Study highlights effectiveness of 2023–24 flu vaccine and its implications for future disease preparedness

By Richard Harth, ASU News
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A study conducted by the U.S. Flu Vaccine Effectiveness (VE) Network, including researchers from Arizona State University, provides fresh insights into the 2023–24 flu vaccine's performance. The research underscores the vaccine's role in reducing flu-related illnesses and offers guidance for improving vaccination strategies in the future.

The study, conducted under the auspices of the Centers for Disease Control and Prevention, evaluated the vaccine's effectiveness in preventing flu-related doctor visits in the United States. It included data from over 6,500 participants across seven states during flu season, which lasted from October 2023 to April 2024.

"The collaborative efforts of the U.S. Flu VE Network continue to provide critical insights into influenza vaccine effectiveness, shaping public health strategies and improving vaccine formulations," says Vel Murugan, director of clinical research with the Virginia G. Piper Center for Personalized Diagnostics at the ASU Biodesign Institute. "This study highlights the importance of ongoing surveillance and rigorous evaluation to protect communities from seasonal influenza."

The Vaccine Effectiveness Network is composed of seven study sites and one coordinating center, Duke University, spread across the United States. ASU is one of the key institutions chosen to contribute to this national research initiative.

In addition to ASU, the network's study sites are the University of Michigan; Washington University; University Hospitals of Cleveland; the University of Pittsburgh; Baylor Scott & White Health; and

Kaiser Permanente Washington.

Immune responses to flu

Results of the study showed that the 2023–24 flu vaccine reduced the overall risk of seeking medical care for the flu by 41%. The level of protection varied depending on the strain of the virus: It reduced the risk by 28% for the most common flu strain (H1N1), 68% for another circulating strain (B/Victoria), and 30% for a third strain (H3N2).

The vaccine was particularly effective for young children and older adults. Children age 8 months to 8 years saw a 59% reduction in risk, and adults age 65 and older experienced a 37% reduction. For adults age 50–64 years, however, the vaccine showed little to no protection against illness caused by H1N1, a subtype of the influenza A flu virus. Researchers have observed this pattern in prior flu seasons, and it is likely linked to the way people's immune systems respond to flu viruses they were exposed to earlier in life — a process called antigenic imprinting.

The findings appear in the journal Clinical Infectious Diseases.

Adapting vaccines to changing viruses

One of the study's important findings is that the vaccine's effectiveness against the H1N1 flu virus was stronger for some versions of the virus than others, pointing to the importance of ongoing virus monitoring to learn how flu viruses change over time. This way, vaccines can be updated to better match the strains circulating in a population.

The study also examined how long vaccine protection persisted. It found that protection was strongest in the two months following vaccination but remained significant for several months after that in people younger than 65. This suggests that getting vaccinated early in the flu season provides valuable protection throughout the peak flu months.

Influenza continues to pose a serious public health challenge, causing millions of illnesses, hospitalizations and deaths each year. This study highlights the flu vaccine's critical role in reducing the impact of flu outbreaks. Although it performed well for children and older adults, the lack of effectiveness in adults age 50–64 against certain flu strains emphasizes the need for continued research to improve vaccines for this group.

The study also underlines the challenges posed by the way flu viruses evolve. Researchers found that some versions of the H1N1 virus circulating this season were less affected by the vaccine. This highlights the importance of regularly updating vaccines to keep up with viral variants, creating better surveillance systems and encouraging faster vaccine development to address these

challenges in the future.

