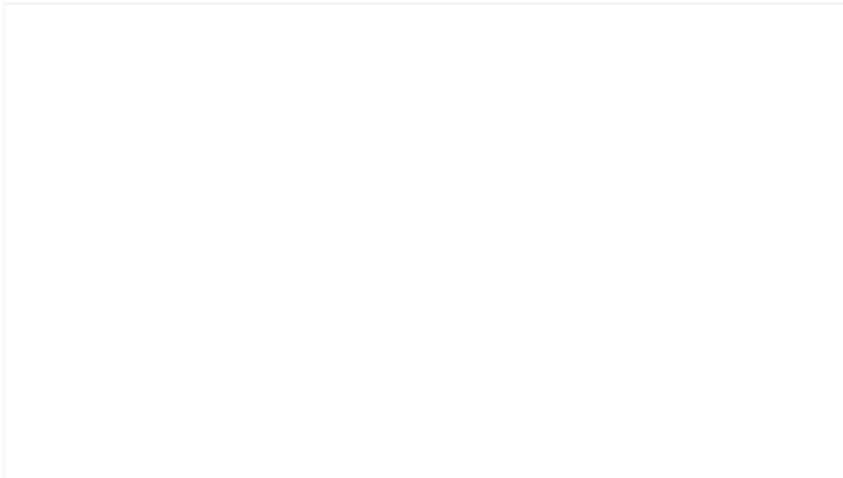

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A flu vaccine you get once, not once a year? A new company in Cincinnati's working on one

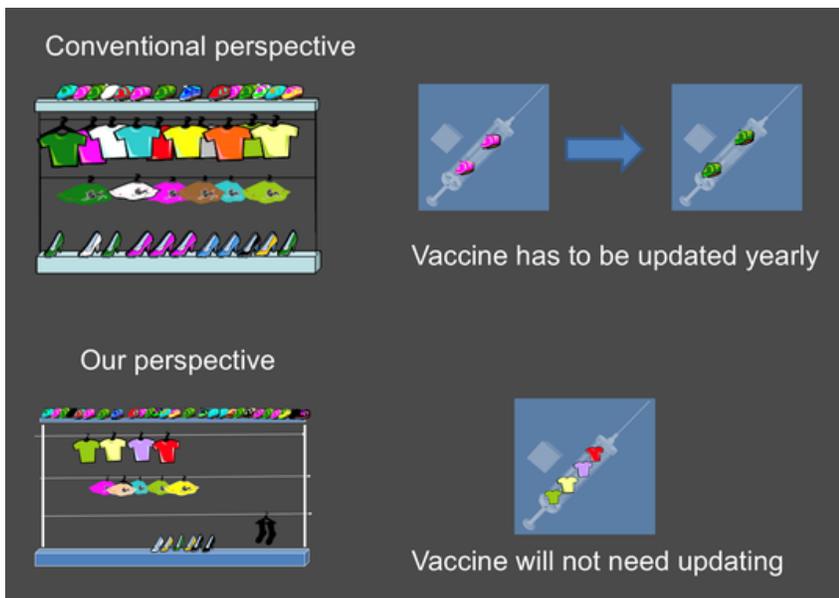
Anne Saker, Cincinnati Enquirer Published 9:45 p.m. ET Sept. 12, 2019



Another flu season approaches in North America, and Americans are getting the nudge for a flu shot, crossing their fingers for a good match against the virus. But a new local company believes it will soon produce a better weapon against flu – a universal vaccine that will last a lifetime.

“Our goal is to change the world,” said Joseph Hernandez, chief executive officer of Blue Water Vaccines. Human testing on the company’s universal vaccine is planned within 18 to 24 months, he said, “then we’ll know if we truly have the revolution on our hands.”

If the vision comes to pass, the cool-weather ritual of the annual flu shot will end, Hernandez said, perhaps as soon as five years from now.

