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Influenza: Update for the 2013-2014 season

New vaccine products are available for this season, including a recombinant agent that has no egg protein.

Each year in late summer, the Centers for Disease Control and Prevention (CDC) publishes its recommendations for the prevention of influenza for the upcoming season. The severity of each influenza season varies and is difficult to predict, which underscores the need to provide maximal vaccine coverage for at-risk patient populations.

Hoping for the best, planning for the worst. Over the past several decades the annual number of influenza-related hospitalizations has varied from approximately 55,000 to 431,000,¹ and the number of deaths from influenza has been as low as 3349 and as high as 48,614.² Infection rates are usually highest in children. Complications, hospitalizations, and deaths are highest in those ≥ 65 years, children < 2 years, and patients with medical conditions known to increase risk for influenza complications. Those at high risk of complications appear in **TABLE 1**.³ The main recommendations for this coming year are the same as last year, including vaccinating everyone ≥ 6 months of age without a contraindication, starting vaccinations as soon as vaccine is available, and continuing throughout the influenza season for those who need it.

What's new this year

An increasing number of influenza vaccine products are available; although to date, their effectiveness (which was determined to be 56% for all vaccines used last influenza season)⁴ remains below what we would hope for. The CDC's recommendations address these

new types of vaccines, including ones that have 4 antigens instead of 3, and use new terminology to describe the vaccines.³

New terminology reflects changing vaccine formulations. Last influenza season there were 2 major categories of influenza vaccines: live-attenuated influenza vaccine (LAIV) and trivalent inactivated influenza vaccine (TIV). All products were produced using egg-culture methods and contained 2 influenza A antigen subtypes and 1 B subtype. Several products this year include 4 antigens (2 A subtypes and 2 B subtypes), and some are now produced with non-egg-culture methods. This has led to a new system of classification, with the term inactivated influenza vaccine (IIV) replacing TIV. **TABLE 2** lists the influenza vaccine categories and abbreviations. **TABLE 3** lists the contraindications for the different vaccine types.³

The new products include Flumist Quadrivalent (MedImmune), a quadrivalent LAIV (LAIV4); Fluarix Quadrivalent (GlaxoSmithKline), a quadrivalent IIV (IIV4); Flucelvax (Novartis Vaccines and Diagnostics), a cell culture-based trivalent IIV (ccIIV3); and FluBlok (Protein Sciences), a trivalent recombinant hemagglutinin influenza vaccine (RIV3). Fluzone (Sanofi Pasteur), introduced last season in a trivalent formulation, is also available this season as a quadrivalent IIV (IIV4). As a group, influenza vaccine products now offer 3 routes of administration: intramuscular, subcutaneous, and intranasal. There is currently no evidence that any route offers an

advantage over another, and the CDC states no preference for any particular product or route of administration.

Mercury content is not a problem

Even though there is no scientific controversy over the safety of the mercury-containing preservative thimerosal, some patients still have doubts and may ask for a thimerosal-free product. The only influenza products that contain any thimerosal are those that come in multidose vials. A description of each influenza vaccine product, including thimerosal content, indicated ages, and routes of administration, can be found on the CDC's Web site³ (<http://www.cdc.gov/flu/professionals/acip/2013-summary-recommendations.htm>).

Options for those with egg allergy

There is now a product, RIV3 (FluBlok), that is manufactured without the use of eggs. It can be used in those 18 to 49 years of age with a history of egg allergy of any severity. Since 2011, the Advisory Committee on Immunization Practices (ACIP) has recommended that individuals with a history of mild egg allergy (those who experience only hives after egg exposure) may receive IIV, with additional safety precautions. Do not delay vaccination for these individuals if RIV is unavailable. Because of a lack of data demonstrating safety of LAIV for individuals with egg allergy, those allergic to eggs should receive RIV or IIV rather than LAIV.

Though the new ccIIV product, Flucelvax, is manufactured without the use of eggs, the seed viruses used to create the vaccine have been processed in eggs. The egg protein content in the vaccine is extremely low (<50 femtograms [5×10^{-14} g] per 0.5-mL dose), but the CDC does not consider it egg free. The **FIGURE** depicts the recommendations for those with a history of egg allergy.³

Other interventions for influenza prevention

Vaccination is only one tool available to prevent morbidity and mortality from influenza. Antiviral chemoprevention and treatment,

TABLE 1

Individuals at high risk for complications from influenza infection³

Children 6-59 months
Adults ≥ 50 years
Adults and children who have chronic pulmonary (including asthma) or cardiovascular (except isolated hypertension), renal, hepatic, neurological, hematologic, or metabolic disorders (including diabetes mellitus)
Individuals who have immunosuppression (including that caused by medications or HIV infection)
Women who are or will be pregnant during the influenza season
Residents of nursing homes and other long-term care facilities
American Indians/Alaska Natives
Morbidly obese individuals (BMI ≥ 40 kg/m ²)
Patients ages <19 years who are receiving long-term aspirin therapy

BMI, body mass index; HIV, human immunodeficiency virus.

and infection control practices can also be effective.