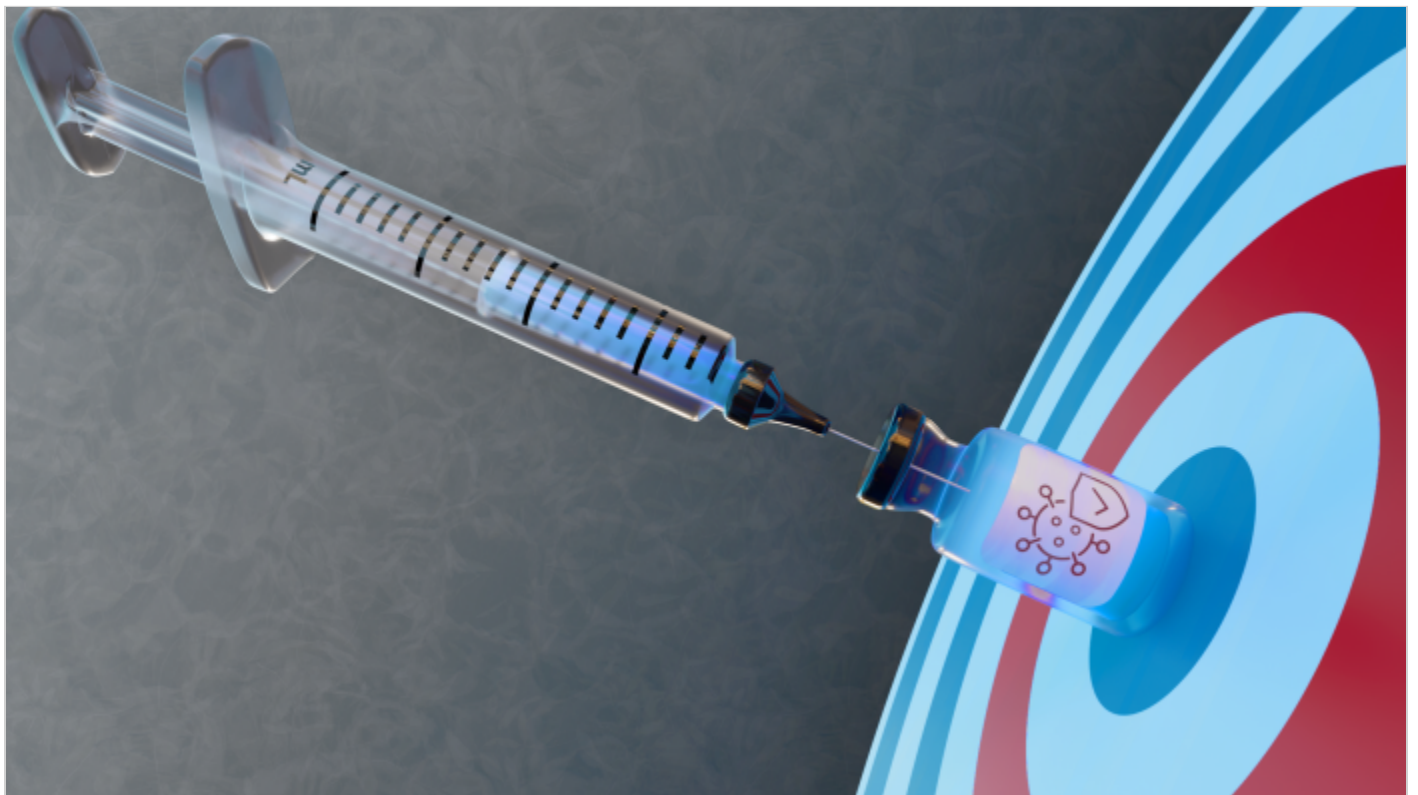## Greater vaccine awareness needed

Despite the vaccine's proven benefits, flu vaccination rates remain concerningly low. During the 2023–24 season, only 49% of adults and 54% of children in the U.S. received the flu shot, falling far below public health goals.

The study also provides crucial insights for enhancing public health initiatives regarding flu vaccination. Vaccination efforts should prioritize groups that stand to benefit the most, specifically children and older adults. Understanding the impact of early flu virus exposure on individuals' immune responses is critical for developing more effective vaccines.

The study emphasizes the importance of worldwide cooperation in monitoring flu virus mutations and sharing data to improve vaccine effectiveness across the globe.

