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August is National Immunization Awareness Month

Pertussis Vaccination: Big Whoop!

Recently, controversy has surrounded vaccination against *Bordetella pertussis*, and for once the concern does not involve the dangers of vaccination. It seems our childhood immunity isn't what we'd like it to be. Studies have shown that pertussis infections may occur as early as five years after vaccination. Unfortunately, the highest incidence of morbidity lies within the infant and adult population and is lower in grade school children and teens.[1] A recent article describes a pertussis outbreak involving a fellow SEC school which had up to 13% of its undergraduate population sick with whooping cough.[2] Vanderbilt student health center officials estimated that numerous students fit the CDC criteria for whooping cough infection, which is an otherwise unexplained cough that persists greater than two weeks and may or may not include paroxysms of cough, whoops or post-tussive emesis. Very few of the infected had serious enough infections to present to the clinic.[2] Henceforth, new recommendations from the CDC include the addition of an acellular pertussis component to the tetanus booster vaccine given every 10 years. The Tdap (Tetanus, diphtheria, acellular pertussis, Boostrix® or Adacel®) shot is recommended at age 10-11 and once again around age 20 (Adacel® only)[1]. Adult pertussis infection is typically not that serious, but it can lead to missed days of school or work. However, it is hypothesized these adult cases serve as a reservoir for childhood infections, which can be very serious. So if you haven't had your Tdap shot yet, be sure to get vaccinated and contribute to community immunity.

1. Raguckas SE. VandenBussche HL. Jacobs C. Klepser ME. Pertussis resurgence: diagnosis, treatment, prevention, and beyond. *Pharmacotherapy*. 2007;27(1):41-52.
2. Craig AS. Wright SW. Edwards KM. Greene JW. Haynes M. Dake AD. Schaffner W. Outbreak of pertussis on a college campus. *Am J Med. 2007;120(4):364-8.*

Gardasil's® Fact and Fiction

Gardasil® is the highly publicized Human Papillomavirus (HPV) vaccine that is 92-100% effective against HPV types 6, 11, 16, and 18 in HPV 6, 11, 16, and 18 naive patients.[1] HPV is a growing health concern; it is estimated that over 2 million females in the US have active HPV-6, 11, 16, or 18.[2] This estimate does not include females with latent virus. Recently, Gardasil® has been the victim and benefactor of many misconceptions. Myth#1: Gardasil® prevents cervical cancer. This myth is mostly correct. Gardasil® can prevent the HPV types that cause about 70% of cervical cancer.[3] Most commonly, HPV 16, 18, and 45 cause cervical cancer. So, Gardasil® does not prevent all causes of cervical cancer as HPV 45 can cause cervical cancer, but it does prevent most causes. Myth #2: there are numerous severe adverse events with Gardasil® use. This myth cost the Australian producer (CSL Limited) of Gardasil® over 1 billion Australian dollars in market value.[4] On May 22, 4 out of 25 high school students in Melbourne, Australia

experienced hyperventilation, palpitations, or neurological adverse events after their first Gardasil® dose. This caused people to believe it must have been vaccine, which lead to CSL.AX stock price to lose over 4.6 % of its value in the week to follow. However, the patient with palpitation had a history of heart palpitation, and the other students recovered after observation only. Furthermore, adverse events in studies with over 6,000 patients have revealed no statistically significant increases in these adverse events.[1] Whether this event was the result of a psychological effect experienced by the student or a "hot lot" of Gardasil® is still unknown.
In conclusion, if females receive all three Gardasil® administrations at least two months prior to contact with HPV 6; 11; 16; or 18, they can significantly reduce their risk of developing genital warts or cervical cancer. Patients should be warned of injection site pain among others, but they can be assured that severe adverse reactions are rarely associated with this vaccine.

1. Miller NB. Clinical review of biological license application for Human Papillomavirus 6, 11, 16, 18 L1 virus like particle vaccine (S. erevisia) (STN 125126 GARDASIL), manufactured by Merck, Inc. 2006 Jun 8. Available from: http://www.fda.gov/cber/review/hpvmer060806r.pdf.
2. Dunne EF, Unger ER, Sternberg M, McQuillan G, Swan DC, Patel SS, et al. Prevalence of HPV infection among females in the United States. JAMA. 2007 Feb 28; 297 (8): 813-819.
3. Knodel LC. Sexually transmitted disease. In: Dipiro JT, Talbert RL, Yee GC, Matzke GR, Wells BG, Posey LM, editors. Pharmacotherapy a pathophysiologic approach. 6th ed. New York: McGraw-Hill; 2005. p. 2115.
4. Chapman S, MacKeinze R. Fainting schoolgirls wipe $A1bn off market value of Gardasil firm. Br Med J. 2007 Jun 9; 334(7605):1195.

