

Meningococcal Vaccination

Improving Rates in Adolescents and Reducing Racial, Ethnic and Socioeconomic Disparities



Call to Action



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Meningococcal disease, which includes meningitis and sepsis (bloodstream infection), is associated with considerable morbidity and mortality. It affects all age groups, but epidemiologic data show a notable risk among adolescents and young adults. Widespread use of meningococcal vaccination can protect against disease, benefiting adolescents, their close contacts and the public. For these reasons, the Centers for Disease Control and Prevention (CDC) and numerous professional organizations recommend routine meningococcal vaccination for all persons 11-18 years of age at the earliest opportunity, and for college freshmen living in dormitories who have not been vaccinated previously (Table 1).¹⁻⁵

Table 1: Meningococcal Vaccination Recommendations

- Routine vaccination of all persons 11-18 years of age with one dose of meningococcal conjugate vaccine (MCV4) at the earliest opportunity (optimally during a pre-adolescent health visit at 11-12 years of age)
- Vaccination* of persons 2-10 and 19 years and older who are at increased risk of meningococcal disease:
 - College freshmen living in dormitories
 - Microbiologists exposed to meningococcal bacteria
 - Military recruits
 - Anyone traveling to or living in parts of the world where meningococcal disease outbreaks are common
 - Anyone with terminal complement component deficiencies (an immune system disorder)
 - Anyone with anatomic or functional asplenia
 - Anyone who might have been exposed to meningococcal disease during an outbreak

*MCV4 is preferred for people 2-55 years of age in these risk groups. Meningococcal polysaccharide vaccine (MPSV4) can be used if MCV4 is not available and for adults over 55. Sources: CDC. *MMWR* 2005;54(RR-7):1; CDC. *MMWR* 2007;56(48):1265; CDC. *MMWR* 2007;56(31):794.

A recent survey of healthcare providers⁶ indicates that meningococcal vaccine coverage for teens is disappointingly low (32.4 percent), leaving far too many adolescents vulnerable to serious and deadly illness. This immunization rate is also well below the 90 percent goal established for most routine immunizations by *Healthy People 2010*, the Department of Health and Human Services' national preventive healthcare initiative.⁷

In addition to setting overall goals, another objective of *Healthy People 2010* is to eliminate health disparities, including differences in immunization rates, among different segments of the population.⁷ Although the gap in immunization rates between white and other populations has narrowed, disparities persist among ethnic and racial groups, across socioeconomic classes and ages, and according to geographic area. CDC has not yet reported meningococcal vaccination data by race or ethnicity, but with experience as a guide, we would expect disparities to emerge as more data become available.

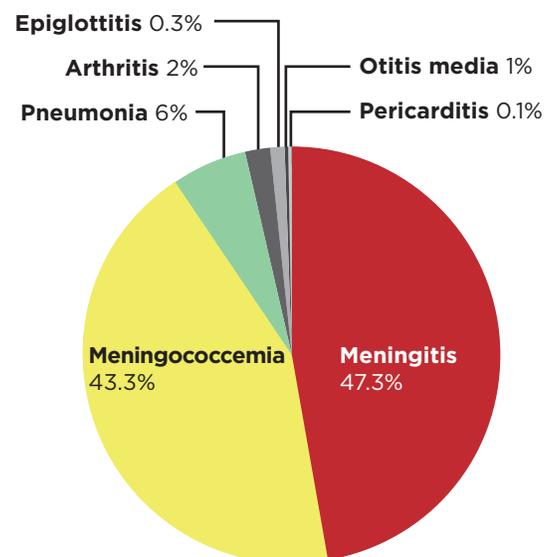
There is still much work to be done to lessen the burden of meningococcal disease. Our most urgent task is to achieve and maintain high immunization rates for meningococcal disease in all U.S. adolescents. Minority groups are expected to grow over the next few decades as a proportion of the total U.S. population, making it even more important to address and overcome possible disparities now. To ensure widespread immunization and equal access to care, it is imperative that healthcare providers and organizations act in a concerted and broad-based way. Such efforts are critical to help improve the health of adolescents in all racial, ethnic and socioeconomic groups.

