

Cave-Associated Histoplasmosis Outbreak Among Travelers Returning from Costa Rica — Georgia, Texas, and Washington, December 2024–January 2025

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Introduction

Histoplasmosis is a fungal infection that primarily affects the lungs. The condition is caused by *Histoplasma* organisms, which are often found in soil contaminated with bird or bat droppings. On January 17, 2025, a Georgia infectious disease physician notified CDC of suspected histoplasmosis cases among 12 members of an extended family from households in Georgia, Texas, and Washington. The ill family members included six adults aged 42–49 years and six children aged 8–16 years. They had recently returned from Costa Rica, where they toured a cave linked to a previous histoplasmosis outbreak (1).

Investigation and Outcomes

On January 21, CDC launched a multistate investigation in collaboration with the Georgia Department of Public Health, Texas Department of State Health Services, and Washington State Department of Health to identify and characterize cases. This activity was reviewed by CDC, deemed not research, and was conducted consistent with applicable federal law and CDC policy.*

Thirteen family members traveled to Arenal and Manuel Antonio, Costa Rica, during December 21–28, 2024. Investigation revealed that 12 of the 13 family members toured Venado Caves, a popular tourist location, on December 24 (day 0). All reported seeing bats and having direct contact with bat droppings while crawling and squeezing through tight spaces in the cave. All 12 persons became mildly or moderately ill after returning to the United States, 8–19 days after exposure. Signs and symptoms included headache, malaise, fever, night sweats, myalgias, and respiratory and gastrointestinal

symptoms (Table). The one family member who did not tour the cave did not become ill. No other activities reported before, during, or after the trip were associated with known risk for exposure to *Histoplasma* species.

Five adults and one child sought medical care at an urgent or a primary care facility; no travel history was elicited during their examinations. Among these six patients, three received antibiotics, two received corticosteroids, and one received a cough suppressant. One adult was referred to an emergency department and hospitalized because of abnormal chest radiography findings that raised concerns about lung cancer. However, when health care providers requested the patient's travel history the next day and learned of the visit to a Costa Rican cave with bats, histoplasmosis became the suspected diagnosis. The patient initially was prescribed voriconazole and discharged 2 days after admission; treatment was subsequently changed to itraconazole (2,3). By 28 days after exposure, all 12 affected family members had recovered or were improving, consistent with the clinical course of mild or moderate histoplasmosis.

Fungal antigen testing was performed for four family members. Two received antigen test results positive for *Histoplasma capsulatum* species complex, including the hospitalized patient; test results for the other two patients were

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*45 C.F.R. part 46, 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.



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negative. Antigen testing for all four patients occurred within 1 month of symptom onset, the optimal time frame. However, because antigen detection sensitivity for histoplasmosis is lower in patients with mild disease who are immunocompetent, the negative test results might have been false negatives (4). One patient with a positive test result also received positive complement fixation antibody test results on two separate occasions. Also, in addition to the patient with chest radiography findings that initially raised concerns about lung cancer, another patient also had abnormal chest radiography results, including pulmonary nodules and opacities, consistent with histoplasmosis.

The 12 ill family members were classified as having confirmed (one patient), probable (eight patients), or suspected (three patients) histoplasmosis based on the Council of State and Territorial Epidemiologists (CSTE) case definition (5). The CSTE case definition includes both laboratory and clinical criteria; cases can be classified as confirmed or probable. Fungal antigen tests are considered nonconfirmatory laboratory criteria based on the CSTE case definition due to cross-reactivity with other fungal pathogens (5). One patient met the criteria for a confirmed case because the illness was clinically compatible (i.e., had at least two of the following: fever, chest pain, cough, myalgia, shortness of breath, headache, or erythema nodosum/erythema multiforme rash) and laboratory confirmed (fourfold or greater increase rise in *Histoplasma capsulatum* serum complement fixation antibody titers taken at least 2 weeks apart). Eight patients met the criteria for having a case of probable histoplasmosis because their illness was clinically

compatible, and they were epidemiologically linked to the patient with the confirmed case, even though the condition was not laboratory confirmed. In addition, three patients were suspected to have cases because although they each had only one clinically compatible finding (one with shortness of breath and two with headache), they were epidemiologically linked to the patient with the confirmed case.

