Pakistan reins in "breakbone fever"

Surveillance systems and fumigation algorithms aren't always held out to be the most effective response to infectious disease epidemics. But if Pakistan's recent experience with dengue fever is any indication, perhaps they should be.

After a catastrophic countrywide epidemic of dengue claimed hundreds of lives and affected thousands of others in 2011, Pakistan fought back with an aggressive preventive approach that included widespread fumigation and a substantially bolstered surveillance system.

As a consequence, there was a drastic reduction in the incidence of dengue fever in 2012 and officials are hoping to use the strategy to stave off similar epidemics in the future.

Caused by the dengue virus, transmitted by mosquitoes and more colloquially dubbed "breakbone fever," the infectious tropical disease known as dengue fever typically presents with such symptoms as fever, headache, joint pain and a skin rash. In severe cases, it results in life-threatening bleeding and extremely low blood pressure, leading to dengue shock syndrome. It is typically treated through rehydration, or in more severe cases, blood transfusion. It is often associated with inadequate hygienic and sanitary conditions.

A 2010 epidemic affected 5000 people in Pakistan, resulting in 31 deaths, primarily in the province of Sindh. A 2011 outbreak resulted in 352 deaths in Lahore, the capital of the Punjab province, alone. But by 2012, the number of identified cases, nationwide, was trimmed to 234, with no casualties.

How was that achieved and what lessons can be learned therein?

First of all, it's important to have an understanding of the conditions that lead to outbreaks.

The 2010 and 2011 outbreaks were a function of "environmental conditions conducive to growth and proliferation of vector and lack of awareness of masses about causes/factors leading to spread of dengue," says Dr. Iqbal Memon, professor of pediatrics at the Dow University of Health Sciences in Karachi and president of the Pakistan Pediatric Association Centre.

As well, the outbreaks may have been a function of the specific serologically distinct dengue viruses (particularly

A crucial component in the fight against mosquito-transmitted dengue fever in Pakistan has been quickly organized fumigation campaigns in high-risk areas.

DEN-2 and DEN-3), says Dr. Firdous Jahan, associate professor of family medicine at the Oman Medical College in the Sultanate of Oman.

The decline in the number of reported cases, though, is the outcome of a stringent surveillance system set up by the government and the use of novel technological measures for early detection of the epidemic, Memon says.

"Improved surveillance, awareness to physicians and public, as well as fumigation in affected cities were the steps that led to control of the disease," he adds.

The surveillance system monitored dengue-related hospitalizations and quickly responded with fumigation campaigns in high-risk areas, as well as rapid warnings to local communities. To that end, the World Health Organization (WHO), in collaboration with local associations, organized capacity building workshops to prepare health care workers on appropriate responses to potential outbreaks, including enhanced social mobilization.

To promote awareness, dengue was included in the DEWS (Disease Early Warning System) and WHO released a weekly epidemiological bulletin on its incidence.

Substantial improvements were demonstrated through time. The data show that DEWS alerts declined from 785 in 2011 to 171 in 2012. In the last week of 2012, not a single outbreak was reported.

Among the tools that proved useful was the utilization of trends reported through Google Flu, using an algorithm developed by a team of researchers at the Lahore University of Managing Sciences (www.ncbi.nlm.nih.gov/pmc/articles/PMC3510767/).

The system tracked data obtained from smartphones utilized by government employees. Using that data, researchers were able to identify areas in which an outbreak was more likely and subsequently respond with preventive measures, such as sending in teams to destroy mosquito larvae, to fumigate certain areas or provide clean water.

Such surveillance is an effective means of halting dengue outbreaks in resource-limited nations, and could be a model for responses to other infectious diseases, says Dr. Fahad Pervais, lead author of the flu breaks study and teaching assistant at the Lahore University of Medical Sciences.

Countries that don't have a comprehensive body to oversee disease outbreaks, such as a centre for disease control and prevention, have to look at developing such novel algorithms, Pervais adds.

With recent dengue outbreaks in Sri Lanka and India, there is a need for all nations, including Pakistan, to maintain their vigilance, Pervais adds. — Haris Riaz MBBS, Karachi, Pakistan

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