Meningococcal disease is life-threatening

Meningococcal disease is a serious and potentially fatal illness caused by the bacterium *Neisseria meningitidis*. The most common presentation of meningococcal disease is meningitis, an inflammation of the membranes (meninges) and fluid surrounding the brain and spinal cord. *N. meningitidis* can also invade the bloodstream, causing meningococcal sepsis, or "meningococemia," which may occur either with or without meningitis (Figure 1).⁸ *N. meningitidis* is transmitted by respiratory droplets or secretions from person to person through coughing, sneezing and kissing.¹ Close and prolonged contact, such as occurs in college dormitories, facilitates the spread of the disease.

The incubation period is typically three to four days. Symptoms of meningitis include high fever, headache and neck stiffness, as well as sensitivity to light, confusion and vomiting. These symptoms can be confused with those of other diseases such as the flu. Meningococemia is often characterized by abrupt onset of fever and a prominent rash. The disease can progress quickly following symptom onset. Thus, even with early diag

Figure 1: Clinical Manifestations of Meningococcal Disease



Source: Rosenstein NE, et al. *J Infect Dis* 1999;180:1984.

nosis and appropriate antibiotic treatment, the disease can be fatal. The overall case-fatality rate of meningococcal disease in the U.S. is 10 to 14 percent.¹ Meningococemia is fatal in up to 40 percent of cases.⁹ Among survivors, the consequences often are devastating: as many as 20 percent experience digit or limb amputation, hearing loss, blindness, loss of speech and mental impairment.^{9,10} Other complications include kidney damage and adrenal gland failure.

Meningococcal disease incidence is cyclical

There are approximately 1,400 to 2,800 cases of meningococcal disease in the U.S. per year (a rate of 0.5-1.1/100,000 population).¹ Disease rates are markedly cyclical however, and can vary from year to year. The incidence is highest in infants but as numerous studies have shown, there is also a rise in incidence beginning in adolescence.¹¹

Meningococcal disease can be prevented

Thirteen serogroups of *N. meningitidis* have been identified, but only five—A, B, C, Y and W-135—are associated with invasive disease worldwide. The relative importance of these groups can vary by year, geographic location and other factors.⁹ Serogroups B, C and Y currently account for a large proportion of U.S. cases; serogroup B accounts for the greatest number of cases in infants, serogroups C and Y become more common in adolescents and young adults. In people 65 years of age and older, serogroup Y is most common (**Figure 2**).¹¹

Currently, two meningococcal vaccines are available in the U.S.: a meningococcal conjugate vaccine (MCV4) licensed in 2005 and a meningococcal polysaccharide vaccine (MPSV4) licensed in 1981. Both vaccines protect against four of the five disease-causing strains (A, C, Y and W-135). Neither vaccine includes protection against serogroup B disease, which accounts for the highest incidence among young infants. Although both vaccines are immunogenic, MCV4 is expected to provide a longer duration of protection. MCV4 is recommended for routine vaccination of adolescents 11 through 18 years of age, and is preferred for people 2 through 55 who fall into certain risk categories (see **Table 1**). MPSV4 can be used if MCV4 is not available and for adults over 55.¹