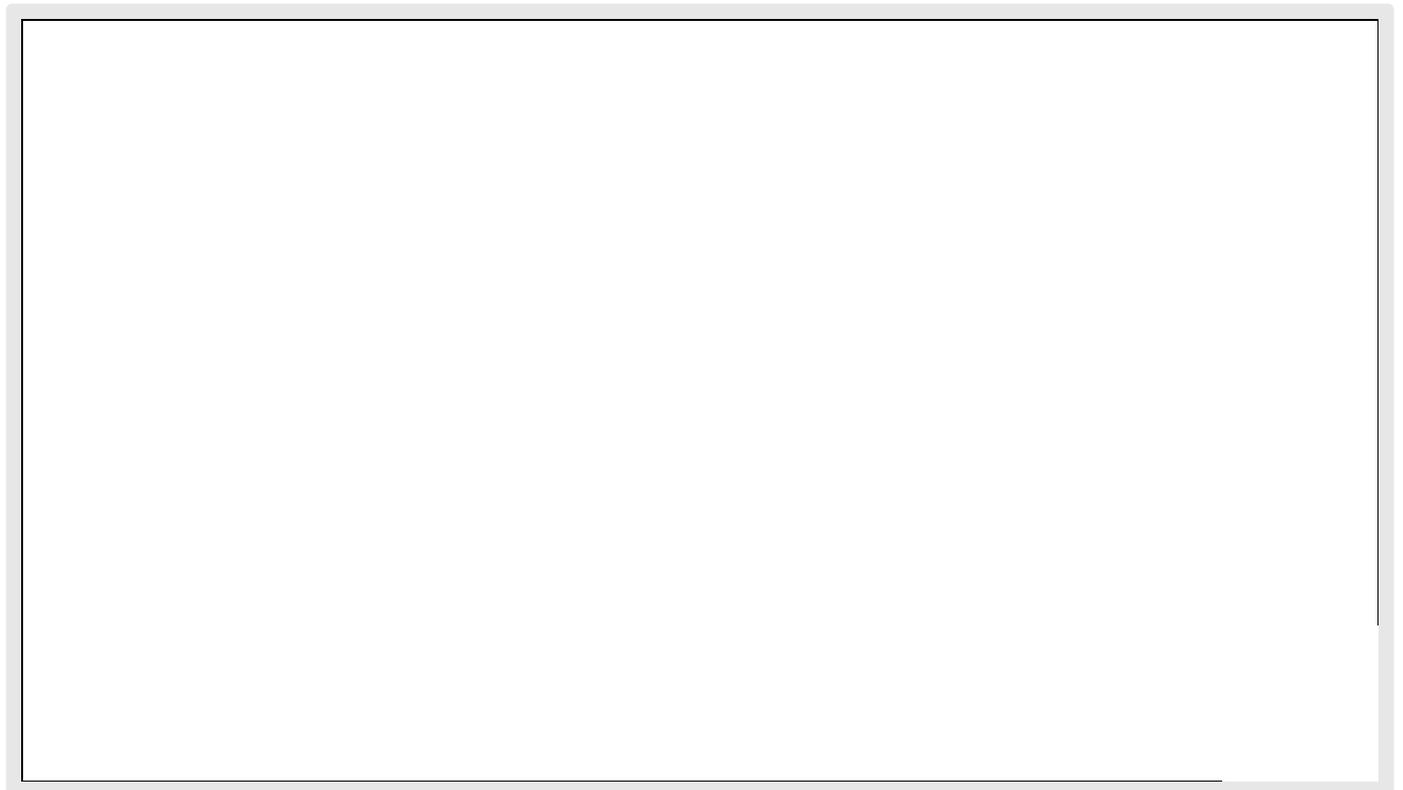


Oxford theoretical epidemiologist Sunetra Gupta thinks of a virus like pieces of a wardrobe. The immune system reacts to the colors of the pieces. Some viruses, such as measles, have monochromatic wardrobes, so once you get measles, the immune system recognizes future exposures as the same “color” and can resist the virus. (Photo: Provided)

This spring and summer, [Blue Water Vaccines](https://www.bluewatervaccines.com/) raised \$7 million through the seed-capital fund [CincyTech](http://cincytechusa.com/) to launch the human trials for the one and done vaccine, a product developed at the University of Oxford in England. Hernandez wants to convert the old Norwood Baptist Church into the company’s base, with a research facility at Oxford.

