



Two Cases of Toxigenic *Vibrio cholerae* O1 Infection After Hurricanes Katrina and Rita --- Louisiana, October 2005

Louisiana was struck by Hurricane Katrina on August 29, 2005, and by Hurricane Rita on September 24, 2005. The two hurricanes caused unprecedented damage from wind and storm surge to the Louisiana Gulf Coast region, and levee breaks resulted in flooding of large residential areas in and around New Orleans. With the flooding, an immediate public health concern was the potential for outbreaks of infectious diseases, including cholera. Nearly all *Vibrio* infections in the United States are caused by noncholerae *Vibrio* species (e.g., *V. parahaemolyticus*, *V. vulnificus*, and non-O1, non-O139 *V. cholerae*) (1,2). Cases of cholera rarely occur in the United States, and cholera epidemics, such as those reported in certain developing countries, are unlikely, even with the extreme flooding caused by the two hurricanes (2). This report describes the investigation by the Louisiana Office of Public Health and CDC into two cases of toxigenic *V. cholerae* O1 infection in a Louisiana couple; the cases were attributed to consumption of undercooked or contaminated seafood. Although noncholerae *Vibrio* illnesses were reported in 22 residents of Louisiana and Mississippi after Hurricane Katrina (1), no epidemic of cholera was identified, and no evidence exists of increased risk to Gulf Coast residents.

In Louisiana, cases of notifiable diseases, including *V. cholerae* infections, are reported through the Internet-based Reportable Disease Database (RDD). All health-care providers and diagnostic facilities throughout the state submit reports through this system. A 24-hour telephone line is available to report emergencies. Although the 24-hour telephone line was disrupted immediately after hurricane Katrina, the Internet-based RDD never stopped functioning. In addition, after the hurricanes, morbidity surveillance systems were implemented in acute-care facilities in severely damaged areas and in evacuee centers throughout the state. During August 29--October 30, 2005, a total of 81 reports were investigated by Louisiana infectious-disease epidemiologists; 33 (41%) of these investigations were related to diarrheal illnesses. Five suspected cases of cholera were reported in Louisiana on the basis of presumptive laboratory results from clinical laboratories. However, of the five stool specimens sent to the Louisiana State Public Health Laboratory, only two were confirmed as containing toxigenic *V. cholerae* O1.

The two cases of toxigenic *V. cholerae* O1 infection were identified in a Louisiana couple approximately 3 weeks after Hurricane Rita. On October 15, 2005, in southeastern Louisiana, a man aged 43 years and his wife aged 46 years had onset of diarrhea. The husband had a history of high blood pressure, alcoholism, diabetes, brain tumor, and chronic renal failure that required dialysis three times a week. On October 16, 2005, he was hospitalized for fever, muscle pains, nausea, vomiting, abdominal cramps, and severe diarrhea and dehydration; subsequently he experienced complete loss of renal function and respiratory and cardiac failure. However, after treatment with ciprofloxacin and aggressive rehydration therapy, the man recovered to his previous state of health. His wife had mild diarrhea and was treated as an outpatient with ciprofloxacin and extra fluids.

Because the couple's residence had been severely damaged and flooded by Hurricane Rita, both patients had waded in coastal flood waters in late September, 2--3 weeks before their illness onset. Five days before onset of illness, both had eaten locally caught crabs. On October 14, the day preceding illness onset, both had

eaten shrimp purchased from a local fisherman. The shrimp were boiled for 5 minutes; however, at least some of the boiled shrimp were returned to a cooler containing raw shrimp and were eaten later. Two other persons who ate the shrimp reported mild diarrhea and abdominal discomfort; they did not seek medical attention, and no stool or serum specimens were collected from them for testing.

