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Children's Environmental Health Research Findings  
January 2014

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Topic: Rainfall and diarrhea

Title: Heavy Rainfall Events and Diarrhea Incidence: The Role of Social and Environmental Factors.

Conclusion: Heavy rainfall events appear to affect diarrhea incidence through contamination of drinking water.

Authors: Carlton EJ, Eisenberg JN, Goldstick J, Cevallos W, Trostle J, Levy K.

Citation: Am J Epidemiol. 2013 Nov 19.

Abstract: The impact of heavy rainfall events on waterborne diarrheal diseases is uncertain. We conducted weekly, active surveillance for diarrhea in 19 villages in Ecuador from February 2004 to April 2007 in order to evaluate whether biophysical and social factors modify vulnerability to heavy rainfall events. A heavy rainfall event was defined as 24-hour rainfall exceeding the 90th percentile value (56 mm) in a given 7-day period within the study period. Mixed-effects Poisson regression was used to test the hypothesis that rainfall in the prior 8 weeks, water and sanitation conditions, and social cohesion modified the relationship between heavy rainfall events and diarrhea incidence. Heavy rainfall events were associated with increased diarrhea incidence following dry periods (incidence rate ratio = 1.39, 95% confidence interval: 1.03, 1.87) and decreased diarrhea incidence following wet periods (incidence rate ratio = 0.74, 95% confidence interval: 0.59, 0.92). Drinking water treatment reduced the deleterious impacts of heavy rainfall events following dry periods. Sanitation, hygiene, and social cohesion did not modify the relationship between heavy rainfall events and diarrhea. Heavy rainfall events appear to affect diarrhea incidence through contamination of drinking water, and they present the greatest health risks following periods of low rainfall. Interventions designed to increase drinking water treatment may reduce climate vulnerability.

Keywords: climate, diarrhea, heavy rainfall events, water treatment