



Centers for Disease Control and Prevention
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Salmonella

Multistate Outbreak of *Salmonella* Bareilly and *Salmonella* Nchanga Infections Associated with a Raw Scraped Ground Tuna Product

Posted June 21, 2012 2:15 PM ET

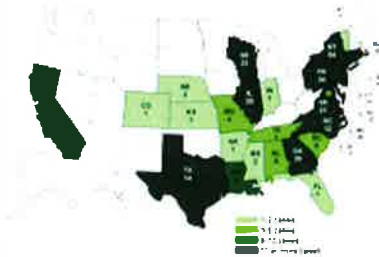
At a Glance:

- **Case Count: 390** (</salmonella/bareilly-04-12/epi.html>)
- **States: 27** (</salmonella/bareilly-04-12/map.html>)
- **Deaths: 0**
- **Hospitalizations: 47**
- **Recall: Yes** (</salmonella/bareilly-04-12/advice-consumers.html>)

More Information:

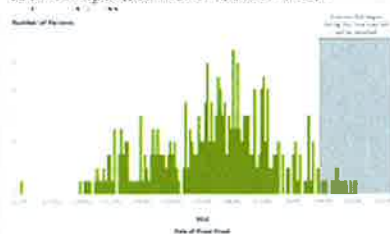
- Recall & Advice to Consumers (</salmonella/bareilly-04-12/advice-consumers.html>)
- Signs & Symptoms (</salmonella/bareilly-04-12/signs-symptoms.html>)
- Key Resources (</salmonella/bareilly-04-12/key-resources.html>)

Latest Case Count Map



[\(/salmonella/bareilly-04-12/map.html\)](/salmonella/bareilly-04-12/map.html)

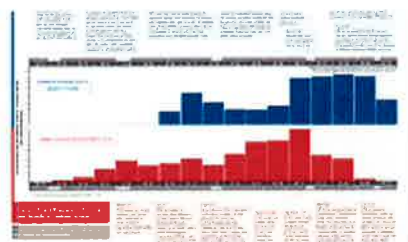
Click map to view updated & previous case count maps. (</salmonella/bareilly-04-12/map.html>)



[\(/salmonella/bareilly-04-12/epi.html\)](/salmonella/bareilly-04-12/epi.html)

Click map to view updated & previous epi curve graphs. (</salmonella/bareilly-04-12/epi.html>)





[\(/salmonella/bareilly-04-12/timeline.html\)]((/salmonella/bareilly-04-12/timeline.html))

Click graph to view timeline of events



[\(/salmonella/bareilly-04-12/advice-consumers.html\)]((/salmonella/bareilly-04-12/advice-consumers.html))

Highlights

- **Read the Advice to Consumers »** ([/salmonella/bareilly-04-12/advice-consumers.html]((/salmonella/bareilly-04-12/advice-consumers.html)))
- A total of 390 persons infected with the outbreak strains of *Salmonella* Bareilly (376 persons) or *Salmonella* Nchanga (14 persons) have been reported from 27 states and the District of Columbia.
 - 47 ill persons have been hospitalized, and no deaths have been reported.
- Collaborative investigation efforts of state, local, and federal public health agencies indicate that a frozen raw yellowfin tuna product, known as Nakaochi Scrape, from Moon Marine USA Corporation is the likely source of this outbreak.
- Consumers should not eat the recalled product, and retailers should not serve the recalled raw Nakaochi Scrape tuna product from Moon Marine USA Corporation.
- Laboratory testing conducted by state public health laboratories in Connecticut, Maryland, Massachusetts, Pennsylvania, South Carolina, and Wisconsin has isolated *Salmonella* from 53 (96%) of 55 samples taken from intact packages of frozen yellow fin tuna scrape from Moon Marine USA Corporation or from sushi prepared with the implicated scrape tuna product.
- The numbers of new cases have declined substantially since the peak in April 2012. The outbreak may continue at a low level for the next several months since some food establishments may be unaware that they received recalled product and continue to serve this frozen raw yellowfin tuna product, which has a long shelf-life.
- CDC and state and local public health partners are continuing surveillance to identify new cases.
- Timeline of Events: Multistate Outbreak of *Salmonella* Bareilly and *Salmonella* Nchanga Infections Associated with a Raw Scraped Ground Tuna Product—United States, 2012 ([/salmonella/bareilly-04-12/timeline.html]((/salmonella/bareilly-04-12/timeline.html)))

June 21, 2012

Case Count Update

A total of 390 individuals infected with the outbreak strains of *Salmonella* Bareilly or *Salmonella* Nchanga have been reported from 27 states and the District of Columbia. The 74 new cases are from Alabama (1), California (3), Connecticut (2), District of Columbia (1), Georgia (5), Illinois (2), Kansas (1), Louisiana (2), Massachusetts (3), Maryland (13), Nebraska

(1), New Jersey (9), New York (10), North Carolina (2), Pennsylvania (9), South Carolina (1), Texas (7), and Wisconsin (2).

