

Salmonella

Multistate Outbreak of Multidrug-Resistant *Salmonella* Heidelberg Infections Linked to Foster Farms Brand Chicken

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At a Glance:

- **Case Count:** **574** (</salmonella/heidelberg-10-13/epi.html>)
- **States:** **27** (</salmonella/heidelberg-10-13/map.html>)
- **Deaths:** **0**
- **Hospitalizations:** **37%**
- **Recall:** **Yes** (</salmonella/heidelberg-10-13/advice-consumers.html>)

More Information:

- [Recall & Advice to Consumers \(/salmonella/heidelberg-10-13/advice-consumers.html\)](/salmonella/heidelberg-10-13/advice-consumers.html)
- [Signs & Symptoms \(/salmonella/heidelberg-10-13/signs-symptoms.html\)](/salmonella/heidelberg-10-13/signs-symptoms.html)
- [Key Resources \(/salmonella/heidelberg-10-13/key-resources.html\)](/salmonella/heidelberg-10-13/key-resources.html)
- [Timeline of Events \(/salmonella/heidelberg-10-13/timeline.html\)](/salmonella/heidelberg-10-13/timeline.html)

Latest Case Count Map



[\(/salmonella/heidelberg-10-13/map.html\)](/salmonella/heidelberg-10-13/map.html)

[Click map to view updated & previous case count maps. \(/salmonella/heidelberg-10-13/map.html\)](/salmonella/heidelberg-10-13/map.html)

Latest Epi Curve



[\(/salmonella/heidelberg-10-13/epi.html\)](/salmonella/heidelberg-10-13/epi.html)

[Click graph to view updated & previous epi curve graphs. \(/salmonella/heidelberg-10-13/epi.html\)](/salmonella/heidelberg-10-13/epi.html)

Highlights

- **[Read the Advice to Consumers » \(/salmonella/heidelberg-10-13/advice-consumers.html\)](/salmonella/heidelberg-10-13/advice-consumers.html)**
- **[View the Timeline of Events » \(/salmonella/heidelberg-10-13/timeline.html\)](/salmonella/heidelberg-10-13/timeline.html)**
- The investigation continues into *Salmonella* Heidelberg infections likely related to Foster Farms chicken.
- As of May 22, 2014, a total of 574 persons infected with seven outbreak strains of *Salmonella* Heidelberg have been reported from 27 states and Puerto Rico, since March 1, 2013.
 - 37% of ill persons have been hospitalized, and no deaths have been reported.
 - Most ill persons (77%) have been reported from California.
- Epidemiologic, laboratory, and traceback investigations conducted by local, state, and federal officials indicate that consumption of Foster Farms brand chicken is the likely source of this outbreak of *Salmonella* Heidelberg infections.
- The outbreak strains of *Salmonella* Heidelberg are resistant to several commonly prescribed antibiotics. Although these antibiotics are not typically used to treat *Salmonella* bloodstream infections or other severe *Salmonella* infections, antibiotic resistance can be associated with increased risk of hospitalization in infected individuals.
- It is not unusual for raw poultry from any producer to have *Salmonella* bacteria. CDC and USDA-FSIS recommend consumers follow [food safety tips \(http://www.foodsafety.gov\)](http://www.foodsafety.gov) [@ \(http://www.cdc.gov/Other/disclaimer.html\)](http://www.cdc.gov/Other/disclaimer.html) to prevent *Salmonella* infection from raw poultry produced by Foster Farms or any other brand.

May 27, 2014

Case Count Update

As of May 22, 2014, a total of 574 individuals infected with the outbreak strains of *Salmonella* Heidelberg have been reported from 27 states and Puerto Rico since March 1, 2013. Most of the ill persons (77%) have been reported from California. Since the last update on April 9, 2014, a total of 50 new ill persons have been reported from 8 states: Arizona (1), California (42), Georgia (1), Montana (1), Nevada (1), Oregon (1), Texas (1), and Utah (2). Since the last update, an average of 8 new ill persons have been reported each week to CDC.