Pneumococcal vaccine … who should get it… The 23-valent Pneumococcal polysaccharide vaccine (PPV23) contains inactivated viruses of 23 disease-causing strains of *Streptococcus pneumoniae*, the most common cause of bacterial community-acquired pneumonia. The recommendation of who should receive PPV23 has not changed in the last decade, but to refresh the following table contains the CDC recommendations.[2] In addition to the table, the CDC recommends evaluating everyone between 50 and 64 years of age to see if he/she is unknowingly a member of the high risk group. If the patient is asplenic or immunocompromised, revaccinate in 3 years if ≤10 years of age and 5 years if >10 years of age.

Group	Examples	Recommendation
≥ 65 years of age yoa	Anyone in that group	One time immunization. No revaccination.
High risk group between the ages of 2 and 64 yoa	Cardiovascular or Chronic pulmonary disease (NOT asthma), Diabetes mellitus, alcoholism, cirrhosis, or CSF leakage	One time immunization. No revaccinate until 65 yoa.
Anatomic asplenia Between the ages of 2 and 64 yoa .	Sickle cell disease or asplenic	If possible, give vaccine 2 weeks prior to splenectomy. No revaccinate until 65 yoa.
Immunocompromised Between the ages of 2 and 64 yoa .	HIV, Leukemia or malignancy, Chronic kidney failure, organ or bone transplant, long term corticosteroid use	Give to all patients. No revaccinate until 65 yoa.
Live in high risk area	Native American Alaskan Natives	Give to all patients. No revaccinate until 65 yoa.

1. Glover ML, Reed MD. Lower Respiratory Tract infections. In: Dipiro JT, Talbert RL, Yee GC, Matzke GR, Wells BG, Posey LM, editors. Pharmacotherapy a pathophysiologic approach 6th ed. New York: McGraw-Hill; 2005. p. 1951-1952.
2. ACIP. Prevention of Pneumococcal disease: recommendations of the Advisory Committee on Immunization Recommendations. 1997 Apr 4; 46(RR-08): 1-24.

Gram negative diplococci… There are two meningococcal vaccines available in the United States, Meningococcal conjugate vaccine (MCV4, Menactra®) and Meningococcal polysaccharide vaccine (MPSV4, Menomune®). The preferred vaccine for people of ages 11 – 55 years is the MCV4; the polysaccharide vaccine has been developed for kids of ages 2 – 10 and can be substituted for MCV4 when it is unavailable. These vaccines prevent bacterial meningitis and sepsis caused by *Neisseria meningitidis* (serogroups A, C, Y and W-35), a Gram negative organism that arranges in diplococci. Not everyone needs to be vaccinated for meningococcal meningitis.

People who should be vaccinated include:

- college freshmen living in a dormitory
- military personnel
- people who have a damaged spleen or are asplenic (*N. meningitidis* is encapsulated)
- people who have complement deficiencies
- microbiologists who are routinely exposed to *N. meningitidis*
- people traveling or residing in countries in which the disease is hyperendemic

Also, it is now recommended that all children ages 11 – 12 received the vaccination. The disease is not that common, but when infection occurs, the symptoms and sequelae can be severe. Death may occur as rapidly as within 24 – 48 hours.[1] Common symptoms of *N. meningitidis* infection include stiff neck, fever, petechial bruising, headache, vomiting and seizures.[1,2] The bacterium is spread by contact with respiratory secretions such that may occur from coughing, kissing, sneezing and sharing drinking vessels. Household members of infected patients are at a greatly increased risk of transmission.[1] And you thought the worst kissy-kissy disease was mononucleosis!