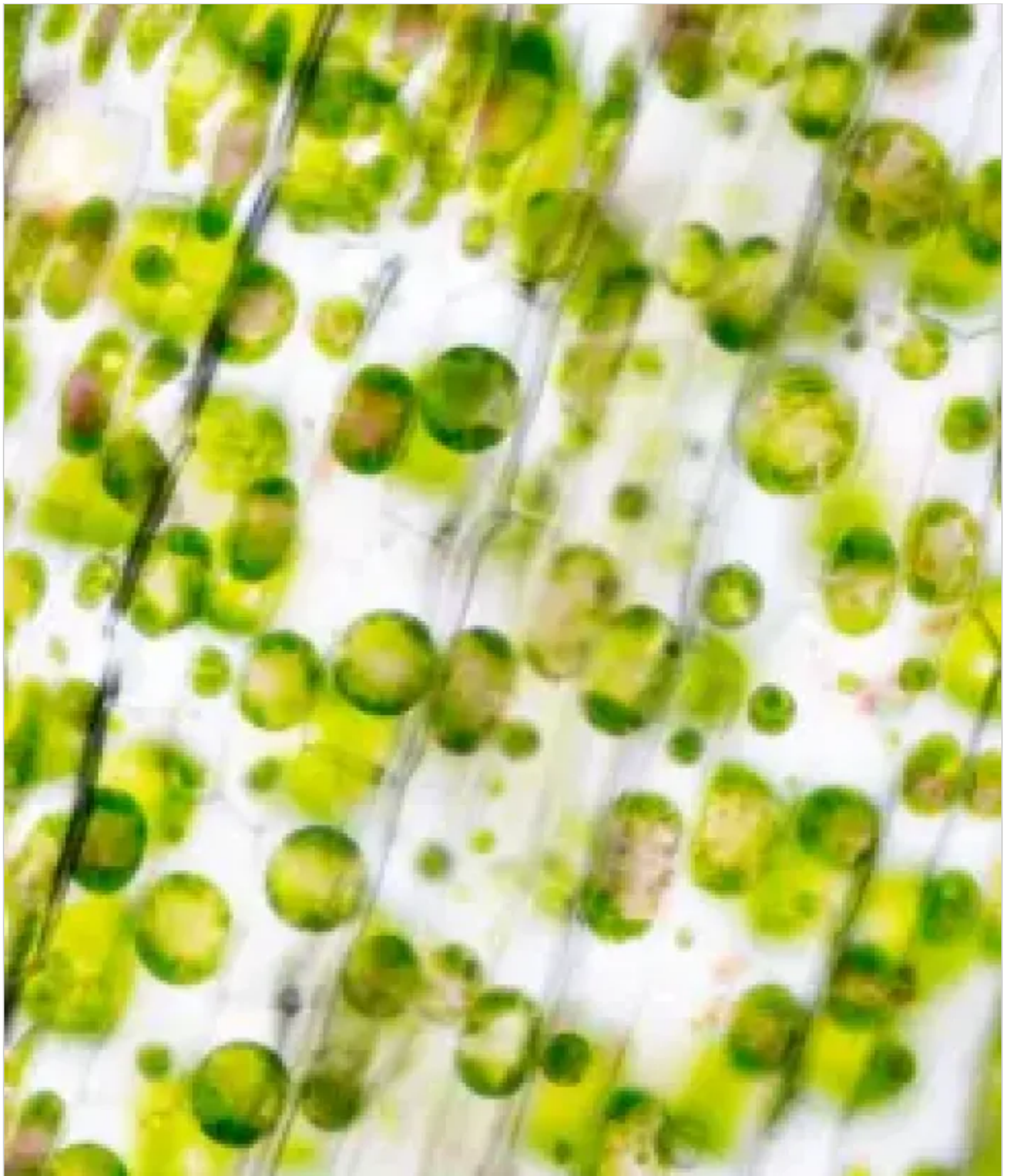*This story originally appeared on* *ASU News*.

Main image

A recent study revealed that the flu vaccine's effectiveness against the H1N1 flu virus was stronger for some versions of the virus than others, underscoring the need for continuous virus monitoring to understand how flu viruses evolve. Such monitoring is crucial for updating vaccines to align more closely with the strains circulating within a population. Graphic by Jason Drees/ASU

Text image(s)

Vel Murugan

Learn more about vaccines and immunology research at the Biodesign Institute.