

# Proactive surveillance and alert systems can mitigate rain-related disease risks

## Key Message

Pathogen tracking and public communication strategies modeled after heat wave warning systems can educate the public about local risks and inform targeted boil-water advisories.

Sewage overflows do not necessarily represent disease risk. Disease risk stems from toxicity and exposure. Toxicity without exposure equates with zero risk, as does exposure without toxicity.

Overflows into lakes and rivers represent toxicity but not necessarily human exposure. Recreational or occupational exposure may result, but most drinking water treatment plants provide adequate protection that kills pathogens drawn from surface water.

Our public water distribution systems, however, remain vulnerable to contamination, especially when water mains break.

Even good treatment systems are not immune when stormwater changes the game. The 1993 *Cryptosporidium* outbreak that made almost a half-million people sick followed heavy rains. Stormwater may have transported the cysts responsible.

Finding viruses in well water and tap water served by non-disinfected systems also represents a clear and present threat to public health currently flying below the radar. This known vulnerability has not yet resulted in a major outbreak but it could.

Rain is likely to exacerbate this risk because stormwater can contaminate groundwater aquifers with pathogens transported from the surface or leaking sanitary sewers. Pathogen virulence then determines the severity of the health impact in exposed populations. Eliminating public exposure to it through disinfection would reduce the risk to near zero.

**1 in 10,000**

Acceptable level of microbial illness (infections/people/year) related to drinking water. —U.S. EPA

## Policy Recommendation

Develop consistent rain-related disease warning messaging for health departments to issue to local media.

## Better Surveillance & Public Education

Better pathogen surveillance can inform infrastructure improvement priorities and identify local waterborne disease risks.

Disease-causing viruses are found in association with human fecal bacteria. EPA considers *E. coli* an indicator of human health risk—but some bacteria are much better indicators of human fecal matter than others. *E. coli* is not the best indicator, because it is also found in animal waste and in the environment. Scientists have identified other bacteria found in human waste but not other sources. Testing for these bacteria at stormwater outfalls and in waterways represents a better tool to pinpoint problem spots.

The Milwaukee Metropolitan Sewerage District has partnered with Milwaukee Riverkeeper and the University of Wisconsin-Milwaukee to track human fecal bacteria in rivers receiving stormwater. This partnership is an example that could be emulated throughout the state to begin to identify vulnerabilities in our state's sewer networks that pose human health risks. Fecal contamination should not appear in stormwater pipes, but evidence shows that it does.

This evidence allows managers to track problem “sewersheds” or portions of the sewer network that flow into specific stormwater outfalls. These can be explored for cross-connections with sanitary sewers, leaky laterals, or inflow and infiltration responsible for contamination.

Knowledge about problem locations is vital. It enables targeted efforts to advise affected residents to boil water or avoid contaminated surface water.

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