If Bird Flu Spreads to Humans... Citizens Must Play a Role in Prevention

By Duncan J. Watts

The Bush administration, along with the EU, the UN and the general public, is finally taking seriously the possibility of an outbreak of an avian influenza pandemic. Health experts are working on identifying the strains of avian flu most likely to mutate into human transmissible form, and drug companies are bustling producing vaccines to ward off their effects. Together, these actions are encouraging; at the very least, should an outbreak of human transmissible avian influenza occur, we will be better off than if it had appeared out of the blue, as SARS did in early 2003.

But while it's reassuring to think that we won't be caught off guard this time, the government's overwhelming focus on vaccine production is worrisome. Although understandable, it downplays other, potentially more effective prevention strategies.

At present, human-to-human transmissible avian flu virus does not exist outside the lab. However, such a virus could emerge any day as a result of the mixing of a bird flu—such as the virulent strain H5N1 that is currently decimating bird flocks throughout southeast Asia—with a human influenza virus within a single human. Alternatively, human transmissible avian flu virus could emerge any day from infected birds—such as the virus responsible for the 1918 influenza pandemic—which was estimated at up to a billion people. How was it, then, that SARS affected only about 8,000? Although partly the answer is sheer luck—for instance, it was fortunate the virus spread first to Toronto and Frankfurt, instead of to cities with weak public healthcare systems like Bombay and Cairo—such a big part of the explanation involves the steps taken by the World Health Organization and other health authorities to detect new outbreaks immediately, to coordinate information between public health agencies, to isolate known and suspected infected cases, and to instruct airlines to identify and isolate potentially infected passengers and crew—thereby targeting perhaps the most dangerous mechanism for rapid global dissemination.

But there is another feature of the SARS epidemic that has received relatively little attention and in my view was of enormous importance—that is, the population itself responded. The distribution of people in space, and even more importantly, the way they move around—whether it is between buildings, neighborhoods, cities, or nations—can have a dramatic impact on the ability of an epidemic to grow, spread and become a global pandemic. How people respond to the knowledge that an epidemic is spreading in their midst, or far away, therefore ought to be a critical parameter both in mathematical models of disease spread, as well as in public health strategies.

For example, a recent model developed by my research group at Columbia suggests that while most infections occur between people in highly localized neighborhoods, the size of an epidemic ultimately depends almost entirely on the movement of just a few individuals who, in traveling from infected to uninfected regions of the global mis-work, allow the epidemic to spread simultaneously in many places at once.

If these people refrain from traveling, or are actively discouraged from doing so, even a potentially dangerous epidemic may be forced to spread relatively less rapidly, allowing public health authorities more time to employ other containment measures.

Applying that lesson forward, to an avian flu outbreak, break, people in affected cities can mitigate the spread of the disease by avoiding work and school and not flooding to hospitals unless they are sick. Those in nearby regions can go about their lives but should avoid traveling into the affected cities or even out of the region. And people far from affected areas can maintain their distance (that is, more or less how they reacted to SARS).

Moreover—and to enlist the public's support—instead of to cities with weak public healthcare systems, the spread of the disease could be contained by applying other, more direct public health strategies. To help control the spread of a March epidemic, if the H5N1 "goes pandemic" this year, we won't have the vaccine. We'll be a vast continent the way we were just asleep at the switch in terms of enhancing preparedness for a major pandemic. If the H5N1 "goes pandemic" this year, we won't have the vaccine. We'll be a vast continent the way we were just asleep at the switch in terms of enhancing preparedness for a major pandemic. If the H5N1 "goes pandemic" this year, we won't have the vaccine.

So Duncan Watts' advice to help control the spread of what could be a living nightmare is sound. What are the measures work? Well, folks, that's about all we'll have.—Irwin Redlener, professor of Clinical Public Health, Columbia University, biomedical dean and director, National Center for Disaster Preparedness

Most virologists consider another influenza pandemic to be inevitable, although no one can predict exactly when or how it will occur. The techniques Watts and his group have pioneered show great promise for improving predictive capabilities.

Meanwhile, in the face of uncertainty, early warning and public education are essential. Early warning can help public health organizations contain the infection at its origins if virus transmission is spotted in time.

Public education is important, because too often, a period of intense concern can give way to complacency if the pandemic doesn't materialize exactly as expected. And inappropriate use of antibiotic drugs by an anxious public can render these defenses useless by selecting for resistant virus strains.

The media, still learning to strike a balance, has an essential role in the educational process. And, as Watts notes, appropriate, individual actions can reduce risk while also protecting the world. Taking the right actions at the right time will be crucial.

—Stephen S. Morse, associate professor of Clinical Epidemiology, founding director & senior research scientist, Center for Public Health Preparedness, National Center for Disaster Preparedness