

**Outbreak of *Salmonella* Enteritidis Infections Associated with  
the Beaches Negril Resort – Negril, Jamaica, March-April 2011**



## **Background**

At approximately 2:00 p.m. on April 18, 2011, the Kansas Department of Health and Environment Bureau of Epidemiology and Public Health Informatics (KDHE) was notified of two laboratory-confirmed cases of salmonellosis among a group who recently traveled to Negril, Jamaica to attend a destination wedding held at the Beaches Negril resort. Some guests arrived as early as March 27, 2011, and all departed on April 3, 2011.

A spokesperson for the wedding group estimated four others became ill following the trip. KDHE began an investigation immediately, working to obtain names and contact information for the group, which included 31 individuals from 17 different households — residents of Kansas, Missouri, Arizona, Arkansas, South Dakota, Virginia, New York, New Jersey, and Germany.

Because of the multijurisdictional nature of this outbreak, KDHE distributed an alert on April 26 via the Epidemic Information Exchange (Epi-X), a communication network maintained by the Centers for Disease Control and Prevention (CDC) that allows state, local, and federal partners to exchange disease outbreak information. KDHE requested to be notified of additional cases of salmonellosis among travelers to Beaches Negril. A similar notification was distributed via CDC's foodborne outbreak listserv on April 27.

## **Methods**

### *Epidemiologic Investigation*

A cohort investigation was conducted to determine the source of infection. The four residents of Germany were not included in the cohort study. Permission to interview non-Kansas residents was requested from all affected jurisdictions other than Germany — each granted KDHE permission. Prior to the finalization of the interview tool, KDHE staff interviewed three individuals with an open-ended questionnaire. The remaining individuals were interviewed via telephone by KDHE staff using a more specific tool, which assessed exposure to 111 food items as well as each individual's participation in activities inside and outside the resort.

A case was defined as an individual who became ill with diarrhea (2 or more loose stools in a 24-hour period) after staying at the Beaches Negril resort anytime between March 27 and April 3, 2011.

Questionnaire data was entered into a Microsoft® Access database and analyzed using SAS® 9.1 by KDHE. Relative risk and 95% confidence intervals were calculated to assess the association between potential risk factors and subsequent illness.

### *Laboratory Analysis*

Only two individuals sought medical care for their illness; each tested positive for *Salmonella*. Each isolate was forwarded to the Missouri Department of Health and Senior Services Laboratory for serotype testing and pulsed-field gel electrophoresis (PFGE) analysis.

## **Results**

### *Epidemiologic Investigation*

KDHE staff were able to interview 22 (81%) of the 27 American travelers. Thirteen (59%) of the 22 interviewed met the case definition. Cases ranged from 21 – 73 years of age (median = 40 years). Eight (62%) were male.

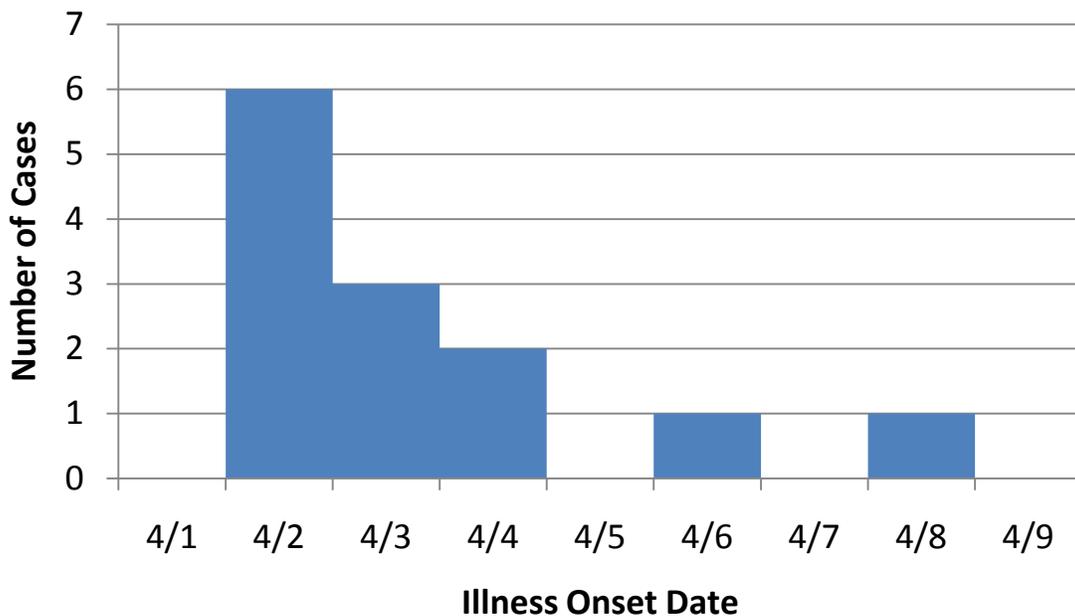
Diarrhea was the most commonly reported symptom, followed by abdominal cramps, muscle aches, and nausea (Table 1). Two cases sought medical care from a physician; no emergency room visits or hospitalizations were reported.