Blue Water is not alone. Dozens of companies around the world are working on a universal flu vaccine. One developed at the National Institutes of Health is [now in human testing](https://www.nih.gov/news-events/news-releases/nih-begins-first-human-trial-universal-influenza-vaccine-candidate).

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The idea for the Blue Water Vaccines product was born when Oxford theoretical epidemiologist Sunetra Gupta became curious about why influenza strains change every year. In studying the mathematics of that variability, she discovered that only a portion of the flu virus changes from year to year, and another portion of the virus doesn’t.

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Current vaccines target the portion of the flu vaccine that varies from year to year, which is why a different vaccine is needed every season. A vaccine that can target the stable portion could protect the human body universally from all strains of flu for life.

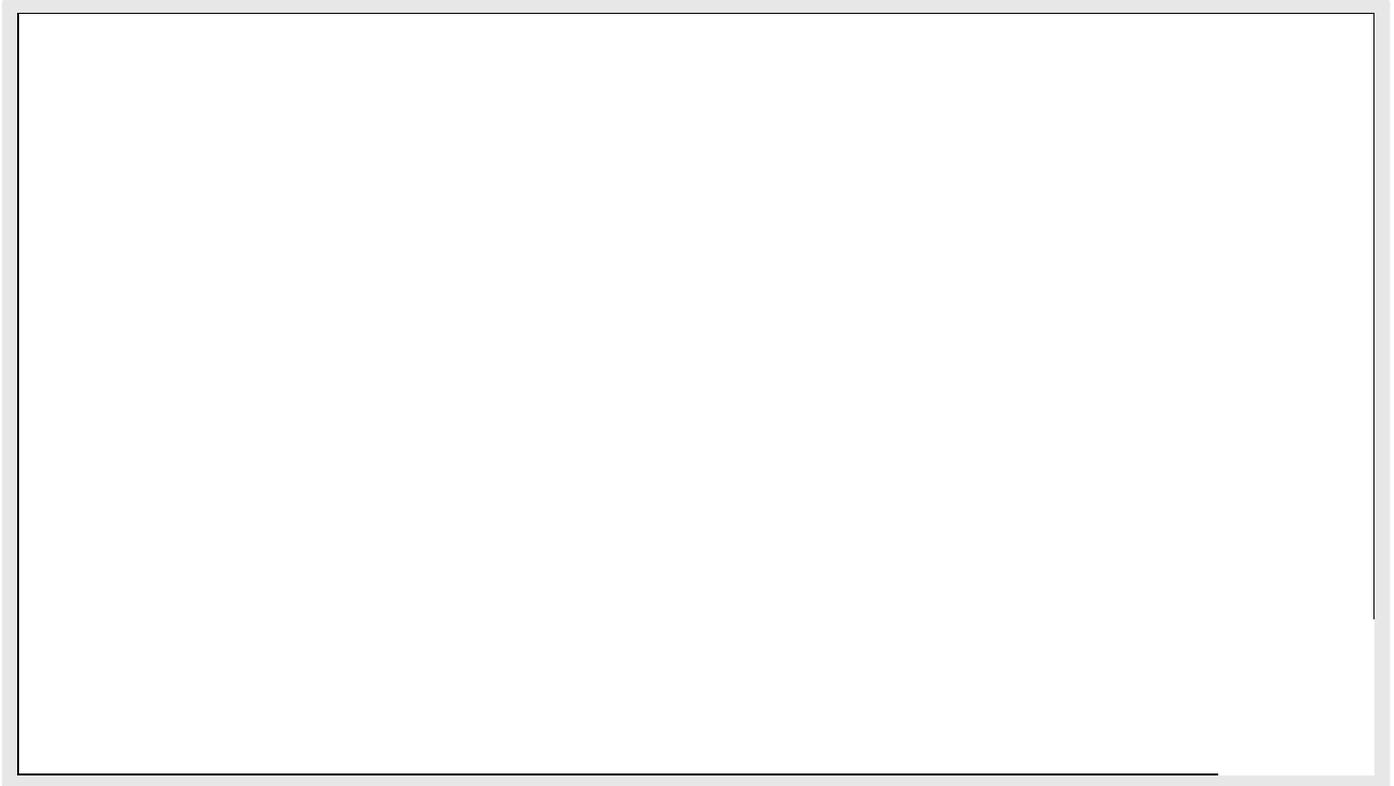


Joseph Hernandez is chief executive officer of Blue Water Vaccines, a new local company aiming to develop and bring to market a universal flu vaccine that can be available year-round and would provide a lifelong immunity to influenza. (Photo: Provided)

In 2007, Gupta [published](https://www.pnas.org/content/104/18/7711) a paper on her theory. In 2018, Oxford virologist Craig Thompson [showed](https://www.nature.com/articles/s41467-018-06228-8?utm_source=Nature_community&utm_medium=Community_sites&utm_content=BenJoh-Nature-MultipleJournals-Microbiology-Global&utm_campaign=MultipleJournals_USG_MICRO) in laboratory research that the theory was true. That work generated another advance: The new product can be made using the E. coli bacteria. Current vaccines are made in millions of chicken eggs, a problem for people allergic to eggs.

Hernandez is a virus scientist and has worked for biotech companies large and small. He told The Enquirer he followed the Oxford flu research then went to England to meet the scientists and discuss commercialization.

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Hernandez knew about CincyTech from work in an earlier startup, and he stayed in touch with the fund's chief executive officer, Mike Venerable. "About six months ago, I called Mike and said I had an opportunity that might be of interest and I wanted to base it in Cincinnati. Mike said 'we're all over it.' "

Cincinnati appealed to Hernandez because he has family in Blue Ash, and, "There's something about the Midwestern culture, the old-fashioned ethics morality, that I really appreciate."

