

## OREGON PUBLIC HEALTH DIVISION • DEPARTMENT OF HUMAN SERVICES

### KNOWING YOUR ABCs: SPOTLIGHT ON OREGON'S ACTIVE BACTERIAL CORE SURVEILLANCE PROGRAM

Oregon's Active Bacterial Core surveillance (ABCs) program, one of ten funded by CDC, conducts active, laboratory-based surveillance for invasive\* disease due to six pathogens: *Neisseria meningitidis*, *Haemophilus influenzae*, *Streptococcus pneumoniae*, group A (GAS) and group B (GBS) streptococci, and methicillin-resistant *Staphylococcus aureus* (MRSA). Because *N. meningitidis* and *H. influenzae* infections are reportable in Oregon, we include cases from the entire state. Infections caused by the remaining organisms are included if identified in one of seven laboratories serving 14 health care facilities in the Tri-County Portland Metropolitan Area.

Through this national network, CDC can answer questions like "What are the most common causes of meningitis in children?" and "Have the recent national guidelines helped eliminate early-onset GBS?" The goal of this report is to describe the highlights of our 2006 surveillance for the five non-MRSA organisms in Oregon. But don't worry—we'll be discussing MRSA in our next issue.

#### THE BIG PICTURE

With one notable exception, the highest morbidity from each of these organisms occurs at either end of the age spectrum, with nadirs of occurrence among those 18–64 years of age (Figure 1). Over half (56%) of infections from any of these organisms in those less than one year of age were bacteremia. In the first three months of life, 11 of 14 bacteremias were GBS, while the sole cause of bacteremia in those 4–12 months of age was *S. pneumoniae*. Among those 5–17 years of age, the predominant clinical manifestation shifts to meningitis (29%), although the presenting syndromes

are more diverse; pneumonia predominates (53%) among those ≥65 years of age. Although the rates of invasive infection by these organisms change through the lifetime, *S. pneumoniae* is the most common cause of invasive infection beyond infancy. The case fatality for GAS is highest (17%), followed by *S. pneumoniae* (14%), *N. meningitidis* (14%), *H. influenzae* (14%), and GBS (5%).

GBS disease in Oregon was 0.9 / 1,000 live births. In 2006, four years after the guidelines were updated to recommend universal screening of pregnant women, early-onset GBS disease incidence had decreased 68% to 0.3 / 1,000 live births.<sup>1</sup>

The incidence of invasive meningococcal disease (IMD) has also been trending downward since its ABCs peak of 3.4 per 100,000 in 1996 to its

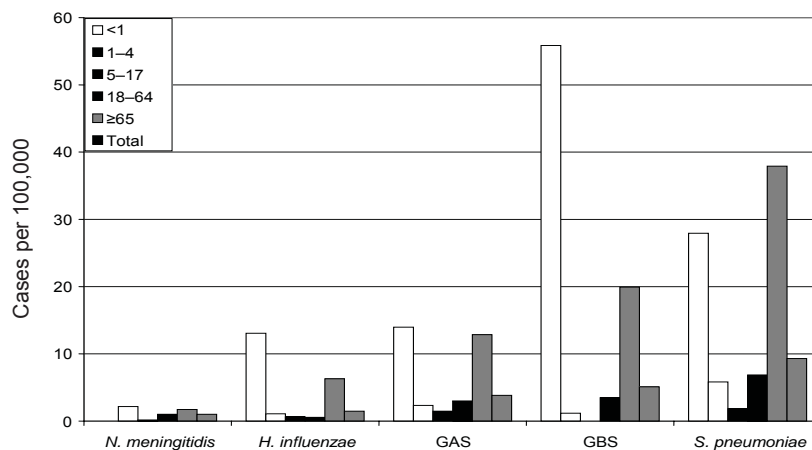


Figure 1. Incidence of invasive diseases under ABCs surveillance by pathogen and age.

#### GOOD NEWS

Rates of infection by at least two of the ABCs pathogens reflect striking successes for immunization. Invasive infection by *H. influenzae* type b (Hib), once the major cause of meningitis among infants and toddlers, has been reduced to a rarity. In 2006, zero cases of Hib were reported among immunized children less than five years of age. Of the 7 cases of invasive *H. influenzae* infection reported in this age group, 5 were non-typeable, and 2 were non-type b.

In 1996, just as the first national prevention guidelines were issued and in our first year of ABCs surveillance, the incidence of early-onset

current historical low: the 37 cases reported in Oregon during 2006 yielded an incidence of 1.0 per 100,000. The overall decrease seems to be due to reductions in serogroup B disease—from 72% of all cases in 2001 to 41% of cases in 2006 ( $p=0.0008$ ). (For those of you who have not been avidly following the epidemiology of meningococcal disease in Oregon for the past decade, a clonal strain of serogroup B has been predominant in Oregon, although it is quite rare elsewhere in the U.S.) Routine immunization of all adolescents ≥11 years of age with the tetravalent meningococcal conjugate vaccine (MCV4), which does not include serogroup B, will thus prevent a greater proportion of Oregon IMD cases in the future.<sup>2</sup>

\* Invasive disease is defined as isolation of the bacterium from a normally sterile body site; most often these come from blood, but isolates from cerebrospinal fluid, pleural fluid, joint aspirations, etc., also qualify.