Among 560 persons for whom information is available, illness onset dates range from March 1, 2013 to May 1, 2014. Ill persons range in age from less than 1 year to 93 years, with a median age of 18 years. Fifty-one percent of ill persons are male. Among 478 persons with available information, 178 (37%) reported being hospitalized. Thirteen percent of ill persons have developed blood

infections as a result of their illness. Typically, approximately 5% of persons ill with *Salmonella* infections develop blood infections. No deaths have been reported.

Illnesses that began after April 22, 2014, might not be reported yet 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 (http://www.cdc.gov/salmonella/outbreaks/reporting_timeline.html).

April 9, 2014

Case Count Update

As of April 7, 2014, a total of 524 individuals infected with the outbreak strains of *Salmonella* Heidelberg have been reported from 25 states and Puerto Rico since March 1, 2013. Most of the ill persons (76%) have been reported from California. Since the last update on March 3, 2014, a total of 43 new ill persons have been reported from 5 states: Arizona (2), California (34), Michigan (1), Oregon (3), Texas (2), and Washington (1).

Among 518 persons for whom information is available, illness onset dates range from March 1, 2013 to March 18, 2014. Ill persons range in age from less than 1 year to 93 years, with a median age of 18 years. Fifty-one percent of ill persons are male. Among 437 persons with available information, 162 (37%) reported being hospitalized. Thirteen percent of ill persons have developed blood infections as a result of their illness. Typically, approximately 5% of persons ill with *Salmonella* infections develop blood infections. No deaths have been reported.

Illnesses that began after March 8, 2014, might not be reported yet 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 ([/salmonella/outbreaks/reporting_timeline.html](http://www.cdc.gov/salmonella/outbreaks/reporting_timeline.html)).

Investigation Update

In interviews, ill persons answered questions about foods consumed and other exposures during the week before becoming ill. Three hundred and ten (86%) of 361 ill persons interviewed to date report consuming chicken in the week before becoming ill. Among those who had brand information available, 119 (74%) of 161 ill persons reported that they had consumed Foster Farms brand chicken or another brand likely produced by Foster Farms.

CDC and state and local public health partners continue to focus the investigation on interviewing ill persons about foods eaten and other exposures before becoming ill, continuing laboratory surveillance through PulseNet to identify additional ill persons who have infections with outbreak-associated strains, and testing recent outbreak strains for antibiotic resistance. CDC is working closely with USDA-FSIS which is assessing interventions implemented at Foster Farms facilities to prevent future illnesses.

CDC's NARMS laboratory ([/narms/index.html](http://www.cdc.gov/narms/index.html)) continues to conduct antimicrobial susceptibility testing on clinical isolates collected from ill persons infected with any of the seven outbreak strains. Of 61 isolates tested to date, 38 (62%) exhibited resistance to one or more antibiotics. Nineteen (31%) of the 61 isolates were multidrug resistant. To date, isolates collected from ill persons were resistant to combinations of the following antibiotics: ampicillin, chloramphenicol, gentamicin, kanamycin, streptomycin, sulfisoxazole, and tetracycline. Although these antibiotics are not typically used to treat *Salmonella* bloodstream infections or other severe *Salmonella* infections, antibiotic resistance can be associated with a higher risk of hospitalization in infected individuals. Isolates collected from ill persons reported in 2014 have exhibited similar patterns of antibiotic resistance as isolates collected from ill persons reported in 2013.

March 3, 2014

Case Count Update

This outbreak investigation continues. Previously, the outbreak appeared to be over, but recent findings indicate otherwise. The number of reported infections from all seven outbreak strains of *Salmonella* Heidelberg returned to baseline levels in January and the outbreak appeared to be over, as noted in the previous update on January 16, 2014. However, the investigation continued and ongoing surveillance in February identified that infections from two of the previously rare outbreak strains have again exceeded the number of infections expected to be reported to PulseNet ([/pulsenet/index.html](http://www.cdc.gov/pulsenet/index.html)) during this time of year.

