



# Occupational Airways



A newsletter of the Occupational Health & Special Projects Program, Division of Environmental Epidemiology and Occupational Health (EEOH), Connecticut Department of Public Health, 410 Capitol Avenue, MS# 11OSP, P.O. Box 340308, Hartford, CT 06134-0308 (860) 509-7744

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## This issue:

- ⇒ Animal Handlers and Allergy
- ⇒ Occupational Asthma Interview Protocol Survey Results
- ⇒ Summary Table of Reported Cases of Selected Respiratory Disease in CT

## Animal Handlers and Allergy

Marian L. Heyman, MT(ASCP), MPH  
CT Department of Public Health  
Environmental Epidemiology & Occupational Health Division



Many people who work with animals do so out of love. They include veterinarians, veterinarian technicians and assistants, breeders, and trainers. Workers in these professions and

others, such as those who work with laboratory animals (animal caretakers, technicians, researchers, physicians), handle animals with some frequency and are at risk for developing allergy and/or asthma. *The National Institute for Occupational Safety and Health (NIOSH) reports that there are approximately two million workers with jobs requiring constant handling of animals. One third of these workers have allergic symptoms, and 10% have occupational asthma caused by animal allergens.*<sup>1</sup>

Animal allergy is an immune reaction to proteins found in animal saliva, dead skin flakes (dander), or urine. When these tiny proteins become airborne, they may land on the lining of the eye (conjunctiva) or nose, on the skin, or may be inhaled directly into the lungs. Any of these exposures can cause allergic symptoms, which can range from mild itching to severe asthma.

The majority of workers with animal allergy present with multiple types of symptoms. The most

common symptom is allergic rhinoconjunctivitis with nasal congestion, sneezing, runny nose, and watery,

itchy eyes. These symptoms have been reported in 80% of symptomatic workers. Forty percent report skin irritation described as contact urticaria or pruritic maculopapular rashes. As many as 50% of symptomatic workers will develop asthma-like symptoms (recurrent coughing, wheezing, chest tightness, difficulty breathing).<sup>1</sup> Twenty to 30% of symptomatic workers develop true occupational asthma.<sup>2</sup>

Symptoms usually occur within minutes of being exposed to animals. In some cases, symptoms continue to build up over several hours, and may become most severe 12 hours after discontinuing contact with the animal(s).<sup>3</sup> Onset of symptoms after beginning a new job working with animals can vary widely. In a prospective study which followed a group of laboratory workers with no previous exposure to rats, Cullinan reported that symptom onset from date of employment ranged from a mean of less than one month to 3.75 years. Furthermore, the length of time of employment before onset of symptoms was a mean of one year for chest symptoms, seven months for eye and nose symptoms, and 11 months for skin symptoms.<sup>4</sup>



The major proteins in mice, rats, Guinea pigs, rabbits, dogs and cats that cause allergy in humans have been identified and characterized. Sources are mostly hair, dander and urine, with serum and saliva being additional sources in some animals. Although primates are used in research facilities, few cases of sensitivity to these animals have been documented.<sup>2</sup>

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**Editor:**  
Juanita Estrada, Epidemiologist  
**Staff:**  
Carolyn Jean Dupuy, Director  
Milinda Daye, Epidemiologist  
Marian Heyman, Epidemiologist/Industrial Hygienist

**Contributors to this edition:**  
Marian Heyman, MPH  
Lisa Costanzo, BA

Risk factors for developing animal allergy depend upon individual susceptibility and environmental exposure. Atopic individuals, or those with a family history of atopy, produce prolonged IgE response to environmental allergens, resulting in chronic allergic rhinitis, asthma or eczema. Rothman, *et al*, and Bryant, *et al* advocate the use of pre-placement screening of prospective employees to help identify those at increased risk. The goal would be to educate these workers to take proactive, protective measures to prevent them from developing laboratory animal allergy.<sup>5,6</sup> Others disagree with this approach, citing poor correlation of presence of IgE antibodies in the worker's serum with development of symptoms or disease.<sup>1</sup>

### Medical Surveillance

Medical surveillance is suggested for workers with occupational exposure to animals. Standardized questionnaires can be useful in identifying workers with early symptoms of allergy or asthma. Bush offers a simple questionnaire that could be used as a surveillance tool. A section which asks the employee to record the *year of onset* for a list of symptoms may be especially useful, as time passes.<sup>2</sup> Workers experiencing upper respiratory symptoms related to their job should be referred for a more detailed follow up and intervention. NIOSH has a case definition for occupational asthma, which may be helpful when designing a medical evaluation plan.<sup>1</sup> It is important to identify asthmatics early, because removing those with asthma symptoms from exposure to animals early on can minimize their risk of developing long term, more persistent and severe sequelae.

