

Staph Infections Reduce Effectiveness of Intradermal Flu Vaccine in Atopic Dermatitis Patients

FEBRUARY 13, 2017

DENVER — The dry, cracked and itchy skin of atopic dermatitis patients is often colonized with *Staphylococcus* bacteria. Researchers at National Jewish Health and their colleagues in the Atopic Dermatitis Research Network report that *Staphylococcus* colonization of atopic dermatitis patients' skin is associated with a weaker response to flu vaccination given into the skin rather than into the muscle. The research, funded by the National Institute of Allergy and Infectious Diseases, part of the National Institutes of Health, is being published online today in the *Journal of Allergy and Clinical Immunology*.



“*Staphylococcus* infections are a widespread problem among atopic dermatitis patients, with up to 90 percent of patients with severe disease colonized by the bacteria,” said lead researcher Donald Leung, MD, PhD, head of pediatric allergy and clinical immunology at National Jewish Health. “We believe that atopic dermatitis patients are likely to get the most protection from traditional intramuscular influenza vaccines, rather than intradermal vaccines. We are actively working to better understand immune dysregulation in atopic dermatitis patients.”

Intradermal vaccines were approved for use in adults in 2011. The vaccines use a much smaller needle than traditional intramuscular vaccines, penetrate much less deeply, and use significantly less material to achieve similar immunologic effects in most people.

Atopic dermatitis, also known as eczema, is the most common chronic skin disease, affecting more than 15 percent of children in the United States and persisting into adulthood for about half of these patients. It is characterized by itchy, dry and cracked skin, and results from a combination of immune dysregulation and breakdown of the skin barrier.

Researchers decided to determine if this chronic skin disease influences the effectiveness of a vaccine that penetrates only skin-deep. The researchers evaluated 202 patients with atopic dermatitis, and 134 control patients, vaccinating 136 of them with intradermal vaccines and the rest with intramuscular vaccines. The vaccines included proteins from three strains of influenza (influenza B, H1N1 and H3N2). Researchers assessed response to the vaccine 28 days after vaccination by measuring levels of various antibodies in the blood. Eighty-four (42 percent) of the atopic dermatitis patients had positive skin swabs for *Staphylococcus aureus* colonization.

Overall, the atopic dermatitis patients responded similarly to the non-atopic patients to both intramuscular (IM) and intradermal (ID) vaccines. However, a significant difference was seen in patients with atopic dermatitis who were colonized with *Staphylococcus aureus* and vaccinated against influenza B. Only 11 percent of patients given the ID vaccine developed protection against influenza B compared to 47 percent who received the IM vaccine. The intradermal vaccine also generated less protection against H1N1 and H3N2 strains of influenza, but these differences were not statistically significant.

Researchers are not certain whether the *Staphylococcus aureus* bacteria caused the lower protection rate or is merely a marker of a poorer immune response. Previous research, however, has shown that *Staphylococcus aureus* infections can cause immune cells to retreat from the skin and that toxins secreted by *Staphylococcus* can inhibit the action of antibody-secreting B cells.

National Jewish Health is the leading respiratory hospital in the nation. Founded 124 years ago as a nonprofit hospital, National Jewish Health today is the only facility in the world dedicated exclusively to groundbreaking medical research and treatment of patients with respiratory, cardiac, immune and related disorders. Patients and families come to National Jewish Health from around the world to receive cutting-edge, comprehensive, coordinated care. To learn more, visit the [media resources page](#).

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