



BEACH Program



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Introduction

Just about everybody enjoys going to the beach! Our lake, river, and ocean beaches are Americans' top vacation choices. Americans take almost two billion trips to the beach each year and spend billions of dollars in beach communities.

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.

IS THE WATER AT YOUR BEACH SAFE?

The water at your beach looks clean, but is it? It may be worth your while to find out before you or your children go swimming. Each year states across the country report thousands of beach closings at rivers, lakes, and oceans due to disease-causing microorganisms that you cannot see. Many other beaches may also be polluted, but if the water is not monitored and the results are not posted, you won't know whether you run the risk of getting sick. The U.S. Environmental Protection Agency (EPA) with its new Beaches Environmental Assessment, Closure and Health Program ("BEACH Program") is working with state, tribal and local governmental partners to make sure you have beach water quality information before you swim.

WHAT IS POLLUTING OUR BEACHES?

The most frequent sources of disease-causing microorganisms (pathogens) are sewage overflows, polluted storm water runoff, sewage treatment plant malfunctions, boating wastes and malfunctioning septic systems.

ARE THERE PUBLIC HEALTH RISKS?

Swimming in unsafe water may result in minor illnesses, such as sore throats or diarrhea. It might also result in more serious illnesses such as meningitis, encephalitis, or severe gastroenteritis. Children, the elderly, and people with weakened immune systems have a greater chance of getting sick when they come in contact with contaminated water.



WHO IS MONITORING THE WATER AT MY BEACH?

Across the country, state, tribal, and local health and environmental protection agencies are responsible for monitoring the quality of water at beaches and posting warnings or closing beaches when pollutant levels in the water are too high. In practice, however, monitoring and beach posting programs are inconsistent. Some areas have good monitoring and posting programs; others have inadequate or no programs at all. EPA established the BEACH Program to provide a framework for local governments to develop equally protective and consistent programs across the country.

WHAT IS THE BEACH PROGRAM?

EPA's BEACH Program aims to protect the health of beachgoers through assistance to state, tribal, and local health and environmental officials in designing, developing and implementing beach monitoring and advisory programs and by providing the public with information about the risks associated with swimming in contaminated water. EPA intends to exercise a variety of authorities and programs to ensure effective state, tribal, and local beach programs are put into operation. Strong water quality standards, improved scientific methods, and providing information to the public are the key elements of the BEACH Program.

Nationwide implementation of strong, consistent beach programs will provide the public with important information about the quality of their beach water and allow them to make decisions on when and where to swim. This document provides a brief overview of beach pollution problems and what EPA is doing to keep you and your family safe when swimming.

New Jersey: A Good Role Model

Since 1974, the New Jersey Department of Environmental Protection (DEP) has had an effective coastal monitoring program. Under its program, local health agencies sample beach waters for bacterial indicators of fecal contamination. They also investigate potential sources of pollution. This sampling data enables local health agencies to respond immediately when they observe potential risks to human health.

New Jersey health agencies collect several water samples from over 300 sites each week during swimming season. A beach is closed when more than one sample per week shows a potential problem. The beach is not reopened until tests show the water is safe for swimming.

In addition, New Jersey DEP and 94 coastal municipalities are working to eliminate causes of beach pollution. Municipalities are mapping their storm water and sewage lines, identifying inter-connections, and monitoring storm water discharged to coastal waters. In recent years, beach closings were generally localized and associated with specific storm or rain events. Improvement in storm water management is expected to further decrease beach closings each year.



Primary Sources of Pollution

EPA awarded approximately \$70 billion to municipalities between 1972 and 1996 to help communities construct and improve wastewater treatment plants. As a result, sophisticated sewage treatment systems serve over 85 percent of the U.S. population and treat billions of gallons of sewage each year. Despite federal, state, tribal and local investments, some poorly maintained or otherwise inadequate sewage treatment systems still exist. These systems, combined with population increases, mean partially treated or untreated sewage is still reaching our recreational waters.

