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OREGON PUBLIC HEALTH DIVISION • OREGON HEALTH AUTHORITY

MENINGOCOCCAL DISEASE: OREGON UPDATE

Meningococcal disease is a severe acute infection caused by the Gram-negative diplococcus *Neisseria meningitidis*. The most common presentations of invasive meningococcal disease (IMD) are meningitis and bacteremia; less commonly seen are pneumonia, arthritis, otitis media, and epiglottitis. In the United States, 1,000–3,000 cases of IMD are reported each year (0.4–1.3 cases per 100,000 population).[1] In 2009, an estimated 80 persons died of meningococcal disease in the U.S.[2]

In this issue of the *CD Summary*, we review the epidemiology of meningococcal disease in Oregon and updated vaccination recommendations from the Advisory Committee on Immunization Practices (ACIP).

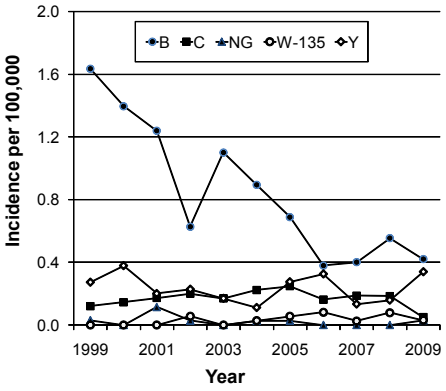
MENING IN OREGON

IMD is defined as the isolation of *N. meningitidis* from a normally sterile body site (e.g., blood or cerebrospinal fluid) in a resident of Oregon. Cases of IMD are monitored by the Oregon Public Health Division's Active Bacterial Core surveillance (ABCs) program, which conducts active, laboratory-based surveillance for invasive disease due to six pathogens, including *N. meningitidis*.

In 2009, 36 cases of IMD were reported in Oregon, corresponding to an incidence rate of 0.94 per 100,000 persons. This is lower than the average annual incidence rate in Oregon during 2004–2008 (1.1/100,000) and continues the general trend of decreasing incidence seen since 1994. Still, IMD incidence in Oregon was more than three times the most recent national estimate (0.28/100,000), although we did manage to meet the Healthy People 2010 goal for IMD (1.0/100,000).[2]

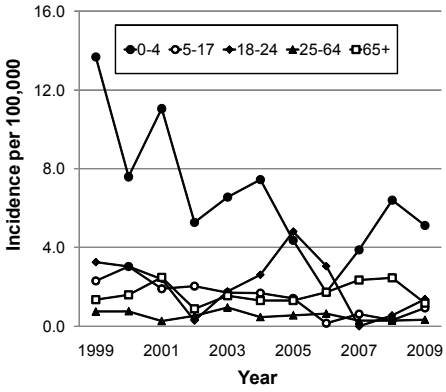
Oregon's highest recorded rate of meningococcal disease — 3.4/100,000 in 1994 —was driven by a clonal epidemic of serogroup B disease that probably arrived around 1993.[3] The incidence of serogroup B IMD has since then declined steadily, but B remains the most commonly identified serogroup in Oregon (Figure 1), accounting for about half of our cases in recent years.

Figure 1. Meningococcal disease in Oregon by serogroup, 1999–2009



The burden of IMD is typically highest in those 0–4 years of age with a second, lower peak in incidence in young adults. Incidence of IMD in different age groups over time is shown in Figure 2.

Figure 2. Meningococcal disease in Oregon by age, 1999–2009



The case-fatality rate (CFR) for IMD in Oregon during 2004–2009 was 7%, yielding a cause-specific mortality of 0.1 per 100,000 population. Two Oregonians — a toddler and a woman in her 80s — died from IMD during 2009.Since 1995, the case-fatality rate has been highest (21%) among those ≥65 years of age and lowest (3%) among children 1–10 years of age. About 6% of cases among the remaining age groups (infants, 11–19, 20–64) have been fatal.

During 1999–2009, 14 cases of meningococcal disease were reported among college students residing in Oregon. Four of the cases were freshmen living in dormitories — a group for whom vaccination with quadrivalent meningococcal conjugate vaccine has been recommended. Of these four cases, two were serogroup B, one serogroup C, and one nongroupable; hence, only one of the cases — that caused by serogroup C — was theoretically preventable by vaccination. Six of the remaining ten cases among college students were also serogroup B.

