

E. coli (*Escherichia coli*)

Multistate Outbreak of Shiga toxin-producing *Escherichia coli* O121 Infections Linked to Raw Clover Sprouts (Final Update)

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This particular outbreak appears to be over. However, *E. coli* is still an important cause of human illness in the United States. More information about *E. coli*, and steps people can take to reduce their risk of infection, can be found on the [CDC *E. coli* Web Page \(/ecoli/general/index.html\)](http://cdc.gov/ecoli/general/index.html).

At a Glance:

- **Case Count:** [19 \(/ecoli/2014/O121-05-14/epi.html\)](http://ecoli/2014/O121-05-14/epi.html)
- **States:** [6 \(/ecoli/2014/O121-05-14/map.html\)](http://ecoli/2014/O121-05-14/map.html)
- **Deaths:** 0
- **Hospitalizations:** 44%
- **Recall:** No

More Information:

- [Advice to Consumers & Retailers \(/ecoli/2014/O121-05-14/advice-consumers.html\)](http://ecoli/2014/O121-05-14/advice-consumers.html)
- [Signs & Symptoms \(/ecoli/2014/O121-05-14/signs-symptoms.html\)](http://ecoli/2014/O121-05-14/signs-symptoms.html)
- [Key Resources \(/ecoli/2014/O121-05-14/key-resources.html\)](http://ecoli/2014/O121-05-14/key-resources.html)

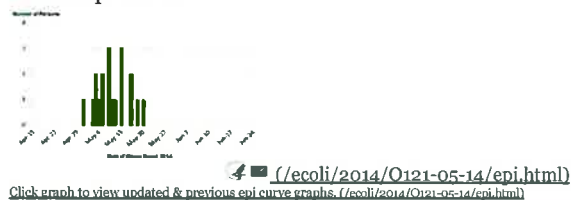
Highlights

- [Read the Advice to Consumers & Retailers » \(/ecoli/2014/O121-05-14/advice-consumers.html\)](http://ecoli/2014/O121-05-14/advice-consumers.html)
- This outbreak appears to be over.
- A total of 19 persons infected with the outbreak strain of Shiga toxin-producing *Escherichia coli* O121 (STEC O121) were reported from six states.
 - The number of ill persons identified in each state was as follows: California (1), Idaho (3), Michigan (1), Montana (2), Utah (1), and Washington (11).
 - 44% of ill persons were hospitalized. No ill persons developed hemolytic uremic syndrome (HUS), and no deaths were reported.
- Epidemiology and traceback investigations conducted by local, state, and federal officials indicated that contaminated raw clover sprouts produced by Evergreen Fresh Sprouts, LLC of Idaho was the likely source of this outbreak.
- Evergreen Fresh Sprouts is no longer using the seed lot linked to illnesses in this outbreak.
 - Sprouts produced by this firm from this seed lot are likely no longer available for consumption given the approximately 14-day shelf life of raw clover sprouts.
- Although this outbreak appears to be over, *E. coli* is still an important cause of human illness in the United States. More information about *E. coli* and steps people can take to reduce their risk of infection can be found on the [CDC *E. coli* Web Page \(/ecoli/general/index.html\)](http://cdc.gov/ecoli/general/index.html).

Latest Case Count Map



Latest Epi Curve



Outbreak Summary

Introduction

CDC collaborated with public health officials in several states and the U.S. Food and Drug Administration (FDA) to investigate a multistate outbreak of Shiga toxin-producing *Escherichia coli* O121 (STEC O121) infections. Public health investigators used the [PulseNet \(/pulsenet/index.html\)](http://pulsenet/index.html) system to identify cases of illness that were part of this outbreak. PulseNet, the national subtyping network of public health and food regulatory agency laboratories coordinated by CDC, obtains DNA "fingerprints" of *E. coli* bacteria through diagnostic testing with pulsed-field gel electrophoresis, or PFGE.

A total of 19 persons infected with the outbreak strain of STEC O121 were reported from six states. The total number of ill persons identified in each state was as follows: California (1), Idaho (3), Michigan (1), Montana (2), Utah (1), and Washington (11).

Among persons for whom information was available, dates that illnesses began ranged from May 1, 2014, to May 20, 2014. Ill persons ranged in age from 11 years to 52 years, with a median age of 27 years. Sixty-eight percent of ill persons were female. Among those persons with information, seven (44%) of 16 were hospitalized. No ill persons developed hemolytic uremic syndrome (HUS), and no deaths were reported.

Investigation of the Outbreak

Epidemiologic and traceback investigations conducted by officials in local, state, and federal public health, agriculture, and regulatory agencies indicated that raw clover sprouts produced by Evergreen Fresh Sprouts, LLC of Idaho was the likely source of this outbreak.