Preliminary Conclusions and Actions

The same bat-inhabited cave in Costa Rica associated with this 2024 histoplasmosis outbreak was linked to a 1998–1999 outbreak among 51 persons (1), when *H. capsulatum* was isolated from bat droppings collected from the cave. In response to the outbreak described in this report, CDC alerted health departments through an Epidemic Information Exchange (Epi-X) notification to identify additional cases. CDC has been collaborating with the U.S. Embassy in Costa Rica and the Costa Rica Ministry of Health to incorporate information about histoplasmosis risks at this location into the caving tour waiver forms. In addition, the U.S. Embassy in Costa Rica issued a health alert in March 2025 notifying the public of the risk for contracting histoplasmosis from caving (6). Persons who have already visited Venado Caves might have been exposed to *H. capsulatum*, and exposure among visitors might be ongoing. In addition, histoplasmosis diagnoses are often delayed (7). Treatment guidelines only recommend antifungal agents for more severe cases of disease (e.g., itraconazole

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TABLE. Demographic and clinical characteristics of patients with confirmed, probable, or suspected cave-associated histoplasmosis after travel to Costa Rica — Georgia, Texas, and Washington, 2024

Characteristic	Cases,* no. (%)			
	Confirmed (n = 1)	Probable (n = 8)	Suspected (n = 3)	Total (N = 12)
Age group, yrs				
<10	0 (—)	0 (—)	1 (33)	1 (8)
11–17	0 (—)	3 (38)	2 (67)	5 (42)
18–39	0 (—)	0 (—)	0 (—)	0 (—)
41–64	1 (100)	5 (63)	0 (—)	6 (50)
≥65	0 (—)	0 (—)	0 (—)	0 (—)
Sex				
Female	0 (—)	5 (63)	2 (66)	7 (58)
Male	1 (100)	3 (38)	1 (33)	5 (42)
State of residence				
Georgia	1 (100)	2 (25)	1 (33)	4 (33)
Texas	0 (—)	3 (38)	1 (33)	4 (33)
Washington	0 (—)	3 (38)	1 (33)	4 (33)
Antigen or antibody test results				
Positive	1 (100)	1 (13)	0 (—)	2 (17)
Negative	0 (—)	2 (25)	0 (—)	2 (17)
No test performed	0 (—)	5 (63)	3 (100)	8 (67)
Clinical course and treatment				
Sought medical care	1 (100)	5 (63)	0 (—)	6 (50)
Hospitalized†	1 (100)	0 (—)	0 (—)	1 (8)
Received antifungal treatment	1 (100)	0 (—)	0 (—)	1 (8)
Signs and symptoms				
Extreme tiredness	1 (100)	8 (100)	0 (—)	9 (75)
Headache	1 (100)	6 (75)	2 (67)	9 (75)
Fever	1 (100)	7 (88)	0 (—)	8 (67)
Night sweats	1 (100)	5 (63)	0 (—)	6 (50)
Body aches	1 (100)	3 (38)	0 (—)	4 (33)
Cough	1 (100)	3 (38)	0 (—)	4 (33)
Chills	0 (—)	3 (38)	0 (—)	3 (25)
Difficulty breathing	1 (100)	1 (13)	1 (33)	3 (25)
Ear infection	1 (100)	1 (13)	0 (—)	2 (17)
Chest pain	1 (100)	1 (13)	0 (—)	2 (17)
Diarrhea	0 (—)	2 (25)	0 (—)	2 (17)
Hoarseness	1 (100)	1 (13)	0 (—)	2 (17)
Increased heart rate	0 (—)	2 (25)	0 (—)	2 (17)
Loss of appetite	0 (—)	2 (25)	0 (—)	2 (17)
Sore throat	0 (—)	2 (25)	0 (—)	2 (17)
Runny nose	0 (—)	1 (13)	0 (—)	1 (8)
Stomach pain	0 (—)	1 (13)	0 (—)	1 (8)
Vomiting	0 (—)	1 (13)	0 (—)	1 (8)

