

Meningococcus can be devastating — claiming a child's life in hours. Although infants less than 1 year of age are at the highest risk of getting this disease, adolescents and teens are most likely to die from it. One meningococcal vaccine that protects against four of the five types of meningococcus is recommended for all adolescents and teens and for some infants. A newer vaccine, specific for type B meningococcus, is recommended for some high-risk groups as well as for adolescents between 16 and 18 years of age.

Q. What is meningococcus?

A. Meningococcus is a bacterium. Meningococcal bacteria live on the lining of the nose and throat and are spread from one person to another by close personal contact. Occasionally, the bacterium enters the bloodstream and causes severe disease.

Five different types of meningococcal bacteria, classified on the basis of a complex sugar that coats the bacteria (called polysaccharide), cause virtually all meningococcal disease in the world. These five different types of meningococcal bacteria are called types A, B, C, Y and W-135.

Q. Is meningococcus dangerous?

A. Yes. Every year in the United States approximately 500 people are infected with meningococcus and as many as 50 die from the disease. Also, about one



of every five survivors live the rest of their lives with permanent disabilities, such as seizures, loss of limbs, kidney disease, deafness and mental retardation. The highest incidence of meningococcal disease occurs in infants less than 1 year of age. In children between 2 and 10 years of age, the incidence of meningococcal infections is low, but starting in adolescence the incidence of disease rises. Although adolescents are less likely to be infected than infants, they are more likely to die when infected. Meningococcal bacteria are particularly dangerous because they rapidly make large quantities of a poison called endotoxin. Endotoxin damages blood vessels and causes low blood pressure and shock. For this reason, meningococcal bacteria can kill people soon after they enter the bloodstream. Children can be perfectly healthy one minute and dead four to six hours later; the disease can be so rapid and overwhelming that even appropriate, early medical care may not be sufficient. Because

outbreaks occur in colleges, schools, childcare centers, army barracks and other areas where people have close contact, meningococcal infections often cause panic in the community.

Q. What are the symptoms of meningococcal infection?

A. Meningococcus infects the bloodstream (causing sepsis) as well as the lining of the brain and spinal cord (causing meningitis). Symptoms of sepsis include fever, chills, rash, low blood pressure and dark purple spots on the arms and legs. Symptoms of meningitis include fever, headache, confusion and stiff neck.

Q. Is there a vaccine to prevent meningococcus?

A. Yes. Two different vaccines are now available. The vaccine recommended for all adolescents between 11 and 12 years of age protects against four of the five different types of meningococcus (A, C, Y and W-135), but not meningococcus type B. The second vaccine protects against meningococcus type B, which accounts for two-thirds of all meningococcal disease in infants and one-third of cases in adolescents. This vaccine is currently recommended for high-risk groups, including those with complement deficiencies, no spleen or a spleen that does not function, lab personnel regularly exposed to the bacteria, and individuals or groups at risk during an outbreak, such as on a college campus. The vaccine has also been recommended for all adolescents between 16 and 18 years of age.

Q. How are the meningococcal vaccines made?

A. The meningococcal vaccine currently recommended for all 11- to 12-year-olds is made using the complex sugar (called polysaccharide) that resides on the surface of the bacteria. Polysaccharides are stripped from the surface of four of the five different types of meningococcal bacteria that cause disease (types A, C, Y and W-135) and each is linked (conjugated) to a harmless protein. The four conjugated polysaccharides are combined into a single shot and protect against four different types of meningococcal bacteria. High-risk infants can also get this version (Menactra®) or one of two similarly manufactured versions (Menveo®). Menveo, like Menactra, contains types A, C, Y and W-135.

The meningococcal serogroup B vaccines, Trumenba® and Bexsero®, contain two or four proteins, respectively, that reside on the surface of the bacteria.

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Meningococcus: What you should know

Q. Are the meningococcal vaccines safe?

A. Yes. The meningococcal vaccines can cause pain or redness at the site of injection as well as low-grade fever, but because they are not made from whole bacteria, they cannot possibly cause bloodstream infections or meningitis.

Q. Do the meningococcal vaccines work?

A. Yes. The routinely recommended meningococcal vaccine protects recipients from most of the meningococcal disease caused by types in the vaccine, but not from type B. The type B vaccine will likely protect recipients against type B but not other types of meningococcus.

Q. Who should get the meningococcal vaccine?

A. The meningococcal vaccine currently recommended for all 11- to 12-year-olds — the one containing types A, C, W, and Y — is given in two doses. The first dose is recommended to be given between 11 to 12 years of age, and a booster dose is recommended at 16 years of age. If the first dose is given between 13 and 15 years of age, a booster dose should be given between 16 and 18 years of age. Any 16 to 18-year-olds who have not previously received this vaccine should also get a single dose, as should first-year college students through age 21 years who are living in residence halls and have not had the vaccine between the ages of 16 and 18 years.



High-risk infants between 2 and 23 months of age are recommended to receive two to four doses of meningococcal vaccine depending upon which product is used. Infants considered to be at high risk include those with complement deficiencies, those with no spleen or with a spleen that is not functional, those who live in an institution or in a community currently experiencing an outbreak and those who will be traveling to the Hajj or to a destination in Africa that is located in the meningitis belt.

Q. Who should get the new type B meningococcal vaccine?

A. People aged 10 years or older and who are considered to be at higher risk of infection should get two or three doses of the vaccine depending upon which one is used. High risk groups include those with complement deficiencies; no spleen or a spleen that does not function; lab personnel regularly exposed to the bacteria; and individuals or groups at risk during an outbreak, such as on a college campus. In addition, the type B meningococcal vaccine is recommended as two doses separated by six months for all 16- to 18-year-olds.

This information is provided by the Vaccine Education Center at Children's Hospital of Philadelphia. The Center is an educational resource for parents and healthcare professionals and is composed of scientists, physicians, mothers and fathers who are devoted to the study and prevention of infectious diseases. The Vaccine Education Center is funded by endowed chairs from Children's Hospital of Philadelphia. The Center does not receive support from pharmaceutical companies.

Q. Should college freshmen get the meningococcal vaccine?

A. Yes. All college freshmen, especially students living in dormitories, should receive the meningococcal vaccine containing types A, C, W, and Y if they have not had it between 16 and 18 years of age. College freshmen living in dormitories are five times more likely to get meningococcal disease than people of the same age who do not attend college.

Type B outbreaks of meningococcus have occurred in recent years on college campuses. Therefore, it would be of value for all incoming freshmen to receive the type B vaccine before college entry.

Q. If someone in my child's school gets meningococcal infection, what should I do?

A. Children in close contact with someone with meningococcal infection should receive an antibiotic to prevent the disease. Close contact with someone with meningococcal disease is defined as 1) living in the same house, 2) sharing the same preschool or daycare classroom during the week before illness, 3) kissing or sharing utensils or toothbrushes or 4) sitting next to the person on an eight-hour or longer flight. Antibiotics used to prevent meningococcal infection include rifampin, ceftriaxone, azithromycin and ciprofloxacin.

Q. Does the meningococcal vaccine prevent all cases of meningitis?

A. Neither of the meningococcal vaccines will prevent all cases of meningococcal meningitis since no vaccine is 100 percent effective. In addition, other bacteria, such as pneumococcus and *Haemophilus influenzae* type b (Hib), cause meningitis. Fortunately, vaccines to prevent pneumococcus and Hib are routinely given to all children before 2 years of age. Some viruses also cause meningitis, but meningitis caused by most viruses is usually not as severe as meningitis caused by bacteria.

