

Implementing a medical surveillance program for animal care staff

Debra Sharpe, MPH, CCHO, RBP^{1,2}

In animal research facilities, personnel may develop allergies or serious health problems as a result of exposure to chemical or biological agents. Medical surveillance is essential for evaluating the health of prospective or current employees and determining their risk of exposure to occupational hazards. The author discusses the role of institutional medical surveillance programs and presents considerations for implementing such programs.

Medical surveillance, or the process of evaluating the health of employees and determining their risk of exposure to occupational hazards, is an important element of occupational health and safety programs. An institutional medical surveillance program serves several purposes. First, it is often used to evaluate the health status of newly hired employees to ensure that the employees do not have preexisting conditions that might increase their risk of developing work-related illnesses. This is especially important for employees who will work in biosafety level (BSL)-2 or BSL-3 laboratories, in which there is potential for exposure to hazardous agents. Furthermore, surveillance is typically carried out periodically (or after incidents of exposure to hazardous agents) to ensure that employees' health has not been compromised.

In my experience, medical surveillance programs in many institutions—including institutions that are accredited by the Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC) International—are not as protective of staff as they could be. For example, when I began working for the Southern Research Institute in 2003, the institution had received full AAALAC accreditation despite the fact that its medical surveillance program at the time was relatively limited. The program offered no pre-employment or annual medical exams; rather, medical evaluations were given only in response to specific complaints, accidents or injuries. Furthermore, employees were not required to wear protective masks in animal rooms in which there was a risk of exposure to hazards (for example, rooms in which animals were housed in static cages rather than in ventilated cages).

This article discusses regulatory requirements related to medical surveillance programs as well as the benefits and challenges of implementing such programs in lab animal facilities.

OCCUPATIONAL HEALTH AND SAFETY PROGRAMS

To carry out federally funded animal research, facilities must comply both with laws concerning the use of animals and with laws for the protection of employees who support the research.

The Office of Laboratory Animal Welfare (OLAW) *Institutional Care and Use Committee Guidebook*¹ states that each institution that receives support from Public Health Services (PHS) or that is covered under the Animal Welfare Act must include an occupational health and safety program within its animal care and use program. The occupational health program should include the following elements: administrative procedures, facility design and operations, risk assessment, exposure control, education and training, occupational health care services, personal protective equipment, equipment performance, information management, emergency procedures and program evaluation¹.

The occupational health and safety program at Southern Research Institute consists of the following three components, known as the 'Hierarchy of Protection'.

Engineering controls. Engineering controls are physical changes to a work environment that prevent employee exposure to hazards. Examples of engineering controls include ventilated cage rack systems, ventilated dumping stations, biological safety cabinets and fume

¹Southern Research Institute, Birmingham, AL. ²Biosafety Solutions, LLC, Birmingham, AL. Correspondence should be addressed to D.S. (sharpe@bslsolutions.com).

hoods. The use of engineering controls, where possible, is the first line of protection and a key component of an occupational safety and health program.

Administrative controls. Administrative controls, or management systems aimed at limiting employee exposure to hazards, constitute the second component of an occupational safety and health program. Administrative controls include safety rules that are integrated into policies, procedures, employee training and documentation programs. A medical surveillance program is a type of administrative control.

Personal protective equipment (PPE). After all other safety measures have been implemented, PPE is used as a 'last line of defense' to protect employees from exposure to hazards. Employees at Southern Research are required to wear protective outer garments, gloves and N95 respirators in animal rooms and to use additional PPE when necessary.

REGULATORY REQUIREMENTS FOR MEDICAL SURVEILLANCE

As noted above, OLAW indicates that all research facilities that are covered by PHS Policy or by the Animal Welfare Act should include medical surveillance (i.e., risk assessment and exposure control) in their occupational health and safety programs¹. Additional regulations regarding medical surveillance apply to laboratories involved in specific types of research.

Laboratories that work with infectious agents must comply with the guidelines outlined by the Centers for Disease Control in *Biosafety in Microbiological and Biomedical Laboratories*². According to these guidelines, institutions should carry out medical evaluations of workers before potential exposure to human pathogens. Such an evaluation should include an assessment of the worker's complete medical history, including medications, vaccinations, allergies and any potential health problems that might interfere with the employee's ability to work safely.

