

NASA technology helps predict and prevent future pandemic outbreaks

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With the help of 14 satellites currently in orbit and the National Aeronautics and Space Administration's (NASA) Applied Sciences Program, scientists have been able to observe the Earth's environment to help predict and prevent infectious disease outbreaks around the world. The use of remote sensing technology aids specialists in predicting the outbreak of some of the most common and deadly infectious diseases today such as Ebola, West Nile virus and Rift Valley Fever.

The ability of infectious diseases to thrive depends on changes in the Earth's environment such as the climate, precipitation and vegetation of an area.

Through orbiting satellites, data is collected daily to monitor environmental changes. That information is then passed on to agencies such as the Centers for Disease Control and Prevention and the Department of Defense who then apply the data to predict and track disease outbreaks and assist in making public health policy decisions.

“The use of this technology is not only essential for the future of curbing the spread of infectious diseases,” explains John Haynes, public health program manager for the NASA Earth Science Applied Sciences Program. “NASA satellites are also a cost-effective method for operational agencies since they are already in orbit and in use by scientists to collect data about the Earth's atmosphere.”

Remote sensing technology not only helps monitor infectious disease

outbreaks in highly affected areas, but also provides information about possible plague-carrying vectors -- such as insects or rodents -- globally and within the U.S. The Four Corners region, which includes Colorado, New Mexico, Arizona, and Utah, is a highly susceptible area for plague and Hanta virus outbreaks, and by understanding the mixture of vegetation, rainfall and slope of the area, scientists can predict the food supply of disease transmitting vectors within the region and the threat they cause to humans. Because plague is also considered a bioterrorism agent, NASA surveillance systems enable scientists to decipher if an outbreak was caused by natural circumstances or was an act of bioterrorism.

A particular infectious disease being targeted by NASA is malaria, which affects 300-500 million persons worldwide, leaving 40 percent of the world at risk of infection. The Malaria Modeling and Surveillance Project utilizing NASA satellite technology is currently in use by the Armed Forces Research Institute of Medical Sciences in Thailand and the U.S. Naval Medical Research Unit located in Indonesia.

Data collected at these locations is combined and used to monitor environmental characteristics that effect malaria transmission in Southeast Asia and other tropical and subtropical regions. Malaria surveillance provides public health organizations with increased warning time to respond to outbreaks and assistance in the preparation and utilization of pesticides, which leads to a reduction in drug resistant strains of malaria and damage to the environment.

“NASA satellite remote sensing technology has been an important tool in the last few years to not only provide scientists with the data needed to respond to epidemic threats quickly, but to also help predict the future of infectious diseases in areas where diseases were never a main concern,” says Mr. Haynes. “Changing environments due to global warming have the ability to change environmental habitats so drastically

that diseases such as malaria may become common in areas that have never been previously at-risk.”

Source: American Society of Tropical Medicine and Hygiene

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