1. Meningococcal disease in-short. Centers for Disease Control and Prevention, Atlanta, Georgia. [monograph on the internet] 2007. [Cited 2007 July 20]. Available from: http://www.cdc.gov/vaccines/vpd-vac/mening/in-short-both.htm
2. Meningitis: topic overview. WebMD Medical Reference from Healthwise, Boise, Idaho. [monograph on the internet] 2007. [Cited 2007 July 20]. Available from: http://www.webmd.com/a-to-z-guides/Meningitis-Topic-Overview

Pharmacists and Immunizations… In 1994 the first organized immunization training for a group of 50 pharmacists was held in Seattle, today pharmacists can administer immunizations in 44 states, including Alabama.[1,2] The American Pharmacists Association guidelines for pharmacy-based immunization advocacy states pharmacists should adopt one of three levels of involvement: 1) pharmacist as educator, 2) pharmacist as facilitator, 3) pharmacist as immunizer.[2] Studies have proven the effectiveness of pharmacists in increasing immunization rates in certain populations and it is believed that the national movement towards pharmacist-administered immunizations may play a very big role in advancing the pharmacy profession beyond dispensing to more direct patient care.[1,3] For more information on pharmacists as immunizers, visit the American Pharmacists Association website at www.aphanet.org.

1. Hogue MD, Grabenstein JD, Foster SL, Rothholz MC. Pharmacist involvement with immunizations: a decade of professional advancement. J Am Pharm Assoc. 2006;46:168-182
2. American Pharmacists Association [Homepage on the internet]. Washington, DC: [cited on 19 Jul 2007]. Available from: http://www.aphanet.org/AM/Template.cfm?Section=Patient_Care_Services&Template=/TaggedPage/TaggedPageDisplay.cfm&TPLID=61&ContentID=3196
3. Loughlin SM, Mortazavi A, Garey KW, Rice GK, Birtcher KK. Pharmacist-managed vaccination program increased influenza vaccination rates in cardiovascular patients enrolled in a secondary prevention lipid clinic. Pharmacotherapy. 2007;27(5):729-733.

Flu season is around the corner… Influenza viruses infect up to 20% of the population every year in the United States. Of those infected, more that 200,000 people are hospitalized and 36,000 people die.[1] Flu season generally lasts from about October to May. The best way to protect yourself from the flu virus is to get a flu shot, and the best time to do so is October or November.[2] The vaccines are available as either an inactivated form administered via IM injection or a live attenuated vaccine (LAIV) administered intranasally. Clinical trials have shown similar efficacy between the two vaccines, however, they are not considered interchangeable.[3] The intranasal product is indicated for individuals aged 5 to 49 years and should not be used in individuals with a high risk of complications from influenza infection. The IM product, on the other hand, is indicated for individuals aged 6 months and up.

The table below indicates the recommendations brought forth by the Advisory Committee on Immunization Practices (ACIP) and the Centers for Disease Control and Prevention (CDC) on who should and who should not receive an annual influenza vaccination.[1,2]

Vaccination is recommended	Vaccination is NOT recommended
▪ Children aged 6-59 months ▪ Pregnant women ▪ Persons aged 50 years and up ▪ Persons of any age with certain chronic medical conditions ▪ Household contacts who have frequent contact with persons at high risk ▪ Persons who live in nursing homes and other long term care facilities ▪ Health-care workers	▪ Persons with a severe allergy to chicken eggs ▪ Persons who have had a severe reaction to an influenza vaccination in the past ▪ People who developed Guillain-Barre syndrome within 6 weeks of getting an influenza vaccine previously ▪ Children less than 6 months of age ▪ Persons with moderate to severe illness with a fever

1. Centers for Disease Control and Prevention [Homepage on the internet]. Atlanta, GA: [cited on 19 Jul 2007]. Available from: http://www.cdc.gov/flu/keyfacts.htm
2. Fiore AE, Shay DK, Haber P, Iskander JK, Uyeki TM, Mootrey G, et al. Prevention and Control of Influenza: Recommendations of the Advisory Committee on Immunization Practices (ACIP), 2007. MMWR. 2007 Jun 29;56:1-54.
3. Treanor JJ, Kotloff K, Betts RF, Belshe R, Newman F, Iacuzio D, et al. Evaluation of trivalent, live, cold-adapted (CAIV-T) and inactivated (TIV) influenza vaccines in prevention of virus infection and illness following challenge of adults with wild-type influenza A (H1N1), A (H3N2), and B viruses. Vaccine. 1999;18:899-906.

The last "dose" …

"The saddest aspect of life right now is that science gathers knowledge faster than society gathers wisdom."

Isaac Asimov [1920 – 1992]

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