As of February 28, 2014, a total of 481 individuals infected with the outbreak strains of *Salmonella* Heidelberg have been reported from 25 states and Puerto Rico since March 1, 2013. Most of the ill persons (76%) have been reported from California.

Since the last update on January 16, 2014, a total of 51 new ill persons have been reported from 5 states: Arizona (3), California (44), Hawaii (1), Tennessee (1), and Utah (2). CDC and state and local public health partners are focusing the investigation on interviewing ill persons about foods eaten and other exposures before becoming ill, continuing laboratory surveillance through PulseNet to identify additional ill persons who have infections with outbreak-associated strains, and testing recent outbreak strains for antibiotic resistance.

Information about illnesses is available from 472 persons. The dates the illnesses began range from March 1, 2013 to February 11, 2014. Ill persons range in age from less than 1 year to 93 years, with a median age of 18 years. Fifty-one percent of ill persons are male. Among 394 persons with available information, 151 (38%) reported being hospitalized. Thirteen percent of ill persons have developed blood infections as a result of their illness. Typically, approximately 5% of persons ill with *Salmonella* infections develop blood infections. No deaths have been reported.

Illnesses that began after January 29, 2014, might not be reported yet 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 ([/salmonella/outbreaks/reporting_timeline.html](http://www.cdc.gov/salmonella/outbreaks/reporting_timeline.html)).

Investigation Update

The NARMS retail meat surveillance program (<http://www.fda.gov/AnimalVeterinary/SafetyHealth/AntimicrobialResistance/NationalAntimicrobialResistanceMonitoringSystem/default.htm>) isolated one of the two outbreak strains of *Salmonella* Heidelberg that has recently increased from a retail sample collected in California of Foster Farms brand chicken wings, purchased on January 27, 2014.

Testing conducted by USDA-FSIS identified the other outbreak strain of *Salmonella* Heidelberg that has recently increased in a leftover sample of raw chicken from an ill person's home in California. The person became ill on January 11, 2014. The outbreak strain isolated from this person was different from the strain isolated from the leftover chicken sample. Using shopper card records obtained with permission from the ill person, investigators determined that the chicken was a brand likely produced by Foster Farms. However, no packaging was available with the tested product to confirm this and the production date of this sample is unknown.

Antibiotic resistance testing results are not yet available for isolates from recent ill persons or isolates from recent food samples. Results of this testing will be reported when they become available.

January 16, 2014

Case Count Update

As of January 15, 2014, a total of 430 individuals infected with the outbreak strains of *Salmonella* Heidelberg have been reported from 23 states and Puerto Rico. Most of the ill persons (74%) have been reported from California. Since the last update on December 19, 2013, a total of 14 new ill persons have been reported from four states: Arizona (1), California (11), Idaho (1), and Virginia (1).

Among 418 persons for whom information is available, illness onset dates range from March 1, 2013 to December 26, 2013. Ill persons range in age from less than 1 year to 93 years, with a median age of 18 years. Fifty-two percent of ill persons are male. Among 359 persons with available information, 137 (38%) reported being hospitalized. Thirteen percent of ill persons have developed blood infections as a result of their illness. Typically, approximately 5% of persons ill with *Salmonella* infections develop blood infections. No deaths have been reported.

The number of reported infections from the outbreak strains of *Salmonella* Heidelberg has returned to baseline levels indicating that this particular outbreak appears to be over. However, activities related to this investigation are ongoing. Illnesses that occurred after December 15, 2013, might not be reported yet 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 (http://www.cdc.gov/salmonella/outbreaks/reporting_timeline.html).