Companies located outside the US might also use the World Health Organization's *Laboratory Biosafety Manual*³ as a guidance document. This document states that the employing authority, through the laboratory director, is responsible for ensuring adequate health surveillance of laboratory personnel, with the goal of monitoring for occupationally acquired diseases. Health surveillance and disease prevention should include the following elements: (i) provision of active or passive immunization where indicated; (ii) facilitation of early detection of laboratory-acquired infections; (iii) exclusion of immunocompromised or highly susceptible individuals (such as pregnant or nursing women) from highly hazardous laboratory work; and (iv) provision of effective PPE and safety procedures.

Federally funded institutions that work with recombinant DNA must comply with the National Institutes of Health (NIH) *Guidelines for Research Involving Recombinant DNA Molecules*. According to these guidelines, an institution must establish and maintain a health surveillance program for personnel whose research involves viable organisms containing recombinant DNA molecules that require biocontainment at BSL-3 or higher⁴. According to the NIH *Laboratory Safety Monograph*, surveillance should include keeping records of agents handled, investigating relevant illnesses and maintaining serial serum samples in order to monitor serologic changes that might result from employees' work⁵. The NIH guidelines also note that certain medical conditions, such as gastrointestinal disorders or treatment with steroids, immunosuppressive drugs or antibiotics, can increase a lab worker's risk of infection when handling potentially hazardous agents.

Finally, the General Duty Clause of the US Department of Labor's Occupational Safety and Health Administration (OSHA) requires the employer to provide employees with "employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm" (29 CFR Part 1910, Section 5(a)(1)).

In summary, the regulations and guidelines above state clearly that animal care staff are exposed to potential health risks and that employers must evaluate those risks and develop ongoing surveillance and monitoring programs to protect employees.

DESIGNING AND IMPLEMENTING A MEDICAL SURVEILLANCE PROGRAM

Identifying health risks

When designing a medical surveillance program, the employer must first evaluate the hazards that employees may encounter in the course of their duties. In an animal research laboratory, the more common hazards include the following.

Laboratory-acquired allergies (LAAs). According to one recent study, 11–44% of individuals who work with laboratory animals report work-related allergic symptoms such as rashes (when animals come into contact with the skin), nasal congestion, itchy or watery eyes and asthma that can persist even after exposure to allergens ceases⁶. According to assessments by the National Research Council Institute for Laboratory Animal Research, up to 73% of employees who have preexisting allergies eventually develop allergies to laboratory animals⁷.

Physical hazards. These include musculoskeletal disorders, strains, sprains, crushing or pinching injuries

caused by handling animal cage rack systems, as well as noise exposures.

Chemical hazards. These include exposure to laboratory chemicals such as disinfectants, cage wash chemicals, formaldehyde or protocol-introduced toxins.

Biological hazards. These include zoonotic pathogens and protocol-introduced human pathogens.

Radiation hazards. These hazards include exposure to ionizing or to non-ionizing (laser) radiation.

Hiring considerations

Before a position is posted for hire, the human resources department, safety department and veterinarian should develop a job description that identifies all requirements of the position. The job description should state that, if they are offered a position, candidates will be required to pass a physical examination before beginning employment. The physical and medical requirements of a position must be made clear to all candidates who apply. For example, a position may require an employee to be able to lift a specified amount of weight (animal feed bags can weigh as much as 50 lbs). It may also require employees to undergo serial blood tests (serum banking), tuberculosis skin tests or vaccinations. Southern Research Institute requires an employee to be vaccinated against a specific infectious agent only if that employee is expected to care for infected animals or to work with the agent in culture. Staff members who refuse vaccines (which are meant to protect both workers and animals) are prohibited from working in positions that may expose them to risks. If requirements are clearly stated for all candidates, employers cannot be accused of discrimination if a candidate who does not meet the requirements is prevented from working in a particular position.

A candidate who is being considered for a position should complete a medical questionnaire. The questionnaire is developed by the safety department in consultation with the veterinarian, the occupational physician and the supervisor. It is important that this document cover all medical history, especially any existing allergies and the extent of those symptoms. The questionnaire should outline the risks associated with the animal work and should notify the candidate of vaccinations or physical screenings that will be required before employment. If an employee has preexisting allergies, it is likely that he or she will eventually develop a LAA; the safety department, human resources department, supervisor and prospective employee should discuss the possibility that if occupational exposure to animals becomes a problem, employment in the position may not be able to continue.