The majority of beach closings in the United States result from testing that indicates high levels of harmful bacteria, viruses, and other pathogens are present in beach water. High levels of these pathogens through ingestion, body contact and inhalation increases the public's risk of illness.



has dramatically reduced the amount of harmful pollutants entering U.S. waters, but the volume of wastewater

continues to increase as our population grows.

Recently collected beach water quality information shows the major sources of pathogens in beach water are

untreated or partially treated sewage and storm water runoff spilling onto the beaches and from overflowing sewage collection and treatment facilities.

Before the passage of the Clean Water Act of 1972, water pollution from untreated sewage was common and widespread. This landmark legislation



Sewer Overflows

EPA and state environmental protection agencies work with local communities to ensure that sewage collection and treatment systems are properly installed, operated, and remain functional. Under normal operating conditions, sewage from homes and businesses is carried to wastewater treatment facilities where it is properly treated and tested before it is discharged.

Older or malfunctioning sewer systems may have leaking or damaged pipes and connections. Some systems may be simply overloaded because they are serving communities larger than those for which they were designed. During storms or even under dry conditions these systems can spill or leak raw sewage into our waters.

About 900 cities in the United States have combined sewer systems. These systems were designed years ago to carry both raw sewage and storm water runoff (rain and snow melt) to a treatment plant. They were also designed to discharge excess wastewater into local

waterways when the system became overloaded. During heavy rainstorms, for example, overloaded combined sewer systems may discharge a mixture of raw sewage, polluted runoff and litter from streets and, in some cases, industrial waste waters, into local waterways where it can contaminate downstream beaches and other areas. In 1994, EPA established a national strategy to greatly reduce the number of combined sewer overflows causing human health and environmental problems.



San Francisco: Controlling Sewer Overflows

The City of San Francisco spent \$1.45 billion and twenty years building a system to control combined sewer overflows. As part of the project, the city built large underground structures that act like a moat surrounding the city's shoreline, intercepting sewage and urban runoff that otherwise would have been discharged into local water bodies. The structures trap, temporarily store, then transport the mixture of storm water and sanitary sewage to upgraded treatment facilities. Eighty-five percent of the sewage and storm water that would otherwise be discharged on the beaches is captured and treated at wastewater treatment plants. The remaining 15 percent gets flow-through treatment in the storage/transport system before it is discharged.

Before the control structures were built, the city had between 50 and 80 untreated overflows on to its shorelines each year. Now that the new system is in place, overflows range between 1 and 10 per year.



Polluted Storm Water Runoff

Santa Monica Finds Health Risk Directly Related to Storm Drains

Storm drain outlets pollute more than two miles of Santa Monica's beaches. In the summer of 1995, more than 15,000 people were interviewed immediately after swimming near storm drains and again 9 to 14 days later. In the second interview, swimmers were asked whether they had any symptoms of illness such as fever, chills, eye discharge, earache, skin rash, vomiting, diarrhea, or sore throat.

During the study, researchers collected daily water samples at various distances from the drain outlets and analyzed the water for the presence of indicators of disease-causing pathogens. They found that people who swam directly in front of storm drain outlets had a higher incidence of symptoms than people who had been swimming 400 yards away.

Santa Monica is working to reduce the risk from its storm drains with street sweeping, catch basin cleaning, and other measures. The city has also established an outreach program to alert the public to the hazards of swimming near storm drain outlets.

In some cities in the United States, separate storm sewer systems collect and transport rainwater and snowmelt to treatment facilities before releasing it into a river, stream, or bay. When storm water sewers are overloaded they discharge directly into these waters. Rainwater also flows to our beaches after running off lawns, farms, streets, construction sites, and other urban areas picking up animal waste, fertilizer, pesticides, trash, gasoline, oil, and many other pollutants.