■ **Antiviral chemoprevention** is available for both pre- and post-exposure administration. In the past few years, the CDC has de-emphasized such use of antivirals for these indications out of concern for the supply of these agents and for the possibility that their use might lead to increased rates of viral resistance. Consider antiviral chemoprevention for those who have conditions that place them at risk for complications, and for those who are unvaccinated if they are at high risk for exposure to influenza (pre-exposure prophylaxis) or have been exposed (postexposure prophylaxis), if the medication can be started within 48 hours of exposure. Another option for unvaccinated high-risk patients is vigilant symptom monitoring with early treatment for influenza symptoms. Chemoprophylaxis is recommended in addition to vaccination to control influenza outbreaks at institutions that house patients at high risk for complications of influenza. Details on recommended antivirals including doses and duration of



Influenza vaccine products now offer 3 routes of administration: intramuscular, subcutaneous, and intranasal.

TABLE 2
Influenza vaccine categories

Vaccine category	Abbreviation	2012-2013 description	2013-2014 description	Patient ages indicated for
Inactivated influenza vaccine, egg culture, standard dose	IIV	TIV	IIV3* IIV4†	≥6 months
Inactivated influenza vaccine, egg culture, high dose	IIV	TIV	IIV3	≥65 years
Inactivated influenza vaccine, cell culture	cIIV	None	cIIV3	≥8 years
Live-attenuated influenza vaccine	LAIV	LAIV	LAIV4	2-49 years
Recombinant hemagglutinin influenza vaccine	RIV	None	RIV3	18-49 years

cIIV, cell culture-based inactivated influenza vaccine; cIIV3, cell culture-based inactivated influenza vaccine, trivalent; IIV, inactivated influenza vaccine; IIV3, inactivated influenza vaccine, trivalent; IIV4, inactivated influenza vaccine, quadrivalent; LAIV, live-attenuated influenza vaccine; LAIV4, live-attenuated influenza vaccine, quadrivalent; RIV, recombinant influenza vaccine; RIV3, recombinant influenza vaccine, trivalent; TIV, trivalent inactivated influenza vaccine.

*Trivalent—A/California/7/2009 (H1N1)-like virus, an H3N2 virus antigenically like the cell-propagated prototype virus A/Victoria/361/2011, and a B/Massachusetts/2/2012-like virus.

†Quadrivalent—Same antigens as in the trivalent vaccine plus a B/Brisbane/60/2008-like virus.

TABLE 3
Contraindications and precautions for influenza vaccines, 2013-2014³

Vaccine	Contraindications	Precautions
IIV (includes IIV3, IIV4, and cIIV)	History of severe allergic reaction to any component of the vaccine, including egg protein, or after previous dose of any influenza vaccine.	<p><i>With all vaccine categories:</i></p> <ul style="list-style-type: none"> Moderate to severe illness with or without fever History of Guillain-Barré syndrome within 6 weeks of receipt of influenza vaccine
RIV	History of severe allergic reaction to any component of the vaccine.	
LAIV	History of severe allergic reaction to any component of the vaccine, including egg protein, gentamicin, gelatin, and arginine, or after previous dose of any influenza vaccine. Concomitant aspirin therapy in children and adolescents. ACIP recommends against use in the following conditions: immune suppression, chronic medical conditions predisposing to severe illness from influenza, and pregnancy.	

ACIP, Advisory Committee on Immunization Practices; cIIV, cell culture-based inactivated influenza vaccine; IIV, inactivated influenza vaccine; IIV3, inactivated influenza vaccine, trivalent; IIV4, inactivated influenza vaccine, quadrivalent; LAIV, live-attenuated influenza vaccine; RIV, recombinant influenza vaccine. Check Food and Drug Administration-approved prescribing information for 2013-2014 influenza vaccines for the most up-to-date manufacturer-specific information, including, but not limited to, indications, contraindications, and precautions.