The need to discuss a candidate's medical history may raise privacy concerns. At the Southern Research Institute, the supervisor is not informed of an employee's medical condition unless there is a problem that interferes with the employee's work. Medical requirements that must be met before a job offer can be extended are defined as conditions of employment and are therefore not included under the Health Insurance Portability and Accountability Act (HIPAA) or the Americans with Disabilities Act.

Determining the frequency of medical evaluations

Institutional managers should determine how often employees should undergo medical evaluations. My institution requires employees to complete a questionnaire annually in which they note any changes in their physical health that could be of concern. The employee subsequently reviews the questionnaire together with an occupational health provider. We try to combine these evaluations with respiratory physicals or other required medical services. We also train employees to contact the safety office immediately if they experience increases in allergy symptoms, job-related injuries or possible exposure to chemical or biological hazards. These types of visits can occur at any time during the year. In my experience, employees are more likely to identify health concerns during routine visits with the health care provider than to mention them specifically to supervisors or safety staff.

Choosing the occupational physician

The occupational physician (or 'Occ Doc') has a key role in the success of a medical surveillance program. It is important to ensure that the physician is familiar with the nature of employees' work. The physician should have a background in infectious diseases and understand the hazards of animal research. The physician should also be knowledgeable of specific hazards related to allergens, the physical environment, tools and ergonomics. Ideally, he or she should be a Diplomate of the American College of Occupational and Environmental Medicine. Before the occupational physician is hired, the safety director and veterinarian should meet with him or her to explain the types of work carried out at the institution, the services needed and expectations.

CHALLENGES TO MEDICAL SURVEILLANCE

One challenge to daily management of a medical surveillance program is the high turnover rate of administrative staff in physician offices. This leads to incorrect billing and difficulty in ensuring that all employee documents are sent back to the safety department to be placed in the employee files. Furthermore, employees (and supervisors) may complain about long wait times in the doctor's offices. In general, visits to the

doctor are inconvenient for employees; my institution struggles with getting employees to attend their scheduled appointments and must often send out numerous reminders. It is best if an organization can provide on-site occupational health care services, but this may not be an option for all institutions.

DISCUSSION

I believe that medical surveillance programs lead to the creation of a safer work environment. Problems are identified early on and can be addressed before an employee gets sick or sustains an injury. Routine medical exams provide employees with opportunities to voice any occupational or health concerns before serious problems arise. They also allow early identification of LAAs.

Surveillance programs may encourage employees to identify health problems that are not work-related; this can benefit overall employee health and improve morale. A medical surveillance program can also lead to increased safety compliance, thus reducing regulatory problems within the institution and with outside regulatory agencies.

Southern Research Institute implemented a comprehensive medical surveillance program in 2003 and subsequently observed a substantial reduction in the number of yearly accidents and injuries among animal care staff members. Whereas 76 accidents occurred in 2003, only 29 accidents occurred in 2007. The number

of work-related injuries or illnesses that had to be reported to OSHA decreased from 41 to 12. These improvements may be related both to the medical surveillance program itself and to the increased safety awareness that resulted from its implementation.

COMPETING INTERESTS STATEMENT

The author declares no competing financial interests.

Received 11 November 2008; accepted 20 May 2009

Published online at <http://www.labanimal.com/>.

1. Office of Laboratory Animal Welfare. *Institutional Animal Care and Use Committee Guidebook* 2nd edn. (National Academy, Washington, DC, 2002).
2. US Department of Health and Human Services: Public Health Service, Centers for Disease Control and Prevention & National Institutes of Health. *Biosafety in Microbiological and Biomedical Laboratories* 4th edn. Section V (US Government Printing Office, Washington, DC, 1999).
3. World Health Organization. *Laboratory Biosafety Manual* 3rd edn. (World Health Organization, Geneva, Switzerland, 2004).
4. National Institutes of Health. *Guidelines for Research Involving Recombinant DNA Molecules* (National Institutes of Health, Bethesda, MD, 2002).
5. National Institutes of Health. *Laboratory Safety Monograph: A Supplement to the NIH Guidelines For Recombinant DNA Research* July (US Department of Health, Education and Welfare, National Institutes of Health, Bethesda, MD, 1978).
6. Bush, R. & Stave, G. Laboratory animal allergy: an update. *ILAR J* **44**, 28–51 (2003).
7. National Research Council. *Occupational Health and Safety in the Care and Use of Animals* (National Academies, Washington, DC, 1997).