Periodic monitoring of pulmonary function should be considered. The employer may also wish to administer a questionnaire on a periodic basis in order to observe any changes against previous results.

### Environmental Controls

It is crucial to pay attention to environmental controls in laboratory animal rooms in order to reduce the levels of airborne allergens, as well as to provide

comfortable conditions for the animals. Achieving the appropriate outdoor air exchange rate and air distribution within rooms should be of primary consideration when designing an animal facility. The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) outlines recommended ventilation, ambient temperatures and humidity ranges for animal rooms. The recommendations are species - specific, but generally, ventilation should be maintained at 10-15 air changes per hour using 100% outdoor air; ambient temperatures should be between 61°- 84° F; and

relative humidity should be between 30-60%. See the tables in the ASHRAE Applications Handbook for specifics.<sup>7</sup>



Control of air pressure is critical in order to maintain a directional air flow. Contaminated areas (i.e., quarantine, isolation, soiled equipment, biohazard areas) should be kept under negative

pressure. Clean areas such as clean equipment and housing rooms for healthy animals should be kept under positive pressure.<sup>7</sup>

The air in human occupancy and animal facility areas should be conditioned separately. Human areas may use HVAC systems that supply returned air. These systems may be set back or shut down on weekends/holidays to conserve energy. Separate systems also serve to prevent personnel from being exposed to biological agents and odors emanating from animal rooms.<sup>7</sup>

### Work Practices & PPE

NIOSH offers recommendations for animal handlers to reduce exposure to animal allergens. They include avoiding wearing street clothes while working with animals, and not bringing work clothes home, working in ventilated chemical hoods and/or biological safety cabinets when possible, keeping cages clean and using appropriate personal protective equipment. Workers can reduce skin contact with hair, dander, urine, serum and saliva by wearing lab coats, gloves, face shields and NIOSH or MSHA (Mine Safety & Health Administration) approved respirators with HEPA filters.<sup>1</sup> (Note:

Workers must be medically cleared and fit tested in order to wear a respirator.)

### Plan for Emergency

Since one third of laboratory animal handlers have allergic symptoms, it is wise to be prepared to treat a worker experiencing anaphylaxis after an animal bite or needle stick injury. These reactions can progress rapidly and result in fatality. Physicians may advise allergic patients to carry an Epi-Pen in order to self-administer epinephrine, and instruct co-workers in emergency procedures such as CPR.

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**Please note:** In the December issue, the number of cases of asbestosis for 1998 was misprinted. It should have been **8**, not 18.

## Occupational Asthma Interview Protocol Survey Results

*Lisa Costanzo, Southern CT State University, MPH Student Intern*



In an effort to control occupational asthma among Connecticut's workers, the Division of Environmental Epidemiology & Occupational Health of the Department of Public Health initiated the occupational asthma interview protocol in 1995. The goal of the project is to reduce the occurrence of occupational asthma by learning more about the workplace practices and conditions that led to exposures that may have caused or exacerbated asthma in workers.

The protocol involves surveying patients with occupational asthma who have been identified through the Occupational Disease Surveillance System (ODSS). Once a patient has been identified, a questionnaire, a letter explaining the protocol, and an occupational asthma brochure are sent to the patient. In addition, a letter and packet of information regarding the asthma interview protocol are sent to the reporting physician.

Of the 174 cases surveyed as of February 1999, a total of 72 workers participated in the survey, yielding a response rate of 41%. Of those who did not participate, 39 were not able to be contacted, 2 were deceased, 4 refused, and 57 did not respond to the first or second mailing of the questionnaire. The average age of the respondents was 44 years, with 89% of the respondents between 30-59 years of age. The following provides a summary of the participants' responses.