**Table1: Symptoms reported among cases (n=13)**

<i>Symptom</i>	<i># of cases</i>	<i>% of cases</i>
Diarrhea	13/13	100%
Abdominal Cramps	10/13	77%
Muscle Aches	7/13	54%
Nausea	6/13	46%
Fever	5/13	38%
Bloody Diarrhea	2/13	15%
Vomiting	1/13	8%

Illness onset dates ranged from April 2 – April 9, with the majority of individuals reporting illness on April 2 (Figure 1).

**Figure 1 – Cases associated with Beaches Negril resort, by illness onset date (n=13)**



Twelve cases had recovered by the time they were interviewed. Their duration of illness ranged from 9 hours to 11 days (median = 134.5 hours).

The risk of illness was approximately three times higher among those who reported eating scrambled eggs from the resort’s breakfast buffet compared to those who did not (Table 2). Analysis of other foods and activities did not reveal an association with illness as statistically significant as scrambled eggs. Although the interview tool was designed to capture when and where each food item was consumed, the majority of travelers were unable to recall these details, which precluded more specific analysis.

**Table 2: Risk ratios for commonly consumed foods**

<i>Food Item</i>	<i>Risk Ratio</i>	<i>95% Confidence Interval</i>
Scrambled Eggs	3.1	0.9 – 10.8
Omelet	1.7	0.8 – 3.6
Chicken	2.9	0.5 – 16.5
Pineapple	2.3	0.2 – 26.6

*Laboratory Analysis*

Both isolates were confirmed as *S. Enteritidis*. The isolates were indistinguishable by PFGE (CDC pattern name JEGX01.0021). From March 1, 2011 to May 23, 2011, 240

additional indistinguishable *S. Enteritidis* isolates were reported to the CDC from 43 other states. While exposure histories were not available for every patient with a matching isolate, 25 individuals from seven states were known to have traveled to Jamaica prior to becoming ill. These individuals traveled to Jamaica between January 30, 2011 and April 12, 2011. Some reported staying at the Beaches Negril resort, while others reported staying at other resorts in Negril or Montego Bay.

## **Discussion**

This cohort study was conducted to determine the cause of *S. Enteritidis* among a group who traveled to the Beaches Negril resort. The epidemiological analysis was unable to implicate scrambled egg consumption as the cause of illness at a statistically significant level (risk ratio = 3.1, 95% confidence interval = 0.9 – 10.8). However, given that no other exposures were associated with illness, scrambled egg consumption is the most likely source of salmonellosis.

The CDC Outbreak Response Team provided information regarding this cohort study and the additional PFGE-matched travelers from other U.S. states to the Pan American Health Organization's Caribbean Epidemiology Center (CAREC) for further investigation.

*Salmonella* serotype Enteritidis is a common cause of foodborne illness. From 1985 through 1999 in the United States, eggs and egg-containing foods were implicated in 80% of *S. Enteritidis* outbreaks reported to the CDC<sup>1</sup>. Unlike other serotypes of *Salmonella*, Enteritidis can infect the inside of normal, intact, and otherwise clean eggs. The bacterial contamination occurs as a result of infection of hens' ovaries<sup>2</sup>. Consumption of contaminated, undercooked eggs can cause *S. Enteritidis* infection. Cooking eggs to a temperature of 160°F (yolks should be firm) will kill *Salmonella* spp. and reduce the risk of foodborne illness<sup>3</sup>.

## **References**

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*As the state's environmental protection and public health agency, KDHE promotes responsible choices to protect the health and environment for all Kansans. Through education, direct services, and the assessment of data and trends, coupled with policy development and enforcement, KDHE will improve health and quality of life. We prevent injuries, illness, and foster a safe and sustainable environment for the people of Kansas.*