* [The Council of State and Territorial Epidemiologists case definition for histoplasmosis](#) includes both laboratory and clinical criteria; cases can be classified as confirmed or probable. One patient met the criteria for a confirmed case because the illness was clinically compatible (had at least two of the following: fever, chest pain, cough, myalgia, shortness of breath, headache, or erythema nodosum/erythema multiforme rash) and laboratory confirmed (fourfold or greater increase rise in *Histoplasma capsulatum* serum complement fixation antibody titers taken at least 2 weeks apart). Eight patients met the criteria for having a case of probable histoplasmosis, even though the condition was not laboratory confirmed, because their illness was clinically compatible, and they were epidemiologically linked to the patient with the confirmed case. In addition, three patients were suspected to have cases because although they each had only one clinically compatible finding (one with shortness of breath and two with headache), they were epidemiologically linked to the patient with the confirmed case.

† The hospitalized patient had abnormal chest radiography findings that initially raised concerns about lung cancer. However, the travel history obtained the next day, which included touring a Costa Rican cave with bats, led to a suspected diagnosis of histoplasmosis. The patient received antifungal treatment and fully recovered.

Summary

What is already known about this topic?

Histoplasmosis is a fungal infection that primarily affects the lungs; it is caused by *Histoplasma* organisms, which are often found in soil contaminated with bird or bat droppings. The condition is often misdiagnosed.

What is added by this report?

CDC was notified about a cluster of suspected histoplasmosis cases affecting 12 members of an extended family from three U.S. states. They had all visited Venado Caves in Costa Rica, the site of a previous histoplasmosis outbreak associated with contact with bat droppings, the likely source of exposure. Four family members received fungal antigen testing, and two received test results positive for *Histoplasma capsulatum* species complex.

What are the implications for public health practice?

Health care providers should consider a diagnosis of histoplasmosis in patients who have signs and symptoms compatible with the condition, including fever, malaise, cough, headache, chest pain, chills, and myalgias. Obtaining a detailed travel and activity history is necessary to identify exposure to bat or bird droppings in caves or elsewhere.

unless the patient is pregnant, in which case liposomal amphotericin B is recommended when treatment is indicated) (2,3). Antibiotic (i.e., antibacterial) medications are ineffective, and corticosteroids might worsen fungal infections; prescription of these medications to certain affected family members suggests that fungal infections were not initially considered as the cause of the illness. Clinicians should consider fungal illness in the differential diagnosis of patients with constitutional or pulmonary signs or symptoms after recent caving or other activities associated with risk for histoplasmosis (8–10) and should report suspected cases of histoplasmosis to local health departments as applicable (5).

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Notes from the Field

Multistate Outbreak of *Salmonella enterica* I 4:l:- Infections Linked to Charcuterie-Style Meats — United States, 2023–2024

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On December 19, 2023, CDC's PulseNet, the national molecular subtyping network for foodborne disease surveillance, identified a cluster of 13 *Salmonella enterica* I 4:l:-infections in five states that were found to be highly related by whole genome sequencing, indicating a possible outbreak.* CDC, the U.S. Department of Agriculture Food Safety and Inspection Service (USDA-FSIS), and state and local partners conducted an investigation to identify the outbreak source. Patients' self-reports of foods consumed before illness onset identified similar reports of charcuterie products, and clinical isolates were genetically related to a 2021 outbreak linked to salami sticks.[†]

Investigation and Outcomes

An outbreak-associated case was defined as a *Salmonella* I 4:l:-infection in a person with an isolate related within three allele differences to the outbreak strain (using core genome multilocus sequence typing), with illness onset between

* [Outbreak Detection | PulseNet | CDC](#)

† [Salmonella Outbreak Linked to Salami Sticks | CDC](#)

November 20, 2023 and February 10, 2024 (Figure). Overall, PulseNet detected 104 cases across 33 states. The median patient age was 48 years (range = 1–92 years); 40% of patients were female. Twenty-seven patients were hospitalized[§]; none died.

