

Influenza vaccination of the egg-allergic individual

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Recent reviews suggest a low risk of allergic reactions to egg-cultured influenza virus vaccines

Australian influenza notification and hospitalisation rates are highest in children aged under 5 years,¹ the group most commonly affected by egg allergy. While vaccines derived from influenza virus grown in mammalian cell cultures exist, those currently distributed in Australia and New Zealand are grown in hen eggs. The ability to safely vaccinate egg-allergic individuals (particularly in the context of epidemic influenza) will remain an important public health issue, well after concerns surrounding recent non-allergic adverse reactions in young children subside (Australian governments recently suspended seasonal flu vaccination for healthy children aged under 5 years; see <http://www.immunise.health.gov.au>).

Product information and current Australian vaccination guidelines list egg anaphylaxis as an absolute contraindication to influenza vaccination,² yet recent studies suggest that most egg-allergic individuals can be safely vaccinated. Most reported cases of anaphylaxis in egg-allergic patients after influenza vaccination occurred over 20 years ago, when the amount of egg protein in vaccines was substantially higher. The amount of egg protein (measured as ovalbumin) in vaccines distributed in Australia and New Zealand in recent years has been about 1 µg or less per dose

(manufacturer data), which is substantially less than the estimated 130 µg likely to trigger reactions in patients with egg allergy if taken orally.³

Are concerns about vaccinating egg-allergic individuals evidence-based? Recent reviews suggest a very low risk of allergic reactions to influenza vaccination.⁴ A United States population study reported 11 cases of non-fatal anaphylaxis (none involving egg allergy) after 48 million doses of influenza vaccine had been given.⁵ Although this suggests there is a low risk of harm from the vaccine, patients with egg allergy were probably excluded from the vaccination program. More useful information is obtained from recent prospective studies. In a US study of 83 egg-allergic patients (27 with anaphylaxis) and 124 controls, positive vaccine skin tests were detected in four allergic patients and one control subject, yet all tolerated split-dose vaccination (a 10% dose followed by the remaining 90% 30 minutes later).⁶ An Italian study demonstrated a similar safety profile in 44 children with asthma and egg allergy (10 with anaphylaxis).⁷ In a Canadian study of split-dose H1N1 vaccination of 830 egg-allergic children, nine developed rash (treated with antihistamines) and three developed bronchospasm, but none progressed to anaphylaxis.⁸ In an expanded vaccination

program, the same study reported rash, cough, or throat irritation or constriction in 71 of 3640 patients, but none developed anaphylaxis.⁸ In Western Australia, after the death from influenza of three otherwise healthy preschoolers in 2007, 165 egg-allergic children aged 6 months to 16 years (48 with anaphylaxis) were vaccinated. One patient developed mild facial urticaria after the first dose, but tolerated the second dose.⁹ In a recent US study, 164 of 171 patients (aged 6 months to 18 years) with non-anaphylactic egg allergy tolerated split-dose vaccination. Six experienced urticaria or wheeze after the 10% vaccine dose and one experienced flushing and hives after the 90% dose, but none had anaphylaxis.¹⁰

British, Canadian, European and US consensus guidelines^{4,8,11,12} suggest that most patients with egg allergy can safely receive seasonal and H1N1 vaccines if they contain no more than 1 µg/dose of egg ovalbumin. The Australasian Society of Clinical Immunology and Allergy concurs with these views and has released guidelines for vaccination of the potentially egg-allergic patient (<http://www.allergy.org.au/content/view/27/8>). We acknowledge that these proposals are at variance with Australian immunisation guidelines.²

People presenting for vaccination may be classified into three risk groups:

- Those considered to be at no additional risk. This includes people with non-egg food allergy, past egg allergy (who can now eat whole egg), and family (not personal) history of egg allergy, as well as those who react to raw egg but can tolerate at least a teaspoon of lightly cooked egg (eg, scrambled or boiled). This group can receive the vaccine as a single dose, followed by the 15-minute observation period recommended in Australian guidelines² (20 minutes in NZ). Importantly, egg allergy is not a contraindication for the measles–mumps–rubella vaccine, which contains no egg protein.
- Those with non-anaphylactic allergic reactions to eggs or egg-containing food. Some authorities recommend a 10%–90% split-dose regimen, 30 minutes apart, if no adverse reaction occurs after the first dose; others recommend a single dose. Data from split-dose protocols^{6–10} have not indicated any significant adverse reactions in this risk group, despite administration of the full dose over 30 minutes. Based on current evidence, we suggest that the vaccine can be safely administered as a single dose with a 30-minute observation period, rather than the standard 15 minutes.
- Those who have had egg anaphylaxis in the past, and those who have never ingested egg in any form, but have had positive skin or blood test results for egg allergy. As reactivity and severity cannot be assessed in advance, these patients merit consideration as a potentially higher-risk group. The decision to vaccinate should include a risk–benefit evaluation of the vaccination, consultation with an allergy specialist (including initial telephone contact), direct medical supervision of vaccination, and use of a split-dose protocol (10%–90%, 30 minutes apart), with another 30-minute observation period after the final dose.

Skin-prick or intradermal allergy testing with the vaccine before administration is not recommended, as results correlate poorly with vaccine tolerance. If the first vaccination is tolerated, the second vaccine dose can be given as a single dose in the same year. Since tolerance one year does not guarantee safety the next (due to yearly fluctuations in egg vaccine content), we recommend that the same process be followed each year.

Rare allergic reactions (including reactions to non-egg vaccine ingredients) cannot be totally excluded. Vaccines should always be

administered in facilities with health professionals able to recognise and treat anaphylaxis. Adverse events following vaccination should be reported to the Advisory Committee on the Safety of Medicines (Australia) or Medsafe (NZ), documenting the timing of onset, nature and severity of symptoms, likelihood of a relationship with vaccination, and any other relevant health details.

Competing interests

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