

Environmental determinants in Mississippi, Louisiana, Chesapeake Bay, Maryland, and Puget Sound, Washington

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Abundance of pathogenic vibrios in the environment varies in response to biotic and abiotic factors. Although temperature has been found to be a dominant factor, other parameters have a demonstrable influence on the abundance and distribution of these organisms. In a multi-coastal collaborative study, the population densities of vibrios were determined in the Mississippi Sound, Hood Canal, Chesapeake Bay, and Timbalier Bay. Sea surface temperature (SST), salinity, pigments (including chlorophylls, fucoxanthins, and others), dissolved organic carbon, and suspended particulate matter were measured and evaluated as predictors of vibrio densities in the context of multiple regression analysis.

Statistically significant relationships between abundance of total vibrio (both *V. parahaemolyticus* and *V. vulnificus*) and temperature were identified in water, oyster, and sediment samples. Abundance of pathogenic *V. parahaemolyticus* was also significantly associated with temperature but only in sediment samples. A positive relationship was apparent between abundance of vibrio and levels of suspended particulate matter (SPM), which is a component of turbidity. The relationship between abundance of vibrio and dissolved organic carbon and chlorophyll-a were less clear.

The ecological models in this project will be used to estimate and summarize the impact of environmental factors on the density and distribution of vibrios. Monitoring and analysis of data from ecological systems with a wide range of environmental characteristics improves estimation of ecological relationships and development of risk assessment models for application in regions where microbiological monitoring programs are cost-prohibitive. This is especially important in developing countries where cholera outbreaks can be devastating or where infections with *V. parahaemolyticus* or *V. vulnificus* from contaminated shellfish are problematic.