Trends in *Vibrio* Illnesses

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Introduction

The Cholera and Other *Vibrio* Illness Surveillance (COVIS) is a national database of reported human illnesses caused by all species of *Vibrio*. It was established in 1988 by the Centers for Disease Control and Prevention (CDC), the U.S. Food and Drug Administration (FDA) and the Gulf Coast states (Alabama, Florida, Louisiana, Mississippi, and Texas) to conduct surveillance of illnesses caused by *Vibrio* species. Clinical and epidemiologic information on cases of *Vibrio* illnesses are reported to CDC by state and local public health officials. In 2007, cases of *Vibrio* infections were made nationally notifiable and all 50 states began reporting through COVIS.

Methods

Data from COVIS were analyzed for the number of cases of *Vibrio* infections by species, type of infection, outcome, and trends. A main-effects, log-linear Poisson regression model (negative binomial) was used to estimate changes in incidence of infections in Gulf Coast states compared with previous years. This model accounts for variability in the size of the population under surveillance over time. The average annual incidence during 1990–1994 was used for the comparison period.

Results

During 1988–2008, in the Gulf Coast states, there were a total of 3,244 cases of vibriosis. *Vibrio vulnificus* (32%), *Vibrio parahaemolyticus* (25%) and *Vibrio cholerae non-O1, non-O139* (13%) comprised the three most common species reported. *V. vulnificus* had the highest percentage of hospitalization (92%) and death (34%), followed by *V. parahaemolyticus* (45% and 3%) and *V. cholerae* non-O1, non-O139 (55% and 6%). Stool was the most common source of isolation overall, however 57% of *V. vulnificus* cases were isolated from blood and 61% of *V. alginolyticus* cases were isolated from wound. The majority of cases occurred during the summer months.
The number of patients that reported seafood consumption, primarily consumption of raw oysters, in the 7 days before illness onset was 2,437. Among *V. vulnificus* cases 72% consumed oysters, 89% of which consumed raw oysters. Among *V. parahaemolyticus* cases who reported seafood consumption, 54% consumed oysters, 82% consumed raw oysters. Among *V. cholera non-O1, non-O139* cases who reported seafood consumption, 52% consumed oysters, 85% consumed raw oysters.
In comparison with 1990-1994, rates of infection in 2008 were higher for *V. alginolyticus*. Additionally, there was no change in rates for *V. parahaemolyticus*, *V. vulnificus*, and *Other Vibrios*. The percent change increased for *V. alginolyticus* and had no change for *V. parahaemolyticus*, *V. vulnificus*, and Other *Vibrios*.

Conclusions

In the Gulf Coast states, between 1999–2008, *V. vulnificus* infection caused the most severe disease and was more likely to result in hospitalization and death compared with the other *Vibrio* species. Seafood consumption is a major risk factor for *Vibrio* infection, specifically consumption of raw oysters leading to infection with *V. vulnificus*. Consumption of seafood is also a risk factor for infection with other species of *Vibrio*. Additionally, transmission of *Vibrio* infections, by both foodborne and non-foodborne routes, peaked during the summer months, with around 500 cases in both June and July, when ocean waters are the warmest. Since becoming nationally notifiable in 2007, incidence and relative rates of *Vibrio* infections (all species) has remained constant. This is despite targeted control efforts. Multipronged and innovative control strategies are necessary and require continued attention to be successful. To be successful, continued state participation in COVIS is essential. Information on human illness, exposures, environmental factors, and lab isolates from COVIS guides prevention and control efforts.