In interviews, 13 (81%) of 16 ill persons reported eating raw clover sprouts in the week before becoming ill. This proportion is significantly higher than results from a survey [\[PDF - 29 pages\]](#) (<http://www.cdc.gov/foodnet/PDFs/FNExpAtlo3022011.pdf>) of healthy persons in which no more than 8% reported eating raw clover sprouts in the week before they were interviewed. According to the [Washington State Department of Health](#) (<http://www.doh.wa.gov/Newsroom/2014NewsReleases/14070CloverSproutsSourceofEColiOutbreak.aspx>) & (<http://www.cdc.gov/Other/disclaimer.html>) and the [Idaho Department of Health and Welfare](#) (<http://healthandwelfare.idaho.gov/AboutUs/Newsroom/tabid/130/cid/ArticleView/mid/3061/articleId/1759/North-Idaho-E-coli-Infections-Linked-to-Raw-Clover-Sprouts.aspx>) & (<http://www.cdc.gov/Other/disclaimer.html>), ill persons reported eating sprouts in sandwiches at several local food establishments, including several Jimmy John's Gourmet Sandwiches locations, the Pita Pit, and Daanen's Deli.

As part of the investigation, [FDA](#) (<http://www.fda.gov/Food/RecallsOutbreaksEmergencies/Outbreaks/ucm398536.htm>) & (<http://www.cdc.gov/Other/disclaimer.html>) performed a traceback analysis and determined that Evergreen Fresh Sprouts, in the timeframe prior to the outbreak, supplied sprouts to seven restaurants where 9 people who became ill during the outbreak reported eating before they became ill. Eight of the people who became ill recalled eating sprouts. This analysis used documents collected directly from the distributors and the grower, Evergreen Fresh Sprouts, as well as documents collected by the states from the points of service.

FDA also conducted an [inspection](#) [\[PDF - 2 pages\]](#) (<http://www.fda.gov/downloads/AboutFDA/CentersOffices/OfficeofGlobalRegulatoryOperationsandPolicy/ORA/ORAElectronicReadingRoom/UCM400745.pdf>) & (<http://www.cdc.gov/Other/disclaimer.html>) of Evergreen Fresh Sprouts' facility on May 22-23, 2014; May 27-30, 2014; and June 6, 2014. During the inspection, FDA investigators observed a number of unsanitary conditions, including condensate and irrigation water dripping from rusty valves; a rusty and corroded watering system in the mung bean room; tennis rackets (used to scoop mung bean sprouts) that had scratches, chips, and frayed plastic; a pitchfork (used to transfer mung bean sprouts) that had corroded metal; and a squeegee (used to agitate mung bean sprouts inside a soak vat) that had visible corroded metal and non-treated wood.

On June 26, 2014, the FDA and CDC held a meeting with the owner of Evergreen Fresh Sprouts to advise the firm of FDA's concerns that the seed lot used to grow clover sprouts linked to this outbreak may be contaminated and to encourage Evergreen Fresh Sprouts to discontinue using that seed lot for producing clover sprouts for people to eat. At the end of the meeting, the owner of Evergreen Fresh Sprouts informed the FDA that the firm planned to discontinue using the sprout seed lot that was used to grow the sprouts linked to the outbreak.

FDA received independent confirmation that, as of July 1, 2014, Evergreen Fresh Sprouts no longer had the seed lot associated with the outbreak and had received a new clover seed lot for sprouting purposes. It normally takes approximately 1 week to sprout the clover seed. Sprouts produced by this firm from this seed lot are likely no longer available for consumption given the approximately 14-day shelf life of raw clover sprouts.

August 1, 2014

Final Case Count Update

As of July 31, 2014, a total of 19 persons infected with the outbreak strain of Shiga toxin-producing *Escherichia coli* O121 (STEC O121) were reported from six states. The total number of ill persons identified in each state was as follows: California (1), Idaho (3), Michigan (1), Montana (2), Utah (1), and Washington (11).

Among persons for whom information was available, dates that illnesses began ranged from May 1, 2014, to May 20, 2014. Ill persons ranged in age from 11 years to 52 years, with a median age of 27 years. Sixty-eight percent of ill persons were female. Among those persons with information, seven (44%) of 16 were hospitalized. No ill persons developed hemolytic uremic syndrome (HUS), and no deaths were reported.

This outbreak appears to be over. However, *E. coli* is still an important cause of human illness in the United States. More information about *E. coli* and steps people can take to reduce their risk of infection can be found on the [CDC *E. coli* Web Page](#) ([ecoli/general/index.html](http://ecoli.general/index.html)).

