

Kids most vulnerable to rain-related disease

Acute gastrointestinal illness (diarrhea) is rain-related disease of greatest concern for both urban and rural kids

Key Message

Children under age 5 are most vulnerable to acute diarrhea and its complication of severe dehydration. The viruses that cause diarrhea are routinely found in groundwater and migrate into public water distribution systems even after treatment.

Rainfall Precedes Waterborne Illness in Kids

Recent studies reveal significant associations between rain and children's diarrhea that underscore the vulnerability of our aging infrastructure to the spread of disease.

A review of Wisconsin hospital admissions reveals an 11% increase in acute gastrointestinal illness in children four days after rainfall. The timing of this signal (onset two to three days prior to hospital visits) suggests waterborne transmission of diarrhea-causing viruses. The number of hospital visits likely underreports the true incidence of disease.

Only one of eight sewage overflows was associated with children's diarrhea in this study, and it occurred during the winter. Rain, however, was significantly associated with increased hospital visits for children suffering from diarrhea.

Risk Not Just from Surface or Sewage Overflows

Impacted children lived in communities served by surface water, but groundwater is not immune.

Diarrhea-causing viruses are routinely found in groundwater and groundwater wells throughout Wisconsin. Viruses are more commonly the cause of diarrhea in children than other pathogens.

One study revealed that well water was more associated with increased diarrhea than surface water.

Another linked children's diarrhea with how many

Policy Recommendation

Public well water should be disinfected to reduce the risk of waterborne disease.

septic tanks were near their residences.

Most recently, researchers found solid evidence linking precipitation to virus prevalence in groundwater. Viruses from human sewage showed up in deep groundwater serving Madison, Wisconsin. Virus levels were correlated with recent rain: when it rained, more viruses showed up in groundwater wells.

Local—Not Just Global—Cause for Concern

Waterborne disease is a global killer, especially where sanitation is poor. Outbreaks have also been associated with extreme precipitation nationwide.

Outbreaks struck during the same month as storms when they were caused by contaminated surface water, but two months later when caused by contaminated groundwater, according to analysis of almost a half century of data. This lag time supports the causal connection between rainfall and disease because it takes longer for contaminated surface runoff to reach groundwater than surface waters.

Diarrhea is seasonal in Wisconsin, spiking each winter. The rotavirus vaccine, released in 2006, has helped to lower this spike nationwide. But local research suggests waterborne viruses remain a persistent cause of diarrhea.

Tourists abroad wisely order drinks without ice to reduce the risk of contracting traveler's diarrhea. Requiring well water disinfection is the same kind of precaution. It reduces the risk of rain-related disease for the most vulnerable among us—our children.

U.S. Gastroenteritis (Acute Diarrhea)

1.5 million health care visits per year

200,000 hospitalizations per year

12% of cases are waterborne

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Quick Stats: Elliot 2007; Gorelick et al. 2011.