CE IN THE MORNINGS
A Tradition of Outstanding Pharmacy Education

The Changing Landscape for Immunizations: New Opportunities for Health-System Pharmacists

A continuing education (CE) activity entitled *Targeting Optimal Protection for Adult Patients: Immunization Strategies in the Health System* was presented as one of four CE in the Mornings topics at the 46th ASHP Midyear Clinical Meeting and Exhibition in New Orleans, Louisiana, in December 2011. The program was presented by Dennis M. Williams, Pharm.D., BCPS, and addressed key vaccine-preventable diseases in adults, including influenza, pertussis (whooping cough), pneumococcal disease, and herpes zoster (shingles). Attendees submitted questions about unresolved issues and controversies that were later addressed by Dr. Williams in a live webinar conducted on February 23, 2012. The highlights of the webinar pertaining to immunization of healthcare personnel and recommendations for immunization against influenza and pertussis are described in this e-Newsletter. Highlights pertaining to recommendations for immunization against pneumococcal disease, hepatitis B, and herpes zoster and new vaccines in development will be discussed in an e-Newsletter to be released in May 2012.

Expand Your Knowledge

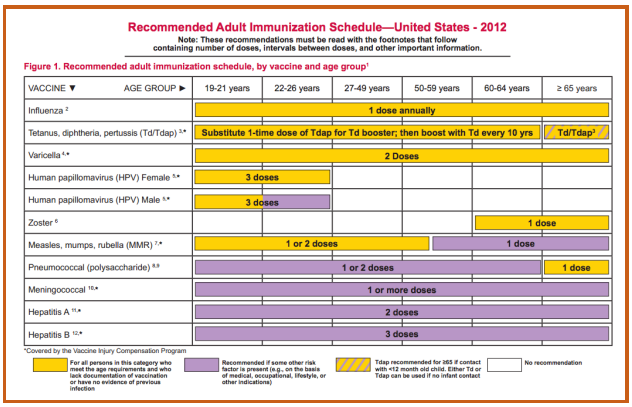
On-demand CPE Activities

If you were unable to attend the live symposium, ***Targeting Optimal Protection for Adult Patients: Immunization Strategies in the Health System***, conducted at the 2011 ASHP Midyear Clinical Meeting, a 1-hour CPE activity is available on demand at www.ashpmedia.org/symposia/cemornings.

Faculty Podcast Interviews

Visit the CE in the Mornings **web portal** to listen to podcast interviews with the faculty. Four interviews, each lasting approximately 5 to 14 minutes, are available.

Immunization recommendations from the Centers for Disease Control and Prevention Advisory Committee on Immunization Practices (ACIP) are dynamic, changing frequently as new epidemiologic and vaccine efficacy and safety data become available and new vaccine products are introduced. An update to the recommended adult immunization schedule was released in early February 2012 by ACIP.[1] This update reflects changes in recommendations for influenza vaccine; tetanus, diphtheria, and acellular pertussis (Tdap) vaccine; hepatitis B vaccine; and zoster vaccine among others (e.g., human papillomavirus vaccine for boys).



Recommended Adult Immunization Schedule—United States - 2012

Note: These recommendations must be read with the footnotes that follow containing number of doses, intervals between doses, and other important information.

Figure 1. Recommended adult immunization schedule, by vaccine and age group[1]

VACCINE ▼ AGE GROUP ►	19-21 years	22-26 years	27-49 years	50-59 years	60-64 years	≥ 65 years
Influenza [2]	1 dose annually					
Tetanus, diphtheria, pertussis (Td/Tdap) [3,*]	Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs					Td/Tdap[3]
Varicella [4,*]	2 Doses					
Human papillomavirus (HPV) Female [5,*]	3 doses					
Human papillomavirus (HPV) Male [5,*]	3 doses					
Zoster [6]					1 dose	
Measles, mumps, rubella (MMR) [7,*]	1 or 2 doses			1 dose		
Pneumococcal (polysaccharide) [8,9]	1 or 2 doses					1 dose
Meningococcal [10,*]	1 or more doses					
Hepatitis A [11,*]	2 doses					
Hepatitis B [12,*]	3 doses					

*Covered by the Vaccine Injury Compensation Program

For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infection

Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications)

Tdap recommended for ≥65 if contact with <12 month old child. Either Td or Tdap can be used if no infant contact

No recommendation

2012 Adult Immunization Schedule available at www.cdc.gov/vaccines

Question: What immunizations are recommended for healthcare personnel?

Healthcare personnel are at substantial risk for acquiring or transmitting influenza, pertussis, hepatitis B, varicella, measles, mumps, and rubella.[2] Current immunizations recommended for healthcare personnel are described in Table 1. Annual influenza immunization is recommended for all healthcare personnel, not just those staff members with direct patient care duties.[2] All healthcare personnel should receive a single dose of Tdap as soon as feasible if they have not previously received Tdap. Hepatitis B vaccine is indicated for healthcare personnel at risk for exposure to contaminated blood or body fluids (i.e., pre-exposure immunization) and as prophylaxis after exposure to the virus (i.e., post-exposure immunization). Varicella and measles, mumps, and rubella vaccines are recommended for healthcare personnel who lack evidence of immunity against these diseases. Meningococcal vaccine is not routinely recommended for all healthcare personnel. It is recommended for personnel at high risk for infection (e.g., persons with known asplenia or traveling to countries where meningococcal disease is hyperendemic or epidemic).

