What Goes Into Beach Monitoring and Testing?

Public Health Madison and Dane County monitors Madison area beaches for E. coli and harmful algal blooms in order to protect the public from pathogen and toxin risk during recreational activities. We want to keep you safe, not deter you from using our lakes!

Challenges in the Monitoring of Bacteria and Cyanobacteria (Blue-Green Algae)

Counts of indicator bacteria vary quickly and drastically over time. Higher bacteria counts are found in shallow water, closer to shore. High counts can be associated with:
- Storm runoff
- Wind erosion
- Resuspension of lake sediment
- Waterfowl, wildlife and pet waste

Cyanobacteria toxin content varies over the course of a bloom and is not fully understood, making it difficult to predict the toxicity of algal blooms. But here's what we do know:
- Cyanobacteria surveillance needs to be well-timed and prompt.
- Conditions may change within hours, causing the size and toxicity of a scum to change. Wind can push blooms towards shore.
- Monitoring is intensified during blooms and can be initiated by:
  - Lifeguard notification
  - Field sampler’s observations
  - Citizens’ calls

Samples are evaluated qualitatively for the presence of various species and toxin analysis is performed in the PHMDC laboratory. The results of the evaluation dictate whether any intervention is appropriate. Interventions may include hazard communication to the public or temporary restriction of water contact activities.

Can We Predict Beach Contamination?

Real-time environmental data can be used to predict pathogen occurrences:
- Our results show significant associations between some bacterial densities and some environmental factors.
- The following can be useful for predicting elevated E. coli levels:
  - Rainfall
  - Wind speed
  - Wave height and water level
  - Turbidity
  - Specific conductance

Some organizations are developing rapid molecular testing capabilities in near real-time testing.

Short-Term Steps to Managing Health Risks

Primary goal: Protection of public health.

Intervention may include informing the public of risks, symptoms of exposure, and avoidance of hazards, sometimes by temporarily restricting water-contact activities.

Increased monitoring following high bacteria counts and during blooms.

PHMDC encourages YOU to contact the health department when you are uncertain of water quality.

Concerns for the Future

Waters can transmit outbreaks of very serious diseases and can even be fatal for animals.

"Water-borne diseases and degraded water quality are very likely to increase with more heavy precipitation due to global warming." (IPCC)

Threats from emerging illness-causing organisms and the severity of illness are little-understood.

We need to learn more about emerging pathogens and understand their public health consequences. We need tests aimed at pathogens to provide good info on beach safety.

We need to learn more about forecasting water quality.

Clean up efforts to control and eliminate contamination sources need to be accelerated.

E. Coli 0157:H7 was detected at a Madison beach where many residents gave up their pets. One other strain of E. coli were previously identified in water and bird droppings in Madison.

Sample Collection and Analysis

- Standard Operating Protocols
- Approved Analytical Methods
- Routine Monitoring for indicator bacteria
- E. Coli
- Field Observations
  - Water Temperature
  - Presence of Weeds and Algae
  - Waterfowl (ducks and geese)
  - Bird or Other Animal Excrements
  - Swimmer and Waterfowl Activity
  - Any Fecal Accidents

Contaminants Can Be Due To Runoff From:

- Urban Lawns
- Yards
- Paved Surfaces
- Roofs
- Golf Courses
- Agriculture
- Waterfowl (geese waste)

Other Factors That Can Lead to Unsafe Conditions:

- Rain, storms, higher temperatures
- Swimmers (resuspension of sediment in the lake)
- Proximity to shorelines
- Heavy accumulations of algae or lake weeds

Symptoms from exposure to cyanotoxins may include:

- Dashes
- Dizziness, loss of balance
- Headache
- Breathing problems
- Hair loss
- Rash
- Itching
- Muscle / joint pain

For more information on beach locations or conditions, check out our website: www.publichealthmdc.com/beaches or call us at (608) 243-0356.