Searching the web for dengue

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Researchers at Children's Hospital Boston and Google.org have found web-based search data to be a viable source of information for early detection and monitoring of outbreaks of dengue, an emerging mosquito-borne virus found in tropical areas of the world. Because search data allows the capture of disease-related queries in near real time, it could help public health officials in the more than 100 countries affected by dengue respond more quickly to nascent epidemics.

A team from the Children's Hospital Informatics Program (CHIP), led by John Brownstein, PhD, together with collaborators at Google, published these findings today in the journal *PLoS Neglected* Tropical Diseases. An online tool developed by the researchers based on the findings is now available at www.google.org/denguetrends.

The team's work on the dengue tool – which tracks epidemics of dengue using web search results provided by Google – shows that, when compared against available national surveillance data, web-based search data is a viable, rapid source of information for early detection and monitoring of dengue outbreaks.

"By using search data, we're tapping into a freely-available, instant dataset that can be gathered, analyzed, and released much more quickly and at much lower effort and cost than through traditional national surveillance and reporting programs," said Brownstein, director of the Computational Epidemiology Group in CHIP and co-developer of the HealthMap and related DengueMap global disease surveillance systems. "The kind of information the tool provides can help direct public health

[officials](#) target interventions aimed at mosquito control and disease prevention, such as education campaigns, as early as possible.

"This information can act as a supplement to traditional surveillance and reporting systems and give local authorities a leg up on an outbreak," he said.

Dengue is endemic to countries in Asia, Africa, the Pacific, and the Americas. A relatively recent disease in humans – it only entered our species in the last 100 to 800 years – it infects about 500 million people every year; 55 percent of the global population is currently at risk of dengue infection.

"Dengue affects large numbers of people," continued Brownstein, "but because it is endemic in many countries, it is not a disease where search data would be affected by panic-induced searching or a lot of 'noise.'"

The research team selected Bolivia, Brazil, India, Indonesia, and Singapore as the basis for their study because each has a sufficient level of endemic dengue transmission to provide baseline data, a large base of Internet users, and national data collected via passive reporting or sentinel site surveillance against which to assess the tool.

The dengue tool follows the methodology of Google Flu Trends, an application developed by Google and the US Centers for Disease Control and Prevention that mines web search data for patterns that can help public health officials get an early jump on seasonal flu epidemics.

Provided by Children's Hospital Boston