Final Investigation Update

Evergreen Fresh Sprouts is no longer using the seed lot linked to illnesses in this outbreak. Sprouts produced by this firm from this seed lot are likely no longer available for consumption given the approximately 14-day shelf life of raw clover sprouts.

June 27, 2014

Case Count Update

As of June 27, 2014, a total of 18 persons infected with the outbreak strain of Shiga toxin-producing *Escherichia coli* O121 (STEC O121) have been reported from five states. Since the last update on June 10, 2014, one additional case has been reported from Washington. The total number of ill persons identified in each state is as follows: Idaho (3), Michigan (1), Montana (2), Utah (1), and Washington (11).

Among persons for whom information is available, dates that illnesses began range from May 1, 2014 to May 20, 2014. Ill persons range in age from 11 years to 45 years, with a median age of 27 years. Seventy-six percent of ill persons are female. Among those persons with information, seven (44%) of 16 have been hospitalized. No ill persons have developed HUS, and no deaths have been reported.

Illnesses that began after June 4, 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 3 weeks. Please see the [Timeline for Reporting Cases of *E. coli* O157 Infection](#) (<http://www.cdc.gov/ecoli/reporting-timeline.html>) for more details.

Investigation Update

According to [FDA](#) (<http://www.fda.gov/Food/RecallsOutbreaksEmergencies/Outbreaks/ucm398536.htm>) & (<http://www.cdc.gov/Other/disclaimer.html>), Evergreen Fresh Sprouts has reported further production and distribution of raw clover sprouts grown from the same seed lot that was associated with the outbreak. Sprouts from this seed lot may still be in the marketplace.

On June 26, 2014, the FDA and CDC held a meeting with the owner of Evergreen Fresh Sprouts to advise the firm of FDA's concerns that the seed lot used to grow clover sprouts linked to this outbreak may be contaminated, and to encourage Evergreen Fresh Sprouts to discontinue using that seed lot for producing clover sprouts for people to eat. CDC is concerned that continued distribution and sales of raw clover sprouts produced from the same seeds pose a risk to human health.

At the end of the meeting, the owner of Evergreen Fresh Sprouts informed the FDA that the firm planned to discontinue using the sprout seed lot that was used to grow the sprouts linked to the outbreak. The FDA will continue to work with Evergreen Fresh Sprouts to ensure the use of this seed lot is discontinued.

This investigation is active and ongoing and CDC will update the public when more information becomes available. CDC and state and local public health partners are continuing laboratory surveillance through [PulseNet \(/pulsenet/index.html\)](http://pulsenet.cdc.gov/pulsenet/index.html) to identify additional ill persons and to interview them about foods eaten before becoming ill.

June 10, 2014

Case Count Update

As of June 9, 2014, a total of 17 persons infected with the outbreak strain of Shiga toxin-producing *Escherichia coli* O121 (STEC O121) have been reported from five states. The number of ill persons identified in each state is as follows: Idaho (3), Michigan (1), Montana (2), Utah (1), and Washington (10).

Among persons for whom information is available, dates that illnesses began range from May 1, 2014 to May 20, 2014. Ill persons range in age from 11 years to 45 years, with a median age of 27 years. Seventy-six percent of ill persons are female. Among those persons with information, seven (47%) of 15 have been hospitalized. No ill persons have developed HUS, and no deaths have been reported.

Illnesses that began after May 17, 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 3 weeks. Please see the [Timeline for Reporting Cases of *E. coli* O157 Infection](http://www.cdc.gov/ecoli/reporting-timeline.html) (<http://www.cdc.gov/ecoli/reporting-timeline.html>) for more details.

Investigation Update

As part of the ongoing investigation, FDA (<http://www.fda.gov/Food/RecallsOutbreaksEmergencies/Outbreaks/ucm398536.htm>) & (<http://www.cdc.gov/Other/disclaimer.html>) performed a traceback analysis and determined that Evergreen Sprouts, in the timeframe prior to the outbreak, supplied sprouts to seven restaurants at which 9 people who became ill during the outbreak reported eating before they became ill. Eight of the people who became ill recalled eating sprouts. This analysis used documents collected directly from the distributors and the grower, Evergreen Fresh Sprouts, as well as documents collected by the states from the points of service.

FDA (<http://www.fda.gov/Food/RecallsOutbreaksEmergencies/Outbreaks/ucm398536.htm>) & (<http://www.cdc.gov/Other/disclaimer.html>) also conducted an inspection of Evergreen Fresh Sprouts' facility on May 22-23, 2014; May 27-30, 2014; and June 6, 2014. During the inspection, FDA investigators observed a number of unsanitary conditions, including condensate and irrigation water dripping from rusty valves; a rusty and corroded mung bean room watering system; tennis rackets that had scratches, chips, and frayed plastic used to scoop mung bean sprouts; a pitchfork with corroded metal being used to transfer mung bean sprouts; and a squeegee with visible corroded metal and non-treated wood being used to agitate mung bean sprouts inside a soak vat.

