



## WATER RESOURCES RESEARCH GRANT PROPOSAL

### SYNOPSIS

Title: Occurrence of *Helicobacter pylori* in Surface, Ground and Finished Water: Implications for Drinking Water Supplies.

Focus Categories: GW, SW, WCL

Keywords: Bacteria, Disinfection, Epidemiology, Groundwater Quality, Health Effects, Pathogens, Water Quality, *Helicobacter pylori*, Emerging Infectious Diseases

Duration: September 01, 1998 - August 31, 1999

Federal Funds Requested: \$ 52,376

Non-Federal (matching) Funds Pledged: \$ 123,343

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Congressional District: 17th

Statement of Critical Regional or State Water Problems:

Chronic gastritis is one of the most common diseases in the world. The recognition of *Helicobacter pylori* as the major causative agent of chronic gastritis, gastric ulcer disease, and stomach cancer has spawned intensive research on the pathophysiology and epidemiology of this organism. *H. pylori* has been classified as a Class I carcinogen by the World Health Organization. In spite of the widespread occurrence of the diseases attributable to the organism, little is known about the mode of transmission and microbial ecology of *H. pylori*. Current opinion regarding the mode of transmission of *H. pylori* is divided with some epidemiological evidence supporting the hypothesis of direct transmission and other studies implicating a water-borne transmission route. Recently, the USEPA Office of Ground Water and Drinking Water has included *H. pylori* on the Contaminant Candidate List (CCL) (62 FR 52193). This list designates contaminants which are not currently regulated under the national primary drinking water regulation (NPDWR), but which are known or anticipated to occur in public water systems, and may require regulations under the Safe Drinking Water Act (SDWA). Unfortunately, there is little data concerning the occurrence and persistence of this organism in surface and ground water or the efficacy of water disinfection practices for controlling this organism. We have conducted preliminary research regarding the occurrence of *H. pylori* in surface water and ground water in Central Pennsylvania. Our data indicates that this organism is frequently present in surface and groundwater.

Given the public health importance of *H. pylori* infections, our results underscore the need for a systematic survey of environmental and potable waters for the presence of this organism. The presence of *H. pylori* in source or finished water has profound public health and epidemiological implications. In addition, the potential presence of the organism in source water necessitates the documentation of treatment and disinfection procedures to prevent infection of drinking water consumers.

#### Statement of Results or Benefits

The proposed research has three immediate benefits associated with it. First, the research will provide essential information on the occurrence and persistence of a microbial Class I carcinogen in surface and ground water and hence of the potential for this organism to be present in private (untreated) drinking water supplies. Second, the research will establish the efficacy of traditional microbiological techniques (indicator organisms) to monitor water supplies for the presence of *H. pylori*. Finally, the research will provide baseline data on the efficacy of both municipal and small-scale (private) disinfection technologies to remove this organism from finished drinking water.

The results of this research will be of use to a variety of professionals involved in public health and water resources management. First, the research will provide essential information concerning the route of transmission and epidemiology of *H. pylori*. Such information will allow public health officials, epidemiologists and risk assessors to objectively estimate the risk posed to individuals via consumption of drinking water. More importantly, the proposed research will provide essential information for the control of this organism and the assurance of a safe drinking water supply. By examining possible associations between water quality parameters, land use and the occurrence of *H. pylori*, this research should provide valuable data to individuals involved in protecting source water and private drinking water supply quality.