US needs more effective flu shots, experts say

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In the midst of an early flu season, public health officials are urging unvaccinated people to get a flu shot, as the best step they can take to protect both themselves and their families.

Yet the Centers for Disease Control and Prevention also acknowledged Friday that influenza vaccines, on average, are only about 62 percent effective. In the past, the CDC had estimated that flu shots were 70 percent to 90 percent effective.

"There is a growing consensus among the public health communities that we need better influenza vaccines," says Michael Osterholm, director of the Center for Infectious Disease Research and Policy. "We're operating largely in the 1950s for our flu technology.

Osterholm last year published an influential analysis in The Lancet showing that, according to very rigorous standards, evidence indicated that flu shots were less effective than commonly reported. For children and seniors over age 65, there was no rigorous data showing their efficacy at all.

One subset of patients does get high protection from flu vaccines, Osterholm found. The intranasal flu vaccine, sold as FluMist, protects 83 percent of children under 8. There's mixed evidence about how well FluMist protects adults over 60, and a lack of evidence on its effect in people ages 8 to 59.

In general, "The flu vaccine is a good vaccine, but not a great vaccine,"

says William Schaffner, a professor at Vanderbilt University School of Medicine.

Osterholm says he strongly believes people should get yearly flu vaccines, given their good safety record. And he says "moderate" protection is better than no protection at all.

But drug companies have felt little pressure to make truly "game-changing" vaccines, Osterholm says, because experts and the public have believed that current shots are adequate.

"The No. 1 deterrent to getting new flu vaccines is the perception that the current ones are good enough," says Osterholm, also a professor at the University of Minnesota School of Public Health.

With relatively low efficacy, the flu shot today doesn't have much power to produce true "herd immunity," Osterholm says. Herd immunity is achieved when enough people are immunized with an effective vaccine that the community's viral load drops, protecting even the unvaccinated.

Joseph Bresee, chief of the CDC's epidemiology and prevention branch in its influenza division, said Friday that "there's lot of research going on toward improving vaccines," noting that "the goal is to create a vaccine that you don't have to give every year that works better."

Today, people need to be revaccinated every year against the flu. That's because the influenza virus is constantly changing. Virologists try to predict which viruses will be in circulation in the coming season, hoping to get a good "match" between the viruses in the community and the viral strains used in the vaccine.

A "game-changing" vaccine would be very different.

Such a vaccine would produce immunity by including parts of the influenza virus that don't change from year to year, and which are common among many strains of virus, Osterholm says. These vaccines should also protect people for a decade or more, stimulating the immune system to recognize flu viruses that it hasn't encountered for a long time.

In a 2011 interview with USA Today, National Institutes of Health director Francis Collins said he was "guardedly optimistic" that a "universal" flu shot could be developed within about five years.

One such game-changing vaccine is being tested in the U.S. in an early phase one trial - the smallest and most preliminary type of human study - Schaffner says.

"It's clearly the holy grail," Schaffner says.

But the U.S. should be doing more to lead the way, Osterholm says.

Most vaccines in development today make only minor improvements, Osterholm says, relying on the same techniques used for decades. These vaccines produce immunity by using proteins found on a virus' outer coating.

Of the more than 170 influenza vaccines in clinical trials around the world, all but 13 are made in the traditional way, Osterholm says. None is supported by the U.S. government, he says.

Developing a next-generation flu vaccine could take 15 years and cost over $1 billion, Osterholm estimates.

Schaffner notes that significant improvements are already being made.

Next year's flu shots should provide slightly broader protection. The

FluMist nasal spray will protect against four viral strains, instead of the current three. Manufacturers of flu shots are also working to include four viral strains.

Also, the Food and Drug Administration in November approved the first flu vaccine made in cell cultures, rather than chicken eggs. The vaccine, Flucelvax, made by Novartis, is approved only for adults.

Many European countries already use cell culture techniques, which allow companies to produce vaccine far more quickly, Osterholm says.

Cell-culture technology allows vaccine makers to respond rapidly to "urgent public health needs, such as a pandemic, within weeks," according to Novartis.

The United States' current system - a six- to nine-month process that relies on fertilized chicken eggs to grow viruses - is "archaic," says Robert Glatter, an emergency medicine physician at Lenox Hill Hospital in New York.

Yet while cell cultures will allow companies to manufacture vaccines much more quickly, it doesn't make the vaccine any more effective, Osterholm says.

And Glatter says companies face significant obstacles in developing innovative flu vaccines.

It's "quite difficult for private companies to embark on such an endeavor, in light of the U.S. government's strict policies toward approving vaccines," which must undergo rigorous tests for safety, Glatter says.

Drug companies may see little point in developing a universal vaccine,

Glatter says. "If you get a mega-vaccine once every 10 years to prevent the flu, the flu vaccine market would essentially be down-regulated, with less financial market incentive."

Yet Glatter says 2009's H1N1 pandemic flu suggests that the human body is capable of producing extremely long-term immunity from influenza. Senior citizens had relatively low rates of infection during that outbreak, likely because they were exposed to a similar virus during the 1930s and 1940s, he says.

"The goal is to make a vaccine that can confer such long-term immunity," Glatter says. "Such a feat would be a real breakthrough."

A broadly protective flu vaccine might save lives during a pandemic, because many people would already have been vaccinated, Osterholm says. During the 2009 H1N1 pandemic, manufacturers required months to develop a matching flu shot.

But a universal vaccine would have its greatest impact in the developing world, Schaffner says. Many poor countries can't afford yearly flu shots. Far more people could be vaccinated if they only had to pay for a shot every 10 years, he says.