May 22, 2014

Initial Announcement

CDC is collaborating with public health officials in Idaho and Washington and the U.S. Food and Drug Administration (FDA) to investigate a multistate outbreak of Shiga toxin-producing *Escherichia coli* O121 (STEC O121) infections.

The type of bacteria responsible for this outbreak is among those referred to as Shiga toxin-producing *E. coli*, or STEC. Some types of STEC frequently cause severe disease, including bloody diarrhea and hemolytic uremic syndrome (HUS), which is a type of kidney failure. STEC bacteria are divided into serogroups (e.g., O157 or O121). *E. coli* O157 is the STEC serogroup found most commonly in U.S. patients. Other *E. coli* serogroups in the STEC group, including O121, are sometimes called "non-O157 STECs." Because clinical laboratories typically cannot directly identify non-O157 STEC serogroups, they must first test stool samples for the presence of Shiga toxins. Then, the positive samples must be sent to public health laboratories to look for non-O157 STEC. In recent years, the number of clinical laboratories that test for Shiga toxin has increased greatly, but some laboratories still do not perform these tests. Because of these complexities, many non-O157 STEC infections are probably not identified.

As of May 21, 2014, seven confirmed and three probable cases of STEC O121 infection have been reported in Idaho and Washington. The number of ill persons identified in each state is as follows: Idaho (3) and Washington (7).

Among persons for whom information is available, illness onset dates range from May 1, 2014 to May 13, 2014. Ill persons range in age from 22 years to 45 years, with a median age of 27 years. Ninety percent of ill persons are female. Five (50%) of the 10 ill persons have been hospitalized. No ill persons have developed HUS, and 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 or epi curve \(/foodsafety/outbreaks/investigating-outbreaks/epi-curves.html\)](http://foodsafety.outbreaks/investigating-outbreaks/epi-curves.html). Illnesses that began after April 30, 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 3 weeks. Please see the [Timeline for Reporting Cases of *E. coli* O157 Infection \(/ecoli/reporting-timeline.html\)](http://www.cdc.gov/ecoli/reporting-timeline.html) for more details.

Investigation of the Outbreak

Results from initial state and local epidemiologic investigations indicate a link to eating raw clover sprouts. In interviews, nine (90%) of ten ill persons reported eating raw clover sprouts in the week before becoming ill. This proportion is significantly higher than results from a [survey](http://www.foodnet.org/PDFs/FNExpAtlo3022011.pdf) & [PDF - 29 pages] ([/foodnet/PDFs/FNExpAtlo3022011.pdf](http://foodnet.org/PDFs/FNExpAtlo3022011.pdf)) of healthy persons in which 8% reported eating raw clover sprouts in the week before they were interviewed. According to the [Washington State Department of Health](http://www.doh.wa.gov/Newsroom/2014NewsReleases/14070CloverSproutsSourceoffColiOutbreak.aspx) (<http://www.doh.wa.gov/Newsroom/2014NewsReleases/14070CloverSproutsSourceoffColiOutbreak.aspx>) & (<http://www.cdc.gov/Other/disclaimer.html>) and the [Idaho Department of Health and Welfare](http://healthandwelfare.idaho.gov/AboutUs/Newsroom/tabid/130/ctl/ArticleView/mid/3061/articleId/1759/North-Idaho-E-coli-Infections-Linked-to-Raw-Clover-Sprouts.aspx) (<http://healthandwelfare.idaho.gov/AboutUs/Newsroom/tabid/130/ctl/ArticleView/mid/3061/articleId/1759/North-Idaho-E-coli-Infections-Linked-to-Raw-Clover-Sprouts.aspx>) & (<http://www.cdc.gov/Other/disclaimer.html>), ill persons reported eating sprouts in sandwiches at several local food establishments, including several Jimmy John's Gourmet Sandwiches locations, the Pita Pit, and Daanen's Deli.

Preliminary traceback investigations indicate that contaminated raw clover sprouts produced by Evergreen Fresh Sprouts, LLC. of Idaho is the likely source of this outbreak of STEC O121 infections. FDA continues its investigation in order to identify the source of the contamination causing the outbreak.

CDC and state and local public health partners are continuing laboratory surveillance through [PulseNet \(/pulsenet/index.html\)](http://pulsenet.cdc.gov/pulsenet/index.html) to identify additional ill persons and to interview them about foods eaten before becoming ill. CDC will update the public when additional information is available.