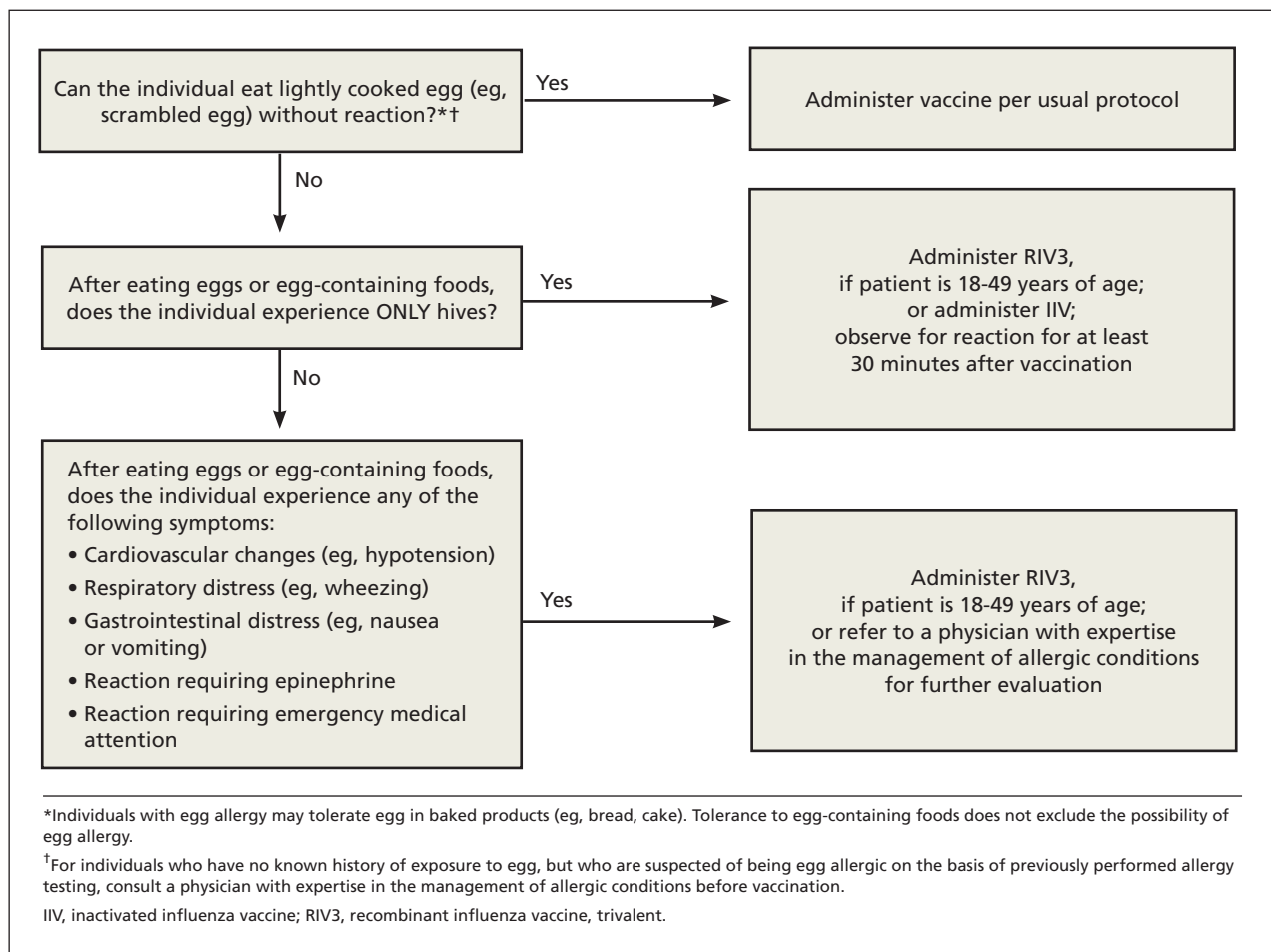
treatment can be found in a 2011 issue of *Morbidity and Mortality Weekly Report*.⁵

■ **Antiviral treatment.** The CDC recommends antiviral treatment for anyone with

suspected or confirmed influenza who has progressive, severe, or complicated illness or is hospitalized for their illness.⁵ Treatment is also recommended for outpatients with

FIGURE

Recommendations for influenza vaccine for those with a history of egg allergy³



suspected or confirmed influenza who are at higher risk for influenza complications. This latter group includes those in TABLE 1, particularly children 6 to 59 months and adults ≥ 50 years. Start antiviral treatment within 48 hours of the first symptoms. For hospitalized patients, however, begin treat-

ment at any point, regardless of duration of illness.

■ **Infection control practices** can prevent the spread of influenza in the health care setting and in the homes of those with influenza. These practices are also described on the CDC influenza Web site.⁶ **JFP**

References

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