CD Summary

August 9, 2005
Vol. 54, No. 16

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AN EPIDEMIOLOGY PUBLICATION OF THE OREGON DEPARTMENT OF HUMAN SERVICES

MENINGOCOCCAL VACCINATION: NEW ACIP RECOMMENDATIONS

MENINGOCOCCAL DISEASE elicits fear in many people because, while rare, it has serious morbidity and a high case-fatality rate; approximately 10% of persons with invasive meningococcal disease die, and 11–19% of survivors have significant morbidity, such as limb loss or neurologic sequelae.[1] Meningococcal disease is caused by *Neisseria meningitidis,* which comes in 13 serogroups, five of which (A, B, C, Y, and W-135) cause the vast majority of meningococcal disease worldwide. The January 2005 licensing of the new quadrivalent meningococcal conjugate vaccine, Menactra™ (MCV4), which covers serogroups A, C, Y, and W-135, has generated excitement among those striving to prevent this dread disease. Menactra™ is licensed for use in persons 11–55 years old.

In March 2005, the national Advisory Committee on Immunization Practices (ACIP) published new recommendations for the prevention and control of meningococcal disease; they feature significant changes, including immunization of teens with the new vaccine.[1] This *CD Summary* reviews the epidemiology of meningococcal disease; compares MCV4 with Menomune,® the quadrivalent meningococcal polysaccharide vaccine (MPSV4); summarizes the new ACIP recommendations; and examines the potential impact of the new vaccine's use in Oregon.

EPIDEMIOLOGY

In Oregon, the incidence of meningococcal disease has declined steadily since its peak of 136 cases in 1994 (see figure). During the past five years, 44 to 70 cases have occurred each year in Oregon. Despite the decline, Oregon continues to have a higher meningococcal incidence rate (1.7/100,000) than the U.S. as a whole (0.6/100,000).

Distribution of *N. meningitidis* serogroups varies by geographic region across the U.S. Serogroup B accounts for 75% of meningococcal infections in Oregon but just 42% of cases in the U.S. (figure, *verso*). While the incidence rate is higher in Oregon than in the United States across serogroups, Oregon's incidence of serogroup B disease is the highest, at 4.8 times the rate for the United States (see table; data on serogroups A and W-135 are not included because they are rare in the U.S.).

Incidence* of Meningococcal Disease by Serogroup

Serogroup	Oregon 2000–2004	U.S 2003
B	1.15	0.24
C	0.21	0.14
Y	0.23	0.11

* per 100,000 population, source: CDC's ABCs surveillance data

Meningococcal disease rates are highest in children <1 year old in both Oregon (24.8 cases/100,000) and the U.S. (9.2/100,000).[2] Nonetheless, nationwide, 62% of all meningococcal cases occur among persons 11 years of age and older.[1] Teens have the highest case-fatality rate (approximately 20%) of any age group; this has been attributed to adolescents' increased likelihood of presenting with meningococcemia and shock.[2]

COLLEGE STUDENTS

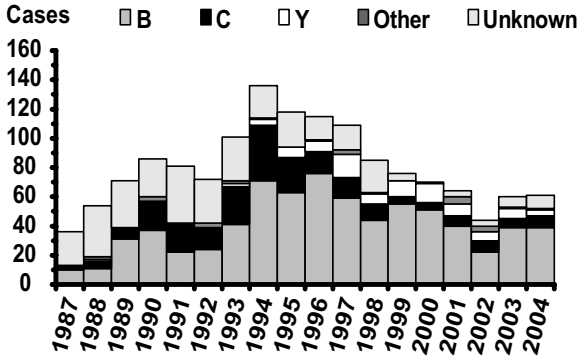
National studies suggest that college students who live in dormitories have a moderately elevated risk of meningococcal disease compared to their non-college peers.[3] Of the 1,039 meningococcal cases that occurred in Oregon from 1993–2004, 10 (<1%) occurred in four-year college students (0.7/100,000 students per year). Of these cases, six were serogroup B and four were serogroup C; the single death was due to serogroup B. Thus, four cases (but not the death) were potentially preventable by vaccination.