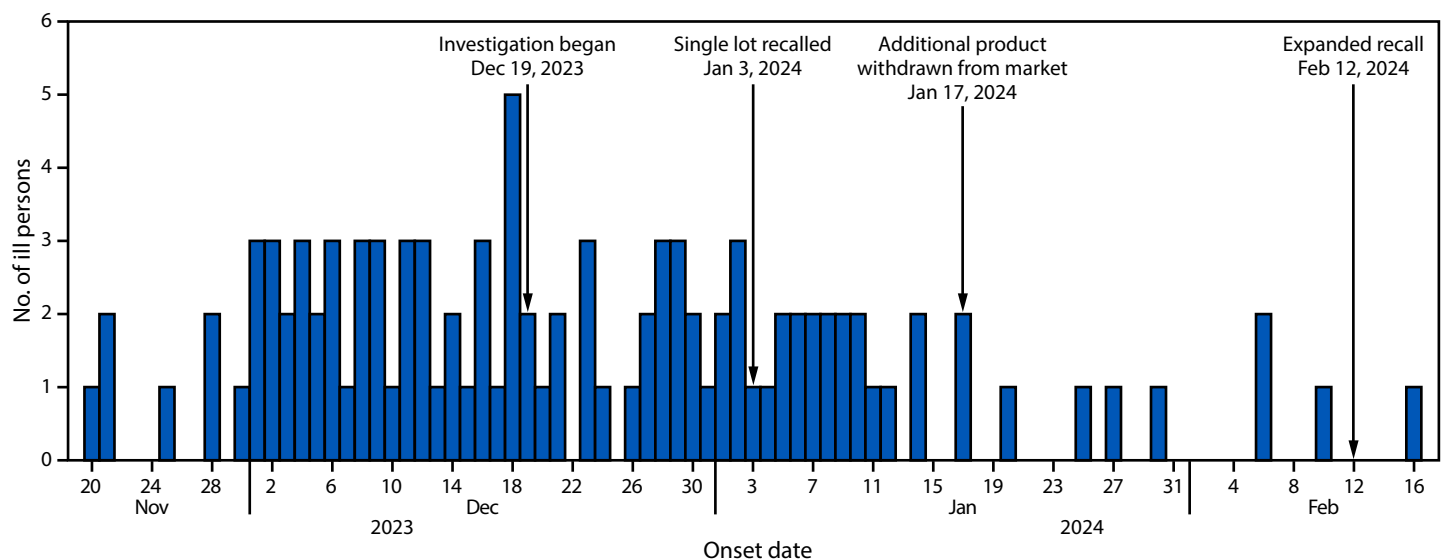
During the initial interview with state health partners, two patients reported having consumed the same company A charcuterie product, which contained three ready-to-eat (RTE) fermented, salt-cured, and dried pork products (coppa, salami, and prosciutto) during the week preceding illness. Both patients purchased the product from different locations of the same national grocery chain. Three days after the outbreak was identified, CDC provided a questionnaire to states to collect more information on charcuterie product exposures and requested purchase records from the grocery store chain (e.g., receipts and shopper card histories) for patients who shopped at the common grocery chain and consented to record collection. This activity was reviewed by CDC, deemed not research, and was conducted consistent with applicable federal law and CDC policy.[¶]

Among 68 patients from 27 affected states with food history information available, 50 (74%) reported consuming charcuterie-style meats before illness onset, a percentage statistically

[§] Information about whether patients are or are not hospitalized is collected as part of foodborne illness outbreak investigations; however, information on clinical course of hospitalized patients is not collected.

[¶] 45 C.F.R. part 46, 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.