- 376 persons infected with the outbreak strain of *Salmonella* Bareilly have been reported from 27 states and the District of Columbia. The number of ill persons with the outbreak strain of *Salmonella* Bareilly identified in each state is as follows: Alabama (4), Arkansas (1), California (7), Colorado (1), Connecticut (11), District of Columbia (3), Florida (1), Georgia (18), Illinois (29), Indiana (1), Kansas (1), Louisiana (6), Massachusetts (36), Maryland (39), Missouri (4), Mississippi (2), Nebraska (2), New Jersey (35), New York (58), North Carolina (12), Pennsylvania (34), Rhode Island (6), South Carolina (4), Tennessee (4), Texas (13), Virginia (22), Vermont (1), and Wisconsin (21).
- 14 persons infected with the outbreak strain of *Salmonella* Nchanga have been reported from 7 states. The number of ill persons with the outbreak strain of *Salmonella* Nchanga identified in each state is as follows: Georgia (2), Maryland (1), New Jersey (2), New York (6), Texas (1), Virginia (1), and Wisconsin (1).

Among 390 persons for whom information is available, illness onset dates range from January 1, 2012 to June 3, 2012. Ill persons range in age from less than 1 year to 86 years, with a median age of 30 years. Sixty percent of patients are female. Among 291 persons with available information, 47 (16%) reported being hospitalized. No deaths have been reported.

Illnesses that occurred after May 18, 2012, might not be reported yet due to the time it takes between when a person becomes ill and when the illness is reported. The numbers of new cases have declined substantially since the peak in April 2012. The outbreak may continue at a low level for the next several months since some food establishments may be unaware that they received recalled product and continue to serve this frozen raw yellowfin tuna product, which has a long shelf-life. Food establishments should not serve recalled frozen raw yellowfin tuna product, and consumers should not eat it.

CDC and state and local public health partners are continuing surveillance to identify new cases.

May 17, 2012

Case Count Update

A total of 316 individuals infected with the outbreak strains of *Salmonella* Bareilly or *Salmonella* Nchanga have been reported from 26 states and the District of Columbia. The 58 new cases are from Alabama (1), California (2), Colorado (1), Georgia (3), Illinois (4), Indiana (1), Louisiana (1), Maryland (3), Massachusetts (6), New Jersey (1), New York (10), North Carolina (6), Pennsylvania (5), Tennessee (2), Texas (3), Virginia (6), and Wisconsin (3).

- Three hundred and four persons infected with the outbreak strain of *Salmonella* Bareilly have been reported from 26 states and the District of Columbia. The number of ill persons with the outbreak strain of *Salmonella* Bareilly identified in each state is as follows: Alabama (3), Arkansas (1), California (4), Colorado (1), Connecticut (9), District of Columbia (2), Florida (1), Georgia (13), Illinois (27), Indiana (1), Louisiana (4), Maryland (27), Massachusetts (33), Mississippi (2), Missouri (4), Nebraska (1), New Jersey (26), New York (48), North Carolina (10), Pennsylvania (25), Rhode Island (6), South Carolina (3), Tennessee (4), Texas (7), Virginia (22), Vermont (1), and Wisconsin (19).
- Twelve persons infected with the outbreak strain of *Salmonella* Nchanga have been reported from 5 states. The number of ill persons with the outbreak strain of *Salmonella* Nchanga identified in each state is as follows: Georgia (2), New Jersey (2), New York (6), Virginia (1), and Wisconsin (1).

Among 316 persons for whom information is available, illness onset dates range from January 28 to May 3, 2012. Ill persons range in age from <1 to 86 years, with a median age of 30. Fifty-nine percent of patients are female. Among 217 persons with available information, 37 (17%) reported being hospitalized. No deaths have been reported.

Illnesses that occurred after April 17, 2012, might not be reported yet due to the time it takes between when a person becomes ill and when the illness is reported.

Investigation Update

Laboratory testing conducted by state public health laboratories in Connecticut, Maryland, Massachusetts, Pennsylvania, South Carolina, and Wisconsin has isolated *Salmonella* from 53 (96%) of 55 samples taken from intact packages of frozen yellow fin tuna scrape from Moon Marine USA Corporation or from sushi prepared with the implicated scrape tuna product. Pulsed-field gel electrophoresis results are available for *Salmonella* isolates from 41 of the 53 positive samples. Thirty-six samples yielded the outbreak strain of *Salmonella* Bareilly, and 12 samples yielded the outbreak strain of *Salmonella* Nchanga. Seven samples yielded the outbreak strains of both *Salmonella* Bareilly and *Salmonella* Nchanga.

