As Ebola Spreads, So Have Several Fallacies

Even as American hospitals prepare for new cases of Ebola, they must brace for a more familiar invader. The flu season will arrive soon — although exactly when, scientists cannot say.

Unlike Ebola, the influenza virus is truly airborne. And if recent history is any guide, it will kill thousands in the coming months.

Flu viruses and Ebola viruses take different routes to the same biological goal: to get into new hosts and replicate. Scientists have learned a great deal about the devious ways in which they manage to do it.

Yet misconceptions about how they travel continue to circulate, including the persistent notion that Ebola, like influenza, is airborne. The uncertainty only grows when possible new cases are identified, as happened on Thursday in New York.

Recently on "Fox News Sunday," the political commentator George F. Will said, "There are now doctors who are saying, 'We're not so sure that it can't be in some instances transmitted by airborne.' "

When another guest on the show started to explain that experts have said this is not true, Mr. Will interrupted to say, "Every expert that you've seen. Here we go again."

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When scientists refer to an airborne virus, they mean one that gets into droplets called aerosols that are so tiny they can float on air currents instead of falling to the ground. Influenza can spread this way as people cough and sneeze. All the evidence scientists have gathered about Ebola, on the other hand, indicates that it spreads through contact with fluids from infected people. During an infection, the virus makes huge numbers of copies that contaminate the victim's vomit, blood, diarrhea, urine and saliva.

Graphic

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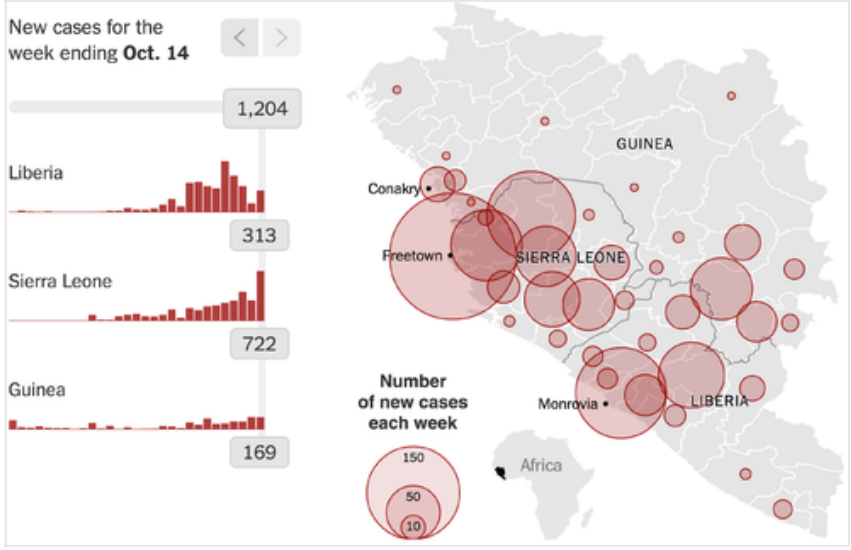
The sheer numbers of viruses in those fluids raise the odds that anyone who makes contact with them will be infected. "This virus only needs a little opportunity," said Vincent J. Munster, a virologist at the National Institutes of Health.

Ebola victims can release large, virus-laden droplets — if, for example, their vomit hits the floor. These

droplets may strike people in close range or land on a wall or some other surface, where they can stay infective for hours or days.

Unlike the flu, Ebola does not lead to the kinds of coughs and sneezes that create a cloud of aerosols around a patient. Scientists who track the spread of Ebola have found that close contact with an infected person is necessary to become infected.



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"The people who pass by the door and knock and say hello, we don't find they get infected," said Dr. Daniel G. Bausch, an associate professor of tropical medicine at Tulane University School of Public Health and Tropical Medicine.

That's not the pattern that airborne viruses produce. Dr. Bausch, for example, has treated hundreds of patients with Ebola and related viruses without protection from aerosols.

