Immunization 2011: Expanding Coverage, Enhancing Protection

This issue marks the fifth consecutive year that the Advisory Committee on Immunization Practices (ACIP) Adult Immunization Schedule has appeared in *Annals of Internal Medicine*. The Adult Immunization Schedule, endorsed by the American College of Physicians (ACP), applies to persons aged 19 years or older, whereas the immunization schedule for children and adolescents applies to persons aged 18 years or younger. Because internists care for adolescents and younger adults, this discussion also highlights a few key changes in the adolescent immunization schedule.

**Influenza Vaccination: Expanded Coverage, New Formulations**

The universal influenza vaccination recommendation now applies to everyone older than 6 months. Fortunately, that expanded coverage also coincides with greater availability of the vaccine. Five companies—GlaxoSmithKline, CSL, Novartis, Medimmune, and sanofi-pasteur—now manufacture influenza vaccine. The Centers for Disease Control and Prevention project that 160 million doses of vaccine will be available for the 2010–2011 flu season, meaning that more flu vaccine is available than ever before.

A high-dose formulation of the influenza vaccine, Fluzone High-Dose (sanofi-pasteur, Stillwater, Pennsylvania), is a new choice for persons aged 65 years or older. This inactivated vaccine contains 4 times more hemagglutinin per dose than the standard influenza vaccine and was designed to improve immune response. Disadvantages, however, include increases in injection-site reaction and cost (Fluzone High-Dose is almost double the price of the standard inactivated influenza vaccine).

The live attenuated nasal influenza vaccine is also an option for healthy, nonpregnant persons aged 2 through 49 years. Pregnant women are at high risk for influenza complications but should receive inactivated vaccine.

**Pneumococcal Vaccine: Clarifying Revaccination Strategy**

Revisions in the footnotes elucidate whether and when to revaccinate with pneumococcal vaccine. The schedule recommends 1-time revaccination after 5 years for persons younger than 65 years who have high-risk conditions (for example, chronic renal failure, the nephrotic syndrome, sickle cell disease, or splenectomy) or who are immunocompromised.

The footnotes also guide practitioners on what to do when previously vaccinated patients reach 65 years of age: These patients should receive 1-time revaccination if more than 5 years have passed since the last vaccination and the patient was younger than 65 years at the time of the primary vaccination.

**Human Papillomavirus Vaccine: Answers and Questions**

Human papillomavirus (HPV) types 6 and 11 cause 90% of cases of genital warts. Types 16 and 18 are linked to 70% of cases of cervical cancer and are also linked to vaginal and vulvar cancer. A growing body of evidence also links HPV types 16 and 18 to oropharyngeal cancer; penile cancer; and anal cancer, which is more common in men who have sex with men, especially if they are HIV positive.

The HPV vaccine is a prophylactic vaccine: It is most efficacious when given before exposure to HPV virus, which usually occurs at the onset of sexual activity. Two HPV vaccines currently exist. The quadrivalent vaccine (HPV4) provides protection against HPV types 6, 11, 16, 18 and is approved by the U.S. Food and Drug Administration (FDA) for males (to prevent genital warts) and for females aged 9 through 26 years (to prevent genital warts and genital cancer and precancer). In contrast, the bivalent vaccine (HPV2) provides protection against HPV types 16 and 18, but it is FDA approved only for females through age 26 years (to prevent cervical cancer and precancer). On 17 November 2010, an FDA advisory panel recommended expanding HPV4 indications to include prevention of anal intraepithelial neoplasia in both males and females aged 9 through 26 years.

The word “females” appears in parentheses after “HPV vaccine” in the adult immunization schedule; this is also a new addition in the adolescent schedule. Although the intent of adding “females” was for clarification, this addition actually sows confusion. “Females” was added to highlight that routine vaccination is recommended only for girls and young women; the ACIP granted only a permissive recommendation for boys and young men because of concerns about cost-effectiveness. The result is that the HPV vaccine may be given to young males but is not routinely recommended.

