



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 (Final Update)

Posted July 26, 2012 5:30 PM ET

This outbreak appears to be over. However, *Salmonella* is an important cause of human illness in the United States. More information about *Salmonella*, and steps people can take to reduce their risk of infection, can be found on the [CDC *Salmonella* Web Page \(/salmonella/index.html\)](/salmonella/index.html) and the [CDC Vital Signs Web Page \(/VitalSigns/FoodSafety/\)](/VitalSigns/FoodSafety/).

At a Glance:

- **Case Count: 425** (</salmonella/bareilly-04-12/epi.html>)
- **States: 28** (</salmonella/bareilly-04-12/map.html>)
- **Deaths: 0**
- **Hospitalizations: 55**
- **Recall: Yes** (</salmonella/bareilly-04-12/advice-consumers.html>)

More Information:

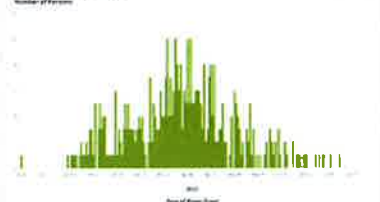
- Recall & Advice to Consumers (</salmonella/bareilly-04-12/advice-consumers.html>)
- Signs & Symptoms (</salmonella/bareilly-04-12/signs-symptoms.html>)
- Key Resources (</salmonella/bareilly-04-12/key-resources.html>)

Latest Case Count Map

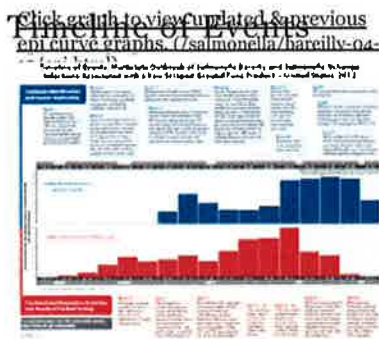


[\(/salmonella/bareilly-04-12/map.html\)](/salmonella/bareilly-04-12/map.html)

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



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



(</salmonella/bareilly-04-12/timeline.html>)



(</salmonella/bareilly-04-12/advice-consumers.html>)

Highlights

- **Read the Advice to Consumers »** (</salmonella/bareilly-04-12/advice-consumers.html>)
- A total of 425 persons infected with the outbreak strains of *Salmonella* Bareilly (410 persons) or *Salmonella* Nchanga (15 persons) were reported from 28 states and the District of Columbia.
 - 55 ill persons were hospitalized, and no deaths were reported.
- Collaborative investigation efforts of state, local, and federal public health agencies linked this outbreak to a frozen raw yellowfin tuna product, known as Nakaochi Scrape, from Moon Marine USA Corporation.
- Consumers should not eat the recalled product, and retailers should not serve the recalled raw Nakaochi Scrape tuna product from Moon Marine USA Corporation.
- This particular outbreak appears to be over. However, additional cases may be reported over 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.
- 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>)

Outbreak Summary ↑ (#top)

Introduction

CDC collaborated with public health officials in many states and the U.S. Food and Drug Administration (FDA) to investigate a multistate outbreak of *Salmonella* Bareilly and *Salmonella* Nchanga infections associated with an imported frozen raw yellowfin tuna product, known as Nakaochi Scrape, from Moon Marine USA Corporation. *Salmonella* Bareilly and *Salmonella* Nchanga are unusual serotypes of *Salmonella* in the United States. 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/) (</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.

A total of 425 individuals infected with the outbreak strains of *Salmonella* Bareilly or *Salmonella* Nchanga were reported from 28 states and the District of Columbia. Since the last update, 35 new cases were reported from 12 states: Alabama (1), California (1), Georgia (2), Illinois (1), New Hampshire (2), New Jersey (5), New York (4), Pennsylvania (3), South Carolina (1), Texas (1), Virginia (11), and Wisconsin (3).