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Table 1.
Immunizations Recommended by ACIP for Healthcare Personnel[2]

Vaccine	HCP Who Should Be Immunized	Schedule
Influenza	All HCP	One annual dose
Tdap	All HCP if not previously immunized with Tdap	One dose
Hepatitis B	HCP at risk for exposure to blood or body fluids or as post-exposure prophylaxis	Three-dose series with second and third doses 1 month and 6 months after first dose
Varicella	All HCP without evidence of immunity: (1) written documentation of two doses of varicella vaccine, (2) laboratory evidence of immunity or laboratory confirmation of disease, or (3) diagnosis or verification of a history of varicella disease or herpes zoster by a healthcare provider	Two doses 4 weeks apart
MMR	All HCP without documentation of two doses of vaccine or laboratory evidence of immunity	Two doses 4 weeks apart
Meningococcal (MCV4 for age <55 yr, MPSV4 for age ≥55 yr)	HCP at high risk for infection (not routine for all HCP)	Initial two-dose series and revaccination every 5 yr

ACIP = Advisory Committee on Immunization Practices; HCP = healthcare personnel; MCV4 = quadrivalent meningococcal conjugate vaccine; MMR = measles, mumps, and rubella; MPSV4 = quadrivalent meningococcal polysaccharide vaccine; Tdap = tetanus, diphtheria, and acellular pertussis

Question: The Healthy People 2020 objective for annual influenza immunization of healthcare personnel is 90%. How much progress has been made toward achieving that goal?

The rate of influenza immunization among healthcare personnel in mid-November 2011 (63%) was approximately 7% higher than that 1 year earlier in mid-November 2010 (56%), but it was far below the Healthy People 2020 target.[3,4] In mid-November 2011, the influenza immunization rate increased with increasing age from 56% in healthcare personnel 18-29 years of age to 68% in workers 60 years of age or older.[4] Most healthcare workers (79%) received the vaccine in their workplace (others received it in a doctor's office, community pharmacy, or another place not associated with their employment). The most common reasons among healthcare personnel for receiving the influenza vaccine were to protect themselves (82%), friends and family members (55%), or patients (43%) from influenza. The reasons for not receiving the vaccine included the expectation that influenza immunization does not work (32%), fear of side effects from immunization (27%), the impression that influenza vaccination is not needed (23%), and concerns about getting sick from the immunization (18%). These findings illustrate the need for additional efforts to educate healthcare personnel about the effectiveness and safety of influenza immunization and its role in preventing influenza in healthcare workers and their friends, family members, and patients.

www.YouCanStopTheFlu.com

The American Society of Health-System Pharmacists (ASHP) developed this resource center – Stop the flu - it starts with you! – to inform, educate, and engage pharmacists as advocates in efforts to improve seasonal influenza immunization rates among healthcare workers.

> "The fact that one in three healthcare workers does not receive an annual influenza immunization, often because of misconceptions about the efficacy, safety, and role of immunization in protecting patients as well as workers, underscores the need for educational efforts targeting healthcare personnel."
>
> —Dennis M. Williams, Pharm.D., BCPS

Question: How can immunization rates among healthcare personnel at my institution be improved?

Various strategies may be used to improve immunization rates among healthcare workers, including establishing immunization as a credentialing requirement for medical staff, a requirement for students to attend class, and a condition of employment for staff, contract workers, volunteers, and emergency responders. Exceptions should be allowed for persons with medical contraindications to immunization.

Written documentation of immunization status should be required for healthcare personnel. Persons with an "indeterminate" antibody level against a pathogen should be considered susceptible to the organism. Measuring post-immunization titers to verify immunity is recommended only for the hepatitis B vaccine.

Question: Influenza vaccine options now include a product that is administered by the intradermal route as well as intramuscular and intranasal products, and a high-dose product for elderly patients. What's next in influenza vaccine development?

Difficulty predicting which viral strains will circulate in an upcoming season and quickly producing sufficient amounts of vaccine products to meet demand (especially in a pandemic situation), a poor immune response to vaccine products among patients who are elderly or have chronic

diseases, and the complexity of the vaccine manufacturing process present limitations to the influenza vaccine program in the United States.[5] Research is under way to identify new vaccine development technologies and products to overcome these challenges and provide improvements in vaccine efficacy, safety, and supply. The high-dose trivalent inactivated vaccine (TIV) product (Fluzone High-Dose) introduced in 2010 for elderly patients (age ≥ 65 yr) was developed to improve the immune response and efficacy of immunization for this age group.[6,7] A quadrivalent influenza vaccine with improved protection against influenza type B (B/Victoria and B/Yamagata), a common cause of morbidity in young adults, was approved by the Food and Drug Administration (FDA) in late February 2012.[8]

Current influenza vaccine manufacturing processes rely on eggs and are vulnerable to interruption because of an inadequate egg supply.[5] Mammalian cell cultures have been developed as an alternative to eggs for vaccine production. Cell-based inactivated influenza vaccines have been introduced in Europe, but not the United States where phase 3 clinical testing is underway. Cell-based live, attenuated influenza vaccines are in phase 1 and 2 clinical testing in the United States.

