

## INFORMATION PAPER

DHA-IHB  
3 May 2016

SUBJECT: Meningococcal Disease and Meningococcal Vaccines

1. Purpose. To describe meningococcal disease and the vaccines to prevent it.

2. Facts.

a. Microbiology. *Neisseria meningitidis*, or meningococcus, is an aerobic, gram-negative diplococcus, closely related to *N. gonorrhoea* and to several nonpathogenic *Neisseria* species, such as *N. lactamica*. *N. meningitidis* has both an inner and outer membrane, separated by a cell wall. The outer membrane contains several protein structures that enable the bacteria to interact with the host cells as well as perform other functions. The outer membrane is surrounded by a polysaccharide capsule that protects the organism from phagocytosis and complement-mediated lysis. There are thirteen distinct serogroups, which are based on the characteristics of the polysaccharide capsule. However, only 5 serogroups of *N. Meningitidis* (A, B, C, W, and Y) cause the majority of disease,

b. Disease. *N. meningitidis* colonizes mucosal surfaces of the nasopharynx and is transmitted through direct contact with respiratory droplet secretions from infected individuals and asymptomatic carriers. Humans are the only host. Meningococcal disease is a serious health threat, causing meningitis (inflammation of membranes around the brain and spinal cord), or blood infections (meningococccemia). Treatment varies, dependent on the cause and severity of illness. Viral meningitis is generally less severe and resolves without specific treatment. Bacterial meningitis can be extremely severe resulting in brain damage, hearing loss, or learning disability. For bacterial meningitis, it is important to know which type of bacteria is causing the meningitis because antibiotics can prevent some types from spreading and infecting other people. Common symptoms in individuals aged 2 years and older, which develop over several hours, or can take 1 to 2 days, include high fever, headache, and stiff neck. Other symptoms include nausea, vomiting, confusion, sleepiness, and discomfort looking into bright lights. In newborns and small infants, the classic symptoms may be difficult to detect. The infant may appear slow, inactive, and/or irritable; experience vomiting, or loss of appetite. As the disease progresses, individuals of any age may develop seizures. Meningococcal disease can be disfiguring or disabling (i.e., limb amputations, hearing loss, brain damage) in up to 20% of those who recover.

c. Epidemiology. Meningococcal disease occurs worldwide in both endemic and epidemic form. Despite the use of effective antibiotics, meningococcal disease still results in death for 10% to 14% of those who become ill. Of note, outbreak-associated cases are associated with a higher case-fatality rate than sporadic cases (21% vs. 11%). Of the many serotypes of meningococcal bacteria, serotype A disease occurs primarily in Africa (in the “meningitis belt”) and Asia; serotype B accounts for more than 50% of

meningococcal disease in infants aged 1 year and younger; and serotypes C, Y, and W-135 cause more than 75% of illness in persons aged 11 years and older. Serious (also called invasive) meningococcal disease occurs most often in infants younger than 1 year of age and surges a second time in adolescence. High-risk groups include college freshmen and military trainees living in dormitories (likely due to crowded living conditions), people with immune deficiencies, travelers to areas where the disease is endemic (sub-Saharan Africa), and people who do not have a spleen or whose spleen is not functioning (as in sickle-cell anemia).

d. Vaccine. There are three types of meningococcal vaccines available in the United States: Meningococcal conjugate vaccines (Mentactra®, MenHibrix® and Menveo®)

e. Immunization.

(1) Routinely, all healthy 11–12 year olds should be vaccinated with a quadrivalent (protects against serogroups A, C, W, and Y) meningococcal conjugate vaccine (Menactra® [9mo-55yrs] or Menveo® [2mo-55yrs]). A booster dose is recommended at age 16 years. For adolescents who receive the first dose at age 13 through 15 years, a booster dose should be administered, preferably at age 16 through 18 years, before the period of increased risk. Adolescents who receive their first dose of quadrivalent meningococcal conjugate vaccine at or after age 16 years do not need a booster dose.

(2) When quadrivalent meningococcal conjugate vaccine was first recommended for adolescents in 2005, the expectation was that protection would last for 10 years; however, currently available data suggest it wanes in most adolescents within 5 years. Based on that information, a single dose at the recommended age of 11 or 12 years may not offer protection through the adolescent years at which risk for meningococcal infection is highest (16 through 23 years of age).

(3) For patients who are about to start college and got their first dose of quadrivalent meningococcal conjugate vaccine more than 5 years ago, it is recommended that these patients receive a booster dose of quadrivalent meningococcal conjugate vaccine.