- Four hundred and ten persons infected with the outbreak strain of *Salmonella* Bareilly were reported from 28 states and the District of Columbia. The number of ill persons infected with the outbreak strain of *Salmonella* Bareilly identified in each state was as follows: Alabama (5), Arkansas (1), California (8), Colorado (1), Connecticut (11), District of Columbia (3), Florida (1), Georgia (20), Illinois (30), Indiana (1), Kansas (1), Louisiana (6), Massachusetts (36), Maryland (39), Missouri (4), Mississippi (2), Nebraska (2), New Hampshire (2), New Jersey (39), New York (62), North Carolina (12), Pennsylvania (37), Rhode Island (6), South Carolina (5), Tennessee (4), Texas (14), Virginia (33), Vermont (1), and Wisconsin (24).
- Fifteen persons infected with the outbreak strain of *Salmonella* Nchanga were reported from 7 states. The number of ill persons infected with the outbreak strain of *Salmonella* Nchanga identified in each state was as follows: Georgia (2), Maryland (1), New Jersey (3), New York (6), Texas (1), Virginia (1), and Wisconsin (1).

Among 425 persons for whom information was available, illness onset dates ranged from January 1 to July 7, 2012. Ill persons ranged in age from less than 1 year to 86 years, with a median age of 30 years; 60% of patients were female. Among 326 persons with available information, 55 (17%) reported being hospitalized. No deaths were reported.

This particular outbreak appears to be over. However, additional cases may be reported over 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.

Investigation of the Outbreak

Collaborative investigation efforts of state, local, and federal public health agencies linked this outbreak to contaminated frozen raw yellowfin tuna product, known as Nakaochi Scrape, from Moon Marine USA Corporation. Nakaochi Scrape is tuna backmeat that is scraped from the bones of tuna and may be used in sushi, sashimi, ceviche, and similar dishes.

Interviews of ill persons conducted by states in March and April, 2012 suggested consumption of sushi made with raw tuna as a source of these infections. By April 11, 2012, 43 (81%) of 53 ill persons interviewed with a detailed questionnaire reported eating sushi. This proportion was

 [PDF - 29

significantly higher when compared with results from [a survey](http://www.cdc.gov/foodnet/surveys/FNExpAtlo3022011.pdf) pages]

(<http://www.cdc.gov/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."

Several methods were used to evaluate the association between tuna and illness in this outbreak. On March 29, 2012, a study was launched 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.

On April 9, 2012, preliminary results of the comparison study using information available from 4 illness clusters at restaurants or grocery stores showed that 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 suggested there was an association between illness and consumption of sushi made with tuna, and specifically "spicy tuna."

State and local public health and regulatory officials worked with the U.S. Food and Drug Administration (FDA) to conduct a traceback investigation of tuna. Investigators visited restaurants and grocery stores associated with ill persons and collected information about the ingredients used in "spicy tuna" recipes. Raw tuna was found to be a common ingredient used to make "spicy tuna" among all 5 restaurant or grocery store clusters for which ingredient information was available. FDA selected 4 of the clusters, which were located in Connecticut, Rhode Island, Texas, and Wisconsin, as the focus of the initial traceback investigation. All 4 establishments received the same imported frozen raw Nakaochi Scrape tuna product from a single tuna processing facility in India, Moon Fishery Pvt Ltd.

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>) 58,828 pounds 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.

A Seafood HACCP (Hazard Analysis and Critical Control Point) inspection was conducted by FDA April 19–24, 2012 at the Moon Fishery Pvt Ltd. processing facility in Aroor, India. Based on the initial tour of the facility, inspectors identified several seafood HACCP deficiencies, such as lack of controls for histamine at receipt of product, lack of controls for *Clostridium botulinum* at storage, and several significant sanitation observations of concern. A copy of the inspection observations document is available: FDA Form 483 for Moon Fishery (India) Pvt.

 [PDF - 3 Ltd4pages] (<http://www.fda.gov/downloads/AboutFDA/CentersOffices/OfficeofFoods/CFSAN/CFSANFOIAElectronic>)  (<http://www.cdc.gov/Other/disclaimer.html>).

During the investigation, samples of the implicated product were collected for laboratory testing. On April 24, 2012, the Wisconsin Department of Health Services announced that the Department of Agriculture Trade and Consumer Protection laboratory had found *Salmonella* Bareilly contamination in recalled yellowfin tuna and in a spicy tuna roll made with the recalled tuna.

On April 26, 2012, FDA announced finding the outbreak strain of *Salmonella* Bareilly from two samples taken from unopened packages of recalled Nakaochi Scrape tuna from Moon Marine USA Corporation. One of the samples also yielded another type of *Salmonella* with a PFGE pattern indistinguishable from a cluster of *Salmonella* Nchanga infections. Based on an epidemiological link and results of laboratory testing, CDC combined the *Salmonella* Bareilly

investigation with an ongoing *Salmonella* Nchanga investigation, and the 2 associated PFGE patterns were grouped together as the "outbreak strains."

