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EVALUATION OF EXPERIMENTAL MRNA-BASED INFLUENZA VACCINE EFFICACY: COMPARATIVE ANALYSIS AND CLINICAL PERSPECTIVES

Context and Methodology A recent phase 2a, randomized, controlled, double-blind clinical trial published in *NEJM Evidence* analyzed the efficacy of an experimental modified messenger RNA (modRNA) influenza vaccine developed by Pfizer. The research aimed to compare it with a conventional tetravalent influenza vaccine (QIV) and an unvaccinated control group. The study included healthy adults, aged 18 to 55, who were subjected to controlled exposure to the influenza A/H1N1 virus 30 days post-immunization.

Results Regarding Efficacy and Viral Load The *per-protocol* cohort analysis demonstrated the superiority of mRNA technology compared to traditional methods:

- **Prevention of symptomatic disease:** The modRNA vaccine recorded a vaccine efficacy (VE) of 100%, while the conventional QIV vaccine achieved an efficacy of 84.5% (with a wide confidence interval, 43.4% – 96.0%). In the control group, the symptomatic infection rate was 26.9%.
- **Prevention of febrile influenza:** Both vaccine types (modRNA and QIV) demonstrated 100% efficacy compared to the infection rate of 17.3% in the control group.
- **Viral dynamics:** Participants immunized with modRNA showed a significant reduction in viral load (VL), measured by the area under the curve (AUC) and peak VL values, compared to the QIV and control groups.

Safety and Immunogenicity The study confirmed the safety profile of the mRNA platform, with no serious adverse events reported. The vaccine generated robust immunogenic responses, and the reduction in viral load suggests an enhanced capacity to limit virus replication. Additionally, a parallel phase 3 study, mentioned in the *New England Journal of Medicine*, corroborated these data, indicating superior immune responses to A/H3N2 and A/H1N1 strains for mRNA vaccines, albeit with a higher incidence of minor side effects.

Perspectives and Limitations The editorial signed by Dr. Hana El Sahly and Dr. Robert Atmar highlights the critical need to improve seasonal vaccines, whose current efficacy is estimated between 36% and 54% in preventing outpatient visits. The technological advantages of the mRNA platform include production speed and the possibility of a more precise match with circulating strains, eliminating dependence on egg-based cultures. However, experts warn of the current study's limitations, conducted exclusively on healthy young adults. Clinical validation requires extending research to vulnerable groups, such as the elderly with comorbidities and the pediatric population.

Although the results support the continued clinical development of the modRNA platform, widespread implementation requires further studies to confirm long-term safety and efficacy among high-risk population categories.

Adapted after Mary Van Beusekom, MS, CIDRAP News - https://www.cidrap.umn.edu/ , 26.11.25