

Long-term epidemiological studies needed to better assess rain-related disease risks

Sharing clinical data should give researchers a better sense of endemic and acute waterborne disease incidence

Key Message

We are beginning to glimpse the tip of the iceberg of rain-related disease, but its true incidence and costs to society are not yet fully quantified.

The true incidence of waterborne disease in the United States is likely underestimated.

Current Epidemiological Data Sound, But Coarse

We know that rain transports pathogens, but scientists have taken a conservative approach in characterizing the extent of diarrhea related to rain.

This caution means we are not overstating relationships, but the downside is that we do not yet know how much we may be understating them.

In Wisconsin, an increased incidence in acute diarrhea in children visiting the emergency room has been statistically documented following rainfall.

We expect that children's ER visits represent just the tip of the rain-related disease iceberg.

Other children are likely getting sick but do not receive any medical treatment; others may go to the family physician or a clinic. We also expect that a low level of waterborne disease is always impacting adults.

Recommended Further Research

Much of the data needed to generate a better picture of rain-related disease exist but researchers lack access. Expanding our data sets to include clinics and primary care physicians would grant a better view of waterborne acute gastrointestinal illness incidence.

Based on the studies so far, we lack the demographic and geographic precision to specify causal relationships. We also have not replicated similar ER studies statewide, or conducted case studies that more

We suspect the actual incidence of rain-related disease among the Wisconsin public is much higher than estimated.

Policy Recommendation

Research accessing broader data sets is needed to clarify the relationships between rainfall and waterborne disease.

closely track and control for specific groups.

The technological infrastructure exists to discern meaning from such data, should it be made available to teams of interdisciplinary researchers. Wisconsin's Public Health Information Network (WI-PHIN) and Geographic Information Systems (GIS) maps are two tools that could triangulate the relationships between rainfall, hydrology, infrastructure integrity, and risk of acute gastrointestinal illness.

Increased reporting is also necessary.

State law requires waterborne outbreaks to be submitted to the Wisconsin Electronic Disease Surveillance System (WEDSS). Two non-viral gastrointestinal diseases, Giardiasis and Cryptosporidiosis, must be reported. Viral diarrhea, however, which is more widespread, is not reported. Thus we may not see the extent of waterborne disease incidence because we are not looking for it.

Toward Quantifying Societal Costs of Disease

If we consider waterborne disease a negative economic externality of failing infrastructure, it could be measured in health care costs and lost productivity.

We have not begun to quantify the true societal costs of that externality. We lack a solid upper bracket of disease incidence to inform a cost-benefit analysis that would help reveal the true value to society of upgrading our underground infrastructure.

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Based on the work of Jonathan Patz, UW-Madison; Henry Anderson, DPH; Kristen Malecki, UW-Madison; Mark Werner, DHS; Sandra McLellan, UW-Milwaukee; Megan Christenson, DHS; Mark Borchardt, USDA; Steve Vavrus, UW-Madison; Steven R. Corsi, USGS; Marc Gorelick, MCW; Ron Gangnon, UW-Madison; Jiale Xu, UW-Madison.

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Authored by Michael Timm

Supervised by Jenny Kehl

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Contact: Center for Water Policy, thiela@uwm.edu