By May 17, 2012, laboratory testing conducted by state public health laboratories in Connecticut, Maryland, Massachusetts, Pennsylvania, South Carolina, and Wisconsin isolated *Salmonella* from 53 (96%) of 55 samples taken from intact packages of frozen yellowfin tuna scrape from Moon Marine USA Corporation or from sushi prepared with the implicated scrape tuna product. Of the 41 *Salmonella* isolates for which PFGE results are available, 36 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 May 10, 2012, Moon Fishery (India) Pvt. Ltd., the manufacturer of the frozen yellowfin tuna Nakaochi Scrape, expanded the voluntary recall

(<http://www.fda.gov/Food/FoodSafety/CORENetwork/ucm298741.htm#recall>) ↗

(<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*. The recall was announced after FDA laboratories isolated the outbreak strain of *Salmonella* Bareilly from a sample of tuna strips from Moon Fishery (India) Pvt Ltd collected as part of increased surveillance efforts. The shipment in question did not enter into U.S. commerce and no human illnesses were associated with this product. FDA laboratory sampling results are available at the FDA website

(<http://www.fda.gov/Food/FoodSafety/CORENetwork/ucm298741.htm#sampling>) ↗

(<http://www.cdc.gov/Other/disclaimer.html>).

This was the first documented outbreak of human salmonellosis linked to raw, scraped tuna product in the United States. This was also the first foodborne outbreak of *Salmonella* Nchanga reported in the United States. Consumers should not eat the recalled frozen raw yellowfin tuna product, known as Nakaochi Scrape, from Moon Marine USA Corporation, and retailers and food service establishments should not serve it. Additional advice for consumers is available here (</salmonella/bareilly-04-12/advice-consumers.html>). *Salmonella* is an important cause of human illness in the United States. More information about *Salmonella* infections, and steps people can take to reduce their risk of infection, can be found on the CDC *Salmonella* Web Page (</salmonella/general/prevention.html>) and the CDC Vital Signs Web Page (</VitalSigns/FoodSafety/>).

Progression of the Outbreak Investigation ↓ (#t)

Page last reviewed: April 4, 2012

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Content source: Centers for Disease Control and Prevention

National Center for Emerging and Zoonotic Infectious Diseases (NCEZID)

Division of Foodborne, Waterborne, and Environmental Diseases (DFWED)

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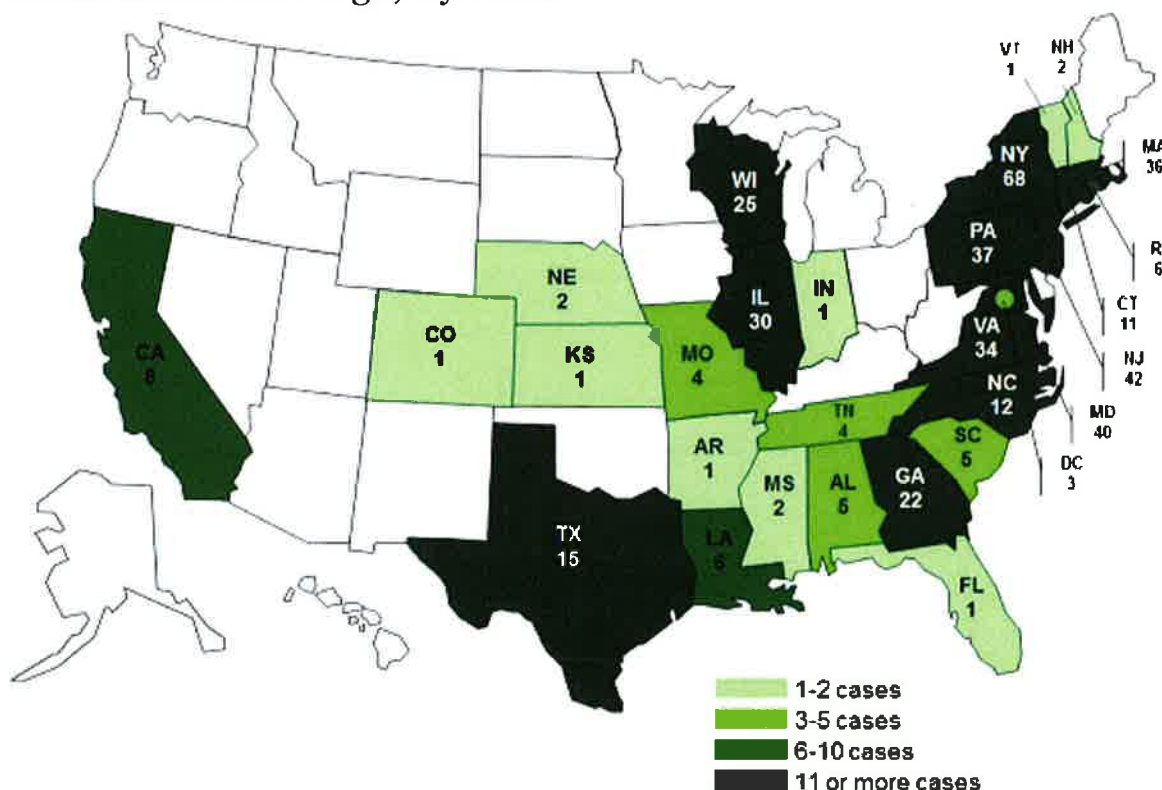
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Current Case Count Map

