WATER BULLETIN

Water Quality Program, College of Human Ecology, Cornell University

Outdoor Swimming

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There is nothing nicer on a hot summer's day than a nice cool swim. But to save yourself some stomach aches it might be wise to investigate the place where you want to swim (see table 1).[1] Is it designated as recreation water? If it is, the local public health officials are required to take surveys to see if the water is still microbiologically safe. Sewer overflows from storm water sewers or blue-algae blooms can greatly increase the health risks of swimming.

Blue-green algae[2] are microorganisms seen in summer when the water temperature rises above 60 F. They like warm shallow water with a lot of sun and nutrients (high nitrogen and phosphate content). Some blue-green algae produce toxins that could pose a health risk to people and animals when they are exposed to them in large enough quantities. The toxins emitted can lead to diseases from skin rashes to liver damage depending on the ingested amount. Blue-green algae grow in big green blooms and sometimes form a scum layer on the water surface and in this way they are very visible. Water where you can see the algae blooms is not fit for swimming or bathing. Beaches that have blue-green algae are closed when visible marks are shown.

The BEACH Act[3]

This act is responsible for the microbiological safety of coastal recreation water. The BEACH Act defines coastal recreation waters as: the Great Lakes and coastal waters (including coastal estuaries) that states, territories, and authorized tribes officially recognize (or "designate") for swimming, bathing, surfing, or similar activities in the water. To measure the safety of the water, indicator organisms are used. Most disease-causing microbes are present in very small concentrations in the water. To test for all would be very expensive. Therefore the indicator organisms *E.coli* and Enterococci (generally not disease-causing) are used as signals for harmful pathogens. The following quantities are designated by the BEACH Act:[5]

E. coli 126 per 100 ml; or Enterococci 33 per 100 ml

If these quantities are exceeded by a certain percentage, depending on the frequency of use, the beach will be closed until the levels recede. Sometimes chlorine is added to kill the bacteria faster.

This Act was finalized in 2004 and many states have already adopted the new criteria or are in the process[4] of adopting the rules. New York State is still in the process of adopting the criteria.

Table 1: Pathogens in sewage and possible illnesses for people who swim in water contaminated by overflows

Disease-Causing Microorganisms in Sewage	
Microorganisms	Some Illnesses & Symptoms
Bacteria	Gastroenteritis (includes diarrhea and abdominal pain), salmonellosis (food poisoning), cholera.
Viruses	Fever, common colds, gastroenteritis, diarrhea, respiratory infections, hepatitis..
Protozoa	Gastroenteritis, cryptosporidiosis and giardiasis (including diarrhea, and abdominal cramps), dysentery
Worms	Digestive disturbances, vomiting, restlessness, coughing, chest pain, fever, diarrhea.

Check local conditions

To help recreants who want to know the local beach quality a web site (BEACON: beach advisory and closing online notification) is accessible for this information. Via http://oaspub.epa.gov/beacon/beacon_national_page.main the results for local beaches that are frequently examined can be found. For further information contact your local public health officers.

Conclusion

Swimming is a healthy pastime, but before you go outdoors, check online or with public health officers if the water where you want to swim is safe.

References

1.http://www.epa.gov/ost/beaches/2000/introduction.html
2. Information bulletin, Blue-green Algae, Department of health, New York State
3. http://www.epa.gov/OST/beaches/
4. Implementation Guidance for Ambient Water Quality Criteria for Bacteria, EPA MAY 2002, EPA-823-B-02-003
5. **Table 1**: The exact rules for controlling the water safety of coastal water under the BEACH Act

For freshwater
E. coli 126 per 100 ml; or Enterococci 33 per 100 ml. No sample should exceed a one sided confidence limit (C.L.) calculated using the following as guidance: Designated bathing beach 75% C.L. Moderate use for bathing 82% C.L. Light use for bathing 90% C.L. Infrequent use for bathing 95% C.L. based on a site-specific log standard deviation, or if site data are insufficient to establish a log standard deviation, then using 0.4 as the log standard deviation for both indicators.
Marine Water
Based on a statistically sufficient number of samples (generally not less than 5 samples equally spaced over a 30-day period), the geometric mean of the enterococci densities should not exceed 35 per 100 ml. No sample should exceed a one sided confidence limit using the following as guidance: Designated bathing beach 75% C.L. Moderate use for bathing 82% C.L. Light use for bathing 90% C.L. Infrequent use for bathing 95% C.L. based on a site-specific log standard deviation, or if site data are insufficient to establish a log standard deviation, then using 0.7 as the log standard deviation.

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