

# Waterborne Pathogens in Michigan

## What is a pathogen?

Pathogens are organisms that cause disease. Waterborne pathogens are most commonly organisms such as bacteria, viruses or parasites found in feces of humans and animals. Waterborne pathogens may be found in drinking water, groundwater, rivers, lakes, streams, and oceans. There are several ways a person might be exposed to a waterborne pathogen:

- Drinking contaminated water
- Direct physical contact with the pathogen such as swimming in contaminated water at a beach
- Inhalation or breathing in a pathogen contained in water vapor

## What is an indicator?

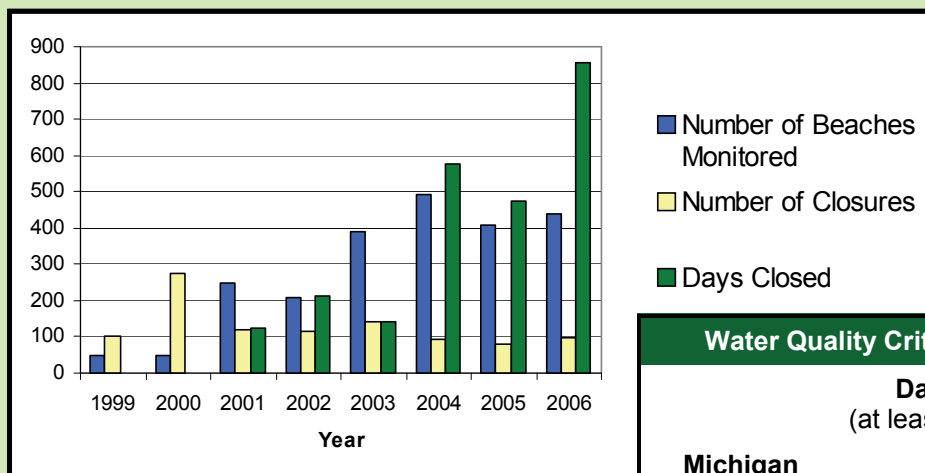
Because pathogens may be difficult or expensive to test for, scientists and governments often use indicator organisms for monitoring instead of actual pathogens. Indicators are organisms that are commonly found with pathogens. For example, *Escherichia coli* (*E. coli*) is a bacterium found in warm-blooded human and animal feces. Finding *E. coli* in water means that there is fecal contamination and therefore pathogens carried in feces may also be present.

## Are pathogens a problem in Michigan?

Although Michigan has not had a large waterborne disease outbreak recently, there have been reports of pathogen-contaminated beaches and drinking water wells.

## Beaches

In Michigan, a beach closure is posted when the daily geometric mean of at least three samples is above 300 colony forming units (CFU) of *E. coli*/100 mL water and when the monthly geometric mean of at least 5 sampling events is above 130 CFU *E. coli*/ 100 mL. Michigan water quality criteria for recreational beaches are slightly different from the EPA's criteria but they are still below the EPA's acceptable risk level of 1% (10 people per 1000 getting sick).



In 2006, there were 110 beach closures and advisories in Michigan.

Water Quality Criteria for Recreational Beaches		
	Daily Mean (at least 3 samples)	Monthly Mean (at least 5 samples)
Michigan	300	130
EPA	-	126

## Drinking Water Wells

The 2005 Michigan Department of Environmental Quality Annual Compliance Report provides information on the status of drinking water wells in Michigan:

- **Small Community Wells:** 2 community wells had acute violations of *E. coli* and 56 wells had total coliform level violations. The term 'total coliform' refers to a group of bacteria that normally live in the intestines of mammals; this group also is used as an indicator of fecal contamination.
- **Noncommunity wells:** 12 *E. coli* and 284 total coliform violations.
- **Private wells:** The Michigan Department of Environmental Quality (MDEQ) does not track private well samples, but has queried lab results periodically for violations. For example, between October 1999 and September 2000, 22,192 samples were taken from private wells. 28% of those samples tested positive for total coliform and 1% were positive for *E. coli*.

## Water Testing

If you are interested in having your water tested, contact your local health department. Find your local health department at [http://www.deq.state.mi.us/beach/public/search\\_hd.aspx](http://www.deq.state.mi.us/beach/public/search_hd.aspx)

## For More Information

**Michigan Department of Environmental Quality Beach (MDEQ) Monitoring Annual Report Year 2006.**

[http://www.michigan.gov/documents/deq/wb-beach-2006annualreport\\_220473\\_7.pdf](http://www.michigan.gov/documents/deq/wb-beach-2006annualreport_220473_7.pdf)

### MDEQ Beaches Website

<http://www.deq.state.mi.us/beach/public/default.aspx>

### Great Lakes Beach Association

<http://www.great-lakes.net/glba/>

### MDEQ Drinking Water Site

[http://www.michigan.gov/deq/0,1607,7-135-3313\\_3675---,00.html](http://www.michigan.gov/deq/0,1607,7-135-3313_3675---,00.html)

### EPA Drinking Water in Michigan Site

<http://www.epa.gov/safewater/dwinfo/mi.htm>

### MSU Center for Water Sciences Pathogen Workshop Site

[http://www.cws.msu.edu/pathogen\\_wkshop.htm](http://www.cws.msu.edu/pathogen_wkshop.htm)



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