

Scientists discover complex connections between social dynamics and diseases

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Scientists discover connections between crowds at events, spread of disease.
Credit: Mauricio Ayovi

Large gatherings—from music festivals to religious pilgrimages to sporting events—have long been known to increase risks of infectious disease outbreaks. Now results from an NSF-funded study led by UC Berkeley researchers associate even small-scale community gatherings with increased transmission of diarrheal diseases. The results are published in the *American Journal of Epidemiology*.

Gatherings at events can create environmental and social conditions that facilitate the spread of pathogens by increasing crowding and contact rates, overextending sanitation and hygiene resources, and encouraging risky behaviors.

"This study shows that disease transmission is a balance between increased [risk factors](#) and the resources available to provide facilities for sanitation, safe food preparation and [safe water](#)," says Tom Torgersen, a program director in NSF's Division of Earth Sciences, which funded the research. "The knowledge is applicable to many diseases."

Using a set of statistical time-series models incorporating environmental, ethnographic and health data, the study found that mass gatherings near Esmeraldas, Ecuador, were associated with an average 21 percent increase in disease incidence in host villages two weeks following an event. When considering only the set of gatherings for which [ethnographic research](#) found substantial inbound travel, the excess risk jumped to 51 percent.

Diarrheal diseases lead to about two million deaths each year, mostly among children. Prevention is a priority target for improving global public health. "Our research shows that certain social and cultural events are predictable foci of endemic disease transmission," said Justin Remais, Head of Environmental Health Sciences at the UC Berkeley School of Public Health, and principal investigator of the study. "We now have an opportunity to target specific events to prevent this disease transmission."

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