On April 24, 2012, FDA issued a document <http://www.fda.gov/AboutFDA/CentersOffices/OfficeofFoods/CFSAN/CFSANFOIAElectronicReadingR> [Ⓔ](http://www.cdc.gov/Other/disclaimer.html) <http://www.cdc.gov/Other/disclaimer.html> that lists observations made by the FDA Representative(s) during the inspection of a Moon Fishery (India) Pvt. Ltd facility conducted as part of this ongoing outbreak investigation.

Recall Update

On May 10, 2012 Moon Fishery (India) Pvt. Ltd., the manufacturer of the frozen yellowfin tuna Nakaochi scrape recently recalled, expanded the voluntary recall <http://www.fda.gov/Food/FoodSafety/CORENetwork/ucm298741.htm#recall> [Ⓔ](http://www.cdc.gov/Other/disclaimer.html) <http://www.cdc.gov/Other/disclaimer.html> to include its 22-pound boxes of “Tuna Strips”, Product of India, marked as “AA” or “AAA Grade” because the product has the potential to be contaminated with *Salmonella*.

On April 13, 2012, Moon Marine USA Corporation (also known as MMI) of Cupertino, California voluntarily recalled <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm300397.htm> [Ⓔ](http://www.cdc.gov/Other/disclaimer.html) <http://www.cdc.gov/Other/disclaimer.html> 58,828 lbs of a frozen raw yellowfin tuna product, labeled as Nakaochi Scrape AA or AAA. Nakaochi Scrape is tuna backmeat, which is specifically scraped off from the bones, and looks like a ground product.

May 2, 2012

Case Count Update

A total of 258 individuals infected with the outbreak strains of *Salmonella* Bareilly or *Salmonella* Nchanga have been reported from 24 states and the District of Columbia. The 58 new cases are from California (2), Connecticut (1), Georgia (1), Illinois (8), Maryland (4), Massachusetts (3), Nebraska (1), New Jersey (8), New York (6), North Carolina (1), Pennsylvania (13), Tennessee (2), Virginia (7), and Wisconsin (1).

Two-hundred forty-seven persons infected with the outbreak strain of *Salmonella* Bareilly have been reported from 24 states and the District of Columbia. The number of ill persons with the outbreak strain of *Salmonella* Bareilly identified in each state is as follows:

Alabama (2), Arkansas (1), California (2), Connecticut (9), District of Columbia (2), Florida (1), Georgia (10), Illinois (23), Louisiana (3), Maryland (24), Massachusetts (27), Mississippi (2), Missouri (4), Nebraska (1), New Jersey (25), New York (39), North Carolina (4), Pennsylvania (20), Rhode Island (6), South Carolina (3), Tennessee (2), Texas (4), Virginia (16), Vermont (1), and Wisconsin (16).

Eleven persons infected with the outbreak strain of *Salmonella* Nchanga have been reported from 5 states. The number of ill persons with the outbreak strain of *Salmonella* Nchanga identified in each state is as follows: Georgia (2), New Jersey (2), New York (5), Virginia (1), and Wisconsin (1).

Among 258 persons for whom information is available, illness onset dates range from January 28 to April 20, 2012. Ill persons range in age from 4 to 86 years, with a median age of 30. Fifty-seven percent of patients are female. Among 173 persons with available information, 32 (18%) reported being hospitalized. No deaths have been reported.

Illnesses that occurred after April 4, 2012, might not be reported yet due to the time it takes between when a person becomes ill and when the illness is reported.

April 26, 2012

Case Count Update

A total of 200 individuals infected with the outbreak strains of *Salmonella* Bareilly or *Salmonella* Nchanga have been reported from 21 states and the District of Columbia. The 40 new cases are from Connecticut (2), Georgia (5), Illinois (1), Maryland (6), Massachusetts (1), New Jersey (11), New York (8), Pennsylvania (1), Rhode Island (1), Virginia (1), Vermont (1), and Wisconsin (2).

Among 200 persons for whom information is available, illness onset dates range from January 28 to April 12, 2012. Ill persons range in age from 4 to 86 years, with a median age of 30. Fifty-nine percent of patients are female. Among 153 persons with available information, 28 (18%) reported being hospitalized. No deaths have been reported.

Illnesses that occurred after March 27, 2012, might not be reported yet due to the time it takes between when a person becomes ill and when the illness is reported.

