

Salmonella

Multistate Outbreak of Human *Salmonella* Cotham and *Salmonella* Kisarawe Infections Linked to Contact with Pet Bearded Dragons

Posted June 12, 2014 6:00 PM ET

At a Glance:

- **Case Count:** **150** (</salmonella/cotham-04-14/epi.html>)
- **States:** **35** (</salmonella/cotham-04-14/map.html>)
- **Deaths:** **0**
- **Hospitalizations:** **43%**

More Information:

- [Advice to Pet Owners](/salmonella/cotham-04-14/advice-pet-owners.html) (</salmonella/cotham-04-14/advice-pet-owners.html>)
- [Signs & Symptoms](/salmonella/cotham-04-14/signs-symptoms.html) (</salmonella/cotham-04-14/signs-symptoms.html>)
- [Key Resources](/salmonella/cotham-04-14/key-resources.html) (</salmonella/cotham-04-14/key-resources.html>)

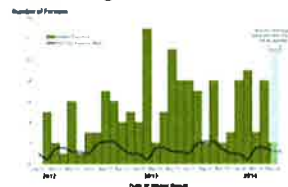
Latest Case Count Map



(</salmonella/cotham-04-14/map.html>)

Click map to view updated & previous case count maps. (</salmonella/cotham-04-14/map.html>)

Latest Epi Curve



(</salmonella/cotham-04-14/epi.html>)

Click graph to view updated & previous epi curve graphs. (</salmonella/cotham-04-14/epi.html>)



A bearded dragon, a type of lizard.

Highlights

- **Read the Advice to Pet Owners »** (</salmonella/cotham-04-14/advice-pet-owners.html>)
- As of June 6, 2014, a total of 150 persons infected with the outbreak strains of *Salmonella* Cotham (145 persons) or *Salmonella* Kisarawe (5 persons) have been reported from 35 states since February 21, 2012.
 - 57% of ill persons are children 5 years of age or younger.
 - 43% of ill persons have been hospitalized. No deaths have been reported.
- A second rarely reported serotype, *Salmonella* Kisarawe, was added to this outbreak investigation after a sample from a bearded dragon collected from an ill person's home yielded both *Salmonella* Kisarawe and *Salmonella* Cotham.
- Epidemiologic, laboratory, and traceback findings have linked this outbreak of *Salmonella* infections to contact with pet bearded dragons purchased from multiple stores in different states.
 - Bearded dragons are popular pet lizards that come in a variety of colors.
- To date, CDC'S NARMS laboratory (</narms/index.html>) has conducted antibiotic resistance testing on *Salmonella* Cotham isolates collected from 12 ill persons infected with the outbreak strain.
 - Of the 12 isolates collected from ill persons, one (8%) was resistant to ceftriaxone, an antibiotic used to treat serious *Salmonella* infections.
 - The other 11 (92%) of the 12 isolates collected from ill persons were pansusceptible (susceptible to all antibiotics tested).
- It is very important to wash your hands (</handwashing/when-how-handwashing.html>) thoroughly with soap and water right after touching reptiles or anything in the area where they live and roam.

- Simple tips on how to enjoy your pet reptile and protect yourself and your family from illness is available [in English \(/Features/salmonellafrogturtle/\)](#) and [en Español \(/spanish/especialesCDC/ReptilesAnfibiosSalmonella/\)](#).

June 12, 2014

Case Count Update

A second rarely reported serotype, *Salmonella* Kisarawe, was added to this outbreak investigation after a sample from a bearded dragon collected from an ill person's home isolated both *Salmonella* Kisarawe and *Salmonella* Cotham. A search of the [PulseNet \(/pulsenet/index.html\)](#) database identified five ill persons infected with the same strain of *Salmonella* Kisarawe, and five non-human isolates collected from bearded dragons.