In an effort to reduce health risks associated with the discharge of untreated storm water into local waterways, EPA and representatives from State and municipal government health and environmental protection agencies have been working collectively to increase the capacity of storm water collection systems and reduce discharges of untreated storm water into surface waters.



The BEACH Program

Strengthening Beach Standards and Testing Programs

Strong health standards and testing programs, improved science, and informing the public are essential for protecting public health at beaches.

EPA is committed to helping the states and tribes protect public health at recreational beaches.

Ensuring state and tribal adoption of strong water quality standards for recreational waters is an essential part of this commitment. States and tribes set beach water quality standards, based on pollutant levels (“criteria”) developed by EPA. Local health officials then test their water to see if it meets the state standards. If tests show that pollutant levels are above the standard, then local agencies take appropriate action to inform beach goers through a swimming advisory or beach closure.

Unfortunately, not all states and tribes have adopted the latest criteria to protect public health at recreational beaches. EPA is working to ensure that those states and

tribes, that have not already done so, adopt the updated water quality criteria for Escherichia (E-coli) and/or enterococcus bacteria as part of their water quality standards. EPA is using its current authority, and a variety of tools including technical and programmatic assistance, to ensure appropriate criteria are adopted into all state and tribal water quality standards.

Monitoring and advisory programs detect pollution and provide timely warnings to the public. Under the BEACH Program, EPA will develop national guidance as a model to state and tribal governments for developing successful monitoring and advisory programs. EPA will also provide information and guidance for implementing local programs.

Current monitoring and advisory programs range from good to non-existent. Under the BEACH Program, EPA, in conjunction with participating agencies, is:

- *Providing technical guidance and training on new methods, sampling strategies and predictive models; and*
- *Sponsoring a national conference and other meetings to focus more scientific research on better detection tools and monitoring and advisory programs.*





Improving Science

Great Lakes Beach Closings Continue

In a comprehensive study on the Great Lakes beaches, EPA noted that 66 of the 276 beaches monitored in 1994 (24%) were closed or restricted at least once during the bathing season. During the fourteen years covered by the survey, the number of beach closures averaged between 40 to 60 per year. Closures were caused by pathogens, turbidity, combined sewer overflow discharges, debris, excessive algae, aesthetic degradation, or any other occurrence such as an accident or spill that was likely to be harmful to human health.

Through the coordinated efforts of all levels of government, the BEACH Program is working to improve the scientific foundation for beach testing by: providing faster laboratory test methods to predict pollution, and making new investments in public health and beach testing methods research. These new scientific tools will help give health and environmental officials the ability to provide early warning about the potential for public health risks caused by swimming in polluted water.

FASTER LABORATORY TEST METHODS

Timing, both in detecting and reporting potentially harmful microorganisms, is critical to protecting public health. Current laboratory tests take too long to determine whether beach water is polluted. EPA has, however, developed and is making available a new laboratory test method that gives accurate results in half the time than current methods allow. This new, improved laboratory test method for enterococci produces results in 24 hours rather than 48 hours required by the current method. Local officials who use this new laboratory test method will be able to reduce unnecessary exposure of the public to disease-causing pathogens by more promptly issuing warnings to beach goers.





PREDICTING POLLUTION

Although some local beach officials can predict beach pollution through the use of computer models or other information, most local officials must wait for test results before they can take action, potentially exposing the public to disease causing organisms. EPA is sponsoring research to develop and validate models that enable government officials to predict pollution before the public is exposed. These models will identify, in advance, when closure of a specific beach is necessary (to protect public health). Predictive models use data such as rainfall rate, duration of pollution, and historical severity of pollution to calculate potential adverse water quality conditions. They are an effective initial warning device that



local officials can use to alert beach goers of potential problems during and immediately following a rain storm.

Typically, pollutants washed into rivers, lakes, and streams eventually make their way to recreational

beaches. Local officials collect samples of water at downstream beaches and test them for the presence of contaminants.

