Assessing the Risk of Laboratory Acquired Allergies

1. PURPOSE

The purpose of this risk assessment is to provide guidance to all University of British Columbia 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.

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. 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.

2. RESPONSIBILITIES

The following information is provided to UBC faculty and staff who may be exposed to LAA this includes technicians, animal care workers, veterinarians, researchers and scientists.

The Department of Risk Management Services (RMS) will:
• Assess work procedures when needed;
• Conduct laboratory inspections to ensure compliance with these standards;
• Administer Respiratory Fit Tests;
• Provide a record of the successful Fit Test to the worker and the Occupational & Preventive Health Unit (O&PH);
• Assist employees, supervisors, and RMS in identifying individuals at risk and requiring respirator protection;
• Where a successful Fit Test cannot be achieved, provide documentation to the worker, supervisor and O&PH.

Occupational & Preventive Health Unit (O&PH) will:

• Provide health screenings to employees considered at risk;
• Assist employees, supervisors and RMS in identifying individuals at risk and requiring respiratory protection;
• Maintain Respiratory Fit Test records;
• Recall annually those employees due for Respiratory Fit Testing;
• Address medical problems and questions related to respiratory protection.

Departments (Supervisors) 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;
• Ensure employee access to appropriate PPE to safely carry out job duties;
• 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 selection decisions to each affected employee;
• Be aware of workplace tasks that can increase employees’ exposure to animal allergens.

Employees will:

• Familiarize themselves with this guideline 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;
• Check with supervisors if you have any questions related to the controls use;
• Never perform a task for which a control is required but not available;
• Always use required controls correctly;
• Never use any controls that are defective or damaged;
• Participate and document training received for controls (ie 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.

3. RISK IDENTIFICATION

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 that 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.

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.

4. RISK ASSESSMENT

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. See Section 7 for recommendations by RMS.

### 5. RISK CONTROLS

Engineering controls should be the primary method to control allergen exposure because respirators limit but do not eliminate allergen exposure. Respirator effectiveness is highly dependent on proper wear and care by the user. If however, ventilation controls are inadequate or not available, a fit-tested respirator should be used for protection.

#### a. Engineering Controls

The best design features for minimizing individuals’ exposures to allergy causing agents during workplace activates 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 by negative pressure is maintained within the rooms.

b. Administrative Controls

Hand washing after cleaning, feeding, or handling the animals will minimize the transfer of the allergens to sensitive areas such as the eyes or nose and will prevent carrying the allergens to sensitive coworkers.

A variety of administrative controls can also be effective for lowering exposures to allergy causing agents, including:

- Training and education of workers
- 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 ie. avoiding dry sweeping when possible but damp surfaces instead
- Designating an area for cage emptying and cage cleaning

c. Personnel Protective Equipment (PPE)

PPE may be necessary in addition to engineering and administrative controls, but should not be relied upon as the sole method for lowering exposures. Respiratory PPE should be provided to those with significant risk of exposure. Where the implementation and evaluation of administrative and engineering controls has not yet been made, respiratory PPE should be made available to the worker in the interim.

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.

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.

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.**

**6. PREVENTION AND TREATMENT**

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.

**Signs and Symptoms of an Allergy or Sensitivity:**

<table>
<thead>
<tr>
<th>Upper Respiratory Tract</th>
<th>Lower Respiratory Tract</th>
<th>Skin Reactions</th>
<th>Anaphylaxis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Itchy, runny nose</td>
<td>Wheezing</td>
<td>Itching</td>
<td>Throat tightness</td>
</tr>
<tr>
<td>Watery eyes</td>
<td>Chest tightness</td>
<td>Hives</td>
<td>Itchy mouth/throat</td>
</tr>
<tr>
<td>Sneezing</td>
<td>Airway mucus production</td>
<td>Rash</td>
<td>Dizziness</td>
</tr>
<tr>
<td></td>
<td>Coughing</td>
<td>Swelling</td>
<td>Nausea</td>
</tr>
<tr>
<td></td>
<td>Shortness of breath</td>
<td></td>
<td>Vomiting</td>
</tr>
<tr>
<td></td>
<td>Difficulty breathing</td>
<td></td>
<td>Loss of consciousness</td>
</tr>
</tbody>
</table>

During your appointment, the O&PH 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 O&PH Physician, a specialist in Occupational Medicine. Where desired, workers may also choose to consult with their family physician.

With early identification and appropriate interventions, it is possible to reduce negative health impacts, such as the development of severe allergic reactions, including asthma.

Risk Management Services &
Occupational & Preventative Health Unit
Title: Assessing the Risk of Laboratory Acquired Allergies
7. RECOMMENDATIONS

Based on the information above on animal allergies and the preliminary data from the UBC animal units, RMS recommended controls for some of the general tasks are in the following table. **Please note that a proper risk assessment must be performed and documented by each unit.**

<table>
<thead>
<tr>
<th>TASK</th>
<th>ENGINEERING CONTROL</th>
<th>PPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cage Dumping</td>
<td>Cage Dump Station</td>
<td>UBC minimum PPE + N95 Respirator, gloves, long sleeves, eye protection</td>
</tr>
<tr>
<td>(Mandatory)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cage Changing</td>
<td>BSC or Cage Change Station</td>
<td>UBC minimum PPE + Gloves, long sleeves</td>
</tr>
<tr>
<td>(Mandatory)</td>
<td>None</td>
<td>UBC minimum PPE + N95 Respirator, gloves long sleeves, eye protection</td>
</tr>
<tr>
<td>Health Checks</td>
<td>Isolating Caging (filter top,</td>
<td>UBC minimum PPE + Gloves, long sleeves</td>
</tr>
<tr>
<td>(As per risk</td>
<td>ventilated)</td>
<td></td>
</tr>
<tr>
<td>assessment)</td>
<td>Open Caging</td>
<td></td>
</tr>
<tr>
<td>Animal Procedures</td>
<td>BSC or Active Ventilation</td>
<td>UBC minimum PPE + Gloves, long sleeves</td>
</tr>
<tr>
<td>(As per risk</td>
<td>Open Bench</td>
<td></td>
</tr>
<tr>
<td>assessment)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

REFERENCES
