

PROJECT BRIEF

A GIS approach to waterborne infectious disease: Cryptosporidium

Background

Cryptosporidium is a parasite that causes a severe and occasionally fatal diarrhea in humans. It is persistent in the environment because it forms an inert particle (oocyst) that does not become active until it is ingested, at which time it matures into the invasive organism. These oocysts are typically found in water sources (streams and rivers) and represent a continual threat to the urban population. The 1993 outbreak in Milwaukee was clear evidence of this threat, which resulted in 400,000 cases of illness and over a hundred deaths.

Purpose

Geographical Information Systems (GIS), a data mapping system, will be used to map the presence of live oocysts and environmental data. This technique will assist in analyzing the movement of Cryptosporidium through an environmental system and the associated risk assessment that differs markedly from analysis of other communicable diseases.

Goals

- Use GIS to describe the location and viability of persistent oocysts of the human pathogen, Cryptosporidium.
- Provide a model and map that will be a unique description of a reservoir of human disease and can be related to risk assessment.
- Fuse two different technologies – biotechnology and GIS to create a new tool that gives a unique view of an important human pathogen in its natural environment.
- Enable water utility managers to respond with appropriate barrier controls necessary to maintain safe drinking water supplies.

Timeline

May 21, 2007 – May 25, 2008

Funding Source

Center for Urban Population Health's Center Scientist Development Program through the Wisconsin Partnership Fund

Partner Institutions

University of Wisconsin – Milwaukee
Robert Burlage, Ph.D., Clinical Laboratory Sciences

Changshan Wu, Ph.D., Geography
A. Cogswell, Student

Special Accomplishments to Date

- Cogswell, A. & Burlage, R. (2007). Transcriptional Regulation of an Early Gene in *Cryptosporidium Parvum* Oocysts. 47th Interscience Conference on Antimicrobial Agents and Chemotherapy. Chicago, IL.
- Provisional Patent. Measuring Viability in *Cryptosporidium* Oocysts and other pathogens. R. Burlage and A. Cogswell. 2007. Assigned to UWM Research Foundation, Inc.

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