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## Meningococcal Disease in Alaska: Recent Changes in Circulating Serogroups

### Background

*Neisseria meningitidis* (Nm) is a gram-negative diplococci that is carried asymptomatically in the nasopharynx of 5–10% of adults.<sup>1</sup> In fewer than 1% of colonized persons, Nm becomes “invasive” by penetrating the mucosal cells and entering the bloodstream. In the United States, the rate of invasive Nm is approximately 0.5 cases per 100,000 population. In about 50% of bacteremic persons, Nm crosses the blood–brain barrier into the cerebrospinal fluid and causes purulent meningitis.<sup>1</sup> Cases of invasive Nm are associated with severe outcomes including neurologic deficits, major limb loss, and death.<sup>1</sup> Serogroups B, C, and Y cause the majority of disease nationally. Until 2013, most meningococcal disease in Alaska was caused by serogroup B (Figure).

Two quadrivalent meningococcal conjugate vaccines containing serogroups A, C, Y, and W (MenACWY or MCV4) are currently licensed in the United States. The Advisory Committee on Immunization Practices (ACIP) recommends routine vaccination of adolescents aged 11 through 18 years with one dose given ideally at age 11 or 12 years, and a booster dose at age 16 years for persons who received their first dose before age 16 years.<sup>2</sup> Two serogroup B meningococcal (MenB) vaccines are newly licensed; the ACIP currently recommends these vaccines for persons who are at increased risk for serogroup B meningococcal disease.<sup>3</sup> These vaccines may also be given to anyone aged 16 through 23 years to provide short-term protection against most strains of serogroup B meningococcal disease.

Every invasive Nm case constitutes a public health emergency because close contacts may become infected and rapidly develop invasive disease. The Section of Epidemiology (SOE) investigates all suspected cases to identify close contacts and assure that appropriate control measures (e.g., surveillance, chemoprophylaxis) are promptly implemented. This *Bulletin* describes changes in serogroup predominance over the past 10 years and recent case investigations of interest in Alaska.

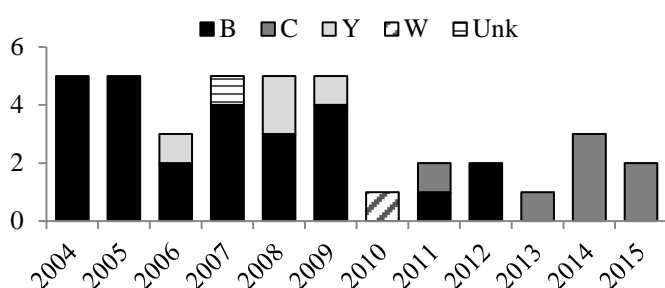
### Methods

Case investigation data were obtained from SOE’s AK-STARS reportable conditions database. Serogroup testing and whole genome sequencing (WGS; i.e., genetic characterization) were performed by the Centers for Disease Control and Prevention’s Arctic Investigations Program (CDC-AIP) and CDC-Atlanta, respectively.

### Results

From January 2004 through September 2015, SOE recorded 39 cases of invasive Nm, three of which occurred in out-of-state residents who became ill while working in or visiting Alaska. During 2004–2012, the predominant serogroup was B; since 2013, all six cases were serogroup C (Figure).

**Figure. Meningococcal Infections by Serogroup and Year of Diagnosis — Alaska, Jan 2004 through Sept 2015**



Note: Two 2005 cases and one 2013 case were diagnosed in out-of-state residents, so were not considered Alaska cases.

Four of the six serogroup C isolates identified since 2013 were genetically related. All four of the genetically related types were in Alaska residents, however, no epidemiologic link was identified among the infected patients.

### Features of Selected Serogroup C Nm Case Investigations

- In 2011, a case occurred in an unvaccinated 13-year-old that prompted 41 contacts to receive prophylaxis. This case was potentially vaccine-preventable.
- In 2014, a case occurred in an unvaccinated boyfriend of a college student who lived near campus, underscoring the importance of vaccinating college students.
- In 2015, a case in a homeless person presented challenges in delivering prophylaxis to close contacts without readily available and reliable locating information.

### Discussion

Prior to 2013, Alaska experienced mostly serogroup B Nm disease. Since then, all cases were serogroup C, and four of the cases were caused by a single Nm clone. To our knowledge, a similar serogroup shift has not been seen elsewhere in the U.S. Performing WGS on Nm isolates is not yet a routine practice; therefore, national comparison data are limited. As WGS becomes more widespread, the importance of the Alaska clone may become more apparent. To date, this clone has not been detected in other outbreaks.

Invasive meningococcal disease is frequently severe and case investigations are generally complicated and resource intensive. Fortunately, safe and effective Nm vaccines are available. MenACWY vaccine is available as a state-supplied vaccine for persons through age 20 years (to increase availability for college freshmen). State-supplied MenB vaccine will become available in the Fall of 2015 for use in high-risk persons.<sup>3</sup>

### Recommendations

1. Nm is a public health emergency. As such, all suspected and confirmed cases must be *immediately* report to SOE by phone (907-269-8000, or 1-800-478-0084 after hours).
2. Close contacts of an Nm patient during the 7 days before symptom onset should receive antibiotic prophylaxis as soon as possible, ideally <24 hours after identification of the index patient. Prophylaxis administered >14 days after onset of illness is probably of limited or no value. Recommendations for prophylaxis are available online.<sup>1</sup>
3. All children aged 11 through 18 years should be routinely vaccinated with MenACWY; young adults entering college need a dose of MenACWY within 5 years prior to matriculation; high-risk children and adults should receive MenACWY and MenB vaccine.<sup>3</sup>
4. Submit sterile site Nm isolates to CDC-AIP. Consult with SOE regarding molecular testing for culture-negative specimens obtained after antibiotic administration.
5. Nm can be found in a patient’s sputum. Unless the patient also has evidence of severe illness or lab confirmation of an accompanying invasive infection, the finding is not reportable and does not generally warrant prophylaxis.

### References

1. CDC. Manual of Surveillance for Vaccine Preventable Diseases. Chapter 8. Meningococcal Disease. (last updated April 2014). Available at: <http://www.cdc.gov/vaccines/pubs/surv-manual/chpt08-mening.html>
2. CDC. Prevention and control of meningococcal disease: recommendations of the ACIP. *MMWR* 2013;62(RR02):1-22. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6202a1.htm>
3. CDC. Use of serogroup B meningococcal vaccines in persons aged ≥10 years at increased risk for serogroup B meningococcal disease. *MMWR* 2015;64(22):608-12. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6422a3.htm>