Hydroepidemiology of Cholera Transmission in Bangladesh
A Spatially Explicit and Seasonally Varying Cholera Prevalence Model

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Abstract

Despite major advances in the microbiological & ecological understanding of Vibrio cholerae, the role of the underlying large-scale hydroclimatic processes in propagating the cholera disease in different seasons is not well understood.

We explain how regional asymmetric seasonal hydroclimatology of the Bengal Delta region may affect regional cholera dynamics by providing a coastal growth environment for bacteria in spring, and propagating to north and central regions by flooding in autumn.

Here we present a coupled hydroclimatology and epidemiology model for the simulation of cholera transmission in the Bengal Delta region. The model is used to simulate seasonal and monthly cholera prevalence in nine 1°x1° spatial grids spanning Bangladesh. Long term cholera surveillance records from the ICDDR,B hospital in Dhaka and short-term records from surveillance locations are used to validate the model.

Our results have important policy implications, formulating effective cholera intervention through water management and understanding the impacts of extreme hydroclimatic events such as droughts and floods, and changing climate patterns on seasonal transmission.

Acknowledgements

This research is supported, in part, by a Research Challenge Grant from the National Institutes of Health (1R01GM109087-01)

Reference


Data

- Cholera: Monthly time series of percent cholera incidence from ICDDR,B (1980-2009)
- Streamflow: Observed daily streamflow data for the Ganges and the Brahmaputra from IJET (1956-2007)
- Sea Surface Temperature: Reynolds 1ox1o Global SST Observation and AVHRR Interpolated Datasets.
- Precipitation: NCEP/NOAA, UCAR Gridded Precipitation Datasets from NOAA Depsitory (1948-2009)

有效的实施Cholera早期预警系统将提供2-3个月的预警时间，以快速干预，拯救生命。