However, people swimming during the time between sample collection and test results may be unnecessarily exposed to microbial pollutants at peak contamination times. Predictive models are intended to reduce such exposures. EPA has begun an evaluation of existing models and will begin collecting modeling data from new sites in 1998. Once complete EPA will provide copies of the models and training in their use.

Delaware Uses Predictive Models

The State of Delaware monitors approximately 50 miles of coastline and several inland ponds — checking bacteria levels, monitoring rainfall, and assessing other factors known to have an impact on water quality. Testing is done throughout the swimming season. By using a predictive model, they are able to make assumptions about the potential risk to swimmers following rainfall and other events, and can reliably predict where and when exposure to bathers is significant. Use of the model allowed the State to reduce the number of sampling sites and staff time, while expanding coverage of their public health protection program.



INVESTING IN HEALTH AND METHODS RESEARCH

As mentioned, current test methods cannot detect all disease-causing organisms or give us instantaneous results. To fill this gap, EPA has begun work on a multi-year research agenda. EPA in conjunction with the scientific community, will develop new and better ways to assess viral and bacterial contamination in recreational waters.

Specifically, the BEACH Program research agenda includes, among other things: development of methods that will identify the presence of eye, ear, nose, throat, and skin disease-causing agents in recreational waters; development of an easy to use “dipstick” indicator method that can be used by local officials, private citizens, or lifeguards to instantaneously identify the potential for fecal contamination; and epidemiological studies to validate new methods and establish relationships between diseases and the presence of microorganisms in the water.

Implementation of the research agenda has begun and will continue at least through the year 2001. Additional monitoring and assessment tools will be made available as they are completed.





Informing the Public

The BEACH Program is designed to improve public access to information about the quality of the water at their beaches and health risks associated with swimming in polluted water. As part of EPA's commitment to ensure the public right-to-know, EPA created an Internet website and additional written materials that explain the program. This will make it easier for everyone to find out about local beach water quality conditions, beach advisories, closures, and other pertinent information. In addition, EPA is in the process of gathering specific information on individual beaches. This information will be available for the first time by the summer of 1998 and will be updated annually.

EPA's new website on the Internet, called "Beach Watch," is an on-line directory of information about the water

quality at our nation's beaches, local protection programs, and other beach-related programs. The "Beach Watch" website is located on the Internet at <http://www.epa.gov/OST/beaches>. Beach closings and local contacts are listed by state where available. "Beach Watch" will be updated as new information becomes available.

Government agencies, tourism boards, environmental groups and others are encouraged to contact EPA about contributing health-related studies, reports, and appropriate questions and answers.

EPA's Brochure: "Before You Go to the Beach..."

EPA's brochure, "Before You Go to the Beach..." (EPA-820-K-97-001) describes what citizens should know or do before they go to the beach. The brochure and additional copies of this document are available free to the public. You can either download them from the "Beach Watch" website or contact EPA's National Center for Environmental Publications and Information (NCEPI) at 11029 Kenwood Road, Building 5, Cincinnati, OH 45242; FAX (513) 489-8695.





For More Information

For additional information on water quality at specific beaches, visit our website or call the city, county, or state health or natural resource protection agency listed in your local telephone book.

You may obtain additional copies of this document and our free brochure "Before You Go to the Beach..." (EPA-820-K-97-001) from our website, "Beach Watch" or

by contacting EPA's National Center for Environmental Publications and Information (NCEPI) at 11029 Kenwood Road, Building 5, Cincinnati, OH 45242; FAX (513) 489-8695.

Visit EPA's website, "Beach Watch," at <http://www.epa.gov/OST/beaches> for additional information on the BEACH Program.

You may also contact: U. S. Environmental Protection Agency Office of Water, Office of Science and Technology, 401 M St., S.W. (4301), Washington, D.C. 20460. E-mail: OWGENERAL@epamail.epa.gov In addition you may contact any of the following EPA BEACH program staff listed below.

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