

Heavy spring rainfall is followed by spikes in gastrointestinal illness in Philadelphia

March 17 2020



Credit: CC0 Public Domain

Heavy spring rainfall in Philadelphia may lead to twice the rate of acute gastrointestinal illness (AGI), such as diarrhea or vomiting, throughout the city, reports a three-year study recently published in *PLOS One* from

researchers at Drexel University's Dornsife School of Public Health.

According to the modeled study data from 2015-2017, the increased rate of illness started a week after a heavy rainfall event and persisted for 28 days. At its peak, the number of daily cases was more than double the average number seen during times of no [precipitation](#).

The authors found this statistically significant association during spring months. They speculate that the rise in AGI may be caused by higher-than-normal concentrations of bacteria and other pathogens in the water due to overflowing sewers or surface runoff into rivers.

As part of the research, the team gathered daily precipitation measurements taken at the Philadelphia International Airport (from the National Oceanic and Atmospheric Administration), as well as precipitation modeled to watershed boundaries that serve Philadelphia's drinking water supplies (from the NOAA Climate Prediction Center). They defined a "heavy precipitation event" as an instance of daily precipitation with an amount higher than on 95% of the days during the three-year study period. The researchers also tracked patients' chief complaint upon admittance to local emergency departments, and classified AGI as a chief complaint of "vomiting" or "diarrhea." The daily number of Philadelphia AGI cases during the study ranged from 48 to 235, with a median of 102.

"Philadelphia is a city of concern for these types of health impacts because of [weather patterns](#) and the way the infrastructure of our city and other cities in the region is built," said lead author Anneclaire De Roos, Ph.D., an associate professor in the Dornsife School of Public Health. "Combined sewer systems that lead to sewage overflows into local rivers and extensive urban development that can't absorb rainfall are a dangerous combination for public health. Although we don't know the cause of the association we found, it would be prudent for

Philadelphians to avoid contact with stormwater and local river waters after heavy rains."

The authors speculate that heavy precipitation brings pathogens, such as *Cryptosporidium*—a bacterium commonly found in fecal matter that is a known cause of waterborne gastroenteritis—into stormwater runoff and local water supplies. They posit that exposure may occur either by direct contact with contaminated stormwater or through contamination of drinking water supplies.

Philadelphians' drinking water begins in the Delaware or Schuylkill Rivers. It is processed by the Philadelphia Water Department before traveling to the tap. The highest increases in AGI were seen with heavy rainfall that fell within the local watersheds that serve the water supply—precipitation that would run off into the Delaware and Schuylkill Rivers. A significant uptick was also found with heavy rainfall measured at the airport.

"Global climate change has led to increasingly severe weather events and heavier [rainfall](#) in the northeastern United States," said senior author Jerald Fagliano, Ph.D., an associate clinical professor and chair in the Dornsife School of Public Health. "These findings indicate that investments made by cities like Philadelphia to manage stormwater better and protect the watershed are important for ensuring safe drinking [water](#) in our changing climate."

The authors note that next steps in the research should aim to confirm how the AGI-causing exposure occurs and to pinpoint specific pathogens.

More information: Anneclaire J. De Roos et al. Heavy precipitation, drinking water source, and acute gastrointestinal illness in Philadelphia, 2015-2017, *PLOS ONE* (2020). [DOI: 10.1371/journal.pone.0229258](https://doi.org/10.1371/journal.pone.0229258)

Provided by Drexel University

Citation: Heavy spring rainfall is followed by spikes in gastrointestinal illness in Philadelphia (2020, March 17) retrieved 26 April 2024 from <https://medicalxpress.com/news/2020-03-heavy-rainfall-spikes-gastrointestinal-illness.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.