"If it happened frequently, I would be dead," he said.

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Graphic

Treating Ebola: The Hunt for a Drug

Although there are currently no drugs or vaccines approved in the United States to treat or prevent Ebola, health officials have used several experimental drugs in the recent epidemic.

The outbreak of Ebola in Dallas has followed the pattern Dr. Bausch has seen in Africa. Thomas Eric Duncan, the infected man from Liberia, stayed in an apartment for eight days without passing the virus on to others there.

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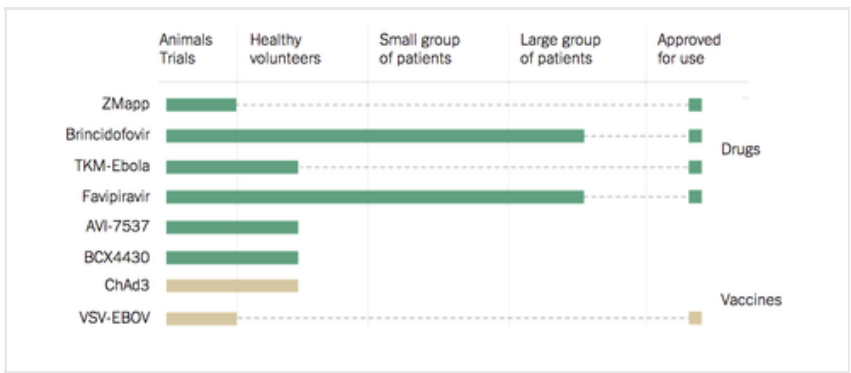
The only two people to become infected were hospital nurses who took care of Mr. Duncan when he was most infective.



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"If it were really highly contagious like the flu, there would be a whole lot more people infected with it," said Thomas W. Geisbert, a virologist at the University of Texas Medical Branch at Galveston.

Influenza, on the other hand, is extraordinarily good at spreading fast, traveling the globe every year. But scientists still are not sure how it does it so well.

"We do not know how influenza and other upper respiratory diseases are transmitted," said Jeffrey Shaman, an environmental health scientist at Columbia University. "We know how they *can* be transmitted."

That's an important distinction. Influenza viruses turn up in fine aerosols, in big droplets and on contaminated surfaces. Just how important each route is for spreading the virus is not known.

To get some answers, Dr. Donald K. Milton, an epidemiologist at the University of Maryland School of Public Health, College Park, and his colleagues find students sick with the flu and pay them to stick their faces in a large cone for half an hour. The cone sucks up flu-laden droplets, which the scientists measure and inspect for viruses.

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In 45 percent of their samples, aerosol droplets contained flu viruses. The aerosols actually hold more pathogens than the bigger droplets, each carrying a hundred flu viruses or more.

"That suggests aerosols are important, but just how important we don't know," said Dr. Milton. "When you want to protect hospital workers, how do you make health care facilities safe places to go when there's a flu pandemic? We need to know this."

After this year's flu season in the Northern Hemisphere, the virus will flare up in the Southern Hemisphere for a few months before coming back.

After past Ebola outbreaks, on the other hand, the virus has simply vanished from humans. Scientists suspect it lurks in the wild before coming back.

Dr. Munster, of the N.I.H., is trying to understand how the Ebola virus spreads in animals. He and his colleagues have trapped hammer-headed bats in the Democratic Republic of Congo, and they have found that 10 percent of them carry antibodies to the virus.

That indicates that at some point in the past, they have had Ebola. But it is very hard to find bats with live virus replicating in their bodies. It is possible that Ebola spreads harmlessly from bat to bat, never causing widespread outbreaks.

So how does the virus return to humans every few years? Most likely not through the air. Dr. Munster suspects that the more contact humans make with bats — eating their meat, for example, or fruit that bats have handled — the more likely they will encounter an infectious animal.

"In the end," Dr. Munster said, "it's a numbers game."