As of June 6, 2014, a total of 150 persons infected with the outbreak strains of *Salmonella* Cotham (145 persons) or *Salmonella* Kisarawe (5 persons) have been reported from 35 states since February 21, 2012. The number of ill persons identified in each state is as follows (listed in alphabetical order): Alaska (1), Arizona (4), California (24), Colorado (3), Florida (3), Georgia (2), Idaho (3), Illinois (8), Indiana (2), Kansas (6), Kentucky (4), Massachusetts (1), Maryland (4), Michigan (6), Minnesota (3), Missouri (7), North Carolina (4), North Dakota (1), Nebraska (1), New Hampshire (1), New Jersey (3), Nevada (3), New York (11), Ohio (1), Oklahoma (1), Oregon (2), Pennsylvania (5), South Carolina (1), South Dakota (1), Tennessee (5), Texas (7), Utah (3), Virginia (3), Washington (4), and Wisconsin (12). Additionally, the [Public Health Agency of Canada \(http://www.phac-aspc.gc.ca/fs-sa/phn-asp/2014/salm-0527-eng.php\)](#) & [\(http://www.cdc.gov/Other/disclaimer.html\)](#) has identified ill persons infected with the same strain of *Salmonella* Cotham in Canada.

Among 95 persons for whom information is available, dates that illnesses began range from February 21, 2012 to May 19, 2014. Ill persons range in age from younger than 1 year to 79 years, with a median age of 2 years. Fifty-seven percent of ill persons are children 5 years of age or younger. Fifty-six percent of ill persons are female. Among 83 ill persons with available information, 36 (43%) have been hospitalized. No deaths have been reported.

Illnesses that occurred after May 6, 2014 might not yet be reported due to the time it takes between when a person becomes ill and when the illness is reported. This takes an average of 2 to 4 weeks. Please see the [Timeline for Reporting Cases of Salmonella Infection \(/salmonella/outbreaks/reporting_timeline.html\)](#) for more details.

Investigation Update

Epidemiologic, laboratory, and traceback investigations conducted by officials in local, state, and federal public health agencies indicate that contact with pet bearded dragons is the likely source of this outbreak of *Salmonella* infections.

Epidemiologic Investigation Update

In interviews, ill persons answered questions about contact with animals and foods consumed during the week before becoming ill. To date, CDC has received a total of 46 completed questionnaires. Forty-one (89%) of 46 persons interviewed reported contact with reptiles or their environments before becoming ill. When asked about the type of reptile, 36 (78%) of 46 persons reported contact with lizards; of these persons, 33 (92%) specifically reported contact with bearded dragons, a type of lizard. Ill persons infected with *Salmonella* Cotham and ill persons infected with *Salmonella* Kisarawe reported contact with bearded dragons. The percentage of ill persons in this outbreak reporting contact with a reptile is substantially higher than the 4.6% of U.S. households that reported owning a pet reptile in a survey conducted in 2013-2014 by the American Pet Products Association. State and local health departments are continuing to interview ill persons.

Laboratory Investigation Update

The [National Antimicrobial Resistance Monitoring System \(http://www.fda.gov/animalveterinary/safetyhealth/antimicrobialresistance/nationalantimicrobialresistancemonitoringsystem/ucmo59089.htm\)](#) & [\(http://www.cdc.gov/Other/disclaimer.html\)](#) (NARMS) is a U.S. public health surveillance system that tracks antibiotic resistance in foodborne and other enteric bacteria found in people, raw meat and poultry, and food-producing animals. NARMS is an interagency partnership among CDC, the U.S. Food and Drug Administration (FDA), the U.S. Department of Agriculture (USDA), and state and local health departments. The NARMS human surveillance program at CDC monitors antibiotic resistance in *Salmonella* and several other bacteria isolated from clinical specimens and submitted to NARMS by public health laboratories.

CDC's [NARMS \(/narms/index.html\)](#) laboratory has tested *Salmonella* Cotham isolates collected from 12 ill persons infected with the outbreak strain. To date, one (8%) of the 12 isolates tested was multidrug resistant (defined as resistance to at least one antibiotic in three or more antibiotic classes), and the other 11 (92%) isolates tested were pansusceptible (susceptible to all antibiotics tested). The multidrug resistant isolate has shown resistance to the following antibiotics: amoxicillin/clavulanic acid, ampicillin, cefoxitin, ceftiofur, ceftriaxone, chloramphenicol, gentamicin, streptomycin, sulfisoxazole and tetracycline; it also was intermediate (neither fully susceptible nor fully resistant) to ciprofloxacin. Ceftriaxone and ciprofloxacin are commonly used to treat serious *Salmonella* infections.

Traceback Investigation Update

The pet industry continues to work closely with CDC to determine the source of the bearded dragons linked to this outbreak in order to prevent additional illnesses.