Investigation Update

During April 2012, CDC began collaborating with public health officials in several states and the U.S. Food and Drug Administration (FDA) to investigate a multistate outbreak of *Salmonella* Nchanga infections. *Salmonella* Nchanga is extremely rare in the United States. Among 10 persons for whom information is available, illness onset dates range from February 19 to April 5, 2012. Ill persons range in age from 17 to 86 years, with a median age of 33 years. Seventy-five percent of patients are female. Among 6 persons with available information, 1 (17%) reported being hospitalized. No deaths have been reported. Initial interviews with ill persons suggested a possible link to the *Salmonella* Bareilly outbreak. Among 5 people for whom information is available, all 5 (100%) reported eating sushi in the 7 days before illness. Among the 4 who reported a specific sushi type, 2 (50%) reported eating "spicy tuna."

As part of the ongoing *Salmonella* Bareilly outbreak investigation, FDA collected and tested samples of unopened packages of recalled Nakaochi Scrape from Moon Marine USA Corporation. FDA laboratories have identified *Salmonella* in two samples of Nakaochi scrape yellowfin tuna with a PFGE pattern indistinguishable from the *Salmonella* Bareilly strain associated with this outbreak. One of the samples also yielded another type of *Salmonella* with

a PFGE pattern indistinguishable from the cluster of *Salmonella* Nchanga infections. Testing conducted by the Wisconsin Department of Agriculture Trade and Consumer Protection laboratory isolated the outbreak strain of *Salmonella* Bareilly from one sample of recalled tuna and one sample of a spicy tuna roll made with recalled tuna. Based on an epidemiological link and results of laboratory testing, CDC has combined this *Salmonella* Bareilly investigation with an ongoing multistate outbreak investigation of *Salmonella* serotype Nchanga infections. The two associated PFGE patterns have been grouped together as the "outbreak strains."

April 20, 2012

Case Count Update

A total of 160 individuals infected with the outbreak strain of *Salmonella* Bareilly have been reported from 20 states and the District of Columbia. The 19 new cases are from Illinois (1), Massachusetts (14), New York (2), North Carolina (1), and Virginia (1).

Among 160 persons for whom information is available, illness onset dates range from January 28 to April 10, 2012. Ill persons range in age from 4 to 78 years, with a median age of 30. Sixty six percent of patients are female. Among 140 persons with available information, 26 (19%) reported being hospitalized. No deaths have been reported.

Illnesses that occurred after March 24, 2012, might not be reported yet due to the time it takes between when a person becomes ill and when the illness is reported.

April 17, 2012

Case Count Update

A total of 141 individuals infected with the outbreak strain of *Salmonella* Bareilly have been reported from 20 states and the District of Columbia. The 25 new cases are from Connecticut (1), Georgia (1), Illinois (3), Louisiana (1), Maryland (3), Massachusetts (1), Mississippi (1), Missouri (2), New Jersey (1), New York (4), Pennsylvania (1), Virginia (3), Texas (1), and Wisconsin (2).

Among 139 persons for whom information is available, illness onset dates range from January 28 to April 1, 2012. Ill persons range in age from 4 to 78 years, with a median age of 30. Fifty-nine percent of patients are female. Among 107 persons with available information, 21 (20%) reported being hospitalized. No deaths have been reported.

Illnesses that occurred after March 20, 2012, might not be reported yet due to the time it takes between when a person becomes ill and when the illness is reported.

April 13, 2012

Investigation Update

Collaborative investigation efforts of state, local, and federal public health agencies indicate that a frozen raw yellowfin tuna product, known as Nakaochi Scrape, from Moon Marine USA Corporation is the likely source of this outbreak of *Salmonella* Bareilly infections. Nakaochi Scrape is tuna backmeat that is scraped from the bones of tuna and may be used in sushi, sashimi, ceviche, and similar dishes. The product looks like raw ground tuna. Hypothesis-generating interviews of ill persons conducted by local and state health departments in March and April, 2012 suggested consumption of sushi made with raw tuna as a source for these infections. To date, among 53 ill persons who have been asked questions about eating sushi and other seafood in the week before illness, 43 (81%) reported eating sushi. This proportion is

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significantly higher when compared with results from [a survey](#) (</foodnet/surveys/FNExpAtlo3022011.pdf>) of healthy persons in which 5% reported eating "sushi, sashimi, or ceviche made with raw fish or shellfish" in the 7 days before they were interviewed. Of the 43 ill persons reporting eating sushi, 39 (91%) reported eating a sushi item containing tuna, and 36 (84%) reported eating a sushi item containing "spicy tuna."