Influenza vaccines with adjuvants have been approved in Europe (e.g., an 2009 H1N1 vaccine containing oil-in-water adjuvants) and studied in the United States (phase 3 clinical trials).[5] Adjuvants augment the immune response to antigens.

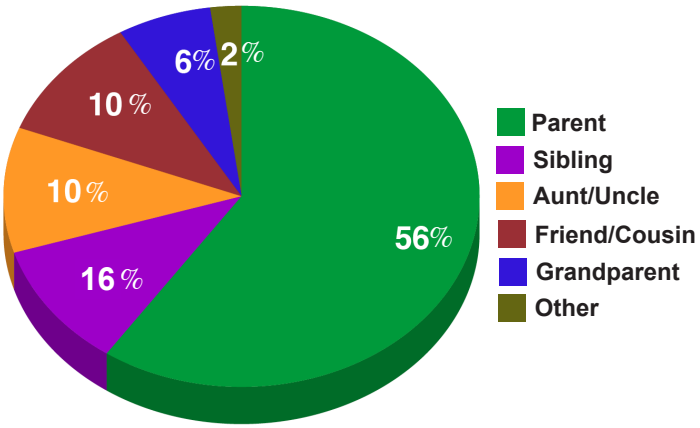
A recombinant trivalent protein-based influenza vaccine has been produced using recombinant DNA technology after sequencing the genes encoding the hemagglutinin on the influenza virus surface.[5] An application for approval of such a product has been submitted to the FDA.

Other approaches to influenza vaccine production or delivery include the use of noninfectious virus-like particles for vaccine production and viral vectors for delivery of viral proteins to the immune system.[5] A universal vaccine that provides long-lasting protection against multiple influenza strains despite antigenic drift is sought. Progress has been made in developing such a product, with FDA approval anticipated as early as 2013.[9]

Question: Why has pertussis been in the news lately? What can be done to improve protection against it?

Outbreaks of pertussis (whooping cough) have been reported in Michigan, Ohio, and California (e.g., 9143 cases and 10 infant deaths during 2010 in California).[10] In the United States there were 16,858 cases and 12 infant deaths in 2009 despite high rates of childhood immunization against pertussis as part of the recommended diphtheria, tetanus, and pertussis vaccination series.[11] The outbreaks in adults reflect waning immunity. The source for most pertussis infections in young infants (6 months of age or younger) is household members (Figure 1).[12] Following current ACIP recommendations to immunize adolescents and adults against pertussis can protect infants and children from infection and boost immunity in vaccine recipients.

Figure 1. Sources of Infant Pertussis Infection



Source: Reference 12.

When the Tdap vaccine first became available in 2006, ACIP recommended it for adolescents 11-12 years of age, persons <65 years of age who have contact with infants, and health-care personnel. Persons who had received the tetanus and diphtheria (Td) vaccine within the preceding 2 years were advised to avoid Tdap because of safety concerns.[13] The Tdap vaccine was not contraindicated during pregnancy, but it was not specifically indicated for pregnant women.

Updated ACIP recommendations were released in 2011, with Tdap recommended for all persons 7 years of age and older (including elderly persons 65 years of

age or older) who have contact with infants less than 12 months of age.[11] Administration of Tdap also is recommended for adolescents 11-18 years of age who have completed the recommended childhood vaccination series and adults 19-64 years of age who have not previously received Tdap, regardless of anticipated content with infants. In late February 2012, ACIP recommended Tdap for all persons 65 years of age or older who have not received the vaccine regardless of contact with infants.[14] Thus, virtually every person 11 years of age or older is a candidate for Tdap if the vaccine was not received previously.

ACIP now recommends that pregnant women who have not been previously vaccinated with Tdap should receive the vaccine during the third trimester or late second trimester (after 20 weeks gestation).[15] If Tdap was not administered during pregnancy, it should be administered immediately postpartum, according to ACIP.[15]

The safety of administering Tdap within less than 2 years after a tetanus- or diphtheria-containing vaccine was demonstrated in a large study of healthcare personnel, including pregnant women and persons 65 years of age or older.[16] ACIP now recommends the administration of Tdap without delay when it is indicated, regardless of the interval since the last tetanus- or diphtheria-containing vaccine.[11]

Additional ASHP Advantage Educational Activities

Visit the ASHP Advantage website to browse listings of convenient on-demand continuing education (CE) activities as well as publications, podcasts, and live webinars. More than 40 hours of free on-demand CE programming are available. Learn more and find a full listing of topics and activities at www.ashpadvantage.com.

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