MCV4 AND MPSV4

Both vaccines protect against against serogroups A, C, Y, and W-135. MPSV4 was first licensed in the U.S. in 1981 for use among persons ⩾2 years of age.[4] MPSV4 is a quadrivalent *polysaccharide* vaccine with limited long-term efficacy; studies show that antibody levels decrease markedly three years after immunization. Furthermore, the vaccine is less efficacious in children <2 years of age—the group with the highest incidence.[4]

MCV4, on the other hand, is a *conjugate* vaccine. Unlike MPSV4, MCV4 simulates a T-cell-dependent immune response (including in infants), and a strong anamnestic response follows re-exposure. No data are available for the efficacy of MCV4; it was licensed on the strength of its immunogenicity. Trials in 2–10-year-old U.S. children, as well as healthy adults 18–55 years old, demonstrate acceptable safety and immunogenicity in both groups.[5,6] In children, functional antibody titers were significantly higher for the conjugate (MCV4) than for the polysaccharide vaccine (MPSV4) at 28 days and six months, with similar side effects.

Meningoccal Disease, Oregon 1987–2004



The **CD Summary** (ISSN 0744-7035) is published biweekly, free of charge, by the Oregon Dept. of Human Services, Office of Communicable Disease and Epidemiology, 800 NE Oregon St., Portland, OR 97232
Periodicals postage paid at Portland, Oregon.
Postmaster—send address changes to:
CD Summary, 800 NE Oregon St., Suite 730, Portland, OR 97232

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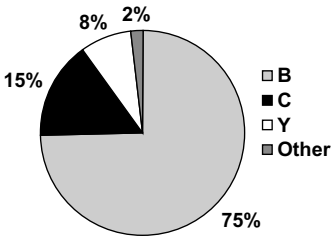
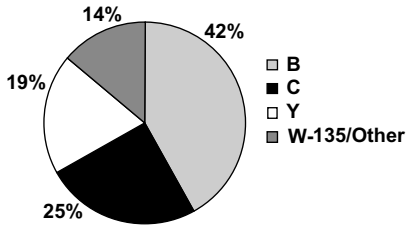
Meningococcal Serogroup Distribution, Oregon, 2004



Source: Oregon DHS

Meningococcal Serogroup Distribution, United States, 2003



Source: CDC ABCs program

ACIP RECOMMENDATIONS

The 2000 ACIP guidelines recommended meningococcal polysaccharide vaccine for specific high-risk groups: 1) persons who travel to or reside in countries in which *N. meningitidis* is hyperendemic or epidemic,* and 2) persons with terminal complement component deficiencies or asplenia. College freshmen, especially those living in dormitories, were to be educated about their risk of meningococcal disease so that they could make an informed decision about vaccination.[3]

With the advent of MCV4, ACIP expanded these recommendations to include 1) young teens (11–12 years old) at the pre-adolescent well-child visit; or 2) teens before high school entry for those not already vaccinated; and 3) entering college students who plan to live in dormitories.[2] By 2008, when supply of the vaccine is expected to be sufficient, the goal is routine vaccination with MCV4 of all adolescents beginning at age 11 years. Finally, ACIP also recommends vaccination for microbiologists potentially exposed to *N. meningitidis*.[1] ACIP also suggests that revaccination might be indicated for persons at increased risk for meningococcal disease and who were previously vaccinated with MPSV4.[1] Data that will guide these recommendations are expected within the next five years.

* For more information, see *http://www2.ncid.cdc.gov/travel/yb/utils/ybGet.asp?section=dis&obj=menin.htm*

COST EFFECTIVENESS

Results of a 2005 cohort simulation model showed that over a 22-year period, 270 cases of meningococcal disease and 36 deaths would be prevented in the U.S. by routine vaccination of all 11-year-old children with the new conjugate vaccine.[7] Routine adolescent vaccination would reduce direct disease costs by $18 million and productivity losses by $50 million. But the vaccine is going to cost somewhere around $80 per dose, and you have to vaccinate a lot of people to prevent a single case; so that even after reaping these savings, we will still end up spending an estimated $633,000 per case prevented.

Oregon's rates of meningococcal disease caused by vaccine serogroups are actually higher than national rates, so the vaccine will be as useful here as it is in the rest of the country. But like MPSV4, MCV4 does not protect against serogroup B disease, which predominates here; so it will not prevent most of the meningococcal disease that we encounter in Oregon.

SUMMARY

The new conjugate vaccine is expensive and will not prevent the vast majority of meningococcal disease cases and deaths in Oregon, given the preponderance of serogroup B disease and the current restriction of the new vaccine to individuals 11–55 years of age. Persons wanting to reduce their risk for meningococcal disease should consider receiving this safe and immunogenic vaccine.

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