

Illnesses caused by recreation on the water costs \$2.9 billion annually in the US

9 January 2018

Swimming, paddling, boating and fishing account for more than 90 million cases of gastrointestinal, respiratory, ear, eye and skin-related illnesses per year in the U.S. with an estimated annual cost of \$2.9 billion, according to a new report by University of Illinois at Chicago researchers.

This is the first time the cost associated with waterborne illnesses contracted during [recreational activities](#) in the U.S. has ever been calculated. The study, published in the journal *Environmental Health*, focused on illnesses that result from participating in recreational activities on or in natural bodies of water including lakes, rivers and beaches. It did not take into account illness acquired through the use of swimming pools or water parks.

"The [costs](#) associated with these illnesses helps us put into perspective the costs of projects that aim to help make our recreational waterways cleaner and safer," said Dr. Samuel Dorevitch, associate professor of environmental and occupational health sciences in the UIC School of Public Health and an author of the paper. "The costs of beach monitoring and notification programs over the summer months are known. But until now, we haven't known the cost associated with illness acquired through recreation on natural waters. This information should help policymakers put the costs of water quality monitoring and water quality improvement projects into context."

Dorevitch cautions that people shouldn't panic about hitting the beach. "At 90 million illnesses out of an estimated 4 billion total water recreation events annually in the U.S., the number of people who get sick is around 2 percent," he said. "However, it's not easy to identify the number of illnesses that result from water recreation. If somebody gets sick a couple days after swimming and visits their doctor, the root cause of the illness - bacteria or viruses in the water - may not be recognized or investigated."

For the study, Dorevitch and colleagues estimated the number of recreational waterborne illnesses using data from two large epidemiological studies as well as reports of water-borne disease outbreaks from the Centers for Disease Control and Prevention, or CDC.

The National Environmental and Epidemiological Assessment of Recreational Water, or NEEAR, and the Chicago Health, Environmental Exposure, and Recreation Study, or CHEERS, estimated non-outbreak or sporadic waterborne illnesses caused by contact with water during recreational activities. NEEAR evaluated health outcomes among approximately 26,000 beachgoers at freshwater and marine beaches in six states between 2003 and 2009. CHEERS evaluated health outcomes among approximately 11,000 recreators at 39 spots in Chicago between 2007 and 2009.

These two studies were used to calculate rates of mild or moderate illness caused by contact with water during recreation. Mild illness was defined as not having contact with a health care provider, but perhaps taking an over-the-counter medication. Moderate illness resulted in a visit to a doctor's office or an emergency department. Illnesses described were most commonly gastrointestinal or respiratory in nature, or involved the eyes, ears or skin.

To estimate the number of severe illnesses which resulted in either hospitalization or death, the researchers turned to the Waterborne Disease and Outbreak Surveillance System, which is maintained by the CDC. They looked at outbreaks that occurred between 2001 and 2010.

Based on the data they collected, the researchers estimated that of the 50 million sporadic, non-outbreak related cases of [gastrointestinal illness](#), 29 million were attributable to swimming and 16.5 million were attributable to fishing. Approximately 10 million cases each of respiratory, eye, ear and

skin illnesses were also attributable to water-based recreational activities.

Adults aged 20 to 54 were the most likely to experience [mild illness](#), while children aged 0 to 10 years old experienced the majority of moderate illnesses. An estimated 333 to 1,696 hospitalizations and 16 to 67 deaths occur annually due to recreational waterborne illness.

Data from NEEAR and CHEERS showed that among people who developed a gastrointestinal illness, 50 percent took over-the-counter medications, 40 percent stayed home from work or school, about 20 percent visited a doctor's office, 10 percent took prescription medications and 1 percent necessitated an emergency room visit.

Next, the researchers estimated the cost of prescription and over-the-counter medications, time off work, visits to doctor offices and emergency departments and hospitalizations associated with the number of mild, moderate and severe cases of illness they determined were caused by recreation on natural bodies of water.

The cost of illness per case ranged from \$9.50 for those with mild illness to \$303,000 for the most severe illnesses.

"To date, approximately \$140 million has been allocated for beach-water protection programs since 2001, or about \$10 million annually, a small fraction of annual estimated illness burden," said Dorevitch. "Efforts to reduce severity of [illness](#) among [water](#) recreators should be explored to reduce total economic burden while encouraging more individuals to enjoy safe surface [water recreation](#)."

More information: Stephanie DeFlorio-Barker et al, Estimate of incidence and cost of recreational waterborne illness on United States surface waters, *Environmental Health* (2018). [DOI: 10.1186/s12940-017-0347-9](#)

Provided by University of Illinois at Chicago
APA citation: Illnesses caused by recreation on the water costs \$2.9 billion annually in the US (2018,

January 9) retrieved 22 November 2019 from <https://medicalxpress.com/news/2018-01-illnesses-recreation-billion-annually.html>

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