

***Salmonella* Typhimurium Infections Associated with Pet Hedgehogs**

July

Ramsey County/Multiple states

On August 8, 2012, staff at the Minnesota Department of Health (MDH) interviewed the parent of a *Salmonella* Typhimurium case with pulsed-field gel electrophoresis (PFGE) subtype TM1075 (Centers for Disease Control and Prevention [CDC] designation JPXX01.1925) detected through routine surveillance. This case was a 7 year-old female whose illness onset was July 15. She owned a hedgehog that was purchased on July 5 and it had developed diarrhea on July 10, lasting 5 days. The case's family purchased the pet from a breeder in Richfield, Minnesota. The case was responsible for feeding and cleaning up the hedgehog's cage in addition to petting and playing with it. A second case with *S. Typhimurium* TM1075 from July was unreachable despite multiple attempts. Nationally, 26 cases of infection were identified from December 26, 2011 through April 8, 2013. Cases in Washington also identified hedgehog contact, and a national investigation was initiated in August.

A case was defined as a person with a *Salmonella* Typhimurium infection with PFGE subtype TM1075 from December 2011 through April 2013. Cases were interviewed for hedgehog contact.

The Minnesota case family that had been interviewed was contacted again to determine a day and time when MDH staff could sample their hedgehog for *Salmonella*. MDH staff took eight samples from the household with the 7 year-old *Salmonella* case. Swabs of cages and a bathing tub in addition to bedding, fecal samples, and pet food samples were collected both for the case-patient's hedgehog and an additional hedgehog that had been more recently purchased for the household.

Ultimately, only one Minnesota case could be definitively linked to hedgehog contact. This case had diarrhea, bloody diarrhea, vomiting, fever, and cramps, with symptoms lasting 10 days. She was not hospitalized. An earlier case was identified in Minnesota with onset on December 26, 2011. The case was a 14 year-old female who did not mention hedgehog contact in her initial interview and could not be reached for re-interview. A fourth case in Minnesota also occurred in December, 2012. This was an 82 year-old male with no known hedgehog contact or other pet or animal contact. He did not have any relatives or know of anyone else who owned a hedgehog.

Nationally, 27 cases with the outbreak strain were reported from 12 states: Alabama (1), Illinois (1), Indiana (1), Louisiana (1), Michigan (3), Minnesota (4), Missouri (1), New Hampshire (1), Ohio (5), Oregon (1), and Washington (7). Illness onset dates ranged from December 26, 2011, to April 8, 2013. The median case age was 15 years (range, <1 to 91 years); 58% of cases were female. Thirty-five percent of cases were children 10 years of age or younger. Eight patients were hospitalized. One death associated with *Salmonella* infection was reported in Washington. Twenty (74%) patients who could be interviewed reported direct or indirect contact with hedgehogs during the week before illness onset.

Of the eight samples taken from the Minnesota case patient's home, the outbreak strain was isolated from an environmental swab of a container and sink in which hedgehogs were bathed. The outbreak strain was also isolated from an environmental swab from the cage of the second hedgehog purchased after the first hedgehog and case-patient became ill. In Illinois, the outbreak strain was isolated from environmental samples of a hedgehog's wheel, ramp, feed area, and bedding as well as from the pet hedgehog's feces. In Ohio, the outbreak strain was isolated from a pet hedgehog's feces.

USDA-APHIS Animal Care collaborated with CDC to identify the sources of hedgehogs linked to ill persons. Traceback investigations of pet hedgehogs from homes of ill persons identified multiple sources of hedgehogs in different states. Among 17 ill persons with available purchase information, hedgehogs were reportedly purchased from both USDA-licensed and unlicensed breeders as well as private individuals. USDA does not have authority over disease transmission due to such pets, only authority to assure safe, healthy, and humane treatment of the animals by the sellers.

Historic infections from 2010-2011 were also investigated to facilitate the traceback investigation. Fifteen PFGE matches to the outbreak strain were identified in 13 states. Onset dates for these infections ranged from April 18, 2010 to September 19, 2011. Epidemiologic information was available for six cases (based on archived state questionnaires). Three (50%) of six cases reported pet hedgehog contact. The three cases with no reported hedgehog contact could not be re-interviewed. Hedgehogs from two USDA-licensed facilities were linked to two historic infections through retrospective interviews by state epidemiologists. One breeder was previously identified; however, the other was newly identified as a result of these efforts.

Overall, nine USDA-licensed facilities were inspected by USDA-APHIS Animal Care inspectors. Traceback challenges among these facilities included the short-term (1 year) availability of records, frequent movement of hedgehogs between breeders, and case confidentiality concerns. Records were evaluated for all nine facilities, and six breeders also completed the hedgehog breeder questionnaire. The breeder in Minnesota was not a USDA-licensed facility, but staff at MDH attempted to contact them to discuss the outbreak and obtain information on the source of the hedgehogs. The breeder could not be reached despite multiple attempts. Based on available information, a single source of the hedgehogs was not identified, and no common feed or bedding could be identified.

Educational materials were created to raise awareness of the risk of *Salmonella* infection associated with pet hedgehogs as a result of this outbreak. Detailed advice to pet owners was included in the outbreak report on the CDC website: <http://www.cdc.gov/salmonella/typhimurium-hedgehogs-09-12/advice-consumers.html>, and an educational poster focused on small nontraditional pets was developed (available in English and Spanish): <http://www.cdc.gov/healthypets/publications/index.html>

This was an outbreak of *S. Typhimurium* infections associated with pet hedgehogs. Transmission likely occurred through contact with the hedgehogs and/or contact with environmental surfaces contaminated by hedgehogs. A single source for the hedgehogs could not be identified. This outbreak again highlights the need to raise awareness of the risk of *Salmonella* infections associated with pet hedgehogs and similar pocket pets among breeders, pet stores, pet owners, health-care professionals, and veterinarians.

Reference

1. Centers for Disease Control and Prevention (CDC). Notes from the field: Multistate outbreak of human *Salmonella* Typhimurium infections linked to contact with pet hedgehogs - United States, 2011-2013. MMWR Morb Mortal Wkly Rep. 2013 Feb 1;62(4):73.