Notes from the Field: Histoplasmosis Outbreak Among Day Camp Attendees—Nebraska, June 2012

ON JUNE 21, 2012, THE DOUGLAS COUNTY HEALTH DEPARTMENT (DCHD) in Omaha, Nebraska, was notified of an acute respiratory illness cluster among 32 counselors at city-sponsored day camps. Laboratory-confirmed histoplasmosis was diagnosed in one camp counselor. DCHD and the Nebraska Department of Health and Human Services (NDHHS) investigated the extent and source of the outbreak to prevent further infections.

Histoplasmosis is a common fungal infection in the United States and is a cause of respiratory illness outbreaks in endemic areas, which include areas in the midwestern states, and particularly the Mississippi and Ohio River valleys. Illness usually is acquired from inhalation of soil contaminated with bird or bat droppings; human-to-human transmission does not occur. Symptoms include fever, headache, and respiratory symptoms, although infected persons can remain asymptomatic. Most patients will recover regardless of treatment, but severe disease can lead to respiratory failure and should be treated; immunocompromised patients are at high risk for developing histoplasmosis that spreads throughout the body.

All camp counselors and camp attendees’ parents were informed of the outbreak. Counselors were requested to complete a questionnaire to report their demographic information, activities, campsite assignments, and symptoms. All camp attendees’ parents were administered a separate Internet-based questionnaire regarding their child’s week of attendance and symptoms. Campsite assignments were obtained from camp administrators.

Serum and urine samples from all counselors were tested by enzyme immunoassay for Histoplasma capsulatum antigen to detect active infection. Parents of all attendees were mailed a letter explaining the symptoms of histoplasmosis, treatment and testing indications, and that testing could be performed free of charge if they desired. A confirmed case of histoplasmosis was defined as a serum or urine test positive for H. capsulatum, regardless of the person’s symptoms, at any time after that person’s arrival at camp. A suspected case was defined as illness comprising self-reported fever and at least one additional symptom (headache, chest pain, shortness of breath, or cough) in a camp counselor or attendee, beginning ≥3 days after camp arrival during May 21–June 27, 2012, regardless of that person’s test results.

Among the 32 counselors, 19 (17 confirmed, two suspected) (59%) had illness meeting the case definition, 11 (34%) were symptomatic with fever and at least one additional symptom, and 10 (31%) sought medical care for their symptoms. No hospitalizations or deaths occurred. Median age of the counselors was 20 years (range: 18–23 years). No specific activities or campsite assignments were associated with illness when confirmed and suspected cases were combined; however, when suspected cases were excluded, digging fire pits was associated with increased risk for illness among persons with confirmed illness (risk ratio [RR] = 2.7; Fisher’s exact test p-value = 0.01).

Camp activities had occurred in a wooded park with 12 campsites, nine of which were open, dirt-floor shelters with roofs supported by posts. During May 21–May 25, counselors participated in a precamp clean-up week. Activities included raking leaves, cleaning picnic tables, digging fire pits, and moving firewood; counselors did not wear personal protective equipment while cleaning. They reported observing bat guano on picnic tables and dirt floors in two of the shelters. Day camps began on

REFERENCES

11 Available.


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June 4, 2012, each lasting from Monday through Friday. Campers were aged 6–14 years (median: 9 years); each was assigned to one campsite, where activities included cooking on wood-fired grills and eating at picnic tables. Camp activities included nature walks, outdoor games, wilderness skill training, archery, and arts and crafts; all campers participated in these activities, but none participated in high-risk activities (e.g., digging in dirt, digging fire pits, raking leaves, or cleaning campsites).

Of 797 children attending camps, questionnaires were completed on 142 (18%), and laboratory testing was performed on 21 (3%). Laboratory or questionnaire data were obtained for 153 (19%) children, of whom 17 (11.1%) had illness meeting the case definition for histoplasmosis (five confirmed, 12 suspected). A multilevel logistic regression model with a random effect for campsite was used to compare illnesses among 18 children assigned to the two campsites where guano was identified, 32 children assigned to two campsites 20 yards from campsites with guano, and 92 children assigned to eight campsites 21 yards from campsites with guano (referent group). Compared with the referent group, children assigned to campsites with guano had 2.4 times the odds of illness (95% confidence interval [CI] = 0.5−11.4), and children assigned to campsites ≤20 yards from campsites with guano and 92 children assigned to eight campsites ≥21 yards from campsites with guano (referent group). Compared with the referent group, children assigned to campsites with guano had 2.4 times the odds of illness (95% confidence interval [CI] = 0.5−11.4), and children assigned to campsites ≤20 yards from campsites with guano had 2.2 times the odds of illness (95% CI = 0.5−8.2). A decreasing trend in illness occurred with increasing distance from campsites with guano (Cochran-Armitage test p-value = 0.04).

During a visit by DCHD and NDHHS personnel on June 26, 2012, bat guano was noted on picnic tables and dirt floors at two campsites. At that time, DCHD and NDHHS recommended closing these campsites, and the areas were fenced off. Soil samples of all campsites, and other areas of the park were obtained for Histoplasma testing; results are pending.

The probable infection source in this outbreak was campsite contamination of soil and picnic tables by bat guano, which likely became aerosolized during camp activities or clean-up before camper arrival. No other potential sources of infection were identified. Subsequent to this investigation, the city parks and recreation division relocated the day camp to a different park. The health department provided recommendations to the city’s parks and recreation division regarding prevention of bat roosting, procedures for inspecting and identifying potentially contaminated areas, and procedures to mitigate biohazardous sites contaminated with Histoplasma. Persons living in endemic areas should be aware that exposure to aerosolized soil or guano in sites with bird or bat droppings can lead to histoplasmosis, should avoid such exposures, and should seek professional assistance for cleanup efforts.

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**REFERENCES**


**QuickStats**

**FROM THE NATIONAL CENTER FOR HEALTH STATISTICS**

<table>
<thead>
<tr>
<th>Race and Hispanic Subpopulation</th>
<th>Percentage (±95% CI)</th>
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<th>Percentage (±95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>15.6% (14.9−16.3%)</td>
<td>Black</td>
<td>16.7% (15.9−17.5%)</td>
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<tr>
<td>Hispanic</td>
<td>13.2% (12.4−14.0%)</td>
<td>Mexican</td>
<td>14.3% (13.5−15.0%)</td>
</tr>
<tr>
<td>Puerto Rican</td>
<td>15.2% (14.4−16.0%)</td>
<td>Cuban</td>
<td>15.2% (14.4−16.0%)</td>
</tr>
<tr>
<td>Central or South American</td>
<td>15.2% (14.4−16.0%)</td>
<td>Other Hispanic</td>
<td>16.7% (15.9−17.5%)</td>
</tr>
</tbody>
</table>

*Current smokers have smoked at least 100 cigarettes in their lifetime and currently smoke cigarettes.

1. All whites and blacks were non-Hispanic. Persons of Hispanic ethnicity might be of any race or combination of races.

2. Estimates are based on household interviews of a sample of the U.S. civilian, noninstitutionalized population. Estimates are age-adjusted using the projected 2000 U.S. population as the standard population and using four age groups: 18−44 years, 45−64 years, 65−74 years, and 75 years or older.

3. 95% confidence interval.

Overall, 12.2% of Hispanic adults were current cigarette smokers, compared with 21.7% of non-Hispanic white adults and 19.8% of non-Hispanic black adults. Among five Hispanic subpopulations, Central or South American adults (7.2%) were less likely to be current smokers compared with Mexican adults (12.0%), Puerto Rican adults (16.9%), Cuban adults (14.5%), and other Hispanic adults (17.9%).


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