Persons infected with the outbreak strains of *Salmonella* Bareilly and *Salmonella* Nchanga, by State*



*n=425 for whom information was reported as of July 25, 2012

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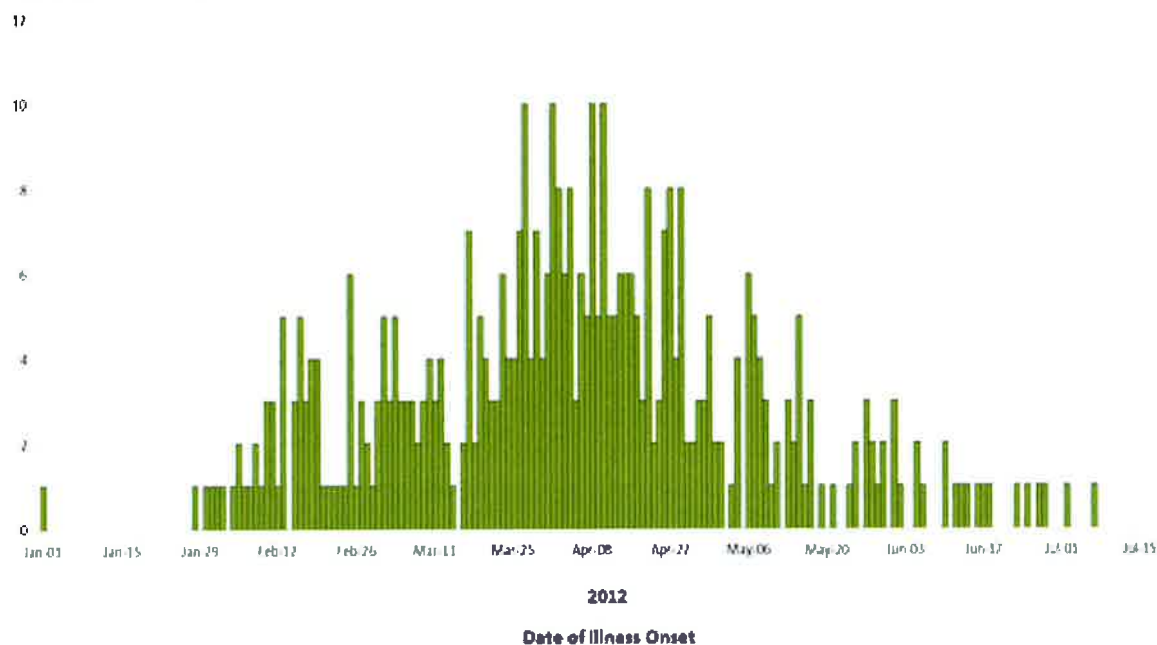
Epi Curve

This outbreak can be visually described with a chart showing the number of persons who became ill each day. This chart is called an epi curve. Please see the [Timeline for Reporting of *Salmonella* Cases \(/salmonella/outbreaks/reporting_timeline.html\)](/salmonella/outbreaks/reporting_timeline.html) for more details on the reporting process.

Current Epi Curve

Persons infected with the outbreak strains of *Salmonella* Bareilly and *Salmonella* Nchanga, by date of illness onset*

Number of Persons



*n=425 for whom information was reported as of July 25, 2012