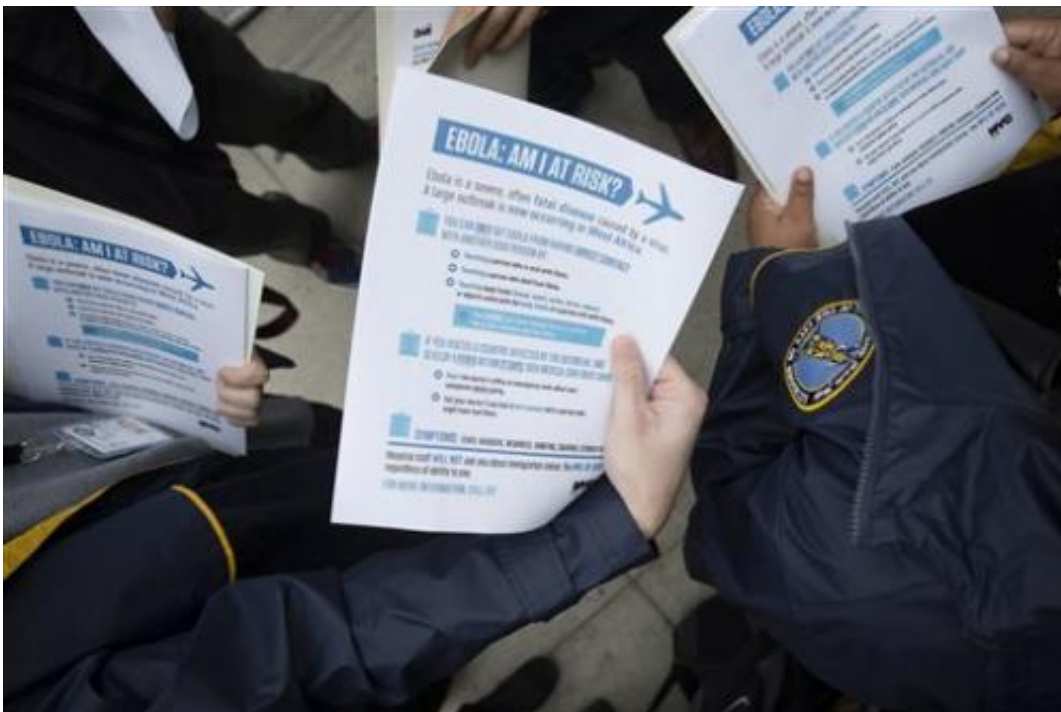


Scientists try to predict number of US Ebola cases

November 1 2014, by Martha Mendoza



In this Oct. 24, 2014 file photo, members of the Brooklyn Borough President's office hand out fliers detailing the risks of Ebola outside The Gutter bowling alley in Brooklyn's Williamsburg neighborhood, in New York. Top medical experts studying the spread of Ebola say the public should expect more cases to emerge in the United States by year's end as infected people arrive here from West Africa, including American doctors and nurses returning from the hot zone and people fleeing from the deadly disease. No one knows for sure how many infections will emerge in the U.S. or anywhere else, but scientists have made educated guesses based on data models that weigh hundreds of variables, including daily new infections in West Africa, airline traffic worldwide and transmission possibilities. (AP Photo/John Minchillo)

Top medical experts studying the spread of Ebola say Americans should expect more cases to emerge in the United States by year's end as infected people arrive here from West Africa, including American doctors and nurses returning from the hot zone and people fleeing from the deadly disease.

But how many cases?

No one knows for sure how many infections will emerge in the U.S. or anywhere else, but scientists have made educated guesses based on data models that weigh hundreds of variables, including daily new infections in West Africa, airline traffic worldwide and transmission possibilities.

This week, several top infectious disease experts ran simulations for The Associated Press that predicted as few as one or two additional infections by the end of 2014 to a worst-case scenario of 130.

"I don't think there's going to be a huge outbreak here, no," said Dr. David Relman, a professor of infectious disease, microbiology and immunology at Stanford University's medical school. "However, as best we can tell right now, it is quite possible that every major city will see at least a handful of cases."

Relman is a founding member of the U.S. Department of Health and Human Services advisory board for biosecurity and chairs the National Academy of Sciences forum on microbial threats.

Until now, projections published in top medical journals by the World Health Organization and the U.S. Centers for Disease Control have focused on worst-case scenarios for West Africa, concluding that cases in the U.S. will be episodic, but minimal. But they have declined to

specify actual numbers.