(4) For patients younger than 16 years who you might not see again, it's recommended that you use clinical judgment in a situation where you may not have another opportunity to provide the booster dose to this patient. The minimum interval between doses is 8 weeks.

(5) For children at high risk (absent or poorly functioning spleen, have a complement deficiency, are traveling to, or living in, an endemic area, or exposed during an outbreak) should be vaccinated with either Menactra or Menomune.

(6) Adults considered at high risk should receive a two-dose primary series 2 months apart and then get a booster dose every 5 years of a quadrivalent meningococcal conjugate vaccine if:

(a) They have complement component deficiency (e.g., C5-C9, properdin, factor H, factor D, or are taking Soliris®).

(b) They have functional or anatomic asplenia.

(c) They are a microbiologist who is routinely exposed to *Neisseria meningitidis* (the causal pathogen).

(d) They are traveling or residing in countries in which the disease is common.

(e) They are part of a population identified to be at increased risk because of a serogroup A, C, W or Y meningococcal disease outbreak.

(f) They are a first-year college student living in a residence hall.

(g) They are a military recruit

(7) **Meningococcal polysaccharide vaccine** (Menomune®). Menomune - A/C/Y/W-135, Meningococcal Polysaccharide Vaccine, Groups A, C, Y and W- 135 Combined [≥2 yrs], is a vaccine for subcutaneous injection. Persons who were vaccinated at age 7 years or older and are at prolonged increased risk should be revaccinated 5 years after their previous meningococcal vaccine. Persons who were vaccinated at ages 2 through 6 years and are at prolonged increased risk should be revaccinated 3 years after their previous meningococcal vaccine. Adults 56 years of age and older at high risk outlined above should receive the meningococcal polysaccharide vaccine.

(8) **Serogroup B meningococcal vaccines** (Bexsero® and Trumenba®) Serogroup B meningococcal vaccines are only routinely recommended for people 10 and older identified as being at increased risk, either because of a serogroup B meningococcal disease outbreak, being routinely exposed to isolates of *Neisseria meningitidis* occupationally, or certain medical conditions. Those conditions include complement component deficiencies (e.g., C5-C9, properdin, factor H, factor D, or are taking Soliris®) and functional or anatomic asplenia. The AICP, while not recommending, does leave to clinicians judgement the use of serogroup B meningococcal vaccines for people 10 through 25 years of age consistent with the labeled indication.

(a) Bexsero (MenB-4C) is licensed as a 2-dose series, with doses administered at least 1 month apart. Safety and immunogenicity data regarding MenB-4C when co-administered with vaccines routinely administered to U.S. adolescents are not available.

(b) Trumenba (MenB-FHbp) is licensed as a 3-dose series, with the second and third doses administered 2 and 6 months after the first dose.

(9) MenB vaccine should be administered as either a 2-dose series of MenB-4C or a 3-dose series of MenB-FHbp. The same vaccine product should be used for all doses. Based on available data and expert opinion, MenB-4C or MenB-FHbp may be administered concomitantly with MenACWY vaccines, but at a different anatomic site, if feasible.

(a) Both MenB vaccines are approved for use in persons aged 10–25 years; however, because the ACIP feels there are no theoretical differences in safety for persons aged >25 years compared with those aged 10–25 years, the ACIP supports routine use of MenB vaccines in persons aged ≥10 years who are at increased risk for serogroup B meningococcal disease. **These recommendations do not apply to children aged <10 years.** These persons include:

- (i) Persons with persistent complement component deficiencies.
- (ii) Persons with anatomic or functional asplenia.
- (iii) Microbiologists routinely exposed to isolates of *Neisseria meningitidis*.

(iv) Persons identified as at increased risk because of a serogroup B meningococcal disease outbreak.

(b) The vaccine is not currently recommended for routine use in first-year college students living in residence halls, military recruits, or all adolescents.

(c) Both MenB vaccines are not recommended for persons who travel to or reside in countries where meningococcal disease is hyperendemic or epidemic because the risk for meningococcal disease in these countries generally is not caused by serogroup B.

(d) Before administering MenB vaccines, providers should consult the package insert for precautions, warnings, and contraindications.

#### 4. References.

a. Centers for Disease Control and Prevention. Use of Anthrax Vaccine in the United States. Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2015; 64(22):608-612

b. CDC disease information: <http://www.cdc.gov/vaccines/vpd-vac/mening/who-vaccinate-hcp.htm>

DHA-IHB Information Paper

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c. Multiple resources (e.g., product insert, Vaccine Information Statements, etc.)  
assembled by DHA-IHB: <http://www.health.mil/meningococcal>

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