Manufacturing, health care, and education were among the most frequently reported lines of business. The size of the place of employment for which the respondents were working when the breathing problems began ranged from 3 to 25,000 employees, with the majority having less than 500 employees. Forty-six (64%) of the reported occupations were grouped into the following categories: administrative support; assemblers and fabricators; educators; health care workers; and machine operators. Forty-five percent of the respondents were represented by unions at the job where their breathing problems began.

<b>Summary of Number of Reported Cases of Selected Respiratory Diseases in CT</b>					
<b>CT DPH Occupational Disease Surveillance Data</b>					
	1995	1996	1997	1998*	ODSS Total**
<b>Asthma</b>	33	38	27	22	173
<b>RADS***</b>	1	7	4	6	25
<b>Silicosis</b>	1	0	1	4	12
<b>Asbestosis</b>	5	10	3	11	107
<b>Asbestos-related pleural diseases</b>	11	8	2	10	111
<b>Total</b>	51	63	37	53	428

\* As of March 8, 1999. Data subject to change.

\*\* Occupational Disease Surveillance System (ODSS) total since 11/91

\*\*\* Reactive Airways Dysfunction Syndrome

The length of time between when the respondent began working and the onset of breathing problems varied from less than a month to many

Connecticut Department of Public Health  
Division of Environmental Epidemiology & Occupational Health  
410 Capitol Avenue, MS# 11OSP  
P.O. Box 340308  
Hartford, CT 06134-0308

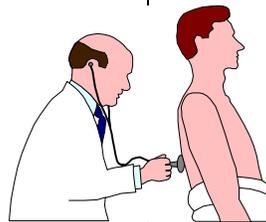
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years. The ten most frequently reported substances/exposures the respondents believed had caused their breathing problems were: (1) solvents, (2) cleaners/disinfectants, (3) isocyanates, (4) mold/other microorganisms, (5) renovation activities, (6) dirt/dust, (7) epoxies, (8) inadequate ventilation systems, (9) paints, and (10) latex gloves.

Nine respondents (13%) reported that they were still being exposed to the substance(s) they felt caused their breathing problems. However, two of the nine stated engineering controls are now used and one stated personal protective equipment (PPE) is worn. Six respondents (9%) reported that they did not know if they were still being exposed. Three of these six respondents moved to a different job/position within the same employer; one is using PPE; one stopped working for three months per a doctor's advice; and one said the construction which was believed to have caused the problems had ended.

Fifty-two respondents (78%) reported that they are no longer being exposed to the substance(s) they felt caused their breathing problems. In 6% of the cases, the exposure was an isolated incident. In the other cases, the reported reasons for no longer being exposed included: stopping work per doctor's advice (27%); moving to a different job/position with the same employer (21%); being fired or laid-off (17%); quitting (12%); the employer stopping exposure through engineering controls (4%); and using a respirator/ personal protective equipment (2%) [some

respondents reported more than one reason]. In addition to those who reported stopping work per a doctor's advice, 17% indicated leaving their job specifically because of the breathing problems, while an additional 8% went on disability. None of the respondents indicated the exposure was discontinued because the substance(s) believed to be causing the breathing problems was/were no longer being used by the company. However, one respondent said that product substitution had occurred.



Fifty-eight percent of the respondents reported that other people at work had breathing problems similar to theirs. Although not applicable to every occupation, 45% of the respondents had received health and safety training. In 96% of the cases, the employer was aware of the employee's breathing problems. When asked, "What do you think could have been changed to reduce or prevent your breathing problems?," some of the more common responses included: improving ventilation, wearing a respirator, improving air quality, heeding warning labels and MSDSs, improving engineering controls, and increasing employer and employee awareness and understanding of hazards.

As is evidenced by the results of this survey, occupational asthma can occur in a variety of job settings, across diverse occupations, and as a result of various substances/exposures. Unfortunately, a common element in many of the cases was the employee having to discontinue exposure by leaving their current job. By educating employers,

employees, and health care workers (through fact sheets, other publications, and site visits), we may potentially prevent occupational asthma among Connecticut's workers, thereby making it possible for them to continue working in their desired occupation and maintain their health. For more information on the occupational asthma interview protocol, please call the Occupational Health Program, 860/509-7744.