To date, a total of 7 clusters at restaurants or grocery stores have been identified where 2 or more unrelated ill persons reported eating in the week before illness. In each cluster, at least one ill person reported eating sushi purchased at the restaurant or grocery store. These clusters are located in 5 states: Connecticut, Maryland, Rhode Island, Texas, and Wisconsin.

Several methods were used to evaluate the association between tuna and illness in this outbreak. To estimate the frequency of consumption of tuna and "spicy tuna" among all sushi eaters, investigators assembled a comparison group from 1) diners who ate at one of the cluster restaurants or grocery stores or 2) a restaurant where a single ill person, who was judged to have a reliable memory, recalled consuming sushi only once in the week before illness. Records were collected on sushi orders that were placed at the same time of day (lunch or dinner) and as close to the date when the ill person ate at the restaurant.

This study is ongoing. Thus far, information has been collected from 4 clusters at restaurants or grocery stores. The proportion of sushi orders that contained tuna as an ingredient averaged 61% (ranging from 43% to 71%). The proportion of sushi orders that contained "spicy tuna" as an ingredient averaged 37% (ranging from 29% to 53%). These data suggest there is an association between illness and consumption of sushi made with tuna, and specifically "spicy tuna."

Public health and regulatory officials also are visiting restaurants and grocery stores associated with ill persons and collecting information about the ingredients used in "spicy tuna" recipes. Based on available information from 5 of the 7 restaurant or grocery store clusters about ingredients used to make "spicy tuna", raw tuna was found to be a common ingredient among all 5 clusters.

State and local public health and regulatory officials are working with the U.S. Food and Drug Administration (FDA) to conduct a traceback of tuna. FDA has selected 4 of the clusters, which are located in Connecticut, Rhode Island, Texas, and Wisconsin, as the focus of the initial investigation. Information to date indicates that all 4 received the same imported frozen raw Nakauchi Scrape tuna product from a single tuna processing facility in India.

This investigation is ongoing. CDC and state and local public health partners are continuing surveillance to identify new cases. Further investigation is ongoing to identify possible sources of contamination and whether any other tuna products are linked with illness. CDC will update the public on the progress of this investigation as information becomes available.

April 11, 2012

Case Count Update

A total of 116 individuals infected with the outbreak strain of *Salmonella* Bareilly have been reported from 20 states and the District of Columbia. The 16 new cases are from Florida (1), Georgia (1), Illinois (1), Maryland (1), Massachusetts (4), Missouri (1), New York (1), Pennsylvania (2), Rhode Island (1), and Wisconsin (3).

Among 100 persons for whom information is available, illness onset dates range from January 28 to March 31, 2012. Ill persons range in age from 4 to 78 years, with a median age of 31. Fifty percent of patients are female. Among 71 persons with available information, 12 (17%) reported being hospitalized. No deaths have been reported.

Illnesses that occurred after March 14, 2012, might not be reported yet due to the time it takes between when a person becomes ill and when the illness is reported.

April 6, 2012

Case Count Update

A total of 100 individuals infected with the outbreak strain of *Salmonella* Bareilly have been reported from 19 states and the District of Columbia. The 7 new cases are from Connecticut (1), Illinois (1), Maryland (2), New Jersey (1), Pennsylvania (1), and Wisconsin (1).

Among 100 persons for whom information is available, illness onset dates range from January 28 to March 25, 2012. Ill persons range in age from 4 to 78 years, with a median age of 31. Forty-seven percent of patients are female. Among 51 persons with available information, 10 (20%) reported being hospitalized. No deaths have been reported.

Illnesses that occurred after March 8, 2012, might not be reported yet due to the time it takes between when a person becomes ill and when the illness is reported.

Initial Announcement

April 4, 2012

CDC is collaborating with public health officials in many states and the U.S. Food and Drug Administration (FDA) to investigate a multistate outbreak of *Salmonella* serotype Bareilly infections. *Salmonella* Bareilly is an unusual serotype of *Salmonella*. Public health investigators used DNA "fingerprints" of *Salmonella* bacteria obtained through diagnostic testing with pulsed-field gel electrophoresis, or PFGE, to identify cases of illness that may be part of this outbreak. They used data from [PulseNet \(/pulsenet/\)](http://pulsenet/), the national subtyping network made up of state and local public health laboratories and federal food regulatory laboratories that performs molecular surveillance of foodborne infections... ([show more »](#)) (#)

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[National Center for Emerging and Zoonotic Infectious Diseases \(NCEZID\)](#)

[Division of Foodborne, Waterborne, and Environmental Diseases \(DFWED\)](#)

Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348 - cdcinfo@cdc.gov