Guidelines for Handling Animal Reservoirs of Hantavirus: Field Research Practices for CSUF

PURPOSE:
These guidelines are based on practices used by Center for Disease Control personnel in areas known to have fatal human cases of Hantavirus infection. The guidelines have been modified for fieldwork in areas of undefined risk. They are intended to give you information about the best work practices to provide protection against Hantavirus infection; the purpose of the document is to give you guidance in your fieldwork. The Office of Environmental Health and Safety is available to work with you in adapting the guidelines to your own fieldwork to help you protect yourself. Please contact at extension 7233 if you have comments or suggestions about the guidelines.

The guidelines will be reissued as additional information about fieldwork practices and about the epidemiology of Hantavirus becomes available.

BACKGROUND:
Rodents are the known reservoirs of Hantaviruses, and other small mammals can be infected as well. In California, deer mice (Peromyscus maniculatus), which are common throughout the state, are the implicated reservoir for a strain of Hantavirus pathogenic to humans. Although current evidence indicates that the rodents harboring Hantavirus are most prevalent in rural settings, suburban or urban areas cannot be excluded as potentially affected.

Infection is believed to result from inhalation, inoculation through broken skin, or rodent bites. Persons have been infected after only a few minutes’ exposure to laboratory rodents infected with a similar virus.

People who frequently handle or are exposed to rodents (e.g., mammalogists, field biologists, pest-control workers) are a higher risk for Hantavirus infection than the general public because the nature of their work brings them into closer and more frequent contact with rodents and their excretions. The likelihood of infection with Hantavirus appears to be low (two confirmed cases in California), but the fatality rate for the Muerto Canyon (New Mexico) strain is high (approximately 60%). At present, there is no effective vaccine to prevent infection, and diagnosis and treatment are difficult. Enhanced precautions are warranted to protect against possible infection.

It is the responsibility of each individual to take appropriate protective measures. It is the responsibility of the supervisor to ensure training and access to appropriate protective equipment.

GENERAL PRACTICES:
1. Practice good personal hygiene at all times. Wash your hands with soap and water or with a disinfectant wipe before you eat, drink, smoke, or apply lip balm, sunscreen or cosmetics.

2. Workers in potentially high-risk settings should receive a thorough orientation about Hantavirus transmission and the symptoms of the disease. They should be given detailed guidance on prevention measures and trained to safely perform the required activities.

3. Workers who develop febrile or respiratory illness within 45 days of a possible exposure should immediately seek medical attention and inform the examining physician. The physician should contact local health authorities promptly if Hantavirus-associated illness is suspected. If appropriate, a blood sample may be sent with available baseline sample to the California Department of Health Services for Hantavirus antibody testing.

4. Hantaviruses are lipid-enveloped viruses and are susceptible to most disinfectants -- dilute hypochlorite solutions (bleach), 70% alcohol, detergents, phenolics, or most general-purpose household disinfectants. The survival time of the virus in the environment liquids, aerosols, or dried states is not known. In the field, carry a spray bottle of disinfectant or hand wipes containing alcohol or detergent.

5. Workers should wear rubber, plastic or latex gloves when handling rodents or traps contaminated by rodent or whenever the worker has broken skin. Before removing the gloves, wash gloved hands in a disinfectant and then in soap and water. Thoroughly wash hands with soap and water after removing gloves. If this is not possible, then rinse gloves with water or use a disinfectant wipe; wash your hands thoroughly at end of the work period.

6. Workers may need to wear respirators when handling field-caught rodents or contaminated traps or when disturbing rodent burrows and nests. Contact EHS for an evaluation of your work practices and for information on the Respiratory Protection Program. Until the infectivity of Hantavirus is better understood, respirators should be used to minimize exposure to airborne particles of rodent excreta during procedures that generate dusts. The proper use of respirators will provide protection against airborne particles of rodent excreta, which is the presumed cause of most Hantavirus infections. However, the incorrect use or care of respirators may increase, rather than decrease, the risk of exposure to harmful agents. If fieldwork does not allow respirators to be maintained in a sanitary condition, or if the conditions of transporting respirators are such that respirator fit is affected, their use is not advised. Additionally, respirators must be used only under the guidance of the Respiratory Protection Program conducted by.

Individual workers should consult for an analysis of their work practices, of exposure risks, and personal fitness to determine their need for respiratory protection. The recommended respiratory protection against Hantavirus is a half-face or full-face air purifying (negative-pressure) respirator with HEPA filters or
equivalent. Environmental Health and Safety is evaluating other new HEPA-filter masks as acceptable alternatives.

7. Disinfect all traps contaminated by rodent urine or feces. If this is not done until the end of the trapping run, wear a respirator whenever handling contaminated traps and transport empty traps in closed plastic bags.

