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Update: Interim Guidance for Minimizing Risk for Human Lymphocytic Choriomeningitis Virus Infection Associated with Pet Rodents

In May 2005, CDC received reports of illness in four solid-organ transplant recipients who were later determined to have been infected with lymphocytic choriomeningitis virus (LCMV) from a common organ donor (1). Three of the four organ recipients died, 23–27 days after transplantation. This report updates information about the ongoing investigation and provides interim measures for reducing the risk for LCMV infection from pet rodents associated with this outbreak.

Epidemiologic investigation traced the source of the virus to a pet hamster recently purchased by the organ donor from a pet store in Rhode Island. LCMV testing of other rodents at the pet store identified three other LCMV-infected rodents (two hamsters and a guinea pig). All four pet rodents had been supplied by a single distributor, MidSouth Distributors of Ohio. Preliminary test results determined that four (3.4%) of 115 hamsters sampled from the Ohio distributor had active LCMV infection. On the basis of sequence analysis, the LCMV from the transplant recipients, the donor's pet rodent, and from rodents obtained from the Rhode Island pet store and the Ohio distributor were determined to have the same lineage (i.e., likely to share a common source). Under the authority of the Ohio Department of Agriculture, the MidSouth facility was quarantined. The MidSouth owner voluntarily depopulated the facility; the premises also will be disinfected.

LCMV test results for the sampled rodents and records reviewed at the Rhode Island pet store and at MidSouth Distributors indicate that LCMV-infected pet rodents might have been transported from the Ohio facility to pet stores in the northeastern and midwestern United States as early as February 2005. Ohio authorities and CDC are working to determine which stores and states have received potentially affected shipments from the Ohio facility. CDC also is conducting an ongoing traceback investigation of the breeding facilities that supplied MidSouth Distributors.

Background Information

LCMV infection in humans with normal immune systems usually causes either asymptomatic or mild, self-limited illness. Aseptic meningitis also can occur in some patients, but the infection is rarely fatal (2). However, LCMV infection during the first or second trimester of pregnancy can cause severe illness or developmental defects in the fetus, including hydrocephalus, psychomotor retardation, blindness, and fetal death (3). The frequency with which developmental defects occur after in utero LCMV infection is not known. In addition, LCMV can be a serious infection in persons with impaired immune systems.

Pet hamsters and guinea pigs are not known to be natural reservoirs for LCMV. However, pet rodents can become infected if they have contact with wild house mice (*Mus musculus*) (e.g., in a breeding facility, pet store, or home). Although infection of other animals with LCMV might be possible, documented infections in humans have occurred only after exposure to infected mice, guinea pigs, and hamsters (2,4). Most human cases are associated with wild house mice, which are considered the primary reservoir (5).

Serologic testing of pet rodent species for antibodies against LCMV has not been reliable; the tests have not detected antibodies in animals with active infections demonstrated by other tests (i.e., immunohistochemistry staining of tissues and virus isolation). The unreliability of serologic testing is of concern because certain species of pet rodents infected with LCMV can shed virus for up to 8 months without signs of illness and thus can be a source of infection for humans (4,6).

A large outbreak of LCMV infection associated with pet hamsters sold by a single distributor was reported in 1974, when 181 symptomatic human cases were identified in 12 states; no deaths occurred (7). The outbreak was controlled by voluntary cessation of the sale of pet hamsters and subsequent destruction of the infected breeding stock. Stores were advised that all caging material be decontaminated or destroyed before receiv-

ing new animals. In addition, the public was informed of the risk for infection from hamsters purchased during the outbreak at stores supplied by the affected distributor (8).

Pet Stores with Potentially Infected Rodents in Stock

Two national retail chains have temporarily stopped the sale of potentially affected rodents (e.g., hamsters, guinea pigs, gerbils, rats, chinchillas, and mice) originating from MidSouth Distributors since February 2005. Pet stores that have received rodents from MidSouth Distributors since February should contact the appropriate authority in their states (i.e., state health department or state department of agriculture) for additional information and guidance.