Health disparities and vaccination gaps persist

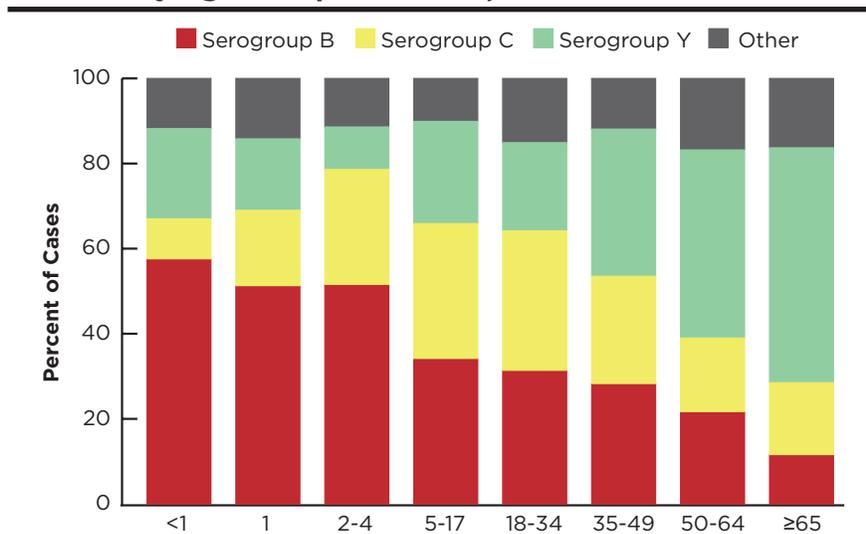
A major goal of numerous government and other programs is to overcome differences in health status, including immunization rate differences that occur by race or ethnicity, income, geographic location or other factors.⁷ While overall immunization rates, especially among children, have improved during the past 20 years, evidence suggests that race and ethnicity, socioeconomic status, age and geographic region continue to correlate with disparities.^{12,13} Unless specific and targeted strategies are employed now, meningococcal vaccination patterns can be expected to follow those of other vaccines and disparities will emerge.

The most recent National Immunization Survey (NIS) points to the persistence of certain immunization coverage gaps. **Figure 3** summarizes ethnic- and race-specific coverage rates for the routine vaccination series in children 19-35 months of age.¹⁴ Series coverage for black children is lower than for non-Hispanic white children. A report based on 2006 NIS data suggests that this disparity may be caused by differences in family income;¹⁵ in fact, data consistently show lower immunization rates for children living in poverty (**Table 2**).¹⁴ Another study using NIS data from 1995-2006 suggests that immunization coverage rates at 19 months differ, with Hispanic and non-Hispanic black children having estimated coverage rates that are significantly lower than white children.¹³

Immunization disparities also are more marked for older persons. Data show that older Hispanic and non-Hispanic black adults are less likely to be vaccinated against influenza and pneumococcal disease than their white counterparts.^{16,17} The first national survey to assess adolescent vaccination rates in the U.S. reveals that rates also are relatively low for all vaccines recommended for adolescents.⁶

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Figure 2: Serogroup Distribution of Meningococcal Disease by Age Group in the U.S., 1997-2007*



*Cases per 100,000 population; 2007 data are provisional. Source: CDC. 2007. Active Bacterial Core Surveillance data, 1997-2007.

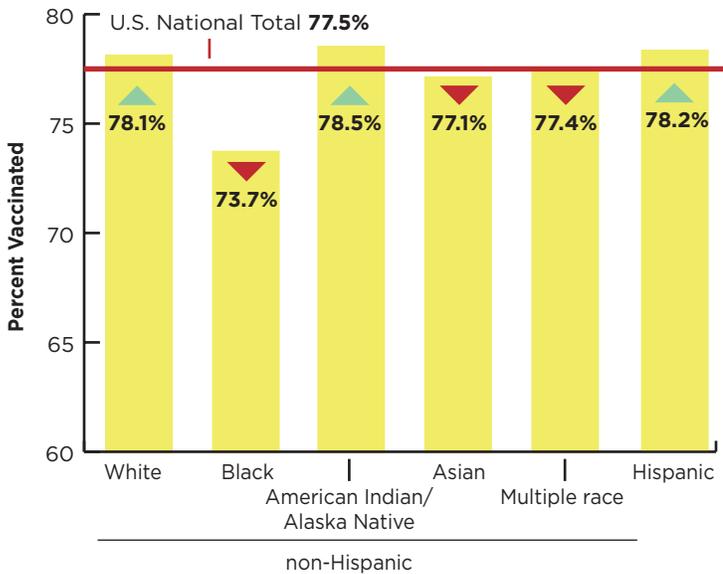
Table 2: Estimated General Vaccination Series* Coverage, U.S. Children 19-35 Months of Age by Poverty Level 2006-2007

U.S. National	77.5
At or Above Poverty	78.6
Below Poverty	74.4

*Series includes all age-appropriate doses of DTaP, poliovirus, MMR, Hib, HepB and Varicella vaccines. Source: U.S. National Immunization Survey, Q3/2006-Q2/2007.

