

Improving sewer infrastructure should reduce rain-related disease risk

Critical need to identify greatest infrastructural and geographic vulnerabilities

Key Message

Impending hydrological changes in Wisconsin due to climate change combined with vulnerabilities due to failing infrastructure pose a public health threat, with increasingly extreme precipitation and leaky pipes promoting waterborne diseases that hit children hardest.

More than half of the documented waterborne disease outbreaks in the United States have followed heavy storms.

Acute diarrhea is responsible for 10% of all U.S. hospital admissions, the death of 300 American children, and \$1 billion in costs to society per year.

Contaminated drinking water is responsible for between 6% and 40% of diarrhea-related illness.

In Wisconsin, climate change is expected to drive increased precipitation overall as well as more frequent and more intense storms.

We can reasonably expect that more precipitation and extreme weather will place greater stress on aging sewer and water infrastructure. This will lead to a greater risk of rain- and runoff-related disease.

Compromised Pipes Facilitate Pathogen Transport

Even under non-extreme conditions, our conveyance systems are vulnerable to the waterborne transport of the viruses that cause diarrhea. Extreme weather events will exacerbate this problem.

Sewer pipes are not supposed to connect with water pipes, but robust evidence suggests that they often do, though we lack comprehensive knowledge of where.

Viruses from human fecal matter flushed down our

Policy Recommendation

A statewide inventory of sewer and water infrastructure vulnerabilities should help prioritize capital improvements and alert communities to local health risks.

toilets migrate into surface waterways, groundwater that supplies drinking water, and directly into public water distribution pipes when system pressure drops.

Health Risks Unquantified but Increasing

The human health risk posed by waterborne disease in Wisconsin has only begun to be quantified.

Our understanding is incomplete because much diarrhea goes unreported; few large-scale epidemiological studies have been done; and we lack a comprehensive understanding of where our failing infrastructure (leaky pipes) intersects with geographic, hydrological, and demographic vulnerabilities.

Even if the climate predictions prove wrong, we still expect rain-related disease risk to increase.

Children under age five are at greatest risk because they have not yet acquired immunity to diarrhea-causing viruses.

The immunocompromised are also at risk.

Unless our disintegrating sewer and water infrastructure is repaired, patching the systemic vulnerabilities to rain-related disease, the health of our most vulnerable will remain at risk.

This risk is highest for small communities that do not disinfect drinking water systems and large, aging distribution systems with many vulnerabilities.

Diarrhea's Impact on American Society

10% of hospital admissions

300 children's deaths

\$1 billion annual costs to society

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This work was partially funded by the Centers for Disease Control and Prevention (CDC) Cooperative Agreement Numbers 1U17EH001043-02, 5U01EH000428-03, and 5U38EH000951-02.

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