



## Flu shots urged as Madison's FluGen plays role in effort for universal vaccine

*David Wahlberg, Wisconsin State Journal October 18, 2018*

With flu season approaching, health officials say people should get flu shots by the end of October, yet acknowledge that the annual vaccine generally works less than 60 percent of the time.

The Madison company FluGen is part of a renewed national effort to improve the odds by developing a universal flu vaccine, which would protect against more types of flu, possibly for many years.

“The current vaccines are surely better than nothing,” said Michael Osterholm, director of the University of Minnesota’s Center for Infectious Disease Research and Policy. “But we’ve got to get new vaccines that work much better.”

Flu activity remains light around the country, but Florida officials on Monday said a child who had not received the vaccine died from the flu. Last winter’s severe flu season caused more than 80,000 U.S. deaths, the highest toll in more than a decade.

Flu typically picks up in November or December and peaks in January or February while continuing to circulate until spring. Everyone six months and older should get a flu shot or the nasal spray vaccine, preferably by Halloween, according to the Centers for Disease Control and Prevention.

More than 119 million of at least 163 million doses of flu vaccine expected to be available this year were distributed as of Oct. 5, the CDC said. People with health insurance can get immunized at their clinics or pharmacies. Those without insurance can call their health departments — including Public Health Madison and Dane County, at (608) 266-4821.

Last year’s vaccine was about 40 percent effective in warding off the flu, according to the CDC. In recent years, the vaccine has worked between 10 percent and 60 percent of the time.

The annual vaccine is designed to fight off the three or four flu strains expected to spread most each year. But it is mostly made through a decades-old process of growing the virus in eggs, which takes about six months. By the time the vaccine is ready, circulating viruses can mutate or new strains can emerge.

In February, the National Institute of Allergy and Infectious Diseases, or NIAID, released a strategic plan for the development of a universal flu vaccine. Congress passed \$100 million to expand flu vaccine research, in a bill co-sponsored by U.S. Sen. Tammy Baldwin, of Madison.

The ultimate goal is a vaccine that would protect against any kind of flu, for a decade or more. But there are 18 known versions of the main flu gene that triggers an immune response — hemagglutinin, or H. For another gene, neuraminidase, or N, there are 11 known versions.

That means there are 198 possible combinations of the two genes, and that's just for influenza type A. There's also influenza type B.

“Universal is the holy grail,” said Dr. Arnold Monto, a flu vaccine expert at the University of Michigan. “But that may not be possible.”

For now, researchers are focusing on “next-generation” vaccines that could protect against a few flu varieties at once, such as H3N2, H1N1 and H7N9. Eventually, a vaccine might be developed that immunizes against all strains known to circulate in people.

About three-fourths of the flu vaccine expected to be available this year nationwide was distributed by Oct. 5, according to the Centers for Disease Control and Prevention.

“It would be universal relative to the human strains,” Osterholm said. “Theoretically, many of us believe this is actually doable. ... It's going to take a concerted effort.”

One approach is to target the stem of the H protein instead of its head, which is what changes most from year to year.

FluGen, started in 2007 by UW-Madison flu researchers Yoshi Kawaoka and Gabriele Neumann, is using a different tactic. It is based on the idea that people who acquire the flu naturally generally don't get it again for a year or more.

The company's experimental vaccine deletes another flu gene, M2, from the virus but adds back its corresponding protein. M2 helps the flu virus enter and exit human cells.

The technique allows the body to treat the vaccine as a flu infection, said Paul Radspinner, CEO of FluGen.

“We're mimicking a wild-type infection, without making you sick,” Radspinner said. “That prepares your body to fight off future infections.”

FluGen is finishing a study in Belgium in which 50 people received the experimental vaccine, based on a flu virus from 2007, and another 50 got a placebo. Both groups were then exposed to a flu virus from 2013, a mismatch intended to simulate what happens during many flu seasons.

The goal of the study, supported by a \$14.4 million grant from the Department of Defense, is to see if the vaccine protects people from infection. Results are expected to be released early next year.

This past summer, FluGen started another study, in St. Louis and supported by NIAID, which plans to enroll 50 children ages 9 to 17. Half will get the experimental vaccine, and half a placebo. Three months later, all will get

regular flu vaccine.

The goal is to see if the vaccine is safe in children and protects those who get both vaccines more from circulating flu than those who get only the regular vaccine.

“We’re trying to show we can do better than the current vaccines by proving broader coverage and hopefully more durable coverage,” Radspinner said.