CDC Races to Create a Vaccine for China's Latest Bird Flu Strain

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Within a week, a special package, shipped in dry ice, is due to arrive at the offices of the U.S. Centers for Disease Control and Prevention in Atlanta: a sample of the H7N9 "bird flu," sent from China. The CDC scientists in the Influenza Division are eager to receive it. Even before then, though, the CDC has launched an ambitious effort to develop a vaccine for the H7N9 virus—made possible by new genomics technology and by notable openness on the part of Chinese health authorities in sharing virus details with international health organizations.

To date, nine people have died from the bird flu in eastern China. The first fatality, an 87-year-old man in Shanghai, fell ill on Feb. 14 and passed away within three weeks. By late March, Chinese health authorities had isolated the H7N9 virus, which has spread without symptoms among Chinese poultry, and sent samples to China's Center for Disease Control in Beijing. Using technology unavailable a decade ago, when the deadly SARS virus struck, China's CDC quickly sequenced the whole genomic code of the H7N9 virus—then submitted that information to GISAID, a publicly available international database for influenza researchers.

"Using that genetic information, we could compare it to viruses we had already seen to check if we had a vaccine that would be a good match," explains Michael Shaw, the U.S. CDC's associate director for lab science, influenza division. After determining that the H7N9 virus was sufficiently novel that it would require a new vaccine, the scientists in Atlanta used the genomic map to create synthetic copies of the virus. That "virus seed stock" is now being used to develop the vaccine. "The information exchange with China has been almost in real time," says Shaw. "We're in regular contact with China's CDC and Health Ministry. The exchange since SARS is tremendously more open."

So far no cases have been confirmed of the virus spreading between humans—a worrying development that, if it happened, could signal the start of an epidemic. Yet if the virus did begin to spread in that manner, there's no assurance it would remain within China. "The way people travel now—with high volumes of airline traffic—if it does start to spread human to human, it's not going to stay localized," says Shaw. That, in part, is why the U.S. CDC is also developing diagnostic kits for the H7N9 virus, due to be shipped to select public-health clinics in all 50 states by the end of next week.

The 2006 Pandemic and All-Hazards Preparedness Act, signed by President George W. Bush, established the Biomedical Advanced Research and Development Authority (Barda) under Health and Human Services as the coordinating organization to oversee the production of vaccines, if needed, to combat emerging infectious diseases. The impetus to create this capacity grew out of responses to the mysterious 2001 anthrax attacks in Washington, D.C.

According to Barda director Robin Robinson, the agency has standing contracts with several leading drug companies, including Novartis, GlaxoSmithKline, and Sanofi Pasteur, to roll out large-scale commercial vaccine production, if that were deemed necessary. “If the virus were to [evolve] to be transmitted readily human to human,” says Robinson, “we may consider manufacturing commercial-scale lots” of vaccines. The entire vaccine development, clinical testing, and manufacturing process is expected to take a matter of months, but that’s “a much shorter time because we’re able to use synthetic-biology technology,” says Robinson “We’re taking preparedness steps in case something [widely contagious] does emerge.”

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