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January 23, 2007

IU team has pulse on pandemic preparation

By **Chuck Bowen**
 Star correspondent

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Bird flu has not been in the news much lately, but the possibility of the virus sparking a human pandemic is a very real concern.



Zoom

Essential strategies: Research associate Vittoria Colizza (left) and informatics professor Alessandro Vespignani are Indiana University researchers focused on developing a model to predetermine effects of a pandemic on the Midwest. - Gary Moore / The Star

Practical tips on avoiding the flu

Dr. Virginia A. Caine, director of the Marion County Health Department and an assistant professor of medicine in the department of infectious diseases at Indiana University, said the best way to keep yourself and your employees healthy may be a little painful:

- Get your flu shot. "(That's) the biggest thing, the number one thing," Caine said.
- Teach your employees how to keep the virus from spreading by washing hands regularly or using alcohol-based hand sanitizer.

Caine said keeping the virus from spreading is simple:

- Cough into your sleeve, not your hands.
- Wash your hands often.
- Disinfect objects that are often in use, such as doorknobs, countertops, computer keyboards and copiers.

-- **Chuck Bowen**

A team of researchers at Indiana University has developed a mathematical model that can predict the spread and severity of a worldwide flu outbreak safety officials a leg up on where to dedicate their resources.

Their report, published today in the journal PLoS Medicine, describes several scenarios of flu virus pandemics and how best to contain them.

Alessandro Vespignani, a senior researcher on the study, and his peers collected data in kitchen-sink detail on more than 3,000 urban centers around the globe.

They focused on passenger-flow data from the International Air Transport Association, which tracks nearly all air travel around the globe -- and crowded hospital beds -- before feeding the information into a supercomputer at IU's Bloomington campus.

After a lot of computing, "essentially what you get is a synthetic pandemic," said Vespignani, a professor of physics and informatics at IU.

The team spent a year and a half on the model, and once it was able to predict how people -- and a disease -- were spreading, researchers began to test the model.

The H5N1 avian flu hasn't yet resulted in a pandemic because the virus still lacks the ability to spread efficiently or to be sustainable among humans.

Here's a scenario the IU model predicts if that did occur:

A flu virus originating, for instance, in Hanoi, Vietnam, with a reproductive number of 1.1 -- which is a measure of how many people are infected by one person -- poses only a mild global threat. Raise that variable to 1.5, however, and the flu potentially could infect half the population in more than a week without quick intervention.

Researchers have learned two important things: that strict travel restrictions would do little to impede a flu pandemic, and, more optimistically, that they could thwart an outbreak if every nation had enough medicine to treat 5 percent to 10 percent of their populations.

They still are refining and tweaking the model, entering data like total economies of countries, the status of their health-care systems, and even the number of people traveling into Marion County to work each day.

"You have to include commuting patterns," Vespignani said. "This gives you information on how the disease (spreads) at a very detailed level: How many in Indiana, how many in Fort Wayne, how many in South Bend, et cetera."

"This kind of tool (is) going to be more and more important in defining public health policies."

Health officials already have some idea of when they will have a run on vaccines, but they have little way to predict where and how bad an outbreak will be.

In case of avian flu or another outbreak, the Marion County Health Department has a plan to vaccinate the entire county -- all 860,000 residents -- if state health officials, said Dr. Virginia Caine, director of the county health department.

Even so, Caine said, models such as Vespignani's could be very helpful.

"These infections come in waves," Caine said. "It can really . . . multiply tremendously."

And knowing when and where those waves may come could save a lot of money, too. In 2006, the county health department spent more than \$8 million on flu vaccines.

The goal of the project, said Vespignani, is to make these models a kind of "weather forecast" so authorities could predict when and where an outbreak would be most severe.

"(We could) build up such an infrastructure (that a) hospital in Indianapolis could expect influenza in the first week of February," he said. "So you can be prepared."

Needless to say, a flu pandemic that has employees staying home for weeks on end could seriously hamper a business.

Dr. Gregory Larkin, director of corporate health services at Eli Lilly and Co., said his company has had a pandemic response plan since 2005, detailing what would happen if, say, 30 percent of the workforce shouldn't -- go to work.

Larkin said companies need such plans "on the shelf" to handle something that can catch many unaware.

Essentially, he said, the threat of a pandemic requires considerable preparation. "It's a daunting task if you haven't thought about it."

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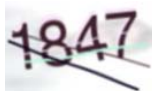
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