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Perhaps most remarkable has been the 55% decrease in invasive pneumococcal disease (IPD) — from 21.0/100,000 in 1998 to 9.4/100,000 in 2006—driven by the 7-valent pneumococcal conjugate vaccine (PCV7). In 1999, 39 (81%) of 48 IPD cases among children less than five years of age were due to PCV7 serotypes; in 2006, for the first time, none of the isolates from cases in this age group were PCV7 types. Even better, it turns out that diminished carriage of pneumococci among the kids is being reflected in lower disease incidence among adults, particularly those over the age of 65, for whom the incidence of IPD due to PCV7 types has decreased from 31/100,000 in 1998–1999 to 4.5/100,000 in 2006.

### BAD NEWS

Amidst the overall downward trends, you may have noticed the 38% increase in incidence of IPD among those  $\geq 80$  years of age from 2005 to 2006 (Figure 2). This increase raises

the specter of “replacement” disease — i.e., non-PCV7 serotypes taking the place of PCV-7 serotypes in the nasopharynges of vaccinated individuals, subsequently increasing transmission. Among those 80 and older, IPD caused by serotypes related to, but not actually those included in PCV7, increased from 6.5/100,000 in 2005 to 10.3/100,000 in 2006. While replacement disease has not yet been seen in other age groups in Oregon, these data, along with reports of replacement disease in children in Alaska and HIV-infected adults, require continued vigilant surveillance.<sup>3,4</sup>

### MORE NEWS

If you find yourself merely teased by the information in this issue, rest assured that it is a mere fraction of that available. Resources that provide more detailed information on the above organisms to health care providers, public health professionals, and other interested individuals are listed below.

### RESOURCES

- **Oregon ABCs Program.** The Monthly Surveillance Summary provides monthly and year-to-date incidence rates with comparisons to the previous 10-year averages. The Yearly Surveillance Report provides detailed analyses of demographic and clinical information and enhanced laboratory characterization of isolates. See [www.oregon.gov/DHS/ph/acd/abc.shtml](http://www.oregon.gov/DHS/ph/acd/abc.shtml)
- **Centers for Disease Control and Prevention ABCs Program.** Overview of Program objectives, methodology, and data collection protocols; list of CDC participants and surveillance areas; information on the ABCs isolate bank for researchers; and reports, publications, and national surveillance reports. See [www.cdc.gov/ncidod/dbmd/abcs](http://www.cdc.gov/ncidod/dbmd/abcs).
- **Oregon ABCs Surveillance Officer.** Contact Mark Schmidt for more information; [mark.schmidt@state.or.us](mailto:mark.schmidt@state.or.us), 971-673-1111.

### REFERENCES

1. CDC. Prevention of perinatal group B streptococcal disease. MMWR 2002; 51(RR-11).
2. CDC. Prevention and control of meningococcal disease: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2005; 54(RR-7).
3. Singleton RJ, Hennessy TW, Bulkow LR, et al. Invasive pneumococcal disease caused by nonvaccine serotypes among Alaska Native children with high levels of 7-valent pneumococcal conjugate vaccine coverage. JAMA 2007; 297:1784–92.
4. Flannery B, Heffernan RT, Harrison LH, Ray SM, et al. Changes in invasive pneumococcal disease among HIV-infected adults living in the era of childhood pneumococcal immunization. Ann Intern Med 2006;144:1–9.

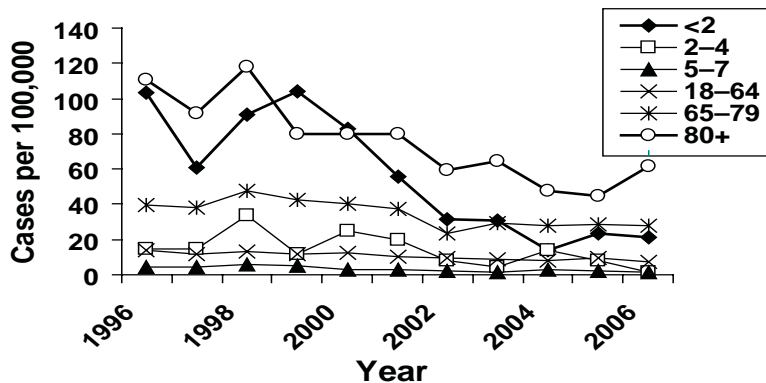


Figure 2. Invasive pneumococcal disease by age group, Portland tri-county area, 1996–2006.