Through this collaboration, multiple potential bearded dragon breeders have been identified that supply lizards to stores in the United States where ill persons reported purchasing their animals. This investigation continues and CDC will update the public when more information is available.

April 23, 2014

Initial Announcement

CDC is collaborating with public health, veterinary, and agriculture officials in many states and the U.S. Department of Agriculture [National Veterinary Services Laboratories \(http://www.aphis.usda.gov/wps/portal/aphis/ourfocus/animalhealth?idmy&urile=wcm%3Apath%3A/aphis_content_library/sa_our_focus/sa_animal_health/sa_lab_information_services/sa_about_nvsl/ct_about_nvsl\)](#) &

(<http://www.cdc.gov/Other/disclaimer.html>) (NVSL) to investigate an outbreak of *Salmonella* Cotham infections linked to contact with pet bearded dragons purchased from multiple stores in different states. Bearded dragons are popular pet lizards, native to Australia, that come in a variety of colors. Public health investigators are using the [PulseNet \(/pulsenet/\)](http://pulsenet.cdc.gov/) system to identify cases of illness that may be part of this outbreak. PulseNet, the national subtyping network of public health and food regulatory agency laboratories coordinated by CDC, obtains DNA "fingerprints" of *Salmonella* bacteria through diagnostic testing with pulsed-field gel electrophoresis, or PFGE.

On January 22, 2014, CDC was notified by the [Wisconsin Department of Health Services \(/foodcore/centers/wisconsin.html\)](http://foodcore/centers/wisconsin.html) of a cluster of *Salmonella* Cotham infections with a high proportion of ill persons reporting exposure to pet reptiles. Since 2012, there have been 12 ill persons infected with *Salmonella* Cotham in Wisconsin, and 10 (83%) of 12 persons reported contact with pet bearded dragons. Wisconsin receives funding under the CDC [FoodCORE \(/foodcore/index.html\)](http://foodcore/index.html) (Foodborne Diseases Centers for Outbreak Response Enhancement) program. These centers work together to develop new and better methods to detect, investigate, respond to, and control multistate outbreaks of foodborne diseases.

Salmonella Cotham is a rare [serotype \(/salmonella/reportspubs/salmonella-atlas/serotyping-importance.html\)](http://salmonella/reportspubs/salmonella-atlas/serotyping-importance.html). Searching historical *Salmonella* databases, CDC determined that *Salmonella* Cotham represents only 0.01% of all human isolates in the United States since 1963. Before this outbreak, typically fewer than 25 *Salmonella* Cotham infections were reported to PulseNet annually. Given the rarity of the Cotham serotype and the information gathered by Wisconsin, CDC conducted a search of PulseNet for all *Salmonella* Cotham infections reported since 2012.

As of April 21, 2014, a total of 132 persons infected with the outbreak strain of *Salmonella* Cotham have been reported from 31 states since February 21, 2012. The number of ill persons identified in each state is as follows (listed in alphabetical order): Arizona (4), California (21), Colorado (2), Florida (3), Georgia (1), Idaho (3), Illinois (6), Kansas (6), Kentucky (4), Maryland (3), Massachusetts (1), Michigan (5), Minnesota (3), Missouri (7), Nebraska (1), Nevada (3), New Hampshire (1), New Jersey (3), New York (10), North Carolina (2), Ohio (1), Oregon (2), Pennsylvania (5), South Carolina (1), South Dakota (1), Tennessee (5), Texas (6), Utah (3), Virginia (3), Washington (4), and Wisconsin (12).

Among 132 persons for whom information is available, dates that illnesses began range from February 20, 2012 to April 1, 2014. Ill persons range in age from less than 1 year to 79 years, with a median age of 2 years. Fifty-eight percent of ill persons are children 5 years of age or younger. Fifty-one percent of ill persons are female. Among 67 ill persons with available information, 28 (42%) have been hospitalized. No deaths have been reported.