Thus far there is little information pertaining to meningococcal disease, although data indicate disparities in incidence as well as low rates of coverage. For example, the incidence of meningococcal disease is higher in black persons (0.41/100,000) than in white persons (0.36/100,000),¹¹ which may in turn reflect socioeconomic or other differences. Moreover, as seen in Table 3, MCV4 coverage in all adolescents is very low.

Figure 3: **Estimated General Vaccine Series* Coverage, U.S. Children 19-35 Months of Age by Race/Ethnicity 2006-2007**



*Series includes all age-appropriate doses of DTaP, poliovirus, MMR, Hib, HepB and Varicella vaccines
Source: U.S. National Immunization Survey, Q3/2006-Q2/2007.

A broad approach is necessary to overcome immunization disparities

Strategies to increase immunization rates and reduce and eliminate immunization disparities must involve healthcare providers, federal, state and local policymakers, health systems, school/education systems and parents. To succeed, it is necessary to **identify the many factors that act as barriers to immunization**. This knowledge will be useful for addressing the needs of diverse populations.

The implementation of educational programs concerning meningococcal disease could have a major impact on the reduction and elimination of disparities. **Clinicians should educate themselves regarding the risks of meningococcal disease and the benefits of immunization**. Public health and medical organizations should share in this commitment and take steps to educate their members. Health care providers should also be aware of vaccination disparities. A recent survey sponsored by the National Foundation for Infectious Diseases (NFID) suggests less awareness of meningitis/meningococcal disease among black and Hispanic parents than white parents,

and underscores the need to educate these groups (see **Public Awareness Disparity Survey box**).¹⁸ The survey found once parents were made aware of the vaccine, the majority would have their child vaccinated, including 86 percent of Hispanic parents.¹⁸ Accordingly, **physicians should inform parents about the benefits of immunization and adopt culturally-sensitive practices**. Such practices may involve providing information to patients in multiple languages or engaging translators to overcome linguistic barriers. Parents should also be informed of available community-based services.

The task of ensuring equal access to vaccines for all adolescents is complicated because most adolescent patient visits are not for preventive care. CDC and many partner organizations recommend a comprehensive healthcare visit for children 11-12 years of age that includes necessary vaccinations.³ However, to reach as many adolescents as possible, **all medical visits should be used to assess immunization status and administer recommended vaccines. Standing orders with clear protocols for adolescent immunizations should be implemented in every office. Alternative sites like schools or pharmacies also can be used to maximize vaccination opportunities**.

Although they are less easily overcome by providers or patients, structural barriers to immunization must also be acknowledged and addressed.¹⁹ **Removing financial barriers is a positive step toward increasing vaccination rates**. The proportion of adolescents with private health insurance is declining.²⁰ Furthermore, minority populations are more likely to be uninsured or underinsured.²¹ Many of these adolescents, up to age 18, are eligible for the Vaccines for Children (VFC) program. VFC-approved vaccines (including for meningococcal disease) are distributed at no charge to registered VFC providers, who in turn make them available for free to eligible patients. Most U.S. pediatricians are now VFC-enrolled providers (along with private clinics, hospitals, public health clinics and schools). **Physicians should advise those who use the public sector about the benefits of vaccination and make sure that those who are eligible actually receive the vaccine**.

Table 3: **Estimated MCV4 Vaccination Coverage* Among Adolescents 13-17 Years of Age**

Age (yrs)					
13 n=551	14 n=627	15 n=609	16 n=609	17 n=551	13-17 n=2947
32.6%	31.6%	33.9%	31.0%	33.0%	32.4%

*Includes those receiving meningococcal conjugate (MCV4) or unspecified type of meningococcal vaccine.
Source: CDC. MMWR 2008;57(40):1101.