Toxigenic *V. cholerae* O1, serotype Inaba, biotype El Tor, was isolated at the hospital from stool specimens of the two patients and was confirmed at the Louisiana State Public Health Laboratory and the Foodborne and Diarrheal Diseases Laboratory at CDC. Both isolates were susceptible to all antimicrobial agents tested and were hemolytic on sheep blood agar, two characteristics of the strain of toxigenic *V. cholerae* O1 that is endemic to the U.S. Gulf Coast. By pulsed-field gel electrophoresis, the isolates were indistinguishable from each other and from other isolates previously associated with the Gulf Coast.

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Editorial Note:

Cholera is caused by toxigenic *V. cholerae* O1 or O139 and is characterized by severe watery diarrhea, sometimes accompanied by vomiting, that can lead to dehydration, electrolyte abnormalities, and hypovolemic shock if fluid losses are not promptly replaced (3). In developing African and Asian countries, where most cholera cases and epidemics occur (4,5), transmission tends to be waterborne. However, because *V. cholerae* occurs naturally in some marine or estuarine environments, cholera is also occasionally acquired from consumption of inadequately cooked crustaceans or molluscan shellfish (3,6--8).

In the United States, epidemic cholera has not occurred during the past 100 years. Although small outbreaks have been identified, most cases have been sporadic. During 1996--2005, a total of 64 cases of toxigenic *V. cholerae* O1 were reported to CDC from U.S. states and territories (Figure). In 35 (55%) cases, cholera infection was acquired during foreign travel. For the remaining 29 (45%) cases, infection was acquired in the United States. Seven (24%) of these 29 cases were attributed to consumption of Gulf Coast seafood (e.g., crabs, shrimp, or oysters); 22 (76%) others could not be attributed to consumption of Gulf Coast seafood.*

Seven of the 11 U.S. cholera cases in 2005 were reported during October--December, after Hurricanes Katrina and Rita. In addition to the two Louisiana cases described in this report, two cases occurred in Guam, and three others were attributed to foreign travel. The number and sources of these seven cases are consistent with U.S. reports of cholera in previous years (9). No evidence suggests increased risk for cholera among Gulf Coast residents or consumers of Gulf Coast seafood after the hurricanes.

Illness in the two Louisiana residents was attributed to shellfish that was not prepared or handled properly, perhaps because of difficult living conditions after the hurricanes. Boiling shellfish for >10 minutes is recommended to render the *V. cholerae* organism nonviable and then placing the shellfish into clean serving dishes to prevent recontamination (3,8).

Acknowledgments

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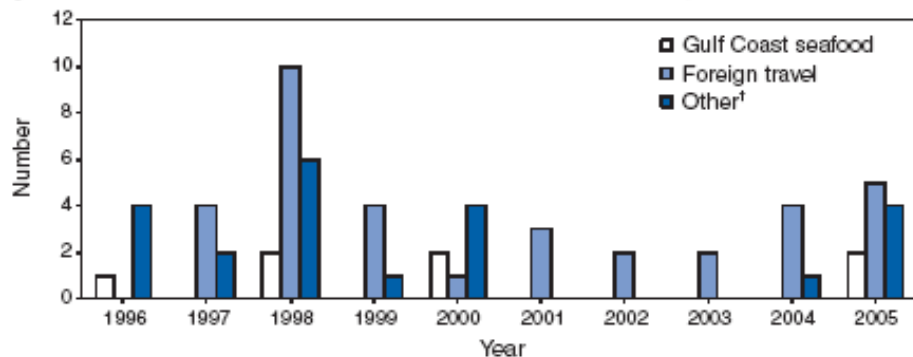
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* Among the 22 cases not associated with either foreign travel or Gulf Coast seafood, 13 were associated with consumption of seafood from areas other than the Gulf Coast, and nine exposures were undetermined. Thirteen of the cases occurred in states outside of the Gulf Coast, eight occurred in U.S. territories (seven in Guam and one in the Mariana Islands), and one case occurred in Louisiana.

Figure

FIGURE. Number of toxigenic *Vibrio cholerae* O1 cases, by year and source of infection — United States, 1996–2005*



* Reported to the CDC Cholera and Other *Vibrio* Surveillance System.

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