The projections are complicated, but Ebola has been a fairly predictable virus—extremely infectious, contagious only through contact with body fluids, requiring no more than 21 days for symptoms to emerge. Human behavior is far less predictable—people get on airplanes, shake hands, misdiagnose, even lie.

Pandemic risk expert Dominic Smith, a senior manager for life risks at Newark, California-based RMS, a leading catastrophe-modeling firm, ran a U.S. simulation this week that projected 15 to 130 cases between now and the end of December. That's less than one case per 2 million people.

Smith's method assumes that most cases imported to the U.S. will be American medical professionals who worked in West Africa and returned home.

Smith said the high end may be a bit of an overestimate as it does not include the automatic quarantining measures that some areas in the U.S. are implementing.

Those quarantines "could both reduce the number of contacts for imported cases, as well as increase the travel burden on—and perhaps reduce the number of—U.S. volunteers planning to support the effort in West Africa," he said.



In this Oct. 24, 2014 file photo, health alerts regarding people who may have traveled to particular West African countries are posted in the lobby of Bellevue Hospital, Friday, Oct. 24, 2014, in New York. Dr. Craig Spencer, a resident of New York City and a member of Doctors Without Borders, was admitted to Bellevue Thursday and has been diagnosed with Ebola. Top medical experts studying the spread of Ebola say the public should expect more cases to emerge in the United States by year's end as infected people arrive here from West Africa, including American doctors and nurses returning from the hot zone and people fleeing from the deadly disease. No one knows for sure how many infections will emerge in the U.S. or anywhere else, but scientists have made educated guesses based on data models that weigh hundreds of variables, including daily new infections in West Africa, airline traffic worldwide and transmission possibilities. (AP Photo/Mark Lennihan)

In a second simulation, Northeastern University professor Alessandro Vespignani projected between one case—the most likely scenario—and a slim chance of as many as eight cases though the end of November.

"I'm always trying to tell people to keep calm and keep thinking

rationally," said Vespignani, who projects the spread of infectious diseases at the university's Laboratory for the Modeling of Biological and Socio-Technical Systems.

In an article in the journal *PLOS ONE*, Vespignani and a team of colleagues said the probability of international spread outside the African region is small, but not negligible. Longer term, they say international dissemination will depend on what happens in West Africa in the next few months.

Their first analysis, published Sept. 2, proved to be accurate when it included the U.S. among 30 countries likely to see some Ebola cases. They projected one or two infections in the U.S., but there could be as many as 10.

So far, nine Ebola patients have been treated in the U.S., and one has died. Seven became infected in West Africa, including Thomas Eric Duncan, the first to arrive undiagnosed and the first to die. He was cared for at a Dallas hospital, where two of his nurses were also infected.

Duncan, who was initially misdiagnosed and sent home from the emergency room, is Vespignani's worst-case scenario for the U.S.

A similar situation, if left unchecked, could lead to a local cluster that could infect, on the outside, as many as 20, he said.

The foreseeable future extends only for the next few months. After that, projections depend entirely on what happens in West Africa. One scenario is that the surge in assistance to the region brings the epidemic under control and cases peter out in the U.S. A second scenario involves Ebola spreading unchecked across international borders.

"My worry is that the epidemic might spill into other countries in Africa

or the Middle East, and then India or China. That could be a totally different story for everybody," Vespignani said.

Dr. Ashish Jha, a Harvard University professor and director of the Harvard Global Health Institute, said he's not worried about a handful of new cases in the U.S. His greatest worry is if the disease goes from West Africa to India.

"If the infection starts spreading in Delhi or Mumbai, what are we going to do?"

Dr. Peter Hotez, founding dean of the National School of Tropical Medicine at Baylor College of Medicine and director of the Texas Children's Hospital Center for Vaccine Development, pegs the range of cases in the U.S. between five and 100.

The Centers for Disease Control and Prevention prefers not to focus on a particular number. But spokeswoman Barbara Reynolds said Ebola will not be a widespread threat as some outside the agency have warned.

"We're talking about clusters in some places but not outbreaks," she said.

The CDC is using modeling tools to work on projections in West Africa, but "there isn't enough data available in the U.S. to make it worthwhile to go through the exercise."

University of Texas integrative biology professor Lauren Ancel Meyers said there are inherent inconsistencies in forecasting "because the course of action we're taking today will impact what happens in the future."

Her laboratory is running projections of Ebola's spread in West Africa.

The U.S. simulations run for the AP had fairly consistent results with

each other, she said. And they are "consistent with what we know about the disease."

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