**Tetanus, Diphtheria, Pertussis Vaccination: A Family Affair**

Data from the 2009 National Notifiable Diseases Surveillance System of the Centers for Disease Control and Prevention show a surge in pertussis-related deaths in infants over the past 10 years. New pertussis vaccination recommendations focus on cocooning infants and young children in a circle of familial protection, thus preventing the spread of this fatal disease through family contact. Household members are responsible for up to 83% of transmission to infants. This phenomenon results from waning pertussis protection from childhood immunization and is the reason why a tetanus, diphtheria, pertussis (Tdap) booster for adolescents, in place of 1 tetanus and...
diphtheria (Td) toxoid vaccine dose, was initially instituted. Unvaccinated new mothers (and fathers) are urged to get a Tdap booster before leaving the hospital after the baby is delivered. In addition, grandparents are now encouraged to get a Tdap booster.

The 2011 schedule extends single-dose Tdap vaccination to adults aged 65 years or older who will have contact with babies. This recommendation is unusual because FDA approval for all currently available Tdap vaccines stops after age 64 years. Favorable vaccine safety and efficacy data for Tdap use in adults aged 65 years or older was presented at the October 2010 ACIP meeting, and these data have been submitted to the FDA.

The new Tdap recommendation also simplifies administration by removing the barrier of an interval between Tdap vaccination and last Td vaccination. The recommendations are for direct immunization with Tdap as soon as feasible, regardless of the interval since the last tetanus- or diphtheria-containing vaccine was received. Physicians and other health care professionals should be vigilant about their own immunization to close the circle of protection—that is, they should get vaccinated with Tdap.

Meningococcal Vaccination: Age Clarification and Booster for Kids

Language revisions in the footnotes to the adult immunization schedule explain the appropriate vaccine for adults according to age: meningococcal quadrivalent vaccine (MCV4) for adults aged 55 years or younger and the meningococcal polysaccharide vaccine (MPSV4) for adults aged 56 years or older.

An important change was also made in the meningococcal adolescent vaccine program. In 2005, when the meningococcal vaccine was originally licensed, protection was believed to last for 10 years. New data show that protection lasts only 5 years. This means that meningococcal vaccination at age 11 years does not provide lasting immunity through high-risk years, including those spent living in a college dormitory (9). The new recommendation adds a booster at age 16 years in addition to initial vaccination at age 11 to 12 years, which is an off-label use of the vaccine. The decision to recommend a 2-dose regimen was heavily influenced by the deadly and devastating nature of meningococcal infection. Although this 2-dose regimen is one of the most expensive vaccine regimens currently recommended, it is also expected to prevent the greatest number of cases of meningococcal disease (10, 11).

Final Thoughts: Get Vaccinated!

Universal influenza vaccination includes health care workers—all of us. In the past year, the American Medical Association (12), the Society for Healthcare Epidemiology of America with endorsement by the Infectious Diseases Society of America (13), the American Academy of Pediatrics (14), and the ACP (15) have strengthened their existing policies on influenza vaccination for health care workers. New ACP policy declares that “health care workers who cannot receive flu vaccines due to medical or religious contraindications should either be reassigned to non-patient care areas during influenza season or wear a mask at all times during influenza season in the context of patient care.” Influenza vaccination of health care workers is undoubtedly a patient safety issue. We must each do our part to reach the goal of 100% flu vaccination. Get vaccinated today!

Note added in proof: The HPV4 vaccine received FDA approval on 22 December 2010 for anal cancer prevention in males and females aged 9 to 26 years.

Sandra Adamson Fryhofer, MD
Emory University
Atlanta, GA 30309

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Requests for Single Reprints: Sandra Adamson Fryhofer, MD, Emory University, 1938 Peachtree Road, Suite 502, Atlanta, GA 30309.


