

HEALTH-RELATED MICROBIOLOGY OF WATER AND THE ROLE OF THE U.S. GEOLOGICAL SURVEY

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Although significant improvements in drinking water and wastewater treatment have been achieved during the past 30 years, periodic waterborne disease outbreaks indicate that certain types and sources of waterborne pathogens (disease-causing organisms) are still a threat to human health in the United States (Craun, 1992). Contamination is a problem in many places. One of every three surface waters not meeting state water-quality standards is affected by microbial pollution from a variety of sources. The magnitude of contamination in water can be great even with dilution because of the high concentration of microorganisms in sewage and animal waste. The microbiological quality of water in relation to human and wildlife health is undervalued nationwide. A recent paper published by the American Society for Microbiology stresses these and other issues and calls for more monitoring and assessment of the Nation's waters by means of new and improved methods (Rose and others, 1999).

By holding a workshop entitled "Building Capabilities for Monitoring and Assessment in Public Health Microbiology," the Ohio District Office and the Office of Water Quality of the U.S. Geological Survey (USGS) seek to expand and enhance the number and type of projects being done across the bureau. The goal of this workshop is to bring together investigators from all parts of the USGS who are engaged in studies of the health-related microbiology of water. The workshop will provide information on new methods and concepts to a group of interested investigators and water-quality professionals currently involved in or seeking to be involved in such investigations. The workshop will provide a forum in which to exchange information with some of the USGS's important stakeholders and data users in this interest area. These stakeholders include EPA (U.S. Environmental Protection Agency), CDC (Centers for Disease Control and Prevention), state and local health departments, and natural-resources and environmental managers at the state and local levels. Information sharing will include presentations and discussions on current and future programs and possible future directions for USGS research and assessment. The workshop is intended to improve communication about USGS capabilities and interests in health-related microbiology of water at all levels within and outside of the bureau.

The types of investigations discussed at this workshop reflect why the USGS is involved in the study of the health-related microbiology of water. In some way, each of the presentations shows a relevance to human-health issues and (or) water-resource or natural-resource management issues. *Human-health issues* include source and drinking-water assessments, and assessment of recreational and shellfish-growing waters. *Water-resource management issues* include microbiological aspects of combined-sewer and stormwater assessment, development of TMDLs (Total Maximum Daily Loads), nonpoint-source assessments, source tracking of animal and human waste, and water quality in relation to water reuse. These studies can be done and are being done in streamwater and lake water, ground water, and aquatic sediments. Investigations cover a range of indicator and pathogenic microorganisms including viruses, bacteria, and protozoans.

A special strength of USGS is the ability to study water-related issues across the Nation in a consistent manner because investigators in state and regional offices of the USGS are located throughout the country. National programs within USGS could play an important role in national assessment of the microbiological quality of water. A pilot study of microbiological monitoring for the NAWQA (National Water-Quality Assessment) Program demonstrated that if resources were

available, a microbiological component could be added to assessment activities (Francy, Helsel, and Nally, in press; Francy, Myers, and Helsel, in press). The Cooperative Water-Resources Program and National Research Program play somewhat different but equally important leading roles in funding the current work of the USGS in health-related microbiology. Research on microbial processes includes studies of microbial transport, dispersion, deposition, resuspension, decay, recovery, regrowth, and induced infiltration. Cooperative water-resources investigations include studies of water-resources management issues in relation to human or animal health and microbiological contamination.

The USGS is making important contributions to the scientific understanding of the role of hydrology, other natural factors, and human systems on the health-related microbiology of water. Future directions of programs in health-related microbiology will arise from the needs of the Nation as defined internally and by stakeholders and external users of USGS data and information. This workshop is one step toward building capabilities across the USGS to assess and research the major health-related microbiological water-quality issues in the Nation.

References cited

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