

Multistate Outbreak of *Salmonella* Infections Linked to Kratom (Final Update)

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This outbreak investigation is over. People should be aware that kratom could be contaminated with *Salmonella* and could make people sick. Contaminated products may still be available for purchase because the investigation was not able to identify a single, common source of contaminated kratom. Illnesses could continue to occur if people consume contaminated kratom. Read more on the [Recalls and Advice to Consumers webpage](#).

Highlights

- [Read the Recalls and Advice to Consumers](#)>>
- As of May 24, 2018, this outbreak investigation is over.
- People should be aware that kratom could be contaminated with *Salmonella* and could make people sick. Contaminated products may still be available for purchase because the investigation was not able to identify a single, common source of contaminated kratom.
 - Several companies recalled kratom products because they might be contaminated with *Salmonella*. The list of recalled kratom products is available on the U.S. Food and Drug Administration website.
 - Kratom is also known as Thang, Kakuam, Thom, Ketom, and Biak.
 - [Kratom](#) is a plant consumed for its stimulant effects and as an opioid substitute.
- CDC, public health and regulatory officials in several states, and the U.S. Food and Drug Administration investigated this multistate outbreak of *Salmonella* infections.
 - A total of 199 people infected with the outbreak strains of *Salmonella* were reported from 41 states.
 - Thirty-eight percent of ill people were hospitalized, and no deaths were reported.
 - This outbreak included infections from several types of *Salmonella*: *Salmonella* I 4,[5],12:b:-, *Salmonella* Heidelberg, *Salmonella* Javiana,

Salmonella Okatie, *Salmonella* Weltevreden, and *Salmonella* Thompson.

- [Epidemiologic and laboratory evidence](#) indicated that kratom was the likely source of this multistate outbreak.

Outbreak Summary

Introduction

CDC, public health and regulatory officials in several states, and the U.S. Food and Drug Administration (FDA) investigated this multistate outbreak of *Salmonella* infections.

Public health investigators used the [PulseNet](#) system to identify illnesses that were part of this outbreak. PulseNet is the national subtyping network of public health and food regulatory agency laboratories coordinated by CDC. DNA fingerprinting was performed on *Salmonella* bacteria isolated from ill people by using techniques called [pulsed-field gel electrophoresis](#) (PFGE) and [whole genome sequencing](#) (WGS). CDC PulseNet manages a national database of these DNA fingerprints to identify possible outbreaks. WGS gives a more detailed DNA fingerprint than PFGE.

As of May 24, 2018, 199 people infected with the outbreak strains of *Salmonella* were reported from 41 states.

Illnesses started on dates ranging from [January 11, 2017 to May 8, 2018](#). Ill people ranged in age from less than 1 to 75 years, with a median age of 38. Among ill people, 52% were male. Of 132 people with available information, 50 (38%) were hospitalized. No deaths were reported.

Whole genome sequencing analysis did not identify any predicted antibiotic resistance in isolates from 111 ill people and 61 kratom samples. Testing of 17 clinical isolates using standard [antibiotic susceptibility testing](#) methods by CDC's [National Antimicrobial Resistance Monitoring System \(NARMS\)](#) laboratory also did not show any antibiotic resistance.

Investigation of the Outbreak

[Epidemiologic and laboratory evidence](#) indicated that kratom was the likely source of this multistate outbreak. [Kratom](#) is a plant consumed for its stimulant effects and as an opioid substitute.

State and local health officials interviewed ill people to ask about the foods they ate and other exposures before they became ill. Seventy-six (74%) of 103 people interviewed reported consuming kratom in pills, powder, or tea. Most people reported consuming the powder form of kratom. People who reported consuming kratom purchased it from retail locations in several states and from various online retailers.

This outbreak was detected when a cluster of people infected with *Salmonella* I 4,[5],12:b:- was identified by CDC PulseNet. During the investigation, health and regulatory officials in several states and the FDA collected various leftover and unopened kratom products to test for *Salmonella* contamination. As additional strains of *Salmonella* were identified in kratom products, a search of the CDC PulseNet database identified ill people infected with some of these strains, including *Salmonella* Heidelberg, *Salmonella* Javiana, *Salmonella* Okatie, *Salmonella* Weltevreden, and *Salmonella* Thompson. These ill people were added to the outbreak investigation. Eighty-five different DNA fingerprints of *Salmonella* bacteria were identified in samples of kratom products. The FDA website has a list of contaminated kratom products, which were from several retail locations and online retailers. Several companies issued recalls of kratom products. A list of the recalled kratom products is also available on the FDA website.

This outbreak investigation is over. However, some kratom products that were contaminated with *Salmonella* have not yet been recalled and may still be available for purchase or in people's homes. [People who are at risk of severe *Salmonella* infection](#) should avoid consuming kratom to prevent infection.