8. In populated areas, dispose of dead rodents by placing the carcasses in a plastic bag containing enough disinfectant to thoroughly wet the carcasses. Seal the bag and dispose of it in the regular trash. Do not overburden the waste with disinfectant (i.e. allow disinfectant to accumulate in the bag)

9. Workers performing procedures associated with animal body fluids or creating aerosols by removing organs or obtaining blood from rodents in an affected area, should contact EHS or the California Department of Health Services for detailed safety precautions.

10. Do not enter enclosed spaces or buildings visibly contaminated with rodents or rodent droppings. Contact the facility manager or EHS for assistance.

**SPECIFIC PRACTICES:**

I. VISUAL SURVEY OF AREA, WALKING, HIKING

   No special precautions are needed for protection against Hantavirus infection. However, respiratory protection may be advisable in a known affected area that is visually contaminated by rodents or has especially dusty conditions.

II. SETTING TRAP LINES

   When setting disinfected traps, no special precautions are needed for protection against Hantavirus. Respiratory protection is recommended if the traps have not been disinfected from prior use.

III. RECOVERY AND TRANSPORT OF TRAPS HOLDING LIVE ANIMALS

   Wear protective clothing, including rubber or latex gloves. If using open-mesh traps, wear respiratory protection. Eye protection is recommended.

   Stand upwind of the trap if possible. Put the trap into plastic bag that is a least 4 mils thick and large enough to ensure a sufficient supply of air for the animals. When transporting animals in an enclosed vehicle to a processing site, isolate the trapped animals from the passenger compartment if possible.

IV. HANDLING LIVE ANIMALS

   Wear protective clothing, including gloves, eye protection and respiratory protection. Use appropriate methods to provide protection against both bites and urine contamination of the hands.
Define a zone to exclude others who are not wearing appropriate protective equipment. Work with the wind at your back if possible. Perform all procedures in a manner to minimize the creation of aerosols and dust.

When possible, anesthetize the animal before handling. Remove captured animal from the trap by shaking it into an anesthesia bag; or alternatively, pinch the animal’s skin through the mesh of the trap with forceps and inject it with anesthetic.

If it is not possible or appropriate to use anesthesia, wear protective clothing as described and use appropriate restraining devices. Avoid creating aerosols.

Wearing gloves, disinfect contaminated traps. The ideal method is to submerge them in a bucket of disinfectant for 10 minutes, rinse twice with water, and set in the sun to dry. Alternatively, spray the traps with disinfectant. If traps are not to be disinfected until end of the project, store them in closed plastic bags.

V. FIELD DISSECTION

Field dissection is strongly discouraged. Instead, transport animals to a laboratory with appropriate containment equipment in order to process them under safer working conditions.

If field dissection is done, wear protective clothing, including latex gloves, eye protection, and respiratory protection. Surgical gowns, shoe covers, and head coverings are recommended.

Process animals in an isolated area. Use the minimum number of workers to do the job safely. Define and mark a zone to exclude others not directly involved in the animal dissection. Work with the wind at your back if possible.

Perform all procedures carefully to minimize the creation of aerosols. Use extreme caution with any contaminated sharp items, including needles, syringes, slides, pipettes, capillary tubes and scalpels. Substitute plastic for glass whenever possible.

Use hypodermic needles and syringes only for gavage, parenteral injection, or aspiration of fluids from diaphragm bottles or well-restrained animals. Use only needle-locking syringes or disposable syringe-needle units. Do not bend, shear, break, recap or otherwise manipulate needles by hand before disposal; place used disposable needles and other sharps in a conveniently located puncture-resistant biohazardous waste container. Dispose sharps container as biohazardous waste. Place non-disposal sharps in a hard-walled closable container, containing a suitable disinfectant. Do not handle broken glassware directly; use mechanical means such as brush and dustpan, tongs, or forceps.

Place tissues or body fluids in a container that prevents leakage during collection, handling, processing, storage, transport, or shipping. Carcasses may be preserved and transported in 10% formalin, dry ice or liquid nitrogen.
Dispose of unwanted carcasses in a plastic bag containing enough disinfectant to thoroughly wet the carcasses; seal the bag and dispose of it in the regular trash.

VI. CLEAN UP
Place used instruments into disinfectant for 10 minutes, or autoclave, if possible.

Remove protective clothing, first, then your respirator in a well-ventilated area (such as outside). Put clothing in plastic bags for disposal or laundering.

Wash hands thoroughly with soap and water.

VII. ADDITIONAL PRECAUTIONS
Establish practical and effective protocols for handling emergency situations.

VIII. CONTACT PERSONNEL

EHS ext. 7233
Exposure questions and protective measures: Respiratory Protection Program

Vector Control Service: 714-971-2421

California Department of Health Services: 714-667-3600

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