

Molecular Epidemiology and Ecology of *Vibrio cholerae* Causing Cholera in Coastal Villages of Bangladesh

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Vibrio cholerae causing cholera has been established as an estuarine flora, but the questions of where the bacterium resides between epidemics, what determines the seasonality of cholera and how an epidemic strain emerges, remain unanswered. Although epidemiological data suggest that cholera emerges first in coastal villages, before cases occur inland, research and intervention on cholera in Bangladesh were done mainly in Dhaka and Matlab, the two inland cholera endemic sites, 350 km away from the coast. Unfortunately, knowledge of cholera and *V. cholerae* in Bangladesh does not reflect the estuarine reservoir or geographic distribution of *V. cholerae* in coastal villages of Bay of Bengal where cholera is also endemic.

We carried out a routine biweekly surveillance (2004 – 2007) in two coastal villages across the mangrove swamp, sunderban, of Bay of Bengal. The study employed a variety of culture methods and ecological analyses, employing direct, enrichment, and antibiotic-aided enumeration, colony blot hybridization, fluorescent *in situ* hybridization, direct fluorescent-antibody, multiplex-PCR, DNA sequencing, and analysis of targeted genes. The results showed that, although endemic cholera in coastal villages is caused mostly by *V. cholerae* O1 El Tor and rarely by O139 Bengal, both cholera serogroups share a niche in the estuarine ecosystem. This study is the first to show an unprecedented high frequency of isolation and detection of both cholera serogroups that exist year round, during and between seasonal epidemics, either as actively growing cells or as dormant cells within biofilms, free-living or in association with plankton.

Extensive phenotypic and genetic characterizations and typing of *V. cholerae* of estuarine ecosystem and comparison with strains isolated from inland endemic sites, during and in preceding years, provide strong evidence that the ecosystem of the mangrove swamp of bay of Bengal serves as an important reservoir for *V. cholerae* causing Asiatic cholera in this region.