Investigation Update

CDC's NARMS laboratory (<http://www.cdc.gov/narms/index.html>) continues to conduct antimicrobial susceptibility testing on clinical isolates collected from ill persons infected with any of the seven outbreak strains. Of 54 isolates tested to date, 32 (59%) exhibited resistance to one or more antibiotics. Fifteen (28%) of the 54 isolates were multidrug resistant. To date, isolates collected from ill persons were resistant to combinations of the following antibiotics: ampicillin, chloramphenicol, gentamicin, kanamycin, streptomycin, sulfisoxazole, and tetracycline. Although these antibiotics are not typically used to treat *Salmonella* bloodstream infections or other severe *Salmonella* infections, antibiotic resistance can increase the risk of hospitalization in infected individuals.

Additionally, CDC's NARMS laboratory received isolates from five chicken products produced by Foster Farms: four collected from ill people's homes in California and Washington and one collected from a warehouse chain store located in California. Of the five isolates tested, four (80%) exhibited resistance to one or more antibiotics. One isolate (20%) was multidrug resistant. Isolates collected from chicken were resistant to combinations of the following antibiotics: gentamicin, kanamycin, streptomycin, sulfisoxazole, and tetracycline.

December 19, 2013

Case Count Update

As of December 18, 2013, a total of 416 individuals infected with the outbreak strains of *Salmonella* Heidelberg have been reported from 23 states and Puerto Rico. Most of the ill persons (74%) have been reported from California. Since the last update on November 19, 2013, a total of 27 new ill persons have been reported from 4 states: Arizona (2), California (22), Colorado (2), and Washington (1).

Among 403 persons for whom information is available, illness onset dates range from March 1, 2013 to December 1, 2013. Ill persons range in age from less than 1 year to 93 years, with a median age of 19 years. Fifty-one percent of ill persons are male. Among 340 persons with available information, 134 (39%) reported being hospitalized. Thirteen percent of ill persons have developed blood infections as a result of their illness. Typically, approximately 5% of persons ill with *Salmonella* infections develop blood infections. No deaths have been reported.

Illnesses that occurred after November 17, 2013 might not be reported yet 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 ([/salmonella/outbreaks/reporting_timeline.html](http://www.cdc.gov/salmonella/outbreaks/reporting_timeline.html)).

Investigation Update

CDC's NARMS laboratory ([/narms/index.html](http://www.cdc.gov/narms/index.html)) continues to conduct antimicrobial susceptibility testing on clinical isolates collected from ill persons infected with all seven of the outbreak strains. Of 34 isolates tested to date, 19 (56%) of these isolates exhibited resistance to one or more antibiotics. Seven (21%) of the 34 isolates were multidrug resistant. To date, isolates collected from ill persons were resistant to combinations of the following antibiotics: ampicillin, chloramphenicol, gentamicin, kanamycin, streptomycin, sulfisoxazole, and tetracycline. Antibiotic resistance may increase the risk of hospitalization or possible treatment failure in infected individuals.

Seven strains of *Salmonella* Heidelberg bacteria have been identified as being linked to this outbreak. Ill persons infected with each of the seven strains were linked to consumption Foster Farms chicken. Four of these strains are rarely reported to PulseNet. The other three strains are more common, with several ill persons infected with each strain reported to CDC monthly. The number of reported cases for these three strains was significantly higher than the number of cases expected during the outbreak period. Since illnesses due to several strains are more commonly reported, not all may be linked to consumption of Foster Farms chicken and may be part of the expected number of illnesses reported during this period.

November 19, 2013

Case Count Update

As of November 15, 2013, a total of 389 individuals infected with the outbreak strains of *Salmonella* Heidelberg have been reported from 23 states and Puerto Rico. Most of the ill persons (74%) have been reported from California. Since the last update on October 30, 2013, 28 new ill persons have been reported from 8 states: Arizona (2), California (20), Idaho (1), Illinois (1), Louisiana (1), Nevada (1), Oregon (1), and Virginia (1). One ill person from Texas has been removed from the CDC case count because the person does not meet the outbreak case definition.