Although the serogroup profile of cases reported in 2009 was not significantly different than that for cases reported during the previous five years, a decreasing trend in the proportion of cases due to serogroup B and an increasing trend in the proportion of cases due to serogroups W-135 and Y have been observed.

Serogroup profiles differ by age group. Although serogroup B disease continues to decrease, it is the serogroup identified most commonly among all age groups <65 years of age; among those ≥65 years of age, serogroup Y has been most common.

As is typical, the top two clinical syndromes of IMD in 2009 were meningitis and "primary bacteremia" (i.e., no focus of infection identified), each noted in 39% of cases. The clinical presentation of IMD varies by age. During 2004–2009, meningitis was most common among all age groups, with the exception of those ≥65 years, among whom pneumonia was most common.

VACCINATION UPDATES AND RECOMMENDATIONS

ACIP recommends routine vaccination with quadrivalent* meningococcal conjugate vaccine (Menactra®, licensed in 2005; or Menveo®, licensed in Febru-

* Contains antigens from serogroups A, C, Y, and W-135

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ary 2010) for all persons 11–18 years of age.[4] Uptake of meningococcal vaccination among adolescents has increased slowly since the 2005 ACIP recommendation.[5] According to the most recent National Immunization Survey – Teen, meningococcal vaccine coverage among Oregon adolescents aged 13–17 years was 41.5 percent in 2009, up from 29.6 percent in 2008.[6]

Meningococcal vaccine is also recommended for persons 2–55 years of age who are at increased risk for the disease.[4] The conjugate vaccines are preferred to the quadrivalent meningococcal *polysaccharide* vaccine (MPSV4) in persons 11–55 years of age. High-risk persons 2–10 years of age should receive Menactra® (Table).

Neither of the two meningococcal conjugate vaccines are approved for use in persons >55 years of age; high-risk persons >55 years old may receive MPSV4.

None of these quadrivalent vaccines protect against serogroup B disease.

In a 6–5 vote on October 27, ACIP recommended that a booster dose of meningococcal conjugate vaccine be given to adolescents five years after their first dose to boost potentially waning immunity.[7] The vaccine is expensive: roughly $100/dose. Even with the optimistic assumption that the vaccine would retain an undiminished 93% effectiveness for 5 years after vaccination, CDC estimated that two doses of the conjugate vaccine in adolescents would cost society $157,000 per quality-adjusted life year (QALY) saved. The cost to the actual payers per QALY saved would be much higher.

Table. Recommendations for meningococcal vaccination

Age (years)	Target Population	Primary Series	Booster**	Vaccine
2–10	Persons with high-risk medical conditions* Travelers†	2 doses‡	3–5 years§	Menactra® only
11–18	Persons with high-risk medical conditions* All others in this age group	2 doses‡ 1 dose	5 years	Either conjugate vaccine
19–55	College freshman living in dormitories Military recruits	1 dose	none	
	Persons with high-risk medical conditions* Travelers† Microbiologists routinely exposed to meningococcus	2 doses‡ 1 dose	5 years	
>55	Persons with high-risk medical conditions* Travelers† Microbiologists routinely exposed to meningococcus	1 dose	none	MPSV4

*persistent complement component deficiencies, anatomic or functional asplenia, or HIV infection.
†Persons who travel to or reside in countries where meningococcal disease is hyperendemic or endemic including visitors to Mecca for the annual Hajj
‡given 2 months apart
**if person remains at increased risk
§3 years if primary series given at 2–6 years of age; otherwise 5 years

FOR MORE INFORMATION

- Oregon ABCs program, 971-673-1111; *www.oregon.gov/DHS/ph/acd/abc.shtml*
- CDC immunization schedules 2010; *www.cdc.gov/vaccines/recs/schedules/default.htm*
- Oregon Public Health Division meningococcal disease investigative guidelines; *www.oregon.gov/DHS/ph/acd/reporting/guideln/mening.pdf*
- Oregon Immunization ALERT; *www.immalert.org/new/*

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