Meningococcal Disease Public Awareness Disparity Survey

Disparities in parents' awareness and knowledge of meningococcal disease may lead to disparities in vaccination rates. According to an NFID survey, there are significant disparities in awareness and knowledge about meningococcal disease among Caucasian, African-American and Hispanic parents of adolescents 11 to 21 years of age.

Most parents say they are aware of meningococcal disease/meningitis, but they have very little knowledge about the disease

- Caucasian and African-American parents are more likely to say they have heard of the disease (97% and 95%, respectively) than Hispanic (85%) parents, but
- Among those aware of meningococcal disease/meningitis, both Hispanic and African-American parents are less likely to name some common symptoms of meningococcal disease/meningitis

Parents Identifying Common Symptoms of Meningococcal Disease/Meningitis			
	Hispanic (n=254)	African-American (n=278)	Caucasian (n=294)
High fever	28%*	26%*	41%
Headache	13%*	11%*	27%
Stiff neck	3%*	7%*	21%
Don't know	56%*	56%*	40%

*P<0.05 vs. Caucasian parents.

- Hispanic and African-American parents are also less likely to name common consequences of meningococcal disease/meningitis

Parents Identifying Common Consequences of Meningococcal Disease/Meningitis			
	Hispanic (n=254)	African-American (n=278)	Caucasian (n=294)
Death	35%*	53%*	63%
Mental retardation	9%	1%*	8%
Don't know	51%*	41%*	30%

*P<0.05 vs. Caucasian parents.

Parents do not realize their children are at risk of getting meningococcal disease; half do not know it is preventable

- Parents who believe their child is at risk of getting meningococcal disease/meningitis: Caucasian (41%), African American (31%), Hispanic (27%)
- Parents who know meningococcal disease/meningitis is preventable: Caucasian (55%), African American (50%) and Hispanic (57%)

Once made aware of the vaccine, Hispanic parents are most likely to say they would seek vaccination

- More than 8 out of 10 (86%) Hispanic parents say they would have their child vaccinated, compared with 66% of African-American and 58% of Caucasian parents

Hispanic parents say they have regular access to medical care, but many do not realize they can access meningococcal vaccine through these sources

- Nearly 40% of Hispanic parents who have not had their kids vaccinated against meningococcal disease (versus 18% of Caucasian and 15% of African-American parents) cite a lack of access to such vaccines as a reason for not doing so
- Most Hispanic parents also said their children have access to care where meningococcal vaccines should be available routinely: family physician (77% have access to this medical service), health clinic (85%), hospital emergency department (82%)

Telephone interviews were conducted in March, 2008 by GfK/Roper with 902 parents of adolescents 11 to 21 years of age and included equal representation of Caucasian (n=302), African-American (n=300) and Hispanic (n=300) parents. Survey data were weighted to ensure accurate representation of U.S. adult population.

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Supporting Organizations

The following organizations agree that immunization rates for meningococcal disease need to be improved to reduce the impact of this disease and overcome possible disparities between racial, ethnic, and socioeconomic groups:

- American Academy of Family Physicians
- American Academy of Pediatrics
- American Academy of Physician Assistants
- American College Health Association
- American College of Physicians
- American Medical Association
- American Nurses Association
- Asian & Pacific Islander American Health Forum
- National Asian Women's Health Organization
- National Association of County & City Health Officials
- National Association of School Nurses
- National Foundation for Infectious Diseases
- National Hispanic Medical Association
- National Medical Association
- National Meningitis Association
- Society for Adolescent Medicine

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About the National Foundation for Infectious Diseases

The National Foundation for Infectious Diseases is a non-profit, tax-exempt (501c3) organization founded in 1973 and dedicated to educating the public and healthcare professionals about the causes, treatment, and prevention of infectious diseases.

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