Among 380 persons for whom information is available, illness onset dates range from March 1, 2013 to October 29, 2013. Ill persons range in age from less than 1 year to 93 years, with a median age of 19 years. Fifty-two percent of ill persons are male. Among 312 persons with available information, 125 (40%) reported being hospitalized. Fourteen percent of ill persons have developed blood infections as a result of their illness. Typically, approximately 5% of persons ill with *Salmonella* infections develop blood infections. No deaths have been reported.

Illnesses that occurred after October 14, 2013 might not be reported yet 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 ([/salmonella/outbreaks/reporting_timeline.html](http://salmonella/outbreaks/reporting_timeline.html)).

October 30, 2013

Case Count Update

As of October 29, 2013, a total of 362 individuals infected with the outbreak strains of *Salmonella* Heidelberg have been reported from 21 states and Puerto Rico. Most of the ill persons (74%) have been reported from California. Since the last update on October 18, 2013, 24 new ill persons have been reported from six states: California (16), Colorado (3), Delaware (1), Idaho (1), Michigan (1), and Texas (2).

Among 356 persons for whom information is available, illness onset dates range from March 1, 2013 to October 8, 2013. Ill persons range in age from less than 1 year to 93 years, with a median age of 19 years. Fifty-two percent of ill persons are male. Among 259 persons with available information, 98 (38%) reported being hospitalized. Fourteen percent of ill persons have developed blood infections as a result of their illness. Typically, approximately 5% of persons ill with *Salmonella* infections develop blood infections. No deaths have been reported.

Illnesses that occurred after September 28, 2013 might not be reported yet 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 3 weeks.

October 18, 2013

Case Count Update

As of October 17, 2013, a total of 338 individuals infected with the outbreak strains of *Salmonella* Heidelberg have been reported from 20 states and Puerto Rico. Most of the ill persons (75%) have been reported from California. Since the last update on October 11, 2013, 22 new ill persons have been reported from three states: Arizona (1), California (20), and Oregon (1).

Among 331 persons for whom information is available, illness onset dates range from March 1, 2013 to October 2, 2013. Ill persons range in age from less than 1 year to 93 years, with a median age of 18 years. Fifty-two percent of ill persons are male. Among 234 persons with available information, 93 (40%) reported being hospitalized. Fourteen percent of ill persons have developed blood infections as a result of their illness. Typically, approximately 5% of persons ill with *Salmonella* infections develop blood infections. No deaths have been reported.

Illnesses that occurred after September 17, 2013 might not be reported yet 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 3 weeks.

Investigation Update

Among the 252 ill persons reported in California, state and local health officials identified at least 25 ill persons as part of a cluster of illness. The ill persons consumed food purchased from the same Costco store location in South San Francisco in the week before they became sick. Based on interviews of ill persons, an association was identified between illness and consumption of cooked rotisserie chicken purchased from this store location. Shopper card information was successfully used to determine the specific food linked to illnesses and allowed investigators to identify the chicken involved as belonging to the Foster Farms brand. Ill persons gave permission for public health officials to retrieve purchase information based on shopper card numbers. This investigation is ongoing.

Two samples of leftover rotisserie chicken were collected by public health officials from the home of ill persons in California infected with outbreak strains of *Salmonella* Heidelberg. Laboratory testing conducted by the California Food and Drug Laboratory Branch identified one of the outbreak strains of *Salmonella* Heidelberg in both samples of leftover rotisserie chicken.