This outbreak can be visually described with a chart showing the number of persons who became ill each day. This chart is called an [epidemic curve \(epi curve \(/foodsafety/outbreaks/investigating-outbreaks/epi-curves.html\)\)](http://foodsafety/outbreaks/investigating-outbreaks/epi-curves.html). Illnesses that occurred after March 22, 2014 might not yet be reported due to the time it takes between when a person becomes ill and when the illness is reported. This takes an average of 2 to 4 weeks. Please see the [Timeline for Reporting Cases of *Salmonella* Infection \(/salmonella/outbreaks/reporting_timeline.html\)](http://salmonella/outbreaks/reporting_timeline.html) for more details.

Investigation of the Outbreak

Epidemiologic, laboratory, and traceback investigations conducted by officials in local, state, and federal public health agencies indicate that contact with pet bearded dragons is the likely source of this outbreak of *Salmonella* Cotham infections.

Epidemiologic Investigation

On March 25, 2014, CDC sent a [questionnaire \(/foodsafety/outbreaks/surveillance-reporting/investigation-toolkit.html\)](http://foodsafety/outbreaks/surveillance-reporting/investigation-toolkit.html) to the states involved in the investigation to obtain more detailed information from ill persons about recent contact with reptiles. In interviews, ill persons answered questions about contact with animals and foods consumed during the week before becoming ill. To date, CDC has received a total of 31 completed questionnaires. Twenty-seven (87%) of 31 persons interviewed reported contact with reptiles or their environments before becoming ill. When asked about the type of reptile, 25 (81%) of 31 persons reported contact with lizards; of these 25 persons, 21 (84%) specifically reported contact with bearded dragons, a type of lizard. The percentage of ill persons in this outbreak reporting contact with a reptile is substantially higher than the percentage of U.S. households that reported owning a pet reptile in a survey conducted in 2013-2014 by the American Pet Products Association (5.6%). State and local health departments are continuing to interview ill persons.

Laboratory Investigation

The [Oregon State Public Health Laboratory \(http://public.health.oregon.gov/LaboratoryServices/Pages/index.aspx\)](http://public.health.oregon.gov/LaboratoryServices/Pages/index.aspx) & (<http://www.cdc.gov/Other/disclaimer.html>) has isolated the outbreak strain of *Salmonella* Cotham from samples from a pet bearded dragon and its habitat collected from an ill person's home in Oregon.

The [National Antimicrobial Resistance Monitoring System \(http://www.fda.gov/animalveterinary/safetyhealth/antimicrobialresistance/nationalantimicrobialresistancemonitoringsystem/ucm059089.html\)](http://www.fda.gov/animalveterinary/safetyhealth/antimicrobialresistance/nationalantimicrobialresistancemonitoringsystem/ucm059089.html) & (<http://www.cdc.gov/Other/disclaimer.html>) (NARMS) is a U.S. public health surveillance system that tracks antibiotic resistance in foodborne and other enteric bacteria found in people, raw meat and poultry, and food-producing animals. NARMS is an interagency partnership among CDC, the U.S. Food and Drug Administration (FDA), the U.S. Department of Agriculture (USDA), and state and local health departments.

The [NARMS human surveillance program at CDC \(/narms/\)](http://narms.cdc.gov/) monitors antibiotic resistance in *Salmonella* and several other bacteria isolated from clinical specimens and submitted to NARMS by public health laboratories. CDC's NARMS laboratory tested *Salmonella* Cotham isolates collected from three ill persons infected with the outbreak strain. One (33%) of the three isolates tested was multidrug resistant (defined as resistance to at least one antibiotic in three or more antibiotic classes), and the other two (67%) isolates tested were pansusceptible (susceptible to all antibiotics tested). The multidrug resistant isolate has shown resistance to the following antibiotics: ampicillin, chloramphenicol, streptomycin, sulfisoxazole, tetracycline, amoxicillin-clavulanic acid, cefoxitin, ceftriaxone, ceftiofur, and gentamicin. One of these antibiotics, ceftriaxone, is commonly used to treat serious *Salmonella* infections, including those in children. The CDC NARMS laboratory is continuing to conduct antibiotic resistance testing on *Salmonella* Cotham isolates collected from ill persons. Additional results will be reported when they become available.

Traceback Investigation

The pet industry is working closely with CDC to determine the source of the bearded dragons linked to this outbreak in order to prevent additional illnesses. Through this collaboration, multiple potential bearded dragon breeders have been identified that supply lizards to pet stores in the United States where ill persons reported purchasing their animals. This investigation is ongoing and CDC will update the public when more information is available.

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