Although LCMV is known to infect hamsters and guinea pigs, data are insufficient to determine the potential for infection of other rodent species (e.g., chinchillas, dwarf hamsters, or gerbils). However, husbandry practices in breeding facilities, distribution centers, and pet stores make cross-contamination with LCMV of other species a possibility. CDC is working with retailers in the pet industry to consider appropriate testing of these other rodent species.

Practices that can lead to cross-contamination of rodents include 1) housing healthy rodents in the same room or bin or in cages near potentially infected rodents (i.e., rodents from the MidSouth Distributors facility in Ohio); 2) handling or caring for rodents without washing hands or changing gloves after handling other rodents and between other animal-care activities, such as cleaning cages; 3) placing rodents in cages that previously housed other rodents without first decontaminating the cages with bleach or other appropriate disinfectants; and 4) reusing materials (e.g., water bottles, food dishes, bedding, or toys) that might be contaminated by potentially infected rodents.

Pet rodents that did not originate from MidSouth Distributors of Ohio and were not exposed to potential cross-contamination can be sold or distributed as normal. In addition, nonrodent species (e.g., ferrets and rabbits) can be sold or distributed as normal.

Pet stores are advised to work with state authorities to minimize the risk for transmission of LCMV from affected rodents to humans. Options considered by state authorities include 1) stopping sale or distribution of all rodents originating from MidSouth Distributors of Ohio since February, 2) stopping sale or distribution of hamsters and guinea pigs originating from MidSouth Distributors of Ohio since February, or 3) allowing distribution (i.e., sale or adoption), provided that appropriate educational material (e.g., state-approved informed consent or fact sheet) is provided to

purchasers of pet rodents originating from MidSouth Distributors since February. Educational material should disclose the specific LCMV risk in this population of pet rodents and potential outcomes in humans, including birth defects and fetal deaths. If sale of rodents is allowed to continue, populations at high risk (i.e., pregnant women, women who think they might become pregnant, and persons with weakened immune systems) should be advised against purchasing a pet rodent (9).

Preventing LCMV Infection in New Supplies of Rodents

Efforts are under way to ensure that animal facilities and equipment in retail outlets are disinfected, that new supplies of rodents come from sources free from LCMV, and that cross-contamination between new supplies of rodents and potentially infected animals will not occur. Surfaces, cages, and any reusable equipment that has been in contact with affected animals, their waste, or bedding material should be cleaned and disinfected by using a household disinfectant according to the manufacturer's instructions. Persons who are pregnant or have compromised immune systems should not engage in cleaning and disinfection related to these affected animals or other rodents. CDC and other partners will work with breeders and retailers in the pet industry to implement quality-assurance programs to minimize the risk for LCMV infection in rodents that are sold to the public.

Previously Purchased Pet Rodents

Testing of individual pet rodents in households is not a recommended strategy to minimize risk for LCMV infection; the probability of any one rodent in the United States being infected is low. The greatest infection risk for a pet owner is likely to occur soon after purchase of a pet rodent. Thus, most exposures likely already have occurred for existing owners and substantial added risk is unlikely to result from continued ownership of the rodent. However, women who are or who plan to become pregnant and persons who are immunocompromised should avoid contact with all rodents.

To prevent any possible infection of other rodents in stores, owners should not return pet rodents from MidSouth Distributors to pet stores. For legal, ethical, and wildlife conservation considerations, owners should not release pet rodents into the wild. Persons who no longer wish to keep their pet rodent should consult a veterinarian.

CDC continues to work with state public health officials and retailers in the pet industry to educate the public regarding safe handling of pet rodents and has prepared educational material for reducing the risk for LCMV infection from pet

rodents. Rodents and other pets from any pet store pose some risk for transmitting certain infectious diseases and should be handled appropriately. Additional information about reducing the risk for infectious diseases from pets is available at <http://www.cdc.gov/healthypets>. More detailed information about LCMV is available at <http://www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/lcmv.htm>.

Reported by: *Div of Viral and Rickettsial Diseases, National Center for Infectious Diseases, CDC.*

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