On October 12, 2013, Costco's El Camino Real store located in South San Francisco, California recalled more than 9,000 units (approximately 40,000 pounds) of rotisserie chicken products (<http://www.fsis.usda.gov/wps/portal/fsis/topics/recalls-and-public-health-alerts/recall-case-archive/archive/2013/recall-058-2013-release>) & (<http://www.cdc.gov/Other/disclaimer.html>). The products subject to recall included 8,730 "Kirkland Signature Foster Farms" rotisserie chickens and 313 total units of "Kirkland Farm" rotisserie chicken soup, rotisserie chicken leg quarters, and rotisserie chicken salad. The products were sold directly to consumers in the Costco store between September 11, 2013 and September 23, 2013. While the use-by date has passed and these products are no longer available for retail sale, USDA-FSIS is concerned that some product may be frozen in consumers' freezers.

On October 17, 2013, Costco's El Camino Real store recalled an additional 14,093 units of rotisserie chicken products (<http://www.fsis.usda.gov/wps/portal/fsis/topics/recalls-and-public-health-alerts/recall-case-archive/archive/2013/recall-058-2013-expanded>) & (<http://www.cdc.gov/Other/disclaimer.html>) that may be contaminated with *Salmonella* Heidelberg. This is in addition to the 9,043 units that were recalled on October 12, 2013. The products subject to recall include 13,455 "Kirkland Signature Foster Farms" rotisserie chickens and 638 total units of "Kirkland Farm" rotisserie chicken soup, rotisserie chicken leg quarters, and rotisserie chicken salad. The products were sold directly to consumers in the Costco store between September 24, 2013 and October 15, 2013. Costco and the California Department of Public Health discovered through a follow-up investigation to the previous recall that

additional product should be recalled. No illnesses have been reported in association with the product recalled on October 17, 2013. According to USDA-FSIS, the problem with possibly contaminated rotisserie chicken products at this Costco location may be the result of cross-contamination after the cooking process in the preparation area.

Seven strains of *Salmonella* Heidelberg bacteria have been identified as being linked to this outbreak. Ill persons infected with each of the seven strains were linked to consumption Foster Farms chicken. Four of these strains are rarely reported to [PulseNet \(/pulsenet/\)](#). The other three strains are more common, with several ill persons infected with each strain reported to CDC monthly. Since illnesses due to several strains are more commonly reported, not all may be linked to consumption of Foster Farms chicken and may be part of the expected number of illnesses reported during this period.

CDC and state and local public health partners are continuing laboratory surveillance through [PulseNet \(/pulsenet/\)](#) to identify additional ill persons and to interview them about foods eaten before becoming ill. USDA-FSIS is continuing to work closely with CDC and state partners during this investigation.

October 11, 2013

Case Count Update

As of October 11, 2013, a total of 317 individuals infected with the outbreak strains of *Salmonella* Heidelberg have been reported from 20 states and Puerto Rico. Most of the ill persons (73%) have been reported from California. Since the last update on October 8, 2013, a total of 39 additional ill persons have been identified from 9 states and Puerto Rico: Arizona (2), California (19), Florida (2), Kentucky (1), Missouri (5), Nevada (1), New Mexico (2), Puerto Rico (1), Texas (4), and Virginia (2). Of the 39 additional ill persons, two have estimated illness onset dates after September 24, 2013, the last illness onset date reported in the October 8, 2013 outbreak announcement. Since the last update, one ill person originally reported from Hawaii was found to be a resident of Florida. This person is now included in the Florida case count.

Among 310 persons for whom information is available, illness onset dates range from March 1, 2013 to September 26, 2013. Ill persons range in age from less than 1 year to 93 years, with a median age of 20 years. Fifty-one percent of ill persons are male. Among 189 persons with available information, 79 (42%) reported being hospitalized. Thirteen percent of ill persons developed blood infections as a result of their illness. Typically, approximately 5% of persons ill with *Salmonella* infections develop blood infections. No deaths have been reported.

Illnesses that occurred after September 5, 2013 might not be reported yet 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 3 weeks.

Investigation Update

To date, seven strains of *Salmonella* Heidelberg have been included in this investigation based on epidemiologic, laboratory and traceback information. The information collected for cases associated with each strain indicates that each of the strains is linked to this outbreak of multidrug-resistant *Salmonella* Heidelberg infections and that Foster Farms brand chicken is the likely source.