FIGURE. Number of ill persons infected with *Salmonella enterica* I 4:l:-, by illness onset date* — United States, 2023–2024



* If illness onset date was missing, specimen collection date minus 3 days was plotted as a proxy for onset date.

significantly higher than that reported in the 2018–2019 FoodNet Population Survey used to identify when consumption of a food is elevated in an outbreak (39%; $p < 0.001$ using a binomial probability distribution).^{**}

The Minnesota Department of Agriculture isolated the outbreak strain from a company A charcuterie product from a patient's home, prompting a recall of that specific product lot. *Salmonella* was not detected in company A charcuterie products tested by Washington and Vermont public health partners. Sixteen consumer purchase records, representing purchases from 10 states, were shared with USDA-FSIS, which conducted a traceback investigation. The purchase records identified 11 charcuterie purchases, representing multiple product lots, that traced back to two of company A's federally regulated production facilities. The remaining purchases traced back to different suppliers.

USDA-FSIS conducted for-cause food safety assessments (FSA) (i.e., a comprehensive review of an establishments' food safety system because of a specific reason, including a foodborne illness outbreak) at the two company A production facilities and collected 179 product, food contact, and environmental samples (1). Two samples of an RTE product that contained coppa yielded two nonoutbreak strains of *Salmonella*. FSAs conducted in company A's production facilities identified the potential for inadequate salt-curing and drying (underprocessing) of coppa during production, which could result in the presence of *Salmonella* species in the finished product. USDA-FSIS has a zero-tolerance standard for *Salmonella* contamination in RTE products. The combination of the positive *Salmonella* results from RTE products, epidemiologic information, and potential for underprocessing of coppa observed during FSAs led to an expanded recall of all products from company A containing coppa that were still within shelf life on February 12.

Preliminary Conclusions and Actions

This report describes the largest U.S. infectious outbreak associated with charcuterie-style meats since 2010.^{††} Charcuterie-style meats are typically produced using either fermentation and drying or salt-curing and drying rather than cooking. Although the production process should control bacteria that can cause illness in consumers, if the procedures are not followed carefully, charcuterie-style meats could be underprocessed and presence of bacteria poorly controlled. Facilities are required by USDA-FSIS to demonstrate sufficient

Summary

What is already known about this topic?

Three multistate U.S. outbreaks of salmonellosis linked to charcuterie-style meats have been reported since 2010.

What is added by this report?

During December 2023–March 2024, CDC and public health partners in 33 states investigated an outbreak of *Salmonella enterica* 14:l:- infection linked to contaminated charcuterie-style meats. Early usage of purchase records identified a common charcuterie product from one company and enabled a swift recall.

What are the implications for public health practice?

Charcuterie-style or fermented, salt-cured, or dried meats are susceptible to bacterial contamination from underprocessing. The U.S. Department of Agriculture Food Safety and Inspection Service has recommendations for facilities for the safe production of charcuterie-style products. Consumer purchase records are an important tool in foodborne outbreak investigations and can lead to prompt regulatory action.

scientific evidence that production processes for charcuterie-style meats will result in a 5-log reduction of *Salmonella* or an alternative pathogen lethality and will achieve shelf-stability among other controls^{§§} (2).

Consumer purchase records were successfully used for hypothesis generation in this outbreak investigation and provided a critical foundation for traceback activities. Coupled with patient interview information, the use of purchase records enabled rapid identification and recall of contaminated products 17 days after the investigation began (approximately 1 week faster than previous CDC-led foodborne investigations that did not use purchase records), likely preventing additional cases of illness. Purchase records are important tools supporting epidemiologic and traceback efforts and can facilitate implementation of prompt regulatory action.

^{§§} [9 CFR 417 - HAZARD ANALYSIS AND CRITICAL CONTROL POINT \(HACCP\) SYSTEMS - Content Details - CFR-2024-title9-vol2-part417](#)

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^{**} [FoodNet Fast | CDC](#)

^{††} [BEAM Dashboard | CDC](#)

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Erratum

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The report “*Notes from the Field: Suspected Medetomidine Withdrawal Syndrome Among Fentanyl-Exposed Patients — Philadelphia, Pennsylvania, September 2024–January 2025*” contained an error.

On page 268, reference 1 in the References should have read, “**PA Groundhogs. Correction: PAG releases new adulterant report. Philadelphia, PA: PA Groundhogs; 2025. <https://pagroundhogs.org/news/f/pag-releases-new-adulterant-report>.**”

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