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A universal flu vaccine would constitute a major victory over a wily opponent, a virus that triggers a contagious disease that has long eluded efforts at control.



Sunetra Gupta is a theoretical epidemiologist at the University of Oxford. In addition to developing a new way of thinking about flu and a vaccine, she is the author of five novels. (Photo: Provided)

A century ago, an estimated 21 million people around the world died in the 1918 Spanish flu epidemic. Flu vaccines were invented (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5139605/>) in the 1930s, and the U.S. military was vaccinating troops by 1938.

Yet year after year, even with vaccination and even in mild seasons, flu kills adults and children around the world and costs millions of lost work hours.

Two years ago, a worse-than-usual flu season in the United States killed nearly 200 children. Last flu season, the seasonal flu shot was about 30 percent effective against all strains – better than nothing, but not great.

Public health authorities urge everyone 6 months old and up to get a flu shot, not just to guard personal health but to create “herd immunity” within the society to protect those who can’t receive flu shots because of health complications.

Herd immunity works best when at least 90 percent of a population gets vaccinated. But the United States isn’t even close (<https://www.cdc.gov/flu/fluview/reportshtml/report1718/report1/index.html>), according to the U.S. Centers for Disease Control and Prevention. In Ohio, only about 43 percent of the population gets flu shots. In Kentucky, it’s 44 percent. The only state that cracks 50 percent, and only by a fraction, is Rhode Island.

Dr. Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases at the National Institutes of Health, told a July gathering of journalists (<https://nationalpress.org/topic/on-the-front-lines-of-infectious-diseases/?st=9624&t=Public%20Health&mm=Video>) in Washington about the development of a potential universal flu vaccine. “We’re ultimately going to get it seven to 10 years from now. We’ll have some form of one. It may not be the perfect one yet.”

Hernandez said his optimism about a universal flu vaccine is reflected in the name of the company.

"I love boats and the ocean, and blue water is kind of the unknown," he said. "When you're in blue water, you're in the middle of nowhere. We're in blue water now, and we're trying to get home."

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