CDC's [NARMS laboratory \(/narms/index.html\)](#) conducted antibiotic-resistance testing on clinical isolates collected from ten ill persons infected with three of the seven outbreak strains. Nine of these isolates exhibited drug resistance to one or more commonly prescribed antibiotics. Of those, three were multidrug resistant. One isolate was susceptible to all antibiotics tested. To date, isolates collected from ill persons were resistant to combinations of the following antibiotics: ampicillin, chloramphenicol, gentamicin, kanamycin, streptomycin, sulfisoxazole, and tetracycline. Antimicrobial resistance may increase the risk of hospitalization or possible treatment failure in infected individuals.

On October 10, 2013, USDA-FSIS announced that Foster Farms submitted and implemented immediate substantive changes to their slaughter and processing to allow for continued operations. FSIS inspectors will verify that these changes are being implemented on a continuous and ongoing basis. Additionally, the agency will continue intensified sampling and testing of chicken products from these facilities for at least the next 90 days.

CDC and state and local public health partners are continuing laboratory surveillance through [PulseNet \(/pulsenet/\)](#) to identify additional ill persons and to interview them about foods eaten before becoming ill. USDA-FSIS is continuing to work closely with CDC and state partners during this investigation.

October 8, 2013

Initial Announcement

CDC is collaborating with public health and agriculture officials in many states and the U.S. Department of Agriculture's Food Safety and Inspection Service (USDA-FSIS) to investigate a multistate outbreak of *Salmonella* Heidelberg infections. Public health investigators are using 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 are using data from [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. Seven strains of *Salmonella* Heidelberg bacteria have been identified as being linked to this outbreak. Four of these strains are rarely reported to [PulseNet \(/pulsenet/\)](#). The other three strains are more common, with several ill persons infected with each strain reported to CDC monthly. The DNA fingerprints of the *Salmonella* Heidelberg bacteria associated with the current outbreak include the strain that was also associated with a [multistate outbreak of *Salmonella* Heidelberg linked to Foster Farms brand chicken \(/salmonella/heidelberg-02-13/index.html\)](#) during 2012-2013.

As of October 7, 2013, a total of 278 individuals infected with the outbreak strains of *Salmonella* Heidelberg have been reported from 17 states. Most of the ill persons (77%) have been reported from California. The number of ill persons identified in each state is as follows: Alaska (2), Arkansas (1), Arizona (11), California (213), Colorado (4), Connecticut (1), Florida (1), Hawaii (1), Idaho (2), Michigan (2), North Carolina (1), Nevada (8), Oregon (8), Texas (5), Utah (2), Washington (15) and Wisconsin (1).

Among 274 persons for whom information is available, illness onset dates range from March 1 to September 24, 2013. Ill persons range in age from <1 year to 93 years, with a median age of 20 years. Fifty-one percent of ill persons are male. Among 183 persons with available information, 76 (42%) reported being hospitalized. No deaths have been reported.

The outbreak can be visually described with a chart showing the number of people who became ill each day or week. This chart is called an epi curve (</salmonella/heidelberg-10-13/epi.html>). Illnesses that occurred after September 1, 2013 might not be reported yet 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 3 weeks. For more details, please see [Salmonella Outbreak Investigations: Timeline for Reporting Cases](/salmonella/outbreaks/reporting_timeline.html) (/salmonella/outbreaks/reporting_timeline.html).

Investigation of the Outbreak

Epidemiologic, laboratory, and traceback investigations conducted by officials in local, state, and federal public health, agriculture, and regulatory agencies indicate that consumption of Foster Farms brand chicken is the likely source of this outbreak of *Salmonella* Heidelberg infections.

