker's educational level, literacy, and language. It should include the following topics:

- Explanation of Lab Animal Allergens, their symptoms, modes of transmission, and long term effects.
- The Exposure Control Plan and where to access it.
- Inventory of tasks and procedures that may expose the worker to allergens.
- Control measures to eliminate or minimize the risk of exposure.
- Personal protective equipment, including availability, location, selection, use, limitations, care, cleaning and decontamination, inspection, maintenance, and storage.
- The role of the Occupational & Preventive Health unit in assessing early signs or symptoms of sensitization and providing medical services to those affected.
- Emergency procedures in case of an anaphylactic reaction: getting first aid and medical attention, and reporting the incident.

Written Work Procedures

Written work procedures should be developed by specific departments for other tasks and should address safety controls such as:

- Handwashing after cleaning, feeding or handling the animals
- Restricted access to animal rooms
- No food/beverages allowed in animal holding areas
- Work process design to reduce animal handling



- Wet prep for shaving
- Room cleaning procedures that minimize dust production (i.e. avoiding dry sweeping when possible but dampen surfaces instead)
- Designating an area for cage emptying and cage changing

UBC has written procedures for the following tasks:

- How to properly wash hands ([Appendix C](#))
- How to safely handle waste, including animal bedding
<http://rms.ubc.ca/environment/hazardous-waste-management/hazardous-waste-manual/> – Point Grey Campus specific

Engineering Controls

Engineering controls are the preferred method of eliminating or reducing occupational exposure to any hazard, including LAA. They work by removing or isolating the hazard or by isolating the worker from exposure.

The best design features for minimizing exposures to allergy causing agents during workplace activities include:

- Biosafety cabinets (BSC)
- Ventilated workstations with down-draft or back-draft systems

The best design features for animal cages that will limit airborne emission of allergy causing agents include:

- Ventilated or filter-top cages
- Absorbent (best) or corncob bedding
- Non-contact bedding

Other engineering controls include having adequate room ventilation. All rooms designed to hold or handle animals should have a minimum of 15 air exchanges per hour to ensure there is constant fresh air brought inside. Further containment of allergens within the animal handling room could be achieved when negative pressure is maintained within the rooms.

Personal Protective Equipment (PPE)

Personal protective equipment (PPE) is specialized clothing or equipment that workers wear to protect them from coming into contact with hazards. PPE is required if engineering and work practice controls are unavailable, impractical, or do not completely eliminate occupational exposure to the hazards, but should not be relied upon as the sole method for lower exposure.



Street clothes must not be worn when entering an animal facility but instead all employees and visitors must change into applicable PPE which includes:

- Gowns
- Shoe covers
- Gloves
- Respirators

All disposable gowns, shoe covers and gloves should be removed when leaving animal rooms to prevent allergy causing agents from being carried into other areas.

Persons requiring the use of an N95 respirator are required to be medically cleared, trained, and fit-tested as part of the UBC Respiratory Protection program in compliance with WorkSafeBC regulations, which require annual fit testing.

N95 respirators should only be considered effective when properly fit-tested. It should be noted that N95 respirators are effective in reducing but not eliminating exposure, sensitization and illness.

The efficacies of respiratory protective devices are heavily dependent upon proper fitting and correct usage. In particular, tight fitting negative pressure respirators – such as the disposable (N95) respirator and half-mask dust respirators – rely on a good seal between the mask and the face.

When an individual is required to use a fit-tested respirator, evaluation and fit testing is conducted by the staff of Risk Management Services in coordination with the Occupational & Preventive Health Unit.

Non-symptomatic personnel who are not required to wear a respirator, but who wish to wear one voluntarily while in animal areas to prevent exposure to potential allergy causing agents should be accommodated wherever possible.

Disposable surgical masks and single-strap "nuisance" dust masks do not provide effective respiratory protection. Surgical masks generally provide a limited aerosol barrier, intended to prevent exposure to viable microorganisms in large droplets from the wearer's exhaled breath. They are basically non-sealing air-purifying devices with highly variable aerosol filtration efficiency; they do not afford the fit, filter efficiency, or protection factor of approved respiratory protection.

For tasks that require a surgical mask such as surgeries, there are respirators available that function as both an N95 and as a surgical mask (i.e. the 3M 1860 model and the 3M Aura 1870+).

Occupational & Preventive Health

At-risk employees are required to participate in the Occupational & Preventive Health (OPH) program, where the following activities are offered:



Initial Appointment

An initial assessment appointment with the Occupational Health Nurse can be conducted in-person at the UBC Health Clinic location or, for off-campus sites, over the phone.

To schedule this appointment, the employee should call 604-827-4713 or email whs.info@ubc.ca.