In interviews, ill persons answered questions about foods consumed and other exposures during the week before becoming ill. One hundred and five (80%) of 132 ill persons interviewed report consuming chicken prepared at home in the week before becoming ill. This proportion is significantly higher when compared with results from a [survey of healthy persons](/foodnet/PDFs/FNExpAtlo3022011.pdf)  [PDF - 29 pages] (</foodnet/PDFs/FNExpAtlo3022011.pdf>) in which 65% reported consuming chicken prepared at home in the week before they were interviewed. Among those who had brand information available, 48 (79%) of 61 ill persons reported that they had consumed Foster Farms brand chicken or another brand likely produced by Foster Farms.

The National Antimicrobial Resistance Monitoring System

(<http://www.fda.gov/AnimalVeterinary/SafetyHealth/AntimicrobialResistance/NationalAntimicrobialResistanceMonitoringSystem/default.htm>) & (<http://www.cdc.gov/Other/disclaimer.html>) (NARMS) retail meat surveillance program is an ongoing collaboration among the U.S. Food and Drug Administration's Center for Veterinary Medicine, CDC, and participating state public health laboratories. NARMS monitors antibiotic resistance in *Salmonella*, *Campylobacter*, *Enterococcus*, and *Escherichia coli* bacteria isolated from raw retail meats. NARMS laboratorians isolated four of the seven outbreak strains from five retail samples of Foster Farms chicken breasts and wings collected in California. Four of these isolates exhibited drug resistance to one or more commonly prescribed antibiotics. Of these, two were multidrug resistant (defined as resistance to three or more classes of antibiotics). Not all isolates from poultry exhibited the same antibiotic-resistance pattern. To date, isolates collected from poultry were resistant to combinations of the following antibiotics: ampicillin, chloramphenicol, gentamicin, kanamycin, streptomycin, sulfisoxazole, and tetracycline.

Additionally, CDC's [NARMS laboratory](/narms/index.html) (</narms/index.html>) conducted antibiotic-resistance testing on clinical isolates collected from five ill persons infected with two of the seven outbreak strains. Four of these isolates exhibited drug resistance to one or more commonly prescribed antibiotics. Of those, two were multidrug resistant. One isolate was susceptible to all antibiotics tested. To date, isolates collected from ill persons were resistant to combinations of the following antibiotics: ampicillin, chloramphenicol, gentamicin, kanamycin, streptomycin, sulfisoxazole, and tetracycline. Antimicrobial resistance may increase the risk of hospitalization or possible treatment failure in infected individuals.

Testing conducted by the Washington State Public Health Laboratories identified one of the outbreak strains of *Salmonella* Heidelberg in one leftover intact sample of raw Foster Farms chicken collected from an ill person's home in Washington.

Preliminary laboratory testing identified four of the seven outbreak strains from multiple chicken product samples at three Foster Farms facilities; additional analysis is ongoing. USDA-FSIS has issued a [Public Health Alert](http://www.fsis.usda.gov/wps/portal/fsis/newsroom/news-releases-statements-and-transcripts/news-release-archives-by-year/archive/2013/pha-100713) (<http://www.fsis.usda.gov/wps/portal/fsis/newsroom/news-releases-statements-and-transcripts/news-release-archives-by-year/archive/2013/pha-100713>) & (<http://www.cdc.gov/Other/disclaimer.html>) due to concerns that illnesses caused by strains of *Salmonella* Heidelberg are associated with raw chicken products produced by Foster Farms at three facilities in California. At this point in the investigation, FSIS is unable to link the illnesses to a specific product and a specific production period. The products were mainly distributed to retail outlets in California, Oregon and Washington State. Raw products from the facilities in question bear one of the establishment numbers inside a USDA mark of inspection or elsewhere on the package "P6137," "P6137A," and "P7632."

CDC and state and local public health partners are continuing laboratory surveillance through [PulseNet](/pulsenet/) (</pulsenet/>) to identify additional ill persons and to interview about foods eaten before becoming ill. USDA-FSIS is continuing to work closely with CDC and state partners during this investigation.

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

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