Allergy Signs and Symptoms Assessments

If you are concerned that you may already be experiencing symptoms of an allergy to laboratory animals, contact the Occupational & Preventive Health Unit (O&PH) to arrange an appointment with the O&PH Nurse. Some of these symptoms include:

Upper Respiratory Tract	Lower Respiratory Tract	Skin Reactions	Anaphylaxis
<ul style="list-style-type: none"> • Itchy, runny nose • Watery eyes • Sneezing] 	<ul style="list-style-type: none"> • Wheezing • Chest tightness • Airway mucus • Coughing • Shortness of breath • Difficulty breathing 	<ul style="list-style-type: none"> • Itching • Hives • Rash • Swelling 	<ul style="list-style-type: none"> • Throat tightness • Itchy mouth/throat • Dizziness • Nausea • Vomitting • Loss of consciousness

During your appointment, the OPH Nurse will review your health and work history and perform a targeted assessment. Based upon the clinical findings, additional evaluation may be performed by the OPH Physician, a specialist in Occupational Medicine. With early identification and appropriate interventions, it is possible to reduce negative health impacts, such as the development of severe allergic reactions, including asthma.

Annual Lab Animal Allergy Questionnaire

Staff and faculty working in animal facilities will be sent an electronic Lab Animal Allergy Questionnaire on an annual basis with the goal to detect the development of allergy symptoms at an early stage. Questionnaire responses are reviewed by the Occupational Health Nurse and individuals will be contacted for follow-up where appropriate.

Contact Occupational & Preventive Health:
Phone: 604-827-4713
Email: whs.info@ubc.ca



Task-Specific Recommendations

Based on the information above on animal allergies and the preliminary data from UBC animal units, RMS recommends the following safety controls. **Please note that a proper risk assessment must be performed and documented by each unit for specific tasks.**

TASK	ENGINEERING CONTROL	PPE
Cage Dumping	Cage Dump Station	N95 Respirator, gloves, long sleeves
Cage Changing	BSC or Cage Change Station	Gloves, long sleeves, etc
	None	N95 Respirator, gloves long sleeves, etc
Health Checks	Isolating Caging (filter top, ventilated)	Gloves, long sleeves, etc
	Open Caging	N95 Respirator, gloves, long sleeves, etc
Animal Procedures	BSC or Active Ventilation	Gloves, long sleeves, etc
	Open Bench	N95 Respirator, gloves, long sleeves, etc

References

1. NIOSH Alert: Preventing Asthma in Animal Handlers, January 1998 DHHS (NIOSH) Publication No. 97-116, <http://www.cdc.gov/niosh/animalrt.html>
2. R. Bush and G. Stave, Laboratory Animal Allergy: An Update, ILAR Journal V44(1) 2003 Occupational Health and Safety in Biomedical Research http://dels.nas.edu/ilar_n/ilarjournal/44_1/v4401BUSH.pdf



Appendix A: Risk Assessment Worksheet

JOB TASK Exposure and additional comments about severity or frequency of exposure	Likelihood (L)	Frequency (F)	Consequence (C)	Risk Score (LxFxC)	Risk Assessment Rating LOW, MODERATE, HIGH

LIKELIHOOD	SCORE
Most likely and expected result if the exposure takes place (high prevalence of allergen)	10
Examine likelihood of exposure in relation to type of job task and circumstances that occur while job is being performed	6
Unusual sequence or coincidence	3
Combined circumstances creates a <i>possible coincidence</i>	1
Remotely possible coincidence. Has never happened in many years	0.5
Practically impossible coincidence.	0.1
FREQUENCY - Potential exposure event occurs:	SCORE
Continuously (or many times daily)	10
Frequently (approximately once daily)	6
Usually (once per week to once per month)	3
Occasionally (once per month to once per year)	2
Rarely (never been known to happen)	1
Very rarely (not known to have occurred but considered remotely possible)	0.5
CONSEQUENCE - Degree of consequence if left untreated:	SCORE
Catastrophic: numerous fatalities, extensive damage	100
Several fatalities	75
Fatality	50
Extremely serious injury or occupational disease (permanent disability)	30
Disabling injuries, reversible damage	10
Short term illness and discomfort	2

Risk Assessment Rating Table

LOW			MODERATE					HIGH			
0	50	90	125	150	175	200	225	250	350	450	750+



Appendix B: Hand Washing

When to Wash Hands

- Immediately after removing gloves at the end of a task, even if the gloves appear to be intact. To avoid contaminating your hands by removing gloves improperly, follow the correct procedures.
- When you tear a glove or think a glove is leaking. Remove the gloves and wash your hands immediately. If you have punctured your skin with a sharp, follow the procedure for exposure incidents.
- After handling or touching potentially contaminated items or surfaces. After removing personal protective equipment. Before eating, drinking, smoking, biting your nails, handling contact lenses, and applying personal care products such as lip balm or make-up.

When hand-washing facilities are not available

- Use a waterless hand cleanser or towelette. Follow the manufacturer's instructions.
- Thoroughly wash your hands with soap and water in a proper facility as soon as possible after using the cleanser.